Please check our wiki for help on navigating the form.

Horizon 2020

Call: H2020-LC-SC3-2018-2019-2020

(BUILDING A LOW-CARBON, CLIMATE RESILIENT FUTURE: SECURE, CLEAN AND EFFICIENT ENERGY)

Topic: LC-SC3-ES-3-2018-2020

Type of action: IA

Proposal number: SEP-210490769

Proposal acronym: RENAISSANCE

Deadline Id: H2020-LC-SC3-2018-ES-SCC

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How to fill in the forms

The administrative forms must be filled in for each proposal using the templates available in the submission system. Some data fields in the administrative forms are pre-filled based on the steps in the submission wizard.

1 - General information

Topic	LC-SC3-ES-3-2018-2020	Type of Action	IA
Call Identifier	H2020-LC-SC3-2018-2019-2020	Deadline Id	H2020-LC-SC3-2018-ES-SCC

Acronym	RENAISSANCE
Proposal title	RENewAble Integration and SuStainAbility iN energy CommunitiEs

Note that for technical reasons, the following characters are not accepted in the Proposal Title and will be removed: < > " &

Duration in months	*36*
Fixed keyword 1	Energy systems (production, distribution, application)
Free keywords	*smart energy communities, smart contracts, decentralisation, interoperable, replicable, global*

Abstract

Leading smart grid solution providers and research groups join forces to integrate a range of consumer-focused innovations into existing service platforms. The project will support Industry leaders ABB (analytical and design tools) and ATOS (energy management platform) deliver services with clear market focus, that are widely replicable across Europe. The suite of tools will be demonstrated in real-life pilots in Belgium, Greece, France and the Netherlands. RENAISSANCE aims to demonstrate highly replicable design and management approaches for integrated local energy systems, that achieve high participation of local consumers (15-20%), exceed at local level EU targets for renewable energy sources (37-80%) while decreasing the energy price for community members (5-10% below current market prices). The methodology and each of the pilots will cover key energy vectors (electricity, heat, transport), involve different actors (households, SMEs, institutions), and valorises flexibility services within and between communities, and with DSOs. In total, over 1.000 households and 50 companies will be connected in a system that totals 30752MW capacity. Main innovations include; multi-actor multi-criteria of technical design, geo-locations , interoperable management platform. To demonstrate replicability and open the role to market, the approach will be applied to 10 more locations across the globe - including in India, the US, the UK and Poland.

Remaining characters 541

Has this proposal (or a very similar one) been submitted in the past 2 years in response to a call for proposals under Horizon 2020 or any other EU programme(s)? ○ Yes ◉ No

Please give the proposal reference or contract number.
xxxxxx-x

Declarations

1) The coordinator declares to have the explicit consent of all applicants on their participation and on the content of this proposal.	☒
2) The information contained in this proposal is correct and complete.	☒
3) This proposal complies with ethical principles (including the highest standards of research integrity — as set out, for instance, in the European Code of Conduct for Research Integrity — and including, in particular, avoiding fabrication, falsification, plagiarism or other research misconduct).	☒

4) The coordinator confirms:

- to have carried out the self-check of the financial capacity of the organisation on http://ec.europa.eu/research/participants/portal/desktop/en/organisations/lfv.html or to be covered by a financial viability check in an EU project for the last closed financial year. Where the result was "weak" or "insufficient", the coordinator confirms being aware of the measures that may be imposed in accordance with the H2020 Grants Manual (Chapter on Financial capacity check); or	○
- is exempt from the financial capacity check being a public body including international organisations, higher or secondary education establishment or a legal entity, whose viability is guaranteed by a Member State or associated country, as defined in the H2020 Grants Manual (Chapter on Financial capacity check); or	◉
- as sole participant in the proposal is exempt from the financial capacity check.	○

5) The coordinator hereby declares that each applicant has confirmed:

- they are fully eligible in accordance with the criteria set out in the specific call for proposals; and	☒
- they have the financial and operational capacity to carry out the proposed action.	☒
The coordinator is only responsible for the correctness of the information relating to his/her own organisation. Each applicant remains responsible for the correctness of the information related to him and declared above. Where the proposal to be retained for EU funding, the coordinator and each beneficiary applicant will be required to present a formal declaration in this respect.	

According to Article 131 of the Financial Regulation of 25 October 2012 on the financial rules applicable to the general budget of the Union (Official Journal L 298 of 26.10.2012, p. 1) and Article 145 of its Rules of Application (Official Journal L 362, 31.12.2012, p.1) applicants found guilty of misrepresentation may be subject to administrative and financial penalties under certain conditions.

Personal data protection

The assessment of your grant application will involve the collection and processing of personal data (such as your name, address and CV), which will be performed pursuant to Regulation (EC) No 45/2001 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data. Unless indicated otherwise, your replies to the questions in this form and any personal data requested are required to assess your grant application in accordance with the specifications of the call for proposals and will be processed solely for that purpose. Details concerning the purposes and means of the processing of your personal data as well as information on how to exercise your rights are available in the privacy statement. Applicants may lodge a complaint about the processing of their personal data with the European Data Protection Supervisor at any time.

Your personal data may be registered in the Early Detection and Exclusion system of the European Commission (EDES), the new system established by the Commission to reinforce the protection of the Union's financial interests and to ensure sound financial management, in accordance with the provisions of articles 105a and 108 of the revised EU Financial Regulation (FR) (Regulation (EU, EURATOM) 2015/1929 of the European Parliament and of the Council of 28 October 2015 amending Regulation (EU, EURATOM) No 966/2012) and articles 143 - 144 of the corresponding Rules of Application (RAP) (COMMISSION DELEGATED REGULATION (EU) 2015/2462 of 30 October 2015 amending Delegated Regulation (EU) No 1268/2012) for more information see the Privacy statement for the EDES Database.

2 - Participants & contacts

#	Participant Legal Name	Country	Action
1	VRIJE UNIVERSITEIT BRUSSEL	BE	
2	IKERLAN S COOP	ES	
3	ATOS SPAIN SA	ES	
4	DEEP BLUE SRL	IT	
5	SMARTWALL	FR	
6	SOREA SOCIETE DES REGIES DE L'ARC	FR	
7	FUNDACION CIRCE CENTRO DE INVESTIGACION DE RECURSOS Y CONSUMOS ENERGETICOS	ES	
8	DEMOCRITUS UNIVERSITY OF THRACE	EL	
9	ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS	EL	
10	BAX INNOVATION CONSULTING SL	ES	
11	SDM-Projects BVBA	BE	
12	Narodowa Agencje Poszanowania Energii SA	PL	
13	ABB OF ASEA BROWN BOVERI	BE	
14	SUNAMP LIMITED	UK	
15	Gemeente Eemnes	NL	

2 - Administrative data of participating organisations

PIC	***Legal name***
999902094	*VRIJE UNIVERSITEIT BRUSSEL*

Short name: VUB

Address of the organisation

Street PLEINLAAN 2

Town BRUSSEL

Postcode 1050

Country Belgium

Webpage www.vub.ac.be

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....yes

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status.....28/05/1970 - no

SME self-assessment .....28/05/1970 - no

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: MOBI, the Mobility, Logistics and Automotive Technology Research ☐ not applicable

☒ Same as proposing organisation's address

Street: PLEINLAAN 2

Town: BRUSSEL

Postcode: 1050

Country: Belgium

Department 2

Department name: Brussels Health Campus ☐ not applicable

☐ Same as proposing organisation's address

Street: Laarbeeklaan 103

Town: Brussels

Postcode: 1090

Country: Belgium

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Prof. Sex: (•) Male ( ) Female

First name: **Thierry** Last name: **Coosemans**

E-Mail: **thierry.coosemans@vub.be**

Position in org.: 'Electric and Hybrid Vehicle' Team Leader

Department: ETEC – Electrical Engineering and Energy Technology ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: PLEINLAAN 2

Town: BRUSSEL Post code: 1050

Country: Belgium

Website: http://mobi.vub.ac.be/mobi/

Phone: +32 (0)2 629 37 67 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	*Last Name*	*E-mail*	*Phone*
Maarten	Messagie	maarten.messagie@vub.be	*+32 (0)2 629 38 34*
Maitane	Berecibar	maitane.berecibar@vub.be	*+32 (0)2 629 38 32*
Stien	Mommaerts	stien.mommaerts@vub.be	*+32 (0)2 629 2213*
Thierry	Coosemans	thierry.coosemans@vub.ac.be	*+32 (0)2 629 37 67*
Jimmy	Van Moer	jimmy.vanmoer@uzbrussel.be	*+32 (0)495 36 07 53*
Cathy	Macharis	cathy.macharis@vub.be	*+32 (0)2 629 22 86*
Saskia	Van Hoyweghen	svhoyweg@vub.ac.be	*+32 (0)2 629 28 00*
Elisavet	Gagatsi	elisavet.gagatsi@vub.be	*+32 (0)2 629 23 62*
Thomas	Crispeels	thomas.crispeels@vub.be	*+32 (0)2 629 12 23*

PIC	***Legal name***
999581315	*IKERLAN S COOP*

Short name: IK4-IKERLAN

Address of the organisation

Street P JOSE MARIA ARIZMENDIARRIETA 2

Town MONDRAGON

Postcode 20500

Country Spain

Webpage www.ikerlan.es

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....yes

International organisation .....unknown

International organisation of European interest .....unknown

Secondary or Higher education establishment .....unknown

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Energy Storage and Management ☐ not applicable

☐ Same as proposing organisation's address

Street: Orona IDeO-Innovation City, 3A

Town: Hernani

Postcode: 20120

Country: Spain

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr.

Sex: (•) Male ( ) Female

First name: **Milo**

Last name: **Aitor**

E-Mail: **amilo@ikerlan.es**

Position in org.: senior researcher

Department: Energy Storage and Management ☐ Same as organisation name

☐ Same as proposing organisation's address

Street: Orona IDeO-Innovation City, Edif. 3A

Town: Hernani Post code: 20120

Country: Spain

Website: www.ikerlan.es

Phone: +34 943 71 24 00 Phone 2: +xxx xxxxxxxxx Fax: +34 943 79 69 44

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Chris	Merveille	cmerveille@ikerlan.es	*+34 943 71 24 00*

PIC	***Legal name***
999993856	*ATOS SPAIN SA*

Short name: ATOS SPAIN SA

Address of the organisation

Street CALLE DE ALBARRACIN 25

Town MADRID

Postcode 28037

Country Spain

Webpage www.atos.net

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....21/07/2016 - no

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Atos Research and Innovation ☐ not applicable

☐ Same as proposing organisation's address

Street: Isabel Torres 19

Town: Santander

Postcode: 39012

Country: Spain

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr. Sex: (•) Male ( ) Female

First name: **Javier** Last name: **Valino**

E-Mail: **javier.valino@atos.net**

Position in org.: Energy Sector

Department: Atos Research and Innovation ☐ Same as organisation name

☐ Same as proposing organisation's address

Street: Isabel Torres 19

Town: Santander Post code: 39012

Country: Spain

Website: www.atos.net

Phone: +34942421063 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Andrea	Rossi	andrea.rossi@atos.net	*+34912149011*
Juan	Rico	juan.rico@atos.net	*+34946662027*
Atos	PMO	recdoc@lists.atosresearch.eu	*+xxx xxxxxxxxx*

PIC	***Legal name***
998325941	*DEEP BLUE SRL*

Short name: DEEP BLUE

Address of the organisation

Street VIA ENNIO QUIRINO VISCONTI 8

Town ROMA

Postcode 00193

Country Italy

Webpage http://www.dblue.it

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....31/12/2015 - yes

SME self-assessment .....31/12/2015 - yes

SME validation sme.....21/10/2008 - yes

Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Operational Office ☐ not applicable

☐ Same as proposing organisation's address

Street: Piazza Buenos Aires 20

Town: Roma

Postcode: 00198

Country: Italy

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. | Sex: ○ Male ◉ Female

First name: **Linda** | Last name: **Napoletano**

E-Mail: **linda.napoletano@dblue.it**

Position in org.: R&D Manager

Department: DEEP BLUE SRL ☒ Same as organisation name

☐ Same as proposing organisation's address

Street: Piazza Buenos Aires 20

Town: Roma | Post code: 00198

Country: Italy

Website: www.dblue.it

Phone: +39 06 85 55 208 | Phone 2: +xxx xxxxxxxxx | Fax: +xxx xxxxxxxxx

Other contact persons

First Name	*Last Name*	*E-mail*	*Phone*
Alessandra	Tedeschi	alessandra.tedeschi@dblue.it	*+39 06 85 55 208*
Francesca	Margiotta	francesca.margiotta@dblue.it	*+39 06 85 55 208*

PIC	***Legal name***
918684867	*SMARTWALL*

Short name: SMARTWALL

Address of the organisation

Street 197 chemin des Tortiers

Town Saint vincent de mercuze

Postcode 38660

Country France

Webpage

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....unknown

Non-profit .....unknown

International organisation .....unknown

International organisation of European interest .....unknown

Secondary or Higher education establishment .....unknown

Research organisation .....unknown

Legal person .....yes

Industry (private for profit).....unknown

Enterprise Data

SME self-declared status.....31/12/2017 - yes

SME self-assessment .....31/12/2017 - yes

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: R&D ☐ not applicable

☒ Same as proposing organisation's address

Street: 197 chemin des Tortiers

Town: Saint vincent de mercuze

Postcode: 38660

Country: France

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. | Sex: (•) Male ( ) Female

First name: **Guy** | Last name: **Baret**

E-Mail: **g.baret@orange.fr**

Position in org.: R&D manager

Department: R&D ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: 197 chemin des Tortiers

Town: Saint vincent de mercuze | Post code: 38660

Country: France

Website: under construction

Phone: +33 6 31 50 87 36 | Phone 2: +xxx xxxxxxxxx | Fax: +xxx xxxxxxxxx

PIC	***Legal name***
925730268	*SOREA SOCIETE DES REGIES DE L'ARC*

Short name: SOREA SOCIETE DES REGIES DE L'ARC

Address of the organisation

Street 6 RUE PORTE MARTEL ZA DU PRE DE PAQU

Town SAINT JULIEN MONT DENIS

Postcode 73870

Country France

Webpage www.sorea-maurienne.fr

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....31/12/2014 - no

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: R&D ☐ not applicable

☒ Same as proposing organisation's address

Street: 6 RUE PORTE MARTEL ZA DU PRE DE PAQUES

Town: SAINT JULIEN MONT DENIS

Postcode: 73870

Country: France

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr.

Sex: (•) Male ( ) Female

First name: **Guy**

Last name: **Baret**

E-Mail: **guy.baret@sorea-maurienne.fr**

Position in org.: R&D manager

Department: R&D

☐ Same as organisation name

☒ Same as proposing organisation's address

Street: 6 RUE PORTE MARTEL ZA DU PRE DE PAQUES

Town: SAINT JULIEN MONT DENIS

Post code: 73870

Country: France

Website: www.sorea-maurienne.fr

Phone: +33 631508736

Phone 2: +xxx xxxxxxxxx

Fax: +xxx xxxxxxxxx

PIC	***Legal name***
999516907	*FUNDACION CIRCE CENTRO DE INVESTIGACION DE RECURSOS Y CONSUMOS ENERGETICO*

Short name: CIRCE

Address of the organisation

Street CALLE MARIANO ESQUILLOR GOMEZ 15 ED

Town ZARAGOZA

Postcode 50018

Country Spain

Webpage www.fcirce.es

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Innovation Management Unit ☐ not applicable

☒ Same as proposing organisation's address

Street: CALLE MARIANO ESQUILLOR GOMEZ 15 EDIFICI

Town: ZARAGOZA

Postcode: 50018

Country: Spain

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr. Sex: (•) Male ( ) Female

First name: **David** Last name: **Rodriguez**

E-Mail: **drodriguez@fcirce.es**

Position in org.: Head of public programs

Department: Innovation Management Unit ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: CALLE MARIANO ESQUILLOR GOMEZ 15 EDIFICIO CIRCE CAMPUS RIO

Town: ZARAGOZA Post code: 50018

Country: Spain

Website: www.fcirce.es

Phone: +34876555520 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Carlos	Pueyo	cpueyo@fcirce.es	*+34876555571*
Samuel	Borroy	sborroy@fcirce.es	*+34876555164*

PIC	***Legal name***
999659109	*DEMOCRITUS UNIVERSITY OF THRACE*

Short name: DUTH

Address of the organisation

Street PANEPISTIMIOUPOLI RECTORATE BUILDING

Town KOMOTINI

Postcode 69100

Country Greece

Webpage www.duth.gr

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....yes

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status.....27/07/1973 - no

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Production and Management Engineering ☐ not applicable

☐ Same as proposing organisation's address

Street: Vas Sofias 12

Town: XANTHI

Postcode: 67100

Country: Greece

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Prof. Sex: (•) Male ( ) Female

First name: **Panteleimon** Last name: **BOTSARIS**

E-Mail: **panmpots@pme.duth.gr**

Position in org.: Professor

Department: Production and Management Engineering ☐ Same as organisation name

☐ Same as proposing organisation's address

Street: Vas Sofias 12

Town: XANTHI Post code: 67100

Country: Greece

Website:

Phone: +302541079878 Phone 2: +xxx xxxxxxxxx Fax: +302541079878

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Konstantinos	Lymperopoulos	klympero@pme.duth.gr	+xxx xxxxxxxxx
Paraskevi	Giourka	pgiourka@gmail.com	+xxx xxxxxxxxx

PIC	***Legal name***
998802502	*ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS*

Short name: CENTRE FOR RESEARCH AND TECHNOLOGY HELLAS CERTH

Address of the organisation

Street CHARILAOU THERMI ROAD 6 KM

Town THERMI THESSALONIKI

Postcode 57001

Country Greece

Webpage WWW.CERTH.GR

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status.....04/03/2009 - no

SME self-assessment ..... unknown

SME validation sme.....04/03/2009 - no

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Hellenic Institute of Transport - HIT ☐ not applicable

☒ Same as proposing organisation's address

Street: CHARILAOU THERMI ROAD 6 KM

Town: THERMI THESSALONIKI

Postcode: 57001

Country: Greece

Department 2

Department name: Information Technologies Institute - ITI ☐ not applicable

☒ Same as proposing organisation's address

Street: CHARILAOU THERMI ROAD 6 KM

Town: THERMI THESSALONIKI

Postcode: 57001

Country: Greece

Department 3

Department name: Chemical Process & Energy Resources Institute - CPERI ☐ not applicable

☒ Same as proposing organisation's address

Street: CHARILAOU THERMI ROAD 6 KM

Town: THERMI THESSALONIKI

Postcode: 57001

Country: Greece

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. | Sex: (•) Male ( ) Female

First name: **Dimitrios** | Last name: **TZOVARAS**

E-Mail: **dimitrios.tzovaras@iti.gr**

Position in org.: Director

Department: Information Technologies Institute ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: CHARILAOU THERMI ROAD 6 KM

Town: THERMI THESSALONIKI | Post code: 57001

Country: Greece

Website: www.certh.gr

Phone: +302311257777 | Phone 2: +xxx xxxxxxxxx | Fax: +302310474128

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Dimosthenis	Ioannidis	djoannid@iti.gr	*+30 2311 257758*
Nikos	Nikolopoulos	n.nikolopoulos@certh.gr	*+30 211 1069506*
Maria	Gemou	mgemou@certh.gr	*+30 211 1069553*
Panagiotis	Grammelis	grammelis@certh.gr	*+30 211 1069504*
Evangelos	Bekiaris	abek@certh.gr	*+30 2310 498 453*

PIC	***Legal name***
998806479	*BAX INNOVATION CONSULTING SL*

Short name: BAX INNOVATION CONSULTING SL

Address of the organisation

Street CALLE ROGER DE LLURIA 120 PRINCIPAL

Town BARCELONA

Postcode 08037

Country Spain

Webpage www.bwcv.es

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....31/12/2013 - yes

SME self-assessment .....31/12/2013 - yes

SME validation sme.....06/08/2008 - yes

Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Information Technologies Institute ☐ not applicable

☒ Same as proposing organisation's address

Street: CALLE ROGER DE LLURIA 120 PRINCIPAL

Town: BARCELONA

Postcode: 08037

Country: Spain

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Ms

Sex: ○ Male ◉ Female

First name: **Maarja**

Last name: **Meitern**

E-Mail: **m.meitern@baxcompany.com**

Position in org.: Project Manager

Department: BAX INNOVATION CONSULTING SL ☒ Same as organisation name

☐ Same as proposing organisation's address

Street: Carrer Casp 118

Town: Barcelona

Post code: 08013

Country: Spain

Website:

Phone: +34 93 176 31 10

Phone 2: +xxx xxxxxxxxx

Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Rolf	Bastiaanssen	r.bastiaanssen@baxcompany.com	+xxx xxxxxxxxx
Giulia	Rinaldi	g.rinaldi@baxcompany.com	+xxx xxxxxxxxx

PIC	***Legal name***
906630677	*SDM-Projects BVBA*

Short name: SDM-Projects BVBA

Address of the organisation

Street Terhulpensesteenweg 362

Town Overijse

Postcode 3090

Country Belgium

Webpage www.groupsdm.com

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....14/03/2018 - yes

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: CEO ☐ not applicable

☒ Same as proposing organisation's address

Street: Terhulpensesteenweg 362

Town: Overijse

Postcode: 3090

Country: Belgium

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr. Sex: (•) Male ( ) Female

First name: **Bavo** Last name: **De Man**

E-Mail: **deman@sdme.be**

Position in org.: Manager

Department: CEO ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: Terhulpensesteenweg 362

Town: Overijse Post code: 3090

Country: Belgium

Website: www.groupsdm.com

Phone: +32 2 687 63 68 Phone 2: +xxx xxxxxxxxx Fax: +32 2 687 63 68

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Ellen	Vanderdood	vanderdood@sdme.be	*+32 2 688 33 89*
Tom	Erkens	erkens@sdme.be	*+32 2 688 33 89*
Wim	Eyckmans	eyckmans@sdme.be	*+32 2 688 33 89*
Kim	Van Gestel	vangestel@sdme.be	*+32 2 688 33 89*
Tim	Slootmaekers	slootmaekers@sdme.be	*+32 2 688 33 89*
Maarten	Foutrel	foutrel@sdme.be	*+32 2 688 33 89*
Lander	Vanton	vanton@sdme.be	*+32 2 688 33 89*

PIC	***Legal name***
983862465	*Narodowa Agencje Poszanowania Energii SA*

Short name: NAPE NATIONAL ENERGY CONSERVATION AGENCY

Address of the organisation

Street SWIETOKRZYSKA 20

Town WARSZAWA

Postcode 00 002

Country Poland

Webpage www.nape.pl

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....12/01/2004 - yes

SME self-assessment ..... unknown

SME validation sme.....12/01/2004 - yes

Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

No department involved

Department name: *Name of the department/institute carrying out the work.* ☒ not applicable

☐ Same as proposing organisation's address

Street: *Please enter street name and number.*

Town: *Please enter the name of the town.*

Postcode: *Area code.*

Country: *Please select a country*

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr.

Sex: (•) Male ( ) Female

First name: **Andrzej**

Last name: **Rajkiewicz**

E-Mail: **arajkiewicz@nape.pl**

Position in org.: Vice-President of the Board

Department: Narodowa Agencje Poszanowania Energii SA ☒ Same as organisation name

☒ Same as proposing organisation's address

Street: SWIETOKRZYSKA 20

Town: WARSZAWA Post code: 00 002

Country: Poland

Website: www.nape.pl

Phone: +48225054654 Phone 2: +48606499145 Fax: +48228258670

PIC	***Legal name***
910277586	*ABB OF ASEA BROWN BOVERI*

Short name: ABB OF ASEA BROWN BOVERI

Address of the organisation

Street HOGE WEI 27

Town ZAVENTEM

Postcode 1930

Country Belgium

Webpage www.abb.com

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Mobility and Energy ☐ not applicable

☒ Same as proposing organisation's address

Street: HOGE WEI 27

Town: ZAVENTEM

Postcode: 1930

Country: Belgium

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr. Sex: (•) Male ( ) Female

First name: **Luc** Last name: **Picard**

E-Mail: **luc.picard@be.abb.com**

Position in org.: Business Development Manager

Department: Mobility and Energy ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: HOGE WEI 27

Town: ZAVENTEM Post code: 1930

Country: Belgium

Website: www.abb.com

Phone: +32496581236 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

PIC	***Legal name***
938124734	*SUNAMP LIMITED*

Short name: SUNAMP LIMITED

Address of the organisation

Street 1 SATELLITE PARK

Town MACMERRY

Postcode EH33 1RY

Country United Kingdom

Webpage sunamp.co.uk

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....31/12/2013 - yes

SME self-assessment .....31/12/2013 - yes

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: NA ☐ not applicable

☒ Same as proposing organisation's address

Street: 1 SATELLITE PARK

Town: MACMERRY

Postcode: EH33 1RY

Country: United Kingdom

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr.

Sex: (•) Male ( ) Female

First name: **Maurizio**

Last name: **Zaglio**

E-Mail: **maurizio.zaglio@sunamp.com**

Position in org.: International Business Develpoment Manager

Department: NA

☐ Same as organisation name

☒ Same as proposing organisation's address

Street: 1 SATELLITE PARK

Town: MACMERRY

Post code: EH33 1RY

Country: United Kingdom

Website: www.sunamp.com

Phone: +44 (0)1875 610001

Phone 2: +xxx xxxxxxxxx

Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Susan	Lang-Bissell	susan.lang-bissell@sunamp.com	*+44 (0)1875 610001*

PIC	***Legal name***
906576939	*Gemeente Eemnes*

Short name: Gemeente Eemnes

Address of the organisation

Street Zuidersingel 1

Town Eemnes

Postcode 3755 ZH

Country Netherlands

Webpage www.eemnes.nl

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....unknown

Non-profit .....unknown

International organisation .....unknown

International organisation of European interest .....unknown

Secondary or Higher education establishment .....unknown

Research organisation .....unknown

Legal person .....yes

Industry (private for profit).....unknown

Enterprise Data

SME self-declared status..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: CEO ☐ not applicable

☒ Same as proposing organisation's address

Street: Zuidersingel 1

Town: Eemnes

Postcode: 3755 ZH

Country: Netherlands

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title | Sex ◉ Male ○ Female

First name **Niels** | Last name **Rood**

E-Mail **n.rood@eemnes.nl**

Position in org. x

Department Gemeente Eemnes ☒ Same as organisation name

☒ Same as proposing organisation's address

Street Zuidersingel 1

Town Eemnes | Post code 3755 ZH

Country Netherlands

Website

Phone +xxx xxxxxxxxx | Phone 2 +xxx xxxxxxxxx | Fax +xxx xxxxxxxxx

3 - Budget

No	Participant	Country	(A) Direct personnel costs/€	(B) Other direct costs/€	(C) Direct costs of sub-contracting/€	(D) Direct costs of providing financial support to third parties/€	(E) Costs of inkind contributions not used on the beneficiary's premises/€	(F) Indirect Costs / € (=0.25(A+B-E))	(G) Special unit costs covering direct & indirect costs / €	(H) Total estimated eligible costs / € (=A+B+C+D+F+G) BENEFICIARY	(I) Reimburse-ment rate (%) BENEFICIARY	(J) Max.EU Contribution / € (=H*I) BENEFICIARY	(K) Costs of third parties linked to participant THIRD PARTIES	(L) Max.EU Contribution / € THIRD PARTIES	(M) Total Costs for BENEFICIARY & THIRD PARTIES (=H+K)	(N) Max.EU Contribution / € BENEFICIARY & THIRD PARTIES (=J+L)	(O) Requested EU Contribution / € BENEFICIARY & THIRD PARTIES
1	Vub	BE	680000	250000	150000	0	0	232500,00	0	1312500,00	100	1312500,00	0	0	1312500,00	1312500,00	1312500,00
2	Ik4-ikerlan	ES	300000	17500	0	0	0	79375,00	0	396875,00	100	396875,00	0	0	396875,00	396875,00	396875,00
3	Atos Spain Sa	ES	261000	24000	0	0	0	71250,00	0	356250,00	70	249375,00	176250	123375	532500,00	372750,00	372750,00
4	Deep Blue	IT	322000	20000	0	0	0	85500,00	0	427500,00	70	299250,00	0	0	427500,00	299250,00	299250,00
5	Smartwall	FR	156000	32800	22000	0	0	47200,00	0	258000,00	70	180600,00	0	0	258000,00	180600,00	180600,00

6	Sorea Societe Des Regies De L'arc	FR	435200	98800	18000	0	0	133500,00	0	685500,00	70	479850,00	0	0	685500,00	479850,00	479850,00
7	Circe	ES	200000	22000	0	0	0	55500,00	0	277500,00	100	277500,00	0	0	277500,00	277500,00	277500,00
8	Duth	EL	92750	108000	0	0	0	50187,50	0	250937,50	100	250937,50	0	0	250937,50	250937,50	250937,50
9	Centre For Research And Technology Hellas Certh	EL	570000	67000	0	0	0	159250,00	0	796250,00	100	796250,00	0	0	796250,00	796250,00	796250,00
10	Bax Innovation Consulting Sl	ES	134000	29000	0	0	0	40750,00	0	203750,00	70	142625,00	0	0	203750,00	142625,00	142625,00
11	Sdm-projects Bvba	BE	132000	17000	0	0	0	37250,00	0	186250,00	70	130375,00	0	0	186250,00	130375,00	130375,00
12	Nape National Energy Conservation Agency	PL	100000	15000	0	0	0	28750,00	0	143750,00	70	100625,00	0	0	143750,00	100625,00	100625,00
13	Abb Of Asea Brown Boveri	BE	501000	15000	0	0	0	129000,00	0	645000,00	70	451500,00	0	0	645000,00	451500,00	451500,00
14	Sunamp Limited	UK	135000	44200	0	0	0	44800,00	0	224000,00	70	156800,00	0	0	224000,00	156800,00	156800,00
15	Gemeente Eemnes	NL	220000	250000	0	0	0	117500,00	0	587500,00	100	587500,00	0	0	587500,00	587500,00	587500,00

	Total	4238950	1010300	190000	0	0	1312312,50	0	6751562,50		5812562,50	176250,00	123375,00	6927812,50	5935937,50	5935937,50

4 - Ethics

1. HUMAN EMBRYOS/FOETUSES		Page
Does your research involve Human Embryonic Stem Cells (hESCs)?	○ Yes ◉ No	
Does your research involve the use of human embryos?	○ Yes ◉ No	
Does your research involve the use of human foetal tissues / cells?	○ Yes ◉ No	
2. HUMANS		**Page**
Does your research involve human participants?	○ Yes ◉ No	
Does your research involve physical interventions on the study participants?	○ Yes ◉ No	
3. HUMAN CELLS / TISSUES		**Page**
Does your research involve human cells or tissues (other than from Human Embryos/ Foetuses, i.e. section 1)?	○ Yes ◉ No	
4. PERSONAL DATA		**Page**
Does your research involve personal data collection and/or processing?	○ Yes ◉ No	
Does your research involve further processing of previously collected personal data (secondary use)?	○ Yes ◉ No	
5. ANIMALS		**Page**
Does your research involve animals?	○ Yes ◉ No	
6. THIRD COUNTRIES		**Page**
In case non-EU countries are involved, do the research related activities undertaken in these countries raise potential ethics issues?	○ Yes ◉ No	
Do you plan to use local resources (e.g. animal and/or human tissue samples, genetic material, live animals, human remains, materials of historical value, endangered fauna or flora samples, etc.)?	○ Yes ◉ No	
Do you plan to import any material - including personal data - from non-EU countries into the EU?	○ Yes ◉ No	
Do you plan to export any material - including personal data - from the EU to non-EU countries?	○ Yes ◉ No	
In case your research involves low and/or lower middle income countries, are any benefits-sharing actions planned?	○ Yes ◉ No	
Could the situation in the country put the individuals taking part in the research at risk?	○ Yes ◉ No	

7. ENVIRONMENT & HEALTH and SAFETY		Page
Does your research involve the use of elements that may cause harm to the environment, to animals or plants?	○ Yes ◉ No	
Does your research deal with endangered fauna and/or flora and/or protected areas?	○ Yes ◉ No	
Does your research involve the use of elements that may cause harm to humans, including research staff?	○ Yes ◉ No	
8. DUAL USE		**Page**
Does your research involve dual-use items in the sense of Regulation 428/2009, or other items for which an authorisation is required?	○ Yes ◉ No	
9. EXCLUSIVE FOCUS ON CIVIL APPLICATIONS		**Page**
Could your research raise concerns regarding the exclusive focus on civil applications?	○ Yes ◉ No	
10. MISUSE		**Page**
Does your research have the potential for misuse of research results?	○ Yes ◉ No	
11. OTHER ETHICS ISSUES		**Page**
Are there any other ethics issues that should be taken into consideration? Please specify	○ Yes ◉ No	

I confirm that I have taken into account all ethics issues described above and that, if any ethics issues apply, I will complete the ethics self-assessment and attach the required documents. ☒

How to Complete your Ethics Self-Assessment

5 - Call-specific questions

Extended Open Research Data Pilot in Horizon 2020

If selected, applicants will by default participate in the Pilot on Open Research Data in Horizon 2020[1] , which aims to improve and maximise access to and re-use of research data generated by actions.

However, participation in the Pilot is flexible in the sense that it does not mean that all research data needs to be open. After the action has started, participants will formulate a Data Management Plan (DMP), which should address the relevant aspects of making data FAIR – findable, accessible, interoperable and re-usable, including what data the project will generate, whether and how it will be made accessible for verification and re-use, and how it will be curated and preserved. Through this DMP projects can define certain datasets to remain closed according to the principle "as open as possible, as closed as necessary". A Data Management Plan does not have to be submitted at the proposal stage.

Furthermore, applicants also have the possibility to opt out of this Pilot completely at any stage (before or after the grant signature). In this case, applicants must indicate a reason for this choice (see options below).

Please note that participation in this Pilot does not constitute part of the evaluation process. Proposals will not be penalised for opting out.

We wish to opt out of the Pilot on Open Research Data in Horizon 2020.	○ Yes	◉ No

Further guidance on open access and research data management is available on the participant portal: http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/open-access-dissemination_en.htm and in general annex L of the Work Programme.

[1] *According to article 43.2 of Regulation (EU) No 1290/2013 of the European Parliament and of the Council, of 11 December 2013, laying down the rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)" and repealing Regulation (EC) No 1906/2006.*

RENAISSANCE

"RENewAble Integration and SuStainAbility iN energy CommunitiEs"

Call	**H2020-LC-SC3-2018-2019-2020**
Call topic	**Integrated local energy systems (Energy Islands)**
Type of Action	**IA Innovation Action**
Duration of the project	**36M**

List of participants

Part. No	Participant organisation name	Abbreviation	Org.Type	Country
1	VRIJE UNIVERSITEIT BRUSSEL	VUB	UNI	BE
2	IKERLAN S COOP	IKL·	RTD	ES
3	ATOS SPAIN SA	ATOS	CORP	ES
4	DEEP BLUE SRL	DBL	SME	IT
5	SMARTWALL	SMR	SME	FR
6	SOREA SOCIETE DES REGIES DE L'ARC	SOREA	CORP	FR
7	FUNDACION CIRCE	CIRCE	RTD	ES
8	DEMOCRITUS UNIVERSITY OF THRACE	DUTH	UNI	EL
9	ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS	CERTH	RTD	EL
10	BAX INNOVATION CONSULTING SL	BAX	SME	ES
11	SDM-PROJECTS BVBA	SDM	SME	BE
12	NARODOWA AGENCJE POSZANOWANIA ENERGII SA	NAPE	SME	PL
13	ABB OF ASEA BROWN BOVERI	ABB	CORP	BE
14	SUNAMP LIMITED	SUN	SME	UK
15	GEMEENTE EEMNES	EEM	PUBLIC	NL

Table of contents

List of acronyms used in the document

GHG	Green House Gasses	LES	Local energy system
LLCOE	Local levelised cost of energy	LCOE	Levelised Costs of Energy
LEC	Local energy community	lRES	Local renewable energy sources

1. Excellence

Currently, 83% of energy consumed is derived from non-renewables, and the lion's share is generated outside the community where it is consumed. This is a consequence of an energy grid that historically is built for centralised production of ´stable´ energy sources like nuclear and coal. This approach has come under pressure as both contributing significantly to GHG emissions, as well as being inherently inefficient and costly in energy transmission and distribution. Europe's ambition is to convert its energy system to become more consumer-centred and clean. Supporting the Climate-Energy objectives, 27[1]% of energy consumption should derive from renewables (RES) by 2030, and 40% reduction of GHG when compared to 1990 levels.

A main approach for that is developing integrated local energy systems (LES), driven by local energy communities (LEC) or other organisational forms. LES could take advantage of local renewable sources and be tailored to specific demand for heating and cooling, electricity and transport. The benefits could be large; a recent report on Energy prices and costs in Europe (EC, 2016[2]) states that final energy prices will be steadily increasing, with transmission and distribution costs being key drivers. LESs have the potential to reduce such overhead costs.

Local Energy System (LES): a connected energy system that includes performing activities of a distribution system operator, supplier or agregators at local level. Typically includes (renewable) generation.

Local Energy Community (LEC): a legal entity, effectively controlled by local shareholders or members, that manages the LES. Generally value- rather than profit driven: an association, a cooperative.

While underlying technology solutions for LESs have mostly developed, and new business models emerge - especially where legislative changes enable so - there is a lack of consumer-centric solutions. The maturity of Local Energy Systems can be characterised as being at the ´chasm´ between early adopters and the early majority of Moore's model of technology adoption. LES have been proven at technology level (innovators), and use cases are being piloted where ´visionaries´ drive implementation. **For a replicable approach with high market uptake, ´pragmatists´ need to be convinced. This requires a shift from technology-driven approaches to consumer-driven approaches**: reliable solutions, cost of ownership, third-party support are key criteria. This characterisation is in line with recent academic and professional observations of key success and fail factors of LESs, as described elsewhere in this proposal.

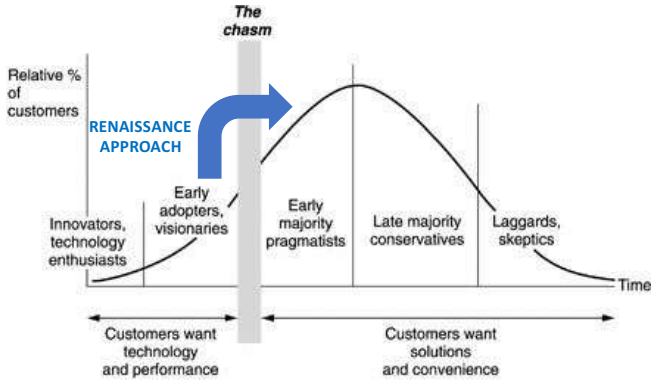


Figure 1 Crossing the chasm: smart grid approaches for the early majority

The **key challenge for LESs is to design an approach for wide replicability, through activation of communities**. RENAISSANCE proposes to do exactly that. It will bring to the market a set of tools that jointly allow identifying business cases for clean integrated systems in any local environment. It will allow mapping energy vectors and associated financial values, and identify business models that will activate a critical mass of local stakeholders

1.1. Objectives

"Participation of consumers and companies in our local energy system ultimately will depend on simplicity and lower energy cost". Niels Rood, Eemnes city councilor.

Following the development of decentralized production technologies, local energy systems have become a topic of increased interest. With many approaches being piloted, emerging insights in success factors of stable local energy systems conclude that economic factors, not environmental or social motives, appear to weigh most[3]. While social success factors are the involvement of a trusted community actor and the involvement of a variety of stakeholders, **positive financial conditions appear to be a prerequisite, and crucial to system stability**. Factors include lower final energy costs, models for off-setting CAPEX, a fair benefit sharing model, and low system coordination costs[4] [5].

[1] EC (2030 climate & energy framework https://ec.europa.eu/clima/policies/strategies/2030_en
[2] EC ((2016) Energy Prices and Cost in Europe. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52016SC0420
[3] ISABEL (2017) https://isabel-project.eu/wp-content/uploads/Social-Innovation-and-Community-Energy-best-practices-methods-and-tools-across-Europe.pdf
[4] Abada (2017) On the viability of energy communities https://www.eprg.group.cam.ac.uk/wp-content/uploads/2017/10/1716-Text.pdf
[5] Curtin (2018) Local Economy: financial incentives to promote local ownership http://journals.sagepub.com/eprint/Uehz8BaZmW4FgKnR7EeJ/full

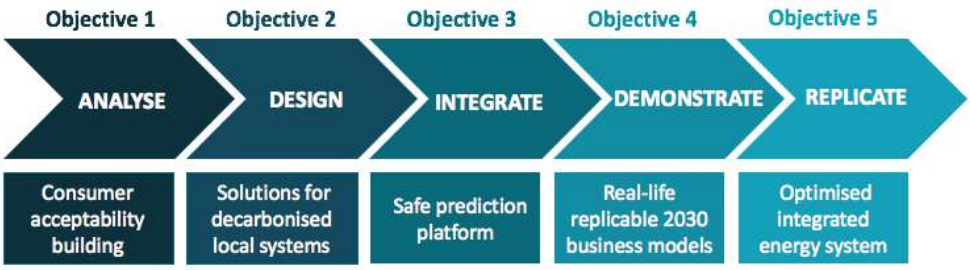


Figure 2 Overview of RENAISSANCE objectives

The RENAISSANCE project will demonstrate an approach where financially-oriented consumer-focus is prevalent in system analysis, design and operational phase. **It will identify long-term stable business cases in multi-energy and multi-actor markets.** In doing so, it will go beyond the conventional environmental-technical approach of interconnecting all energy vectors or optimising CO2 reductions.

RENAISSANCE aims to demonstrate an easily replicable approach to design and operate local integrated energy systems that have a high and stable level of social acceptability.

The project will demonstrate local energy systems that meet or exceed the EU target of 27% of RES across energy sources, at equal or lower cost of energy in comparison with current solutions, and **reach a critical mass of participation of 15-20% of citizens** and businesses.

In order to achieve RENAISSANCE's aim, the approach will have the following objectives;

Objectives	Means of achieving
O1: Identify stable and equitable business cases for Local Energy Communities	VUBs MAMCA software is a social consensus-building tool that allows multi-actor, and multi-criteria analysis to evaluate business cases for energy systems. It helps explore and test acceptability of financial and organisational architectures, covering elements such as CAPEX/OPEX, benefit sharing and ROI.
O2: Design business models for integrated, decarbonized Local Energy Systems in delimited environments	ABBs MESA tool allows analysis of energy vectors in a chosen system and optimised technical design of an integrated system. The tool will be enhanced to cover key decentralised energy sources, including electricity, heat, storage and transport, and crucially: attach monetary values, and spatial information to vectors. This allows identifying CAPEX/OPEX, CO2 emissions, and benefits for both the system as well as individual nodes (users), achieving a required level of realism.
O3: Deliver a platform for integrated management and value delivery across all actors	ATOS's FUSE platform is a secure, commercial energy management system that seamlessly interoperates between individual appliances to DSO/TSO flexibility markets. It allows energy balancing and valorisation of energy vectors within a community, between communities, and with the broader markets. The tool will be enhanced with an automated, low-cost settlement system by integrating a block-chain based model (CERTH) using smart contracts (IKERLAN), and expanded to include heat, and energy generation forecasting models (CERTH).
O4: Demonstrate energy communities and systems with >27% RES and equal or better Local Levelised Cost of Energy	Design, build and operate 4 independent energy communities, in Belgium, Greece, the Netherlands and France, with altogether over 1.000 households and business participating. The pilots cover different combinations of closed and open markets, and urban and rural settings. The sites will have between 37% and 80% RES, while Local Levelised Cost of Energy is equal or better than current local energy prices.
O5: Test the approach under market conditions in 10 sites across the globe	Selected tools will be tested for market-readiness in 10 locations in key markets; the UK, Poland, India, the United States, and China. This will ´localise´ approaches, identify value and value proposition, and serve as starting point for future market entry. Partnerships with GBI (India), CambridgeCleanTech (USA, UK), GlobalEnergyInterconnectionDevelopmentandCooperationOrganisation (China) will help deliver connections with city authority and site developers.

O1: Identify stable and equitable business cases for Local Energy Communities

Today business models are based on the traditional market where energy companies trade energy from the producers to the end users unidirectionally. This settlement does not entail any active participation of the consumers. RENAISSANCE aims to lead the transition towards consumer-oriented business models for local energy systems where multiple actors can play a key role by shifting their demand, storing or producing energy. **RENAISSANCE will go beyond business as usual practices identifying compelling value propositions for end-users and investors built upon a reliable and sustainable energy supply.** A "high consensus economy" based on real-time prices such as Peer to Peer (P2P) and Community to Community (C2C) trading will unlock energy saving potential for end-users and wider uptake of smart technologies (heat pumps, EVs, etc.) that dynamically respond to grid needs. **RENAISSANCE will utilise the Multi Actor Multi Criteria Analysis (MAMCA) for defining viable site-specific LES business cases with higher end-users acceptance than currently, through consensus building, and enabling up to 15-20% of "consumer/prosumer" participation.**

O2: Design business models for integrated, decarbonised Local Energy Systems in delimited environments

RENAISSANCE will interact with 4 selected "energy islands" for the advancement of the multi energy site analysis tool through which the technical asset of the LES will be optimised. LES design has to be tailored to the specific site and scope; to improve the utilization of the local decentralized resources, design has to address local technical, economic and regulatory challenges while meeting local stakeholders ambitions. Currently, **no systematic approach is available to scope and design local energy systems considering all energy vectors**. Enhanced MESA tool (RENERGiSE) will fill this gap by optimizing LES configuration against environmental and socio-economic objectives and integrating all energy layers (electricity, heat, transports, etc) into a unique business case. Energy flows between the system nodes are turned into monetary values with a spatial information for assessing the profitability of the business cases (CAPEX/OPEX) and how the benefits are shared among the different users. This tool will offer a total solution covering all smart grid technologies into a well-defined environment while aligning with key stakeholders' ambitions (manufacturers, energy companies, DSO, authorities and consumers).

Implementation of the results at pilot sites will make renewable energy integration more accessible by increasing the synergies among the existing energy vectors. Avoidance of grid investments and high balancing efforts for the DSO will reduce renewable ROI and investment risks. Additionally, real-time local market prices will allow consumers and smart appliances to shift the consumption from peak to low-demand periods, enhancing overall system efficiency and reducing energy bills. **RENAISSANCE demonstrators will achieve LLCOE reduction of about 10%-15% by optimising supply and consumption locally.** Results will reflect potential future local energy market prices avoiding network charges and renewable generation taxes.

O3: Deliver a platform for integrated management and value delivery across all actors

RENAISSANCE will integrate into an interoperable ICT network all devices bringing computer resources for control and monitoring close to application services**. A multi-stakeholder energy management and trading platform will be advanced by integrating the communication, information, function and business layers characterising local energy market structure.** RP (RENAISSANCE Platfrom) crosscutting blockchain architecture ensures integrity and security of data shared among stakholders for decision making, risk assessments and social aspects. **RENAISSANCE will develop smart contracts to implement the logic and automation of interactions within and between energy communities. These energy trading arrangements will be designed in alignment with the business model and use case identification for each selected local energy system.** The platform will be implemented in 2 real life pilots (France, Greece) and connected virtually to the other 2 in Belgium and the Netherlands to prove the economical and socio-technical value of an open participative energy market for the energy communities: enhanced flexibility and dynamic interaction with close communities will ensure reliable supply at all times at the minimum cost. **RENAISSANCE's platform will allow to provide dynamic response to flexibility requirements by trading integrated energy services with both the centralized grid or other microgrids.**

O4: Demonstrate energy communities and systems with >27% RES and equal or better LLCOE

Because of the lack of standardised practices to test and develop LES projects, business viability is highly affected by market immaturity and uncertainty which entail high prices for the community and high risk for investors.

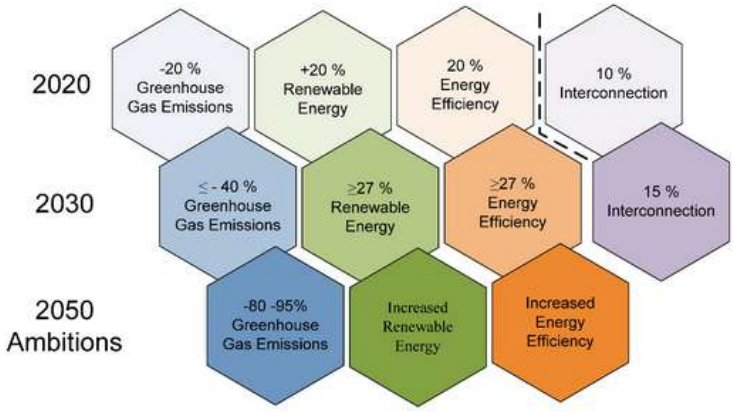


Figure 3 EU 2020 and 2030 target for renewable energy technologies penetration with GHG reduction

RENAISSANCE will validate the systematic approach to design and operate optimised local integrated energy systems through a wide range of real-life demonstration and virtual simulation activities. 4 real life pilots in France, Belgium, Greece and the Netherlands characterised by different grid topology, generation assets and stakeholders' ambitions will demonstrate LES with high penetration of renewable energy sources (>27%) and reduced LLCOE.

RENAISSANCE set of solutions will be implemented at pilot sites increasing the local energy system efficiency by balancing in real time local generation and consumption hence reducing RES curtailment and distribution losses.

Demonstration will take place in different countries to reflect the impact of climate, cultural and regulatory differences on the approach, validating its replicability worldwide.

O5: Test the replicability approach under market conditions in 10 sites across the globe

RENAISSANCE approach and solutions will be validated virtually worldwide in multiple sites characterised by different economic, social and legal ecosystems. RENAISSANCE will work with the partners GlobalBusinessInroads (India), Global Energy Interconnection Development and Cooperation Organisation (China), CambridgeCleanTech (USA, UK) to engage with the relevant private and public stakeholders of the virtual demonstrator sites in order to develop tailored business cases. **The objective is twofold**: on one side **validating the replicability of the approach under various circumstances** through the scale of in-project replication testing; on the other side **creating a strong link with the key decision makers to be used as market entry for RENAISSANCE solutions**. Nowadays Asia accounts for 40% of the global microgrid market and India alone has a total market value of $10B. Establishing solid relationships along the course of the project will open opportunities for RENAISSANCE results adoption at scale. Additionally, RENAISSANCE will interact with regulators and decision makers to raise awareness around local energy systems as a cost-effective and low-carbon solution to secure the energy access to energy communities.

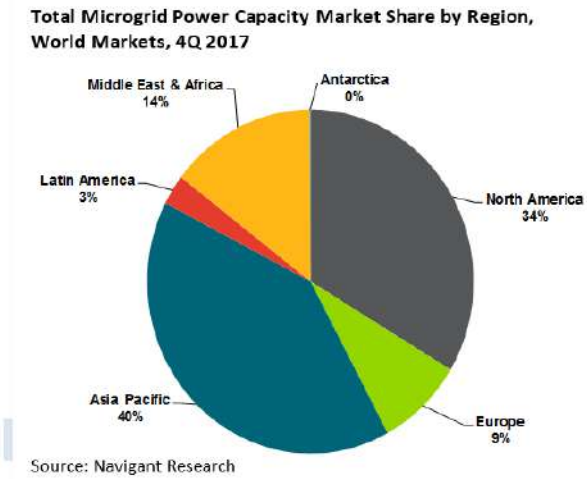


Figure 4 Accessing key markets outside Europe: North America and Asia Pacific

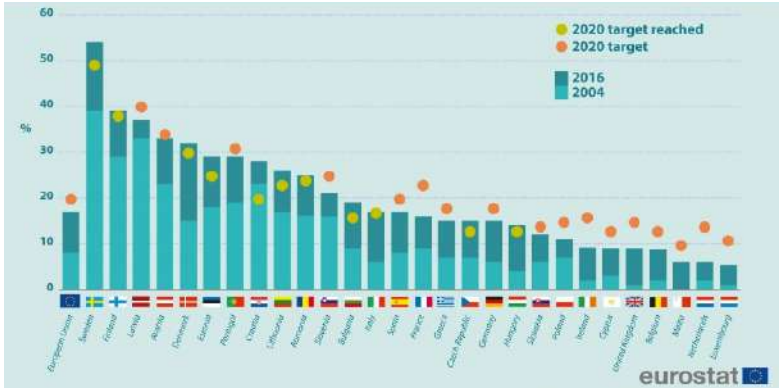


Figure 5 Share of energy from RES sources % of gross final energy consumption; source Eurostat

RENAISSANCE demonstrators (NL, BE, GR and FR) and UK and PL virtual pilots are all located in countries that structurally score low on RES generation, and that have not met 2020 targets. Achieved project objectives therefore would be a meaningful contribution to activating consumers in hard-to-reach markets.

1.2. Relation to the work programme

Table 1 Fit to the call

Call excerpt	How this point is addressed
Develop and demonstrate solutions which analyse and combine all the energy vectors that are present and interconnect them where appropriate	The project will develop and demonstrate ABBs local multi energy site analysis tool MESA that analyses and optimises thermal, electric, transport energy vectors in local systems and their interconnection potential. Critically, the tools will include social acceptance filtering, realistic cost-benefit analysis based in geospatial data, and business case development for individual nodes. RENAISSANCE will validate and demonstrate the ATOS FUSE energy management and trading platform. Integrated into a modular and interoperable architecture key energy layers (thermal, electric, transport etc.), and seamlessly connecting between edge devices and C2C and DSO/TSO energy service trading opportunities, such as P2H, H2P and DR. This will be supported by CERTH blockchains and supply forecasting, and IKERLAN smart contracts.
Present a preliminary analysis of the local case as part of the content of the proposal	RENAISSANCE includes 4 real-life demonstrators located in Belgium, France, the Netherlands and Greece, described in section 1.3.8. The sites, with each a formal energy community, will include in total over 1000 households and 50 businesses, with individual capacities ranging from 600 MWh-1500 MWh. Upon completion, 37-80% RES will be achieved, at equal or lower cost of energy than current prices
propose to develop solutions and tools for the optimization of the local energy network…	The scope of the tools allows analysis, design and operation of integrated energy systems from a scale of 5kW to 10MW: from individual small buildings, to the scale of 100s of nodes - typically the level of substations in the low-voltage distribution grid. Acknowledging that economic indicators are key drivers of uptake by communities, RENAISSANCE: • Provides a new consumer-driven KPI for energy system optimisation: Local Levelised Cost of Energy. • Integrates realistic cost/benefit factors and business model selection at individual and aggregated level in the ABB MESA design tool • Ensures maximum valorization, and fair and equitable benefit sharing through the ATOS FUSE management platform
…but having high replication potential across Europe.	The suite of tools is connected to commercially available solution libraries, validated in 6 European markets (4 pilots and UK, Polish virtual demonstrators), and crucially: will used by ABB and ATOS –global industrial players in smart grid development and management
Local consumers, small to medium industrial production facilities and commercial buildings should be involved in the project from the start.	Local consumer groups have helped design the project. This has led to a focus on energy costs as KPI, an option to identify individualized business cases, and user-friendly interfaces in energy management tools. Letters of Support from end-user groups across the 4 demo sites are attached.
TRL will range typically between 5 and 8. Proposers will indicate the estimate levels of TRL at the beginning and at the end of the project	The project does not focus on energy generation, storage and interconnection hardware, which will be based on commercial solutions. Rather, it will enhance ICT for design and management of interconnected systems. While the base of ICT tools are typically commercially deployed, novel functionalities and layers will be improved from TRL 5/6 to 7/9, enabling full integration.
include a task for the analysis of obstacles to innovation	A dedicated task T6.2 has been created, with a particular focus on obstacles of broad exploitation of innovation.
foresee the coordination with similar EU funding projects through the BRIDGE initiative.	Collaboration with inteGRIDy (see Letter of support) into the BRIDGE initiative will facilitate the definition of optimal pathways to achieve local energy systems' transition.
International cooperation, in particular with India.	RENAISSANCE has physical demonstrators in Belgium, the Netherlands, France and Greece, and virtual pilots in India, the UK, Poland, USA, China. A Coordination Agreement has been signed with Indian entity Quess Corp Ltd

1.3. Concept and approach

1.3.1. Project concept

RENAISSANCE will enable and demonstrate 4 energy communities with local levelised costs of energy at or below current consumer prices levels, while achieving over 27% RES. RENAISSANCE will combine novel micro grid design and management tools with existing energy generation and storage technologies to provide energy communities with identification of business cases and subsequent operational solutions to maximise value capturing and delivery for users.

"In becoming an energy neutral town by 2030, we need to be able to show our citizens and business that it also is a good deal financially"
Niels Rood, councillor of Eemnes

A key concept to the project is Local Levelised Cost of Energy (LLCOE). It covers lifetime costs of energy generation and distribution, divided by energy production. This measure calculates present value of total system costs operations for the community it serves. This allows comparison between different system designs of unequal model (centralized, decentralized), life span, size, capital costs, etc. The measure differs from the know LCOE, which considers only individual assets. By including transmission and distribution, the measure allows comparing smart grids, and crucially, allows comparison with current centralized energy systems. Currently such comparison is not possible beyond electricity, as all energy vectors are not monetized. However, with the **RENAISSANCE approach will allow comparing LLCOE against other grid models, while taking into account all potential energy vectors, allowing thus a truly comprehensive benchmarking model**. Therefore, LLCOE is critical in supporting informed decision-making for cost effectiveness of local energy systems. For the purpose of RENAISSANCE, the optimal LLCOE is equal to local RES and other energy costs + taxes; meaning distribution and transmission costs are reduced to minimum. The current EU average LLCOE (for electricity only) is the net consumer price of €0,204, which is foreseen to rise about 15% by 2050. The RENAISSANCE ambition is to reduce these prices at least by 10%-15%.

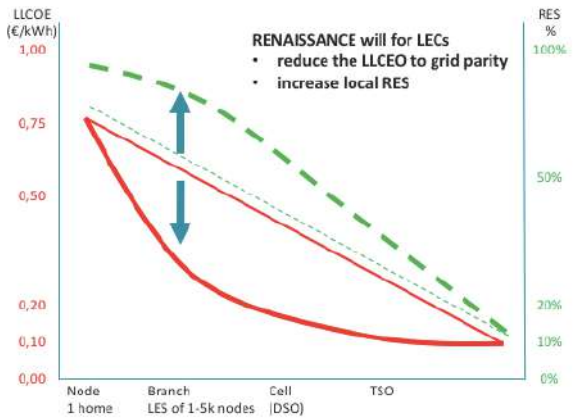


Figure 7 Local Levelised Cost of Energy reduction through RENAISSANCE

The operational scope of RENAISSANCE is the low-voltage network, mostly at the level of one or several sub-stations level. To compare; a single substation typically has a capacity of up to 10MW, covering buildings (residential, commercial and small-scale industrial), renewable generation and storage, and other assets such as e-vehicles. Socially, such systems serve up to 10,000 people or 10 medium sized business (offices or light industrial). Financially, the consumer end price of energy is €1 to €5M per year. For Demand Response and trading purposes, RENAISSANCE will virtually connect several LECs.

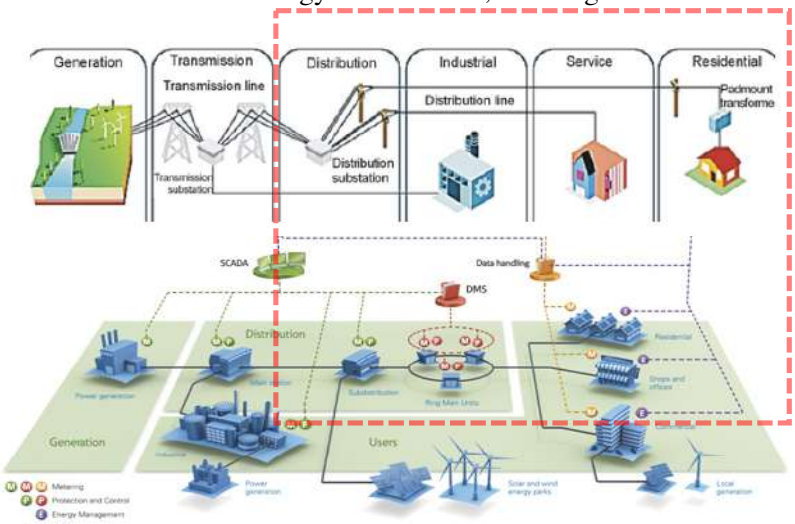


Figure 6 RENAISSANCE targets local energy system at substation level

"Our energy community can deliver more value if we have large local participation. But we need not just to be able to demonstrate value to individual business and citizens – but also models that recognise and allow sharing investments and benefits in a fair way".
René Pie, EnergieCooperatie Eemnes

Conceptually, the project will be set in 2030, when European energy markets will be fully liberalised and governed by market prices. Any entity producing energy will be allowed to trade that energy with any consumer, often via market place mediators. It will be a many-to-many market. At the same time, market support instruments will be gradually reduced; subsidies for installing renewables should follow price reductions, and crucially, feed-in tariffs (FiT) should be replaced with feed-in premiums (FiP) that incentivise producers to respond to market developments. In these liberalised markets, viable business cases for energy islands could occur at various scales (building-, district-,

community or higher scale levels), and often compete. Each scale comes with different sets of economically viable generation and storage technologies. The technologies are associated with different decision-makers, CAPEX/OPEX and thus different business models. Gradual technology development and market liberalisaton will unlock different, increasingly integrated and holistically optimised, business cases. For energy communities, the main challenge is to analyse a given open-ended environment and 1) explore the business case within and across scales, and 2) identify the trade-off between investment horizon (short to long term) and optimisation level (each individual versus community).

1.3.2. Methodology

RENAISSANCE will mature its approach through 3 tiers of demonstrators, which will bring its TRL from 6 to 9. The base is the site of the Free University of Brussels, where advanced generation, storage and management hardware is installed and highly detailed data is made open source. RENAISSANCE will be demonstrated in 3 sites with different settings; a publicly controlled urban community (GR), an end-user driven urban community (NL) an and-user driven remote community (FR). Finally, the integrated approach will be presented to sites in India, USA, Poland, UK to be ´localised´ and tested against market conditions.

The Eemnes pilot has been granted an exemption to Dutch electricity market laws in 2018. It could become the 1st Dutch and European dynamic peer-to-peer trading site in Europe – a future energy market.

Table 2 Overview of RENAISSANCE demonstrators and their value

Tier	Site	Type	General value	Specific Value	TRL
1	VUB (BE)	Physical	Development and validation	Open data approach	6
2	Eemnes (NL) St.-J Maurienne (FR) Xanthi (GR)	Physical	Application in end-user environment	Live P2P trading in community DSO cost avoidance, eVehicles Multi-vector; heat and electricity	8
3	Bangalore (IN) Jharkhand (IN) Warsaw (PL) Kozienice (PL) North Carolina (USA) Oxfordshire (UK)	Virtual/ Physical	Localisation of approach and toolbox. Testing against market conditions; community buy-in required	Integrate renewables; electrification of rural areas; smart grid set up; testing different technology combinations, testing different business models etc.	9

Methodology for local energy system analysis and design

RENAISSANCE process starts with the assumption that prior work on individual technologies have generated sufficiently mature solutions to create operational microgrids. What is lacking is a systematic consumer-based approach enabling to identify LES business models which will decrease the energy island-LLCOE and the planned upgrading grid investments. We will work among 5 main lines (work packages); enhanced system analysis and design, business model development, interconnection of information systems, demonstration and replication.

MAMCA analysis consist of 7 steps: i. definition of scenarios; ii. Stakeholder analysis and objective definition; iii. ranking of objectives; iv. KPI definition for measuring scenarios' performance; v. scenario evaluation in the MESA tool; vi. results ranking for each stakeholder group; vii. workshop to discuss results and find consensus. The MAMCA analysis relation the tasks and WPs is described in more detail in figure 1.

No realistic business case or effective implementation can be achieved without deep knowledge of stakeholders' needs. At project start, key stakeholder groups of the demonstrators' energy communities will be actively engaged to define implementation objectives and ambitions to be met (T2.2, T5.1). For each pilot, a set of KPIs (technical, environmental, economic, social) will be selected as indicators to be used in the Multi Actor Multi Criteria Analysis (MAMCA)[6].

Each demonstrator's business ecosystem will be framed analysing the revenue streams, investments and cost structures as well as the mechanism through which financial risks and benefits are shared among the different actors. A set of potential business opportunities including the provision of cross-cutting energy services will be evaluated together with the stakeholder's objectives to define the viable scenarios using the MAMCA analysis (T2.1).

[6] MAMCA software is been developed by VUB and has been applied in Several European Projects such as: Straightsol, CityLab, Mobility4eu.

Each of the demonstrators will be assessed applying the multi energy site analysis (MESA) tool towards the different business case scenarios proposed, taking into account the realistic environmental, regulatory and economic constraints. Including the multidisciplinary levels of energy system dimensioning and operation, this tool will identify the best synergy strategies of the existent energy vectors based on historical and forecasting data. For each scenario, the software will output the optimized design configurations and the different operational strategies to be compared with the current pilots' practices.

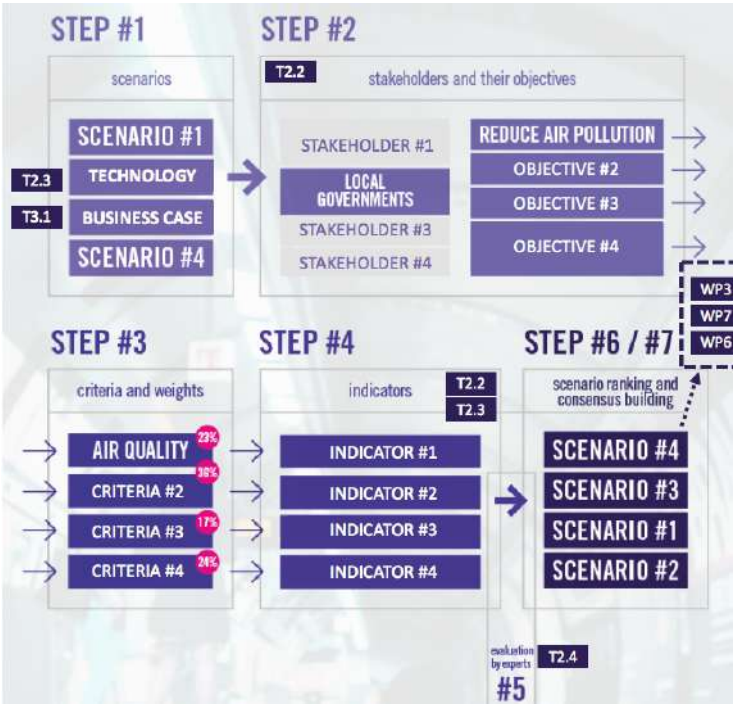


Figure 8 MAMCA relation to WPs and tasks

The outputs from the MAMCA analysis along with the demonstrator's technical characteristics and regulatory framework will set the basis for the design process carried out by the RENERGiSE tool. At the core of this advanced optimisation tool is an operational energy island, the site of the Free University of Brussels VUB whose data are initially used for the validation. The site is unique in Europe as an operational energy island providing energy data (open source – also available to the public) across different building types, energy generation, storage and demand types. Furthermore, RENERGiSE will assess the financial viability of the proposed business models by turning the energy vectors into monetary values and addressing the specific objectives set by local stakeholders. This process will establish the most appropriate business cases with high social acceptance for any level of aggregation or type of microgrid considered, providing suggestions for enhancing energy community value (WP2).

Methodology for integration FUSE platform with additional layers

WP4 will develop and implement the RENAISSANCE Platform through which management and implementation of the energy/financial transactions within the energy community will take place. Its Social Engine will facilitate interactivity and participation of consumers/prosumers. Based on the **secure, interoperable and scalable blockchain architecture** defined in the WP3, it will interconnect all existing demonstrators' energy vectors into a unique decentralized multi-vector energy services market where all actors will actively participate performing financial actions defined by smart contracts. Chosen business cases from WP2 are turned into data and transaction models determining the interactions that can be executed within and between microgrids (WP3). The platform will regulate the Energy service trade market dynamically and transparently ensuring the effective operation of the LES at minimum cost: DR signals are delivered and smart contracts' limits established in real time.

The set of solutions provided will also be used to simulate scenarios of energy interaction between microgrids C2C and at DSO/TSO level (WP6). Along with the broad European regulatory review (WP6), the results of this simulation will contribute to the replicability and scalability of the RENAISSANCE solutions at EU level, identifying policy barriers and how to overcome those hindering energy island potentials.

RENAISSANCE Demonstration

RENAISSANCE is an industry driven consortium that has direct involvement in microgrids, software and city energy system experts (ABB, Atos) and directly involves DSOs (SOREA) and end-user communities (DUTH, Eemnes) that provide pilot sites and that have decision-making power over the energy community. Firstly, the set of tools improved along the project will be validated by partners ABB, ATOS, IKERLAN, VUB and CERTH with the design and operation of local energy systems in the 4 pilot sites. Technical, energetic, economic and social aspects are considered under market realistic circumstances. Secondly, the hardware/software infrastructure developed in WP3 and WP4 will be rolled-out at pilot sites where possible (Greek and French pilot) to validate the security of the financial transactions as well as the stakeholders' level of acceptance and involvement (T5.2, T5.3). The real-life operation of the demonstrators will provide data to assess the performance against pilots' KPIs and hence validate the solutions implemented (T5.4, T6.3).

Methodology for validating replication potential

Replicability is a core aim of the RENAISSANCE project. RENAISSANCE will be targeting countries with weak grid connection and/or with low RES generation capacity. Virtual demonstrators in Eastern Europe, India, China, United Kingdom, USA will demonstrate the value of RENAISSANCE set of solutions to any type of local energy system at any country. Throughout the project additional 1 or 2 countries might be identified as target countries where to additional test the RENAISSANCE approach.

RENAISSANCE will deliver a proven community-driven approach scalable and replicable globally which will allow to scope any microgrid with a specific business model for future energy markets. In addition, through its communication & dissemination activities in WP7, RENAISSANCE will raise awareness at European level around opportunities created by the uptake of energy communities. Partners will liaise with decision makers and key stakeholder groups to leverage project results and suggest regulatory changes based on the outcomes of the analysis of T6.2. Direct collaboration with international and European microgrid stakeholders will open the way of RENAISSANCE and other EU RES products and services to be established in Europe and in emerging markets.

1.3.3. Positioning of the project

Combining all the activities together, RENAISSANCE aims to provide a set of solutions enabling to analyse and manage energy islands reaching a level of "system maturity" for optimised multi vector integration. The individual technologies advanced during the projects will move largely from TRL5 to TRL8 (see figure 9). However, most of the innovations we propose combine and integrate existing technologies (generation, storage, distribution and demand-side) in novel combinations and more integrated architecture, driven by novel algorithms (design tool, trading and management platforms). Local energy systems involve a wide range of solutions related to generation, delivery and usage of energy as well as crosscutting software tools enabling operation, communication and management of the LES.

Smart grid technologies: hardware and applications

The hardware related to smart grid in local energy systems is already well established (TRL8-9). Looking at the whole smart grid value chain, some of the segments such as the decentralised generation and smart network (transmission-distribution) technologies will be covered using existing commercial solutions. In order to improve synergies between the energy vectors, we will use large volume thermal PCM storages enabling power2heat services (TRL7) along with other available commercial solutions (batteries, buffer tanks, etc). Installation at the Greek demonstrator site will demonstrate suitable applications in real life operation and bring this technology close to market (TRL8). On the demand-side, the next-generation of real time control devices EnergyBox will be further improved (TRL5) integrating new functionalities not demonstrated yet. Successful integration of the Energy Box with RENAISSANCE management platform will validate its operation in real-life conditions, reaching TRL8.

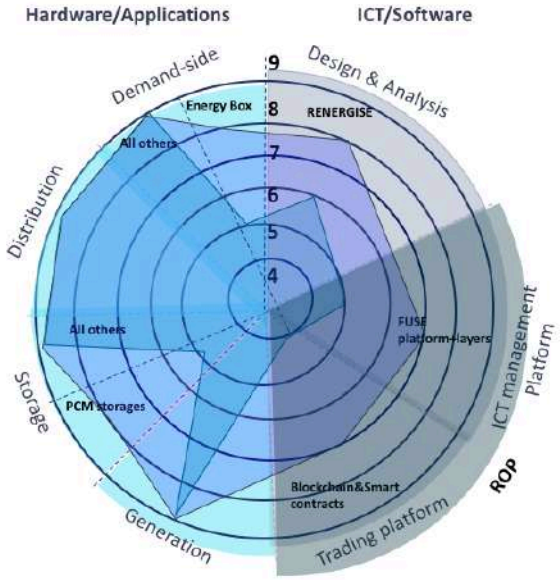


Figure 9 Overview of current and targeted TRL of RENAISSANCE technologies

Smart grid technologies: software and ICT solutions

Crosscutting architecture and software solutions cover the full value chain of smart grids bringing together communication, energy management systems and ICT integration, network and cyber security. RENAISSANCE will provide a set of tools for optimising energy island design and operation minimising LLCOE and grid CAPEX. Overall, these solutions will allow creating a participative energy service market with improved security and transparency.

Design & Analysis

The Renaissance ENERGy Island SoftwarE replicator (RENERGiSE) tool represents one of the main outcomes of RENAISSANCE project. Tools performing multivectors analysis including spatial information, models of interconnection costs and losses have not been commercialised yet and is a superior version of ABB developed MESA tool (TRL6). RENERGiSe allows for multi-objective optimization functions to evaluate socio-economic and environmental performance, identifying the configurations that are cheaper to run, more efficient and reliable

resulting in lower CO2 emissions than conventional systems. By adding to the energy flows a monetary value, LES business models are assessed towards the selected KPIs ensuring high social acceptance.

Table 3 Overview of TRL advancements

Hardware Applications	**Technologies implemented**	**Current TRL**	**Target TRL**
Generation	Existing	TRL 9	
Storage	PCM storages	TRL7	TRL 8
	Existing	TRL 9	
Distribution	Existing	TRL 9	
Demand-side	Existing	TRL 9	
	EnergyBox	TRL 5	TRL 8
ICT Software	**Technologies implemented**	**Current TRL**	**Target TRL**
Design & Analysis	MESA	TRL 6-	TRL 8-9
Management & trading platform	FUSE	TRL 5	TRL 7
	Smart contracts + blockchain	TRL 4	TRL 7

MESA tool will be further improved integrating advanced forecasting algorithms for production/consumption, storage models and an interactive interface. Advancements will allow the tool to understand the implications of component and subsystem design decisions on the overall configuration, operation and performance of the LES featuring multiple energy layers (electricity, heat, cooling, …) at different level of aggregation. Operational data from the demonstrators will be used to improve its accuracy and bring it close to market (TRL8). Virtual simulation of international energy islands will validate its replicability to any type of microgrid and scalability to any energy service (waste, water, etc) and LES dimension (smart clustering).

Management and trading platforms

Related to objective 3, the project ATOS will develop together with the partners an enhanced FUSE platform for advanced management of the energy communities. FUSE platform which has been already tested in energy management focused on providing services for demand side flexibility (TRL5). We will advance the current SotA by embedding in the original validated structure a set of layers which will enable interoperability with all existing physical devices and platforms, trading services, modelling and forecasting, decision and operation algorithms, enhanced consumer engagement and multiple-energy vector capacity.

The novelty of our project is to integrate a crosscutting blockchain based decentralized modular architecture into the energy management platform to create a multi-vector energy services exchange ecosystem open to all members of a given energy community. Blockchain architecture and smart contracts (TRL4) will be implemented into the platform and validated against the demonstrators' business cases (TRL7).

At the end of the project, the comprehensive Renaissance Platform (RP) will be demonstrated both in real life operational conditions (2 pilots) and in virtual environment (TRL7). Pilots data will facilitate its fine tuning and testing on real scenarios towards a fully demonstrated prototype.

1.3.4. Links to other projects/initiatives

RENAISSANCE consortium understands that the technologies developed along the project are only a restricted share of the innovative energy solutions currently available on the market. Consequently, additional technologies from other running European projects or innovation hubs will be implemented in in order to avoid being limited to those demonstrated in the project.

Collaboration with the inteGRIDy project

RENAISSANCE and inteGRIDy will collaborate leveraging their strategic fit on a number of subtopics. While RENAISSANCE aims to provide a replicable and interoperable set of solutions to create local energy communities enabling future energy market models, inteGRIDy focuses on smartening the energy grids, enabling innovating demand response and collaborative storage schemes, being the distribution grid its operators at the core of the proposed solutions. We will learn from inteGRIDy approach in order to facilitate the integration of all energy vectors but moving the focus into a user-driven local energy market. Public deliverables will be shared and inteGRIDy learnings used to advance in the state of the art of the proposed solutions implementing a scalable and interoperable architecture interconnecting vectors and multiple stakeholders. Some dissemination and communication activities will be unified and coordinated in order to achieve a wider impact.

Through the BRIDGE initiative, we will cooperate with inteGRIDy and some of the projects listed below in the analysis of potential barriers to innovation and in addressing policy issues through a coherent strategy (WP2, WP6).

BRIDGE working groups are also very helpful as a way to collaborate with similar projects toward a unified and agreed way to address business models, enhance customer experience and develop data management policies.

Links to other projects and initiatives

RENAISSANCE project builds on the work of large-scale R&D initiatives at European and national level. We intend to explore opportunities of collaboration with the following recent and still running projects (among others). Direct involvement of some consortium partners (shown in brackets) in some of the project listed below facilitate cooperation and will leverage their results.

Table 4 Link to other projects

Project	Project description	Relevant and connection with RENAISSANCE
eDream H2020 2018-2020 Atos	eDREAM will develop and make available a novel near real time DR scalable secure blockchain-driven technological and business framework aimed to optimize aggregated system services flexibility provisioning to DSOs.	RENAISSANCE will use eDream's findings regarding DR and the use of blockchain technologies at DSO level so to pave the way for the projects trading activities.
WiseGRID H2020 2016-2020	WiseGRID aims to provide a set of solutions and business models to enable secure, sustainable and flexible smart grids.	We will learn from best practices of wiseGRID such as its customer-centric approach for an open market model.
SHAR-Q H2020 2016-2019 Atos	The SHAR-Q project aims to establish an interoperability network that connects the capacities of the neighbourhood and wide regional RES and EES ecosystems into a collaboration framework that mitigates the requirement on the overall EES capacities thanks to the shared capacities among the participating actors.	The learnings and methodology derived will be used to set the basis/reference for the development of the interoperable architecture connecting community RES and storage sources.
FLEXICIENCY H2020 2017 Circe	Demonstration of innovative services to increase the flexibility of the current retail market through the establishment of an open European market place where all stakeholders are interconnected.	FLEXICIENCY's best practices will be used for enabling the creation of new market models at local level. Partner CIRCE will contribute its experience and knowledge.
NOBEL 2010-2012 CERTH)	Within NOBEL project an energy brokerage system was developed where individual energy consumers can communicate their energy needs directly with both large-scale and small-scale energy producers, thereby making energy use more efficient.	We will support secure energy e-coin trading between users and large networks using DR algorithms based on historical and forecasted energy data.
DRIVE H2020 2017-2020	DRIVE aims to unlock the DR opportunities for residential and tertiary buildings through the development of a fully interoperable ICT platform enabling higher flexibility in the distribution grid.	We will learn from the Demand-side Management solutions developed in DRIVE to create innovate local market models

1.3.5. Sex and gender issues

Multiple studies have shown gender imbalance in energy access. Energy access and impacts should be analysed considering the different gender dimensions on both economic and socio-cultural perspective. Women are at greater risk of energy poverty than men[7] due to their low income. Energy poverty will be tackled along the project by lowering the LLCOE of the local communities, hence, raising gender equality.

RENAISSANCE project aims at the development of new methods of participation of end-users by deploying new more democratic market models (WP2, WP3, WP4). Involvement of men and women will be always balanced enabling equal opportunities by offering new services and tools. End-users expectations and requirements (WP2,5,6) will take into account gender-based differences in energy demand and behaviour to ensure equal opportunities and benefits to all stakeholders. The elicitation methodology (WP2) will be developed to equally consider and involve all consumers.

[7] "Gender perspectives on Access to Energy in the EU", European Parliament (2017)

RENAISSANCE is highly sensible regarding sex and gender issues related to involvement of women in decision-making, in research and in the energy industry in general. These actions alone do not ensure the development of gender-aware energy policies. Higher percentages of women technicians, engineers and scientist will help raising awareness about gender equality issues among decision makers.

1.3.6. Trans-disciplinary considerations

RENAISSANCE project groups together partners and organisations from a number of expertise including smart energy technology design, grid operation and management, software and cloud technologies development, human factors and safety issues, regulatory studies and business models implementation. The project implementation requires cross-cutting collaboration and knowledge from partners in each WP and task of the project plan. Creation of local energy communities entails the integration of different dimensions (technological, societal, economic & environmental). Transdisciplinary work and experience are required to better interconnect diverse elements and stakeholders into a unique ecosystem.

1.3.7. Description of demonstrator sites and their value to Renaissance

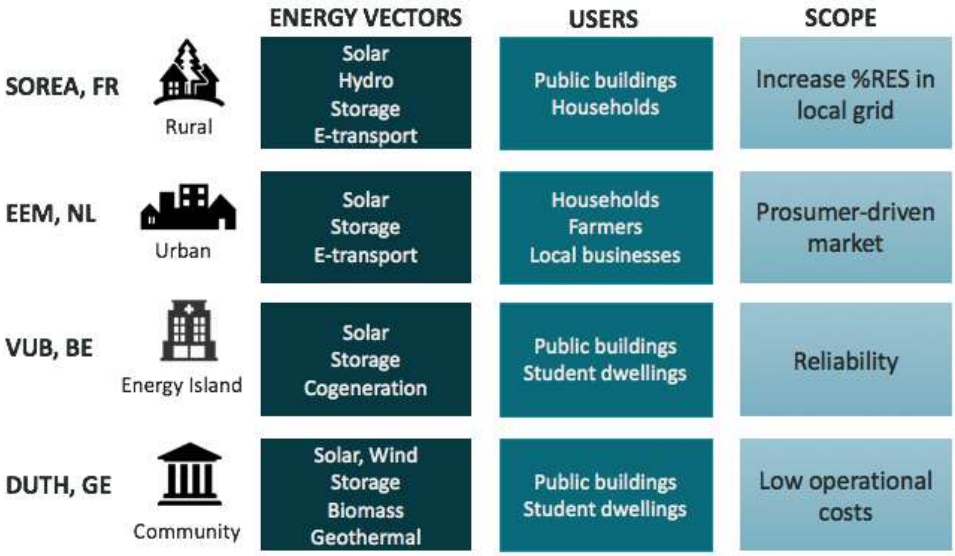


Figure 10 Overview of RENAISSANCE demonstrator sites

The RENAISSANCE project has selected four distinct "energy islands" as demonstrator sites. This allows to discover requirements and business models for the later use by different stakeholder groups in the smart grid value chain. Each demonstrator site is owned by a different actor in the value chain: DSO (SOREA), city authority (Municipality of Eemnes), social housing owner (DUTH) and public service provider (Brussel health Campus and hospital). Furthermore, each site represents different end-user groups, integrates different combination of energy vectors and has, therefore, diverse challenges when it comes to design of local energy systems.

The demonstrator sites of RENAISSANCE will allow to validate solutions and tools for local integrated energy system design. Furthermore, it will allow to benchmark business and technology models based on rea-life data gathered from sites that are operating outside of current regulatory possibilities. Finally, the consensus building approach for designing energy islands will allow to test the replication potential based on the inputs from stakeholder groups.

In addition to the real-life demonstrators, the consortium aims to test the enhanced MESA tool of energy system design at virtual sites in Poland, United Kingdom, Unites States and potentially in China (through the collaboration of VUB with GEIDCO (Global Energy Interconnection Development and Cooperation Organization)). Finally, a *draft* Coordination Agreement has been signed between Indian site owner Quess Corp Ltd. and the European partnership of RENAISSANCE. The Indian site owners will use the RENAISSANCE tools to optimise their smart grid system plans at local sites in both urban and rural ecosystems.

Below a preliminary analysis of the local cases that will be enhanced through RENAISSANCE approach. An overview of the pilot characteristics, current baselines and expected changes are described in the sections below. Furthermore, the tables give an overview of the expected investments to the pilots, in most cases RENAISSANCE will be leveraging existing pilots, RENAISSANCE strategically invest funding in the development of innovative software solutions for planning and management of energy islands. **By avoiding the investment in hardware on pilot sites, RENAISSANCE focuses on the replication rather than the implementation of energy islands allowing to envision a future free of fossil fuels.**

Eemnes (the Netherlands)

The town of Eemnes is located in the centre of the Netherlands, 35kms from Amsterdam, with 3.600 households. Eemnes seeks to be energy neutral by 2040. **This demonstrator aims to validate a local, blockchain enabled, peer-to-peer energy market in an operational environment**. During the first three years the demonstrator size will be between 100-200 participants consisting of households, local business and farmers. The ambition is to scale up to 1.000 participants within Eemnes over a period of 10 years.

The demonstrator will include high energy efficient dwellings, a local solar farm. The work will be facilitated by member-driven energy cooperation (LoS), a local energy market (**exception from Dutch regulation**: permission for peer-to-peer electricity trading received by Ministry of Economic Affairs, that will become operational under RENAISSANCE), and co-creation of a financing instrument and investments in e-vehicle charging points.

Beyond state of the art

The municipality has been granted an exemption to Dutch Electricity Laws by the Ministry of Economic Affairs (2018-2027), such exemption is granted only to few innovative projects in the Netherlands. The exemption will allow operating a peer-to-peer energy trading system. This system will be a national and potential European first in realising dynamic pricing in a prosumer environment. The market platform will be provided by Enervalis[8] and is supported by the Ducth DSO Stedin. A member-owned consumer cooperative, representing companies as well as citizens, will govern the market (LoS; annex 4-5).

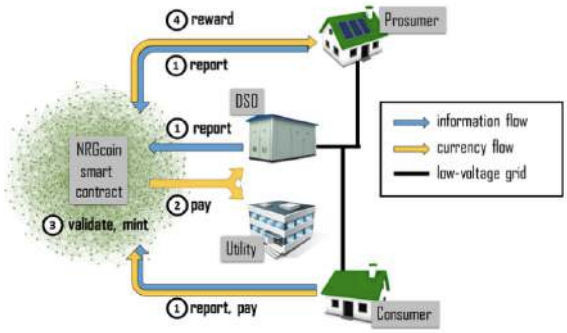


Figure 11 Eemnes Peer-to-Peer trading model

Drive to join RENAISSANCE

Eemnes is setting up initiatives that reduce energy consumption, and has a clear vision, but lacks the expertise to connect the long-term ambition with mapping alternative routes to reach that objective; suitable energy systems, supporting technology options, financing models. Such studies would increase feasibility (political support, access to finance). Eemnes hopes to work together with knowledge partners that provide the tools and experience in process and project design, stakeholder engagement and future planning.

Enervalis is a Belgium solution provider for advanced energy management services, including e-vehicle management systems, home/district energy management systems, and higher level flexibility services, including peer-to-peer trading, and for various TSO/DSO. applications. Enervalis has been active in various EU and national projects. E.g. Enervalis developed the world's first commercial implementation of an energy flexibility market based on the Universal Smart Energy Framework(USEF).

Key performance indicators	Baseline	After project	Change
Economic: LLCOE (electricity)	€0,21	€0,19	-10%
Environmental: Share of RES	12,3%	32,9%	+20%
Social: participation	25/1000	200/1000	x 8, 20% of total
Energy demand and micro-grid measures			
Energy Demand	**Current**	**Measures**	**Estimated**
Electricity consumption	3.410 kWh/y per dwelling	250 Smart Meters 250 Gateways 1 Battery Trading platform	2.920 kWh/y per dwelling
Energy Supply created		**Production in MWh/yr**	**Savings in Ton Co2**

[8] https://www.enervalis.com/

Solar panels (275WP)	1200	280,5 MWh/jr	114,9

Social engagement

The pilot will be led by the municipality of Eemnes, but will involve key local stakeholders (LoS - Annex 2)

- EnergieCooperatie Eemnes, a local not-for-profit energy association with mainly business owners (about 25);
- De Alliantie, a social housing provider owning 800 of 3500 homes in the town;
- The local business association;
- EnergieVan, acting as Energy Service Aggregator on behalf of the cooperation;

The city council actively reaches out to citizens and businesses through periodic public events, a local information point, and frequent (monthly) street-by-street information and engagement sessions. The meetings are mentioned to provide general information about building renovation, and will be used to on-board participants for the future energy market.

Project budget

The total project budget for 4 years is €1,9M, excluding dwelling renovation. The RENAISSANCE project would help close the gap in the business case, which is funded through the market trading mechanism.

Total project budget[9]	**Cost per unit**	**Total budget**	**Investments under RENAISSANCE**	**Budget line**
Gateways (smart-meter already installed)	€600 per unit	€615.000	€86.250	Equipment
Substations	€25.000 per unit	€50.000	€6.000	Equipment
Battery	scalable	€360.000	€65300	Equipment
Platform usage, development, maintenance	€48 per user per year	€540.000	€77.350	ICT
Project Management office		€168.000	€150.000	Staff
Stakeholder mgt		€168.000	€40.000	Staff
Total:		€1.901.000		

[9] Section 3.3 will define the investments under RENAISSANCE project

Kimmeria Student Buildings, Xanthi (Greece)

The pilot site is located in a rural area about 1 km west of the city of Xanthi and 1 km east of the Kimmeria Village, in North Greece. It includes a building complex of 11 buildings of total area of 15.000 m^2, that consists of 8 buildings for students' residences, one electromechanical equipment building, one restaurant and one amphitheatre, owned by Democritus University of Thrace (DUTH). Students' residences are provided free of charge, therefore characterizing the buildings as social housing.

Beyond state of the art

Reliability and low operational costs through the maximum utilization of RES technologies are the focus points of this demonstration site due to its social character. During the RENAISSANCE project, the demonstrator will run mainly using the local generation. The remaining share required is drawn by the main electricity. Through RENAISSANCE, the pilot will demonstrate solutions that can solve large imbalance between supply and demand of thermal energy as well as between supply and demand of electricity through Power-to-heat and ORC generator. The demonstrator will prove the value of local energy communities with similar characteristics in the southern European area. The successful execution of the pilot will unlock the potential replicability at large scale in University campuses and/or student residences located in rural areas with similar climate conditions. Indeed, demand profile of the energy community would be similar and high availability of renewable sources such as solar and heat would enable the creation of sustainable self-sufficient energy communities.

In addition, with the contribution of a simulation engine, after being run for the DUTH campus based micro-grid, this will be extended to include also its virtual connection with the macro-LV/MV (DSO level) grid, by including energy production/consumption profiles of near-located energy intensive industries and that of the city of Xanthi, for which data are available. This activity is of importance, since through simulation results, it can be identified the technical extent up to which a micro-grid can interact with a macro-grid. This in turn can define flexibility potential of participation in implicit (dynamic energy pricing) or explicit (load shedding) Demand Response programs. Through that, the integrated solutions demonstrated in RENAISSANCE will be stress tested for their scalability and replicability for the cases that a micro-grid operates not in an islandic mode.

Drive to join RENAISSANCE

DUTH is pushing for new technical solutions and want to implement and develop new state-of-the-art models. Currently, they lack international expertise from the academic and industrial fields to develop such systems. By joining Renaissance, the pilot of Xanthi hopes to benefit from process design from industrial partners and software solutions from industrial partners as well as from other academic institutions.

Key performance indicators	Baseline	After project	Change
Economic: LLCOE (electricity/thermal)	0.22€/kWh (electric) 0.09€/kWh (thermal)	0.20€/kWh 0.07€/kWh	-9% -20%
Environmental: Share of RES Electric	3%	10%	+7%
Social: participation	0/1000	500/1000	50% of total
Energy demand and micro-grid measures			
Energy Demand	**Current**	**Measures**	**Estimated**

Electricity consumption	1500 MWh/y 10MWh/y excess electricity	7kWe ORC generating 50 MWh/y Smart meters	1300 MWh/y
Heat	2300MWh/y (100% RES) Excess 100 MWh/y (RES)	Thermal buffers 9000l Adjustments on the current pipe network PCM storages: 60kWh Smart meters	Improved use of heat for electricity production Reduction of biomass consumption
Energy Supply created	**Measures**	**Production in MWh/yr**	**Savings in Ton Co2**
ORC generator	7kWe generating electricity	50 MWh/y	57 tCO2/y

Social engagement

The core energy community of Greek demo site comprises: 8 buildings of students' residences (630 students); 1 restaurant (serving 400 people); 1 amphitheatre (capacity 700 people).
Potentially, the energy community of the Greek demonstrator site can further include:

- 7 buildings of DUTH's school of engineering (more than 1000 students every day and more than 200 employees;
- A neighbourhood of city of Xanthi or Kimmeria Village including rooftop PV and PV parks owners;
- Industries located near the demo-site;
-

Key stakeholders involved in the execution of the demonstrator are the Democritus University of Thrace, CERTH, the Municipality of Xanthi, commercial and industrial facilities (who are supporting with a LoS), the students and staff of the university (actual participants through DUTH).

Currently, there is no active participation of prosumers in the local energy market. In order to engage end-users and eventually influence their consumption behavior, smart meters will be installed and connected to the FUSE enhanced platform. Installation of smart meters for both thermal and electrical consumption will increase observability and transparency of consumption profiles by 100%, enabling to test DR schemes and innovative market models. Smart contracts and improved communication tools such as mobile apps will increase participation of end-users by 50%.

Project budget

The total project budget for 4 years is €110.000.

Project budgets		**Total budget**	**Budget line**
ORC turbine of 7kWe		€50.000	Equipment
Smart meters (electric smart meters, smart thermostatic valves, thermal smart sensors) (300 addressing the needs of 100 prosumers (students		€17.000	Equipment
SUNAMP PCM storage 60 kWh (2)	€7.800 per unit + shipping	€18.600	Equipment
Equipment for advances in electrical grid (cabling, switching, etc)	Scalable	€4.000	Equipment
Buffer tank of 3000 lt (3 items)	€4.000 per unit	€12.000	
Hydraulic equipment for advances in thermal grid (pumps, pipes, insulation, etc)	Scalable	€7.000	Equipment
Total:		€108.600	

VUB pilot name: Brussels Health Campus (Belgium)

The Brussels Health Campus containing the university Hospital (Universitair Ziekenhuis Brussel UZB-VUB) and part of the Vrije Universiteit Brussel (VUB), is a well-advanced energy island owning and running a state-of the art microgrid that can work in island mode for 5 consecutive days. It includes a thermal and electricity grid, waste water recovery, a high-speed glass-fibre telecom network and a total of 33 HV transformers divided over HV 18 substations. Energy production and storage include photovoltaics (817 kWp), CHP 2.8MW, and 3 emergency generators (5.25 MVA), and a total capacity of 2,5 MWh in battery storage.-The microgrid serves the hospital complex, 250 student dwellings, the faculty of health sciences, a primary school and a fitness centre.

During the 2018 -1019 the site will be further extended with 0,6 MWh Batteries, 1.200 kWp photovoltaics and a 25 MWh ice buffer, additionally in 2022 a Borehole Thermal Energy Storage (BTES) of 1.6MWh system will be installed. The microgrid contains about a 1000 smart-meters that are included in a PRIVA Building Management System. Power generation is controlled by a DEIF systems, and the switchboards and controllers for load-balancing and emergency scenario's in the HV Grid are controlled by Siemens Software, the whole is and programmed by SDME. The microgrid system is conceived to go in island mode with complete automatic transition in max. 15s to critical need and 3 min to comfort need. The financial bookkeeping and billing to the different consumers in the microgrid is carried out by means of ERBIS software platform. Cutting edge control technology and maximal reliability are the focus points of this demonstration site.

Beyond state of the art

Currently the load balancing is mainly carried out by balancing the loads and production at HV level. In such scenario's it is possible that certain substations need to be shut down resulting in partial shut-down subsystems. In order to avoid such situations a smarter management of the consumption at the various departments of the hospital may consistently help in sustaining the balance within the microgrid. For that purpose, intelligent scenario's need to be implemented in the controllers of the energy management of the buildings, prioritizing the most important consumers (e.g. surgery rooms), delaying and adapting/reducing consumption for less important components systems. Several scenario's need to be programmed in order to ensure fast response on various levels of balancing needs. This methodology/intelligence is an enabler for the deployment of microgrids in a broad sense, it not only increases efficiency of the microgrid but is also an enabler in less complex systems.

VUB will develop and introduce the scenarios in the controllers of the Priva Building Management System in collaboration with SDM-projects. In addition, the demo site will take into account the *extension of the renewables* and storage (PV, ICE, Borehole, Batteries) in this context, and study and implement the use of additional storage in terms of curtailment mitigation. The VUB will carry out this task in collaboration with SDM-Projects based on the multi-vector design tool developed in WP2. Finally, the implementation of batteries in a microgrid does not only allow for internal balancing and renewable energy storage, but also allows to foster trading in the reserve markets. Especially in the R1 market where reaction speed is in the order of 30 seconds, with limited power alteration but with an activation of about 100 times/year. The project will study the potential of R1 trading with the local DSO in Brussels (Sibelga) and the potential ROI and the potential implementation of an innovative Universal Power Device (UPD) developed by SDM projects, serving to control a complex hybrid power production plan. (Potential savings of R1 trading are currently estimated 14%).

Drive to join RENAISSANCE

The creation of a smart grid for the university hospital is an opportunity for real-life tests of current technologies, especially since the added features characterizing a smart grid are very important to a demanding infrastructure such as a hospital. The academic drive to push technology and the technical need for more reliable grid management systems due to rising importance of renewable energy sources has lead VUB to develop a research pilot. The interest to the Renaissance project to develop microgrid technologies fits perfectly both the hospital needs. Parallel, the hospital putting a priority on reliability and energy efficiency rather than price (as in some of the other pilots), brings another dimension to Renaissance.

Simulation Platform for benchmarking

The measurements of the 1000 smart meters are stored at UZ-VUB and will be used as an open source platform for the testing of the software tools and algorithms developed in WP2, WP3 and WP6. The historical data can not only be used to improve the models, but also allows to create virtual communities and test smart clustering and trading mechanisms.

Key performance indicators	Baseline	After project	Change
Economic: LLCOE (electricity)	0,10 €/kWh	Only PV: €/0.092 Kw after 10 years Only BTES: after 9 years €/0.097 Kw	-8% -3%
Environmental: Share of ***local*** RES on yearly basis	3.2%	8%	+4,7% (including grid +/- 14%)
Social: participation	0	100 students	100 students
Energy demand and micro-grid measures			
Energy Demand	**Current**	**Storage Measures**	**Estimated**
Electricity Consumption	25000MWh/year	Ice Buffer 20MWh BTES 1.6MWh Total Batteries 3,1 MWh	- 875MWh/Year
Energy Supply created	MWh/year	**Production measures in MWh/yr**	**Savings in Ton Co2**
Solar panels	800	Additional 1200	280 ton/ year

Social engagement

Currently the 400 students in the adjacent student houses all get an equal electricity bill based on an average consumption. In order to raise awareness in the student community, Smart meters will be installed in 100 student houses owned by the VUB, monitoring the electricity consumption of each student room. Installation of the smart meter will be carried out by subcontractor ENERVALIS, who will also gather the data and pass it through the data base of UZ-VUB and prepare them to be ready for the collaboration platform that will be provided by CERTH. Students will be shown their consumption behaviour and incentivized they will be incentivized through e.g. reduction of house rent. A such customer sensitivity to incentivizing measures is monitored. In addition, the different services of the VUB will be separately billed in order to incentivize their behaviour towards a more efficient use pattern, e.g. carrying out energy intensive operations on moments electricity is cheap/abundant. Finally, the UZVUB personnel will be engaged in a crowd funding exercise for purchasing the new photovoltaics in the hospital, as such investigating methodologies for citizen engagement in the capex participation.

Project budget

The total project budget for 3 years is €273250

Project budgets		**Total budget**	**Budget line**
Smart Meters + Gateway in student houses	€600 per unit	€60 000	Equipment
PLC's, software licenses	1 PLC for Priva incl software and ICT hardware.	€10000	Equipment
Platform, development, maintenance	€ 150/user/year (2 years)	€30 000	ICT, Data Subsciption
Project Management Office	1 PM	€5250	Staff
Stakeholder Management	2 PM	€10500	Staff

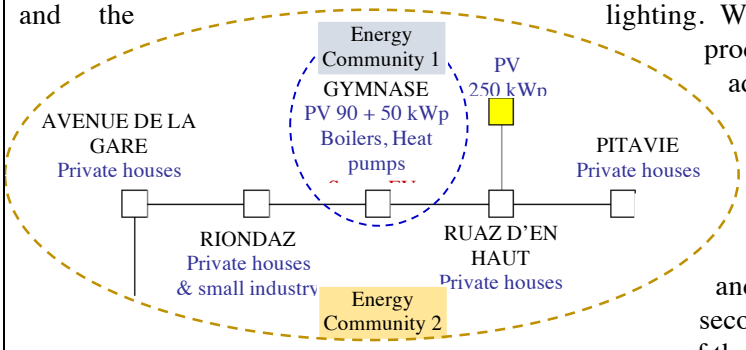
Implementation and operation	30 PM	€157500	Staff
Total:		€273250	

Saint-Jean de Maurienne (France)

The demo site of Saint-Jean de Maurienne operated by SOREA will be made of 5 low-voltage branches (5 micro-grids), each one supplied by one MV-LV substation fitted with a 400 kVA transformer. These 5 micro-grids together have been selected as demo site in order to allow two-level simulations and operations of energy exchanges and Energy Communities. Today, the RES ratio on the network operated by SOREA is 35% on a yearly basis, from 10% in January to 110% in May.

The first energy community, called Gymnase micro-grid, will be built between the 2 PV producing companies and the local consumers which are mainly public buildings (sport hall and kinder garden) fitted with heat pumps, boilers and heat storage. On this micro-grid, PV curtailment is experienced during very sunny day, to solve that a charging station for EVs and E-buses, a 200 kW/200 kWh Lithium battery and an additional heat storage tank (to increase power-to-heat capacity) will be installed during the project. This Energy Community will be simulated and operated on the energy management platform proposed by partners ATOS and CERTH. SMARTWALL will do the practical work on building the 2 Energy Communities and the smart contracts in the SOREA demo site. SOREA will collect the data and manage the site. The data will be transferred to SMARTWALL for analysis and management of the 2 Energy Communities.

The local PV production will be used to charge the electrochemical battery used mainly to supply the heat-pumps and the lighting. When the battery is fully charged, the local PV production will supply the electric boiler and heat the additional hot water tank. PV curtailment will then be drastically reduced. A second Energy Community will be built with the first Energy Community (Gymnase micro-grid), part of the local consumers from the 4 other micro-grids which are residential, shops and small industry, and the PV producing company (250 kWp). This second Energy Community will be impacted by the use of the MV distribution grid.



Beyond state of the art

The 2 Energy Communities will explore a real simulation of time-of-use energy tariffs. The present and short-term regulations do not allow for free energy tariffs for small consumers, in particular a higher cost at peak period. In these 2 Energy Communities, smart meters will record real-time energy consumption (heat & electricity & gas). Demand-response actions, including electricity (battery), heat storage (P2H) and EVs charging will be developed to reduce consumption during the peak hours and increase it during low energy cost periods. Then, the cost energy will be calculated in one (or few) given smart contract scenario(s), optimized for the whole Energy Community and compared to present cost for the consumers in the Energy Island.

Drive to join RENAISSANCE

For the purpose of the experience, the consumers in the Energy Community will really pay the energy following the smart contract tariff, the difference versus the real present cost will be assumed by the local DSO (partner SOREA). Optimization will be calculated for the whole community. The experience will put the consumers in a real environment of time-of-use energy tariffs calculated every few minutes. Financial gain will encourage consumers to "play the game » of optimizing their common time dependence consumption and DR actions.
The pilot indent to:

- Demonstrate the energy management platform to optimize use of energy and storage (battery, P2H, EVs charging);
- Demonstrate the optimization of the local consumption of locally produced renewable energy;

- Demonstrate a local energy community on 1 micro-grid (low-voltage branch), based on the energy management plateform from the project;
- Demonstrate a local energy community on 5 micro-grids on the MV grid, based on the energy management plateform from the project
- Demonstrate solutions for fast voltage deviation issues when PV production is unstable (partially cloudy days) or too high end of line voltage at maximum PV production.
- Opportunities to avoiding grid reinforcement for the specific purpose of EVs charging (in particular E-buses which require high charging power): An E-buses charging station will also be installed (to charge E-buses during sport events), with an expected power of 250 kW. This will be coupled with an additional 200 kWh/200 kW battery and an additional 100 kWp PV system. This will avoid grid reinforcement which is estimated to 450 k€ for the transformer, cables and civil engineering.

Key performance indicators	Baseline	After project	Change
Economic: LLCOE (electricity) *Currently not able to calculate the impact of energy vectors; at the start of the project the baseline will be improved to include other energy vector costs/revenues.*	TBD	TBD	TBD
Environmental: Share of RES	35%	50%	+15% abs.
Social: participation	-	2 Energy Communities	2 Energy Communities
Energy demand and micro-grid measures			
Energy Demand	**Current**	**Measures**	**Estimated**
Electricity consumption	3 400 MWh	3 400 MWh	Self-consumption
Energy Supply created			
Solar panels	140 kWp	240 kWp	+ 71%
Production (incl. curtailment)	122 MWh/y	254 MWh/y (no curt. with battery)	+ 108%
Savings in Ton Co2	58	121	+ 108% savings

Social engagement

The pilot will be lead by the DSO SOREA, and will involve key local stakeholders

- The Gymnase, a local not-for-profit energy association with mainly business owners (about 25)
- Local businesses
- Private households
- The municipality of Saint-Jean de Maurienne

To engage consumers in a real-life experience, they will pay the tariffs calculated by the smart contracts. Through these consumers will be financially encouraged to provide demand response actions to lower their bills.

Project budget

The total project budget for 4 years is 494 k€.

Project budgets		**Total budget**	**Budget line**
100 smart-meters & 2 Gateways	94 & 800 € per unit	11 000 €	Equipment
5 grid controllers & switches	2 000 € per unit	10 000 €	Equipment
Heat Storage		16 000 €	Infrastructure
Battery / BMS / Inverter	200 kWh / 200 kW	90 000 €	Infrastructure
SUNAMP PCM storage 60 kWh (2)	€7.800 per unit + shipping	18.600€	Equipment
Project Management office		367 200 €	Staff
Total		494 200 €	

India

Together with the Indian partnership (currently signed by Quees Corp Ltd. waiting for signature from Sun Group), RENAISSANCE has identified 6 sites for potential replication sites in India (here presented 3). In addition, during the project the partnership will potentially approach the city of Panjimin in the framework program of the Government of India called MNRE for the Solar / Green Cities https://mnre.gov.in/solar-cities.

Demo 1: Village, Rural
Location: Jharkhand
Size/types of assets: villages with +100 house holds.
Stakeholder groups involved: Smart Power India (SPI), i engineering Group, village gram panchayat.
First ideas on applying the RENERGiSE tool: Electrify the identified rural area, using renewable energy resources thus making it self-sufficient and independent of the centralized grid.

Drive to join RENAISSANCE
Poor air quality and unreliable power supplies were identified as key issues in the International Energy Agency's India Energy Outlook 2015 report[10]. Furthermore, India is expected to surpass in energy demand China by 2040. In order, to reduce the current dependency in fossil fuel consumption and increase the reliability and access to energy in both rural and urban environments India is looking at the options of setting up local energy systems that consumer renewable energy sources. This will allow for more reliable energy systems, better air quality and reduced energy poverty in the country. Indian partners join the Renaissance project in order to identify energy systems that are cheaper to run, more reliable, more sustainable and energy efficient than the conventional system designs.

Demo 2: Manufacturing Unit, Urban
Prismatic Engineering Pvt Ltd.
Location: Jigani Industrial Area, Bangalore, Karnataka
Size/types of assets: Contract demand of 65 KVA; manufacturing of HF Switching Power Transformers, Common Mode and Differential Mode Chokes in various geometries, Mains Frequency Step Down Transformers for Linear Power Supplies and a variety of custom magnetics for the Electronics Industry.
Stakeholder groups involved: Prismatic Engineering Pvt Ltd
First ideas on applying the RENERGiSE tool: to setup solar power plant, energy storage, minigrid and optimize the solar power generation to reduce diesel consumption.

Demo 3: Housing co-operative, Urban
Prestige Oasis, Independent Villas
Location: Yelahanka, Bangalore, Karnataka
Size/types of assets: 33 acre property with 182 villas and common amenities like sewage treatment plant, water treatment plant.
Stakeholder groups involved: Prestige Estates Projects Ltd – Property developer, housing co-operative, tenants who are owners of dwellings and co-owners of common areas.
First ideas on applying the RENERGiSE tool: to setup solar power plant, energy storage, minigrid and optimize the solar power generation to reduce diesel consumption of the community.

China

The virtual demonstrator will be selected during the duration of the project in collaboration The Global Energy Interconnection Development and Cooperation Organization (GEIDCO), with its permanent office domiciled in Beijing, China, is an international organization among willing firms, associations, institutions and individuals who are dedicated to promoting the sustainable development of energy worldwide.[11].

Drive to join RENAISSANCE
China has a large SMOG problem due to a high dependency on coal powerplants. To mitigate this problem China is already one of the biggest investor in renewable energy in the world. Following the same objectives, the involvement in Renaissance will make the electricity greener and the grid safer and more reliable, all of which will in turn make the air cleaner and result in lower CO2 emissions.

[10] https://www.iea.org/publications/freepublications/publication/IndiaEnergyOutlook_WEO2015.pdf
[11] http://www.geidco.org/html/qqnycoen/index.html

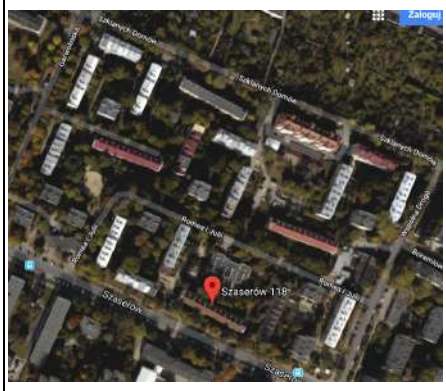
United States, North Carolina

The virtual demonstrator will be selected during the duration of the project in collaboration with the Research Triangle Region of North Carolina, one of the oldest and largest research parks in the world, in North Carolina near the mid-point of the U.S. East Coast[12].

Drive to join RENAISSANCE

The United States are very dependent on fossil fuel and oil in particular. To mitigate the increasing price of energy, local research groups are pursuing the development of smart grid technologies. Island grids are of significant importance in the US as many villages or farm are isolated and thus either not connected to the national grid or suffering high energy transmission losses. To mitigate those effects, participating to a project such as Renaissance is a valuable opportunity. This would allow to lower the cost of energy, get a more reliable electricity and limit the fossil fuel dependency.

Poland



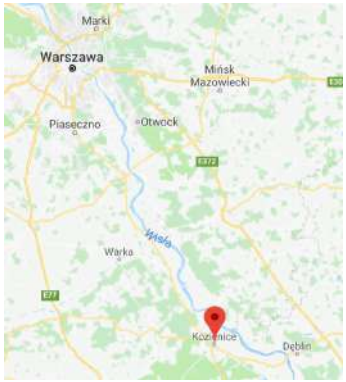
Housing co-operative Szaserow (Warsaw)

Size & types of assets: 28 multifamily residential buildings with 800 dwellings and approximately 1800 residents

Stakeholder groups involved: housing co-operative, tenants who are owners of dwellings and co-owners of common areas, City of Warsaw as owner of kindergarten located inside the settlement

Interest in RENAISSANCE: to learn abour modernisation of buildings and surrounding areas towards energy independency from utilities by use of RES and smart grid solutions. Study indication of potential technology packages that could maximise/optimise such system from energetic and/or financial perspective.

City of Kozienice



Size & type of assets: 18 000 inhabitants, where of a half are living in 56 buildings of the Co-operative Kozienice constructed during 60-ies of XX century, public buildings of the City, co-operative and commercial buildings, district heating system supplied so far by the hard coal fired heat only plant of 35MW capacity. Heat is used for residential and public buildings being subject of deep renovation in short perspective.

Stakeholders: inhabitants, municipality, Municipal Company managing the DH, water & sewerage and waste economy, public transportation.

Interest in RENAISSANCE: The city hopes to gain experience in desiging the business models for introduction of RES in municipal economy including application of smart-grid solutions. Stuyd concerning indication of potential technology package that could maximise and optimise such system from energetic and/or financial perspective especially for development of electro mobility in public transportation and use RES for heating purposes.

Drive to join RENAISSANCE

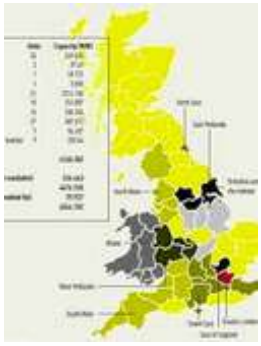
GHG emissions in Poland decreased strongly in the period 1990- 2002, but after 2002 emissions slowly grew until 2015.[13] To achieve its global GHG emissions for 2050, Poland needs to start investing significantly in RES and in prepare the move to smart grids. The Renaissance project is perfectly aligned with this strategy and is thus an excellent opportunity for the Polish local energy markets.

[12] http://www.researchtrianglecleantech.org/

[13] http://www.europarl.europa.eu/RegData/etudes/BRIE/2017/607335/IPOL_BRI(2017)607335_EN.pdf

United Kingdom, Oxfordshire

Pilot overview



The virtual demonstrator will be selected during the duration of the project in collaboration with Cambridge Cleantech[14], a leading cleantech community in Europe. They achieve this through their mission of enhancing the area's global competitiveness by co-ordinating, supporting and promoting commercial opportunities for their members. They have pre-identified a community in Oxfordshire, UK to become one of the virtual demonstrator sites.

Drive to join RENAISSANCE

The UK intends to lower its CO2 emissions according to the Paris agreement. To do so, the electricity production will need to move from natural gas power plant to renewable power plant. As one of the strategy is to pursue microgrid development, it is very interesting to develop UK based smart grid cases, especially as UK grid is facing increasingly capacity constraints at the NDO level. Through the Renaissance project, UK based pilot will be studied and allow make a first case study for future development.[15]

[14] http://www.cambridgecleantech.org.uk/about-us

[15] Xenias, Dimitrios, et al. "UK smart grid development: An expert assessment of the benefits, pitfalls and functions." *Renewable Energy* 81 (2015): 89-102.

1.4. Ambition

RENAISSANCE focuses on demonstrating an approach to design widely acceptable solutions for decarbonised Local Integrated Energy Systems.

Local Renewables' route to grid parity

The dominant approaches to decarbonisation of energy systems focus on individual buildings, or on large-scale RES projects. For dwellings, 100% self-consumption can be realised if there are no cost restrictions. These solutions have a pay-back of 20-30 years, which should decrease to 10 years by 2030. However, solutions are less suitable for existing buildings. In terms of Levelised Cost of Energy, hydro and on-shore wind are on par with coal and natural gas, which have an LCOE of €0,04 - €0,09 per kWh. Overall system cost – transmission, distributions and associated taxes and levies - lead to prices of €0,10-€0,25 kWh. The 2016 Scenario of the EC foresees a price increase to €0,11-€0,30kWh due to increased TSO and DSO costs.

Local intermittent solutions such as PV (€0,08-0,012) and biogas (€0,15-0,22) have a higher LCOE then large-scale RES and non-RES. The potential of self-consumption and other business models that avoid TSO, DSO costs and taxes however create a positive business case if prices would be considered in terms of Local Levelised Cost of Energy. RENAISSANCE has the ambition to demonstrate LLCOE equal or better to grid prices, at at least 27% local RES.

Table 5 Smart grids route to market

	EU Urban Market			Innovations (2030 market standard)		
	LLCOE	lRES	Examples	LLCOE	lRES	Examples
New build	+5–15%	100%	Market prices	Parity	100%	Numerous
LEC	n/a	n/a	n/a	90-100% v centralised	37%	RENAISSANCE
Centralised	€0,10-0,25	0-20%	EC 2016 scenario	€0,11 - 0,30	20%	EC 2016 scenario

Smart Grids´ route towards consumer-centric and acceptable solutions

Many models have been developed to integrate distributed energy resources in the grid, such as virtual power plants, community groups, energy hubs and others. These integration approaches however mostly focus on technical aspects. Also Local Energy Community approaches failed to deliver the combination of value generation and high degrees of RES integration as models focused on self-reliance, resiliency, or aggregation services. The limited momentum for solution uptake can mainly be attributed to missing active engagement from local communities as well as existing regulatory barriers. Local consumers want low-cost, hassle free energy at their disposal[16].

The US Department of Energy, reflecting on the technology adoption in its Modern Distribution Grid Advanced Technology Maturity Assessment[17] notes that key technologies, including distributed energy resource management systems, and microgrid interfaces are in pilot phases.

Figure 15: Distributed Resource Management

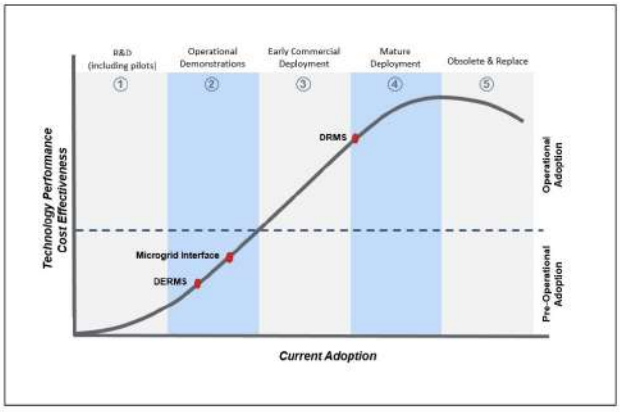


Figure 12 Current Adoption levels of micro grids

The key challenge, and ambition of RENAISSANCE is to cross the chasm from early adopters to early majority. This requires reaching audiences that are not technology enthusiasts or principled environmentalists, but rather pragmatists that focus on value propositions and established providers. For the uptake of Local Energy Systems products and services, elements to be improved are[18];

- Map stakeholder interests to avoid issues with coordination
- Quantify benefits for stakeholders
- Share costs and benefits fairly amongst the stakeholders involved
- Transparent coordination and interactions to ensure fair cost-benefit allocation

[16] Koirala (2016) Market intrgration of Local Energy Systems, https://www.sciencedirect.com/science/article/pii/S0360544216311859

[17] US DOE (2017) Modern Grid Distribution www.gridarchitecture.pnnl.gov/modern-grid-distribution-project.aspx

[18] Koirala (2016) Market intrgration of Local Energy Systems

Foreseen uses and advancements in state of the art of LES approaches

From a technology perspective, LECs are feasible. As described elsewhere, RENAISSANCE will use commercially available hardware for generations, storage and distribution – supporting technology innovation only where a significant impact is expected on smart grid integration and effectiveness. But, to cross the chasm from early adopters to early majority buyers of smart grid technologies and integrated system need to be shown and guaranteed positive returns of the local integrated system compared to the current legacy systems. That is why **innovation focuses on developing an approach that puts the "consumer" perspective centre stage**. Key innovation steps have been identified to enhance the consumers perspective in the analysis and modelling, and in operational phases, the demonstrators are key to this project as it allows to test, validate and refine approaches for different settings (country, geography, institutional structure and other factors) as well as populations (citizens, businesses, students).

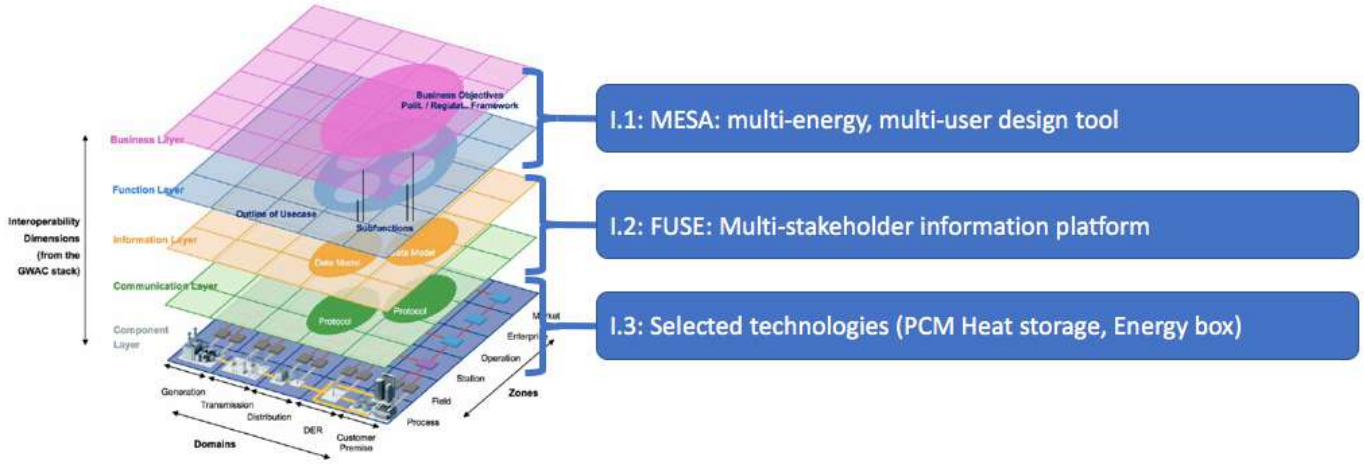


Figure 13 Overview of the RENAISSANCE individual innovation layers

In REINAISSANCE, 3 main innovation areas can be identified, depicted below and described further on this section. Innovation 1 integrates consumer acceptable business models and individualised cost/benefit analysis in the ABB MESA tool for the Analysis and Design phases. Innovation 2 will integrate integrated settlements through smart contracts and simplified user interfaces in ATOS FUSE platform. Innovation 3 will cover key hardware that unlock additional optimisation potential, in particular PCM heat storage and Energy Management control boxes.

Overall, the TRL composition of RENAISSANCE is as follows

Hardware Applications	Technologies implemented	Current TRL	Target TRL	Market uptake
Generation	Commercial	TRL 9	Medium	Medium
Storage	PCM storages	TRL5	TRL 8	n/a
	Commercial	TRL 9		Low
Distribution	Commercial	TRL 9	Low	Low
Demand-side	Commercial	TRL 9	Low	Low
	EnergyBox	TRL 5	TRL 8	N/a
ICT Software	Technologies implemented	Current TRL	Target TRL	Low
Design & Analysis	ABB's MESA	TRL 5-6	TRL 8-9	Low
Management platform	ATOS FUSE	TRL 5	TRL 7	Low

1.4.1. Innovation potential

Advances in analysis and design of LES: ABB MESA tool and stress-testing

State of the Art

As community scale energy systems are being promoted by policy, a wide range of modelling tools for community scales are being developed, over 70 have been identified in recent research. They are mostly at TRL 5-6 levels; tested in the intended environment, but case specific[19].

Traditional – operational - power system simulation focuses mainly on system analysis and load flow calculation (PowerFactory, NETOMAC, PSAT[20]). Including Smart-Grid specific characteristics, such as distributed energy resources, distributed storage and trading, is still in its infancy (TRL4-5). Two main approaches are used; single-simulation approaches and co-simulation. Examples of the first are GridLab-D, HOMER and IDAPS. Examples of the latter are EPOCHS, GECO, PowerNet and others. These systems better handle complexity, multi-systems and control strategies – but are usually limited to electricity. Expansions to thermals systems are recent (HOMER, 2017). The VUB-MOBI model connects all energy carriers in use at the University of Brussels complex. The model is operational, but in a non-commercial environment (TRL4/5).

Considered most advanced by RENAISSANCE is the HOMER tool, which now uses electricity demand, available solar, and biomass resources, and associated costs to analyse techno-economic viability of a system. It allows optimising system size to reach minimum net present costs. Other systems, such as TRNSYS, have a larger library of components and solvers with user-defined time steps of as little as 1 second. The level of input requires makes these tools better suitable for buildings.

Challenge

For delivering community-driven approaches, there are three main challenges;

- Most energy grid design tools are designed with – often explicitly or implicitly – a specific type or technical challenge in mind, such as balancing or voltage control. This approach does not lead to community level option analysis and business case identification. The tools are therefore not suitable for in **future open energy markets which require multi-stakeholder engagement for multi-level system analysis**.
- Tools need to take local geographic information into account. Solely focusing on technical system design like current tools do, has a key omission; the distance between generation, storage and use functions in the grid. By not including cost for connecting assets, no real cost-benefit analysis can be made at aggregated or individual user level. **Reference tools HOMEr and TRNSYS are not GIS-capable**.
- Tools need to assess viability based on stakeholders / participant acceptability on technical, financial, and sustainability criteria. This requires **a detailed understanding of individual and aggregate end-user requirements and an approach to balance these**.

Ambition beyond state of the art

RENAISSANCE will enhance ABB's MESA decision-making tools in the following ways;

- A tool that can analyse energy vectors in any given environment – not a specific system – and identify possible "systems" where a business case could be realised. This means including all assets (use, storage generation) in open-ended systems, and 3-dimensional option-analysis; horizontal (among peers, mostly prosumers), vertical (clusters, centralised generation/storage)) and diagonal (across energy types).
- Addition GIS information to accurately map assets, and prices of connecting infrastructure such as cabling, to arrive at a far more accurate and individualised cost-benefit analysis

[19] https://www.sciencedirect.com/science/article/pii/S2210670717309824
[20] https://www.researchgate.net/publication/269274354_Requirements_for_Smart_Grid_simulation_tools

- Integration with the MAMCA software developed by VUB. This multi-actor multi-criteria analysis tool allows for detailed mapping of participants preferences across a large number of variables (financial, operational, technical, etc). It will act as a filter on the proposed smart grid solutions identified by the MESA tool
- Addition of an easy-to-use interactive interface to allow direct utilization by LES site owners, hence, enhancing its replicability and uptake potential.

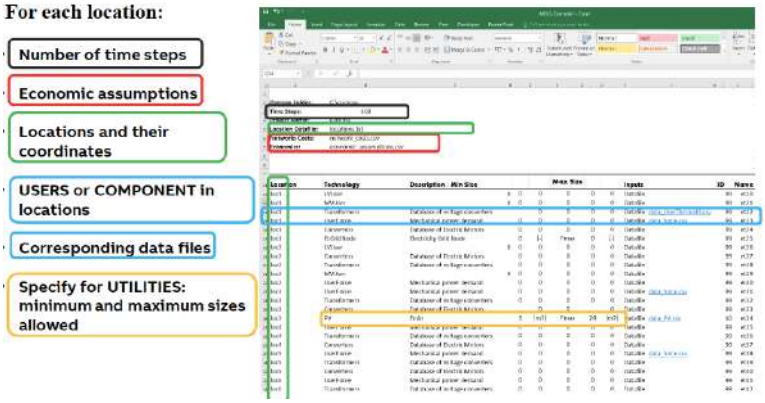


Figure 14 Screenshot from MESA tool

CERTH stress-testing tool for analysis and design tools

To independently stress-test primary analysis and design solutions, CERTH will adapt a dynamic, multi-physical and holistic micro-grid simulator modelling platform, using APROS software for refined design and optimised control strategy. This platform is based on system dynamics modelling and uses causal loop diagrams (CLD) and feedback loop structures. This will effectively result in stress-testing for micro-grid energy sustainability and symbiotic operation of all energy vectors and improved energy resilience and demand-response readiness during both on and off-grid periods (Peak to Average optimization).

Advances in integration and operation of Local Energy Systems: ATOS FUSE

Current SotA of Energy management and trading platforms

Energy management software currently count 100s of different commercial solutions (eg. Etronix, Wattics, EEM, Energinet, etc) to monitor, control and optimise the overall performance and operation of any type of energy system.

P2P software platforms represent a step further towards the creation of decentralised multidirectional market structures in LES. Several are the projects at European and international level that have piloted p2p business models and platforms (TRL 5-6) (Piclo, Smart Watts, TransActive Grid, etc)[21]. Among them, Enerchain[22] represents the most relevant example, bringing together powerful energy trading firms for the development and demonstration of a blockchain based architecture to execute electricity transactions.

Some of these solutions are already close to market (TRL8) and being deployed in real life demonstrators in several countries. However, regulatory restrictions limit their application and uptake. Enervalis is a software provider who has developed and tested a novel P2P energy trading platform supporting blockchain market mechanisms whose first commercial implementation will be carried out at Eemnes pilot site thanks to the exemption received from the Dutch electricity Law. Technology immaturity and market uncertainty of P2P trading software leave space to potential relevant innovations in this field. RENAISSANCE aims to go a step further of the current technology developing an integrated solution with novel capabilities which have never being demonstrated before.

Challenge

RENAISSANCE aims to advance the current state of the art of ATOS FUSE platform by embedding additional functionalities on top of the core data layer (TRL 5) which enable a consumer-centric operation of the LES. Current commercial energy management and trading platforms are strictly connected to the control and operation of the electricity layer and related market structures. RENAISSANCE aims to provide a complete software solution connecting into a unique ICT architecture different energy vectors. Objective is to deliver a platform to transform LES into fully transactive energy networks based on blockchain technology enabling innovative business models with high social acceptance.

Interconnection with multiple actors and devices requires superior interoperability to ensure secure and solid data transfer. Currently, a standardized and replicable architecture to enable communication and transactions among different systems and communities is missing. RENAISSANCE aims to fill this gap by providing an advanced interoperable platform.

[21] "Review of existing Peer-to-Peer Energy Trading Projects", C. Zhang et al., Energy Procedia (2017)
[22] ENERCHAIN (2017) https://enerchain.ponton.de/index.php/21-enerchain-p2p-trading-project

Ambition beyond the state of the art

The goal of RENAISSANCE platform is to upgrade local micro-grids with intelligence pertaining to flexibility and demand response agility over available multi-energy sources, whilst facilitating the integration of a multi-vector energy trading market among local producers, consumers and prosumers alike. Higher stakeholder participation is ensured by offering a range of multi-energy innovative services (including smart contracts) for automated transactions.

Taking this a step further, the RENAISSANCE platform aims to facilitate a transactive energy network among neighboring local energy communities (Community-2-Community trading) in the attempt to empower disconnected and fragmented local ecosystems to interoperate and interact at energy as well as stakeholder level. The following figure depicts the overall ambition of the project via the interconnection of the pilot sites.

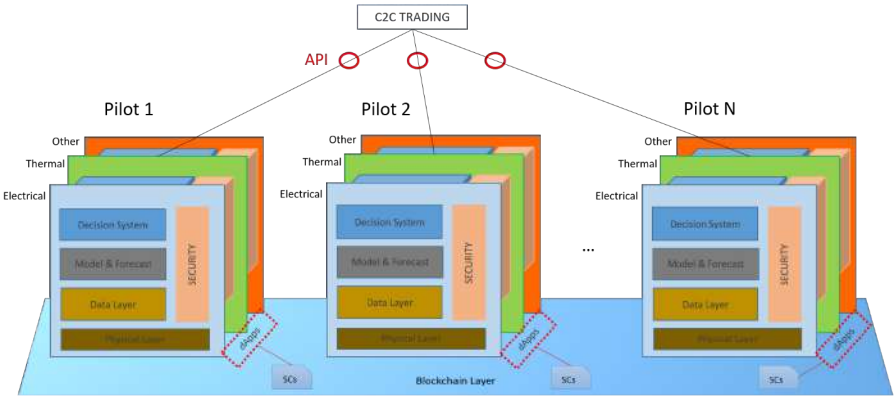


Figure 15 Overview of the C2C trading platform structure

Each pilot site will be served by the FUSE platform independently (TRL7), integrating all existing energy vectors into a participative local energy trading market within the pilot site environment. Each LES implementation comprises the following basic layers:

- **Physical layer (Fog Ready Devices)** designed to be Fog-Enabled and to physically interact with all devices and energy sources (metering, smart metering, smart gateways, sensors etc.) including innovative ones as those of provided by SUNAMP (Section 1.4.3.a) and Energy-Box (Section 1.4.3.b). Real-time flexibility will be provided to FUSE facilitating permission based p2p interaction at energy exchange level.
- **Data layer** interfacing the physical layer with the upper digital layers via data stream formalizations;
- **Data modelling and forecasting layer** leveraging data to produce meaningful insights based on advanced forecasting generation and consumption algorithms;
- **Decision support system layer** incorporating forecasting and other sources to empower the limits of transactive activities while ensuring network stability;
- **Security layer** aligning all other layers to security framework;
- **Blockchain layer** crosscutting the platform structure and interconnecting all pilot sites to rule the exchanges within and between LES. On top of the technology proposed, RENAISSANCE will develop smart contracts, which will implement the logic and automation for managing interactions. Bockchain enables the execution of smart contracts for audit trails and facilitating participation into a secure and trusted P2P transactive environment. These smart contracts will be derived in alignment with the business model and use case.
- **Trading and Collaboration layer** exchanging information with the smart contracts to enable transactive activities and collaboration between actors. **The trading module** is placed to exchange information with the smart contracts. The platform should be able to provide:
    - Information about the smart grid status upon request
    - Reaction to events generated by the smart contracts to provide trading orders to smart grids (either simulated or real)
- **Social Engine** representing the Frontend layer of the RP whose aim is to support the information exchange among the LES users. Through this platform, all actors of existing energy vectors are expected to exchange knowledge/expertise. To achieve this, its design process will be user-centric ensuring that the multiple-actors needs, their wellbeing and their autonomy are prioritized.

The blockchain layer consists of a common network that will interconnect all pilot sites. Its architecture will include:

- **Nodes**: Nodes will be implemented in smart edge devices and the RP cloud infrastructure. Light nodes will be implemented in selected smart edge devices and mobile and web applications
- **Smart Contracts**: Smart contracts will hold rules and enable contract execution over the blockchain network as defined in WP3, within the confines of a site or across sites

- **Decentralised Apps**: Decentralized Applications or dApps will act as interfaces between the blockchain network and all the layers of the RP architecture (physical & digital)

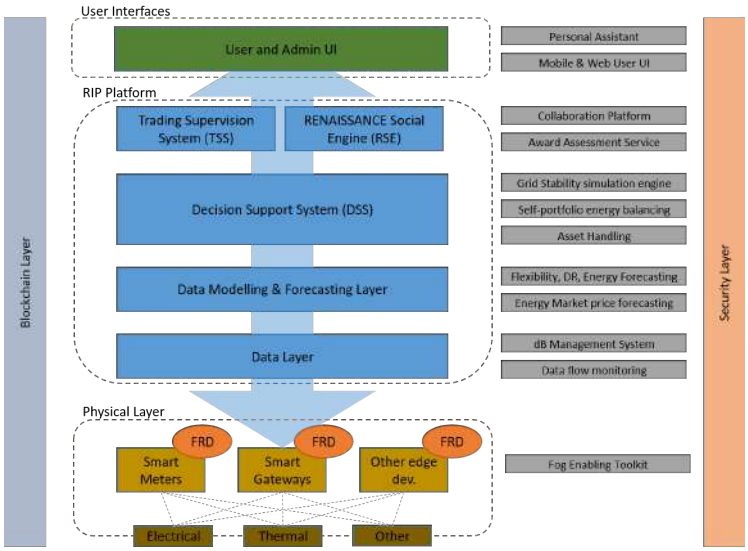


Figure 16 Overview of FUSE enhancements

Additionally, the platform will be in the position to interact with both new and existing similar control and decision platforms already available in various microgrids across Europe. This will be achieved through the provision of list of interoperability services, thus setting the basis for a "universal" interoperability framework for data and service exchange among such type of platforrms and different type of nodes. This list will be developed using the available standards of Industry Fundation Classes (IFC) or of the International Framework for Dictionaries (IFD). Interoperability is a key element of the whole solution, to avoid any data transfer discrepancies across all individual layers of FUSE. More details about each layer are provided in the Work Package breakdown sections.

Advances in selected hardware technologies

During the RENAISSANCE project in addition to the overarching solutions, selected individual technologies advance SotA due to piloting and integration in operational platforms.

UniQ Heat Battery

State of the art of PCM materials

To date, PCM materials has been mainly used to increase the storage capacity of water tanks by immersing PCM capsules with size ranging from mm to few cm with limited efficiency. SUNAMP heat batteries design, on the other side, aims at maximizing the thermal power by immersing a powerful heat exchanger into the PCM used as storage medium. This solution ensures reduced storage volume and effective heat transfer for charging and discharging.

Ambition Beyond the state of the art

To offer the best solution to the demo sites in the RENAISSANCE Project, Sunamp will include some tasks related to product design and development to tailor the technology to the pilots' needs, characterised by higher flexibility and integration with other vectors (current TRL 7). The high thermal power capability and flexibility of Sunamp solution will facilitate the integration of higher share of RES and reduce excess heat losses by delivering multiple services (e.g. p2h, h2p) within a dynamic integrated market. Additionally, UniQ will contribute to the reduction of the local emissions and LLCOE of the LES by replacing high-pollutant and expensive peak plants. Demonstration in operational conditions at Greek and French pilot sites will bring this innovative solution close to market (TRL8).

Circe EnergyBox

State of the art

The Energy Box is an embedded solution for real-time control developed by CIRCE in the FLEXICIENCY Project. It is a multi-purpose smart controller able to manage real smart devices in any environment (residential, industrial) via the integration of several communication technologies. The Energy Box has been already proved to successfully operate in a real life for a home, thus achieving TRL7. Several operational modes have been tested in the Energy Box including bill optimization, flexibility, peak shaving, power factor and voltage and frequency regulation.

Challenge

The objective within RENAISSANCE project is to operate the Energy Box at an upper control level integrating new functionalities that, although they are already under study (TRL4), need to be further developed and tested.

Ambition beyond the state of the art

The novel features that will be included are:

- The compatibility of the Energy Box communication protocol with the FUSE and other devices in order to manage the energy assets accordingly to the smart contract.
- The addition of blockchain layer to ensure a safe recording of the transactions managed.
- Deep-learning techniques to allow the self-learning of the device and increase the flexibility

The RENAISSANCE project will adapt and improve the Energy Box to allow its application for managing bidirectional energy transactions executed via smart contracts and energy services ensuring enhanced security of the data and transparency for the different users.

2. Impact

Smart grids are a major research line among the market players in the field of energy, given the promising **market opportunity** it represents: with a current estimated **valued of $51 billion by 2020 globally**[23]. The RENAISSANCE consortium is placed in a favourable position to embrace this opportunity, translating the success in the project into tangible impact due to the high involvement of relevant market places and its' network of replication partners in Asia and in the US. Specifically, **4 of the major smart grid technology experts in Europe** (ABB, CERTH, VUB, ATOS, etc.), will guarantee major **market adoption** of RENAISSANCE technologies and approach.

2.1. Expected impacts

The RENAISSANCE project aims to significantly improve the uptake of local integrated energy grids, through improved analytics and modelling to identify positive business cases. This approach is expected to help create market opportunities for hardware, software and services - **driven by economic value, increased community engagement and compliance with a range of public policies.**

Figure 4: EU power generation (net) by fuel (Mtoe – left, shares – right)

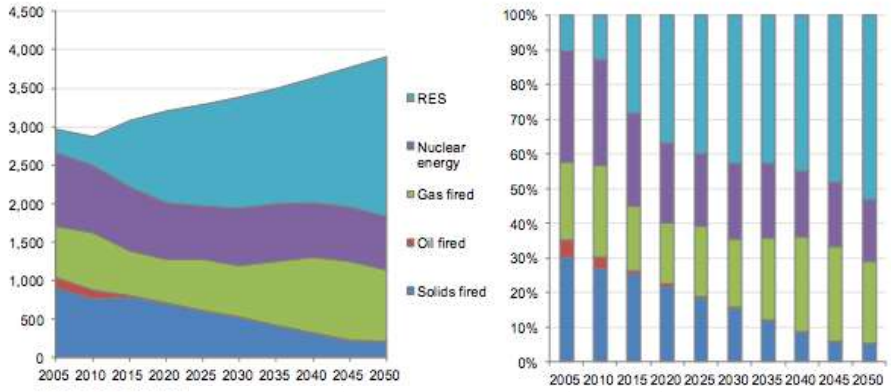


Figure 17. Market capacity forecast for remote microgrids

Local renewables: increasing demand in Europe

The EU-28 share of renewables is believed to have reached 16,7% of total energy generation in 2015 (EEA, 2017). That typically consist of 5-16% biofuels, 10-40% electricity and the remainder in heating and cooling. The target for 2030 is to reach a 27% market share, reaching 53% by 2050 (EU reference scenario, 2016[24]). The associated investments range from €2 trillion to €3 trillion, or €80 billion per year [25].

Smart grids: a quickly growing market

The smart grid market comprises of a broad range of technologies and services, covering transmission and distribution hardware and software, advanced metering, analytics and a growing range of (consulting) services. Market analysts foresee an investment of to be worth $51 billion per year worldwide by 2022, with a CAGR of 19,4%.

According to Navigant (2017[26]), a particularly fast growing sub-segment is the market for IT and services, with Software as a Service and demand-response the fastest growing category with 16% CAGR through 2026. Key markets are the United States, and Europe.

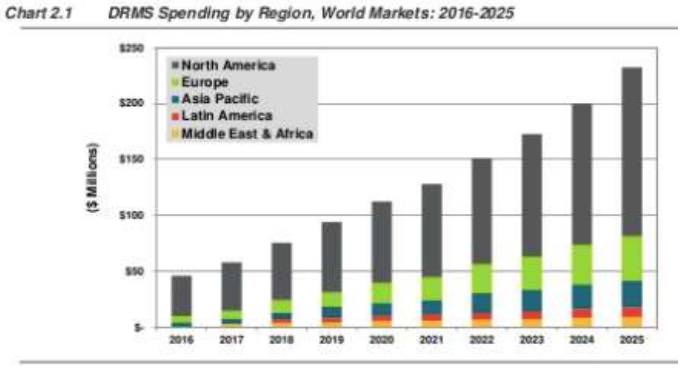


Figure 18 Global growth of smart grids

[23] https://www.smartresilient.com/smart-grid-market-global-forecast-2022
[24] EC (2016) EU reference scenario 2016 https://ec.europa.eu/energy/en/news/reference-scenario-energy
[25] http://www.europarl.europa.eu/RegData/etudes/STUD/2017/595356/IPOL_STU(2017)595356_EN.pdf
[26] https://www.businesswire.com/news/home/20170321005268/en/Global-Market-Smart-Grid-Analytics-Software-Services

2.2. Expected impacts listed in the work programme

The RENAISSANCE project **aims to activate the high potential of replicability of smart grid solutions provided by the RENAISSANCE consortium**. The approach is a breakthrough in reaching widely applicable and replicable pathways for local energy systems, in particular relevant for small to medium sized communities. To maximise the expected impact, RENAISSANCE has set up an approach for in-project demonstration, replication and wide validation for key markets within Europe and at global level.

The call text suggests projects to make contributions to:
Validate solutions for decarbonisation of the local energy system;
Enhance involvement of local energy consumers and producers [and] create energy communities;
Validate approaches to safe and secure local energy system that integrates significant shares of renewables;
Benchmark solutions and business models acceptable by citizens, and replicable in many local regions;

As the suggested impacts mostly refer to desirable outcomes or results, and are strictly not impacts, the RENAISSANCE project will follow the basic logic of **Impacts = Adoption x Benefit**. Adoption relates to how many users will be affected by the dissemination and exploitation of our project results, whereas benefit relates to the aggregated benefit for single users affected.

For the purpose of measuring impact, the following composite of the abovementioned outcomes is used.

Solutions for decarbonisation of local energy systems, while ensuring a positive impact on the centralized energy infrastructure, on the local economy, social aspects, and air quality. Additional requirements are enhanced involvement of and acceptability by local energy consumers and producers, safety and security, and the potential

For quantification of the impact, a single factor will be used: Localised Levelised Costs of Energy.
While LLCOE does not quantify desired impacts such as air quality, social aspects or even integration of renewables etc – it does focus on what finally will be the key decision-making criterion for sustainability investments; the cost of delivered energy for a community.

Localised Levelised Costs of Energy (LLCOE) covers lifetime costs of energy generation and distribution, divided by energy production. This measure calculates present value of total system costs operations. This allows comparison between different system designs of unequal model (centralized, decentralized), life span, size, capital costs, etc.
The measure differs from the know LCOE, which considers individual assets. By including transmission and distribution, the measure allows comparing smart grids, and crucially, allows comparison with current centralized energy systems.

2.2.1. Achieving the impacts set out in the work programme

Expected Impacts	Direct Contribution of RENAISSANCE	Ad-hoc indicators for measurement
Validate solutions for decarbonisation of the local energy system while ensuring a positive impact on the centralised energy infrastructure, on the local economy and local social aspects, and local air quality;	RENAISSANCE will demonstrate 4 operational energy islands in 4 countries (BE, NL, FR, GR), ranging from 600 MWh-1500 MWh, 37-100% RES on full-year basis and each 100-700 users - and a further virtual demonstration on 5 sites across the globe (India, USA, China, Poland and the UK).	<LLCOE >27% local RES
Enhance the involvement of local energy consumers and producers, create energy communities in the development and the operation of local energy systems and test new business models	In the core demonstration sites, 4 energy communities will be organised (legal entity or under single coordination), with in total around 1000 households and 50 businesses participating as well as public building or lighting.	Activation of 20% of local consumers (households and businesses)

Validate approaches to safe and secure local energy system that integrates significant shares of renewables (electricity, heating, cooling, water, wastes, etc.). For variable renewables, this entails the development of an accurate prediction system for the local generation of energy and adequate solutions to match the generation with local consumption as a function of time	The sites will have significant shared of RES across Solar, Wind and Hydro; France 65%, Greece 100%, VUB XX%, Eemnes 37%. Forecasting tools will be integrated, system autonomy will range from 37% (Dutch) to 100% (Greek case). While the Belgium site has a very strong focus on safety and reliability. The Renaissance platform adds an extra security layers in T4.5.	27% RES Belgium site: 5 day off-grid capacity
Benchmark technical solutions and business models that can be replicated in many local regions and that are acceptable by local citizens	The RENAISSANCE integrated approach is designed for low voltage networks – aligned with the typical DSO substation levels capacity, covering >95% of European communities. The RENERGiSE replicator tool is developed and will be validated for easy replication throughout the world. The RP foresees easy implementation of different providers of system and components solutions. Both solutions will integrate end-user perception in their systems.	95% of EU local energy communities covered by both solutions; 20% end-users expected to participate in the design phase and using RP end-user services.

2.2.2. Economic impact on users: LLCOE

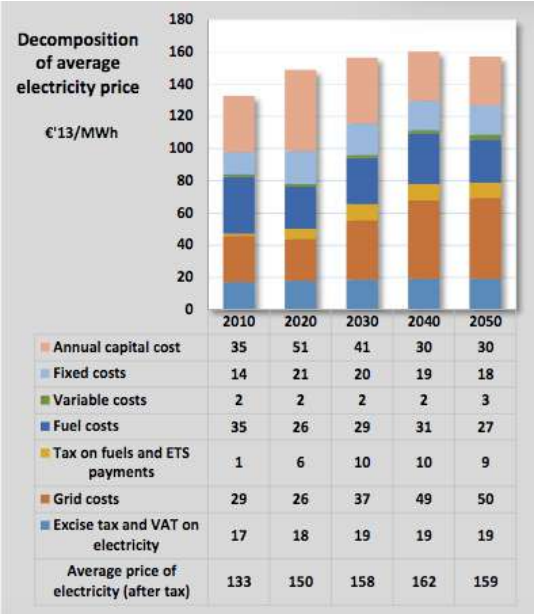


Figure 19. Cost components of average electricity[25]

The LLCOE comparison used here are based on existing final electricity costs for consumers. It is recognised that prices for businesses are typically lower, and these costs cannot be compared with prices for other types of energy (eg heat). The availability of prices and transparency in build-up however make it the best available indicator.

The LLCOE, defined elsewhere in this proposal, is based on national electricity prices as published by Eurostat. This is a theoretic comparable only as it does not include the value delivered for grid connection as safety and security back-up, but as well as a potential for trading. The LLCOE for pilots are based on first estimate based on a weighted average between costs of initial configuration of pilot systems, including local distribution costs, and current LLCOE.

If the energy is consumed within the Low-Voltage branches (EU objective), the Medium and High Voltage costs would be avoided. Taxes will be reduced by not feeding renewable energy into the grid.

Based on initial estimation by partners, the impact of applying the RENAISSANCE methodology would result in expected reduction of LLCOE in pilots by 10-15%, corresponding to €0,03€-0,04€/kWh, due to avoided transmission costs and distribution costs associated to the MV level. The avoidance of national and local taxes will further lower the price. This would the LLCOE potential, and compares positively to the expected average electricity prices across Europe in 2030 which is expected to keep rising[27] (2016 scenario).

Given the current energy demand in the pilot areas, the total value of savings delivered to consumers is about €172 saved/dwelling

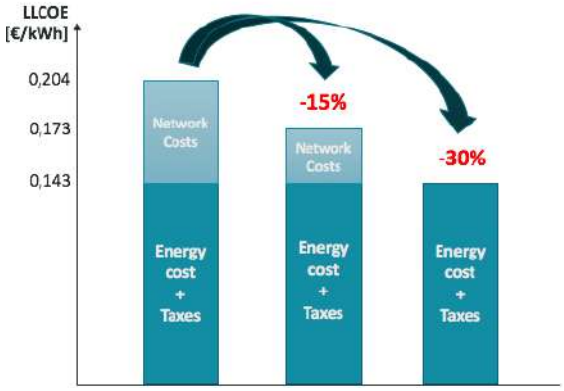


Figure 20 RENAISSANCE impact over coming decade

[27]EC (2016) EU reference scenario

(with average demand of 3500 kWh/y), and 1,2m€ per year across the pilots. Lifetime savings for a 20-year lifetime of the system are €24m.

Table 6 Estimated LLOCE per pilot site

	Current	LLCOE[28]			2030	Pilots			
	El. Prices (€/kWh)	Network costs	Pilot potential LLCOE*	Potential LLCOE 2050**	El. prices (forecast)	Users	MWh	Potential Savings User/Year	Potential Savings Pilot/Year
EU-28	€0,204	29%	n.a	€0,145	+15%	n.a	n.a	n.a	n.a
VUB (BE)	€0,280	41%	€0,238	€0,165		100	25000	n.a	€1,05m
Xanthi(GR)	€0,194	16%	€0,165	€0,163		670	1500	€65,01	€43,5k
Eemnes (NL)	€0,199	33%	€0,170	€0,133		200	700	€104,48	€21k
SjdM (FR)	€0,169	30%	€0,144	€0,118		250	3400	€344,76	€86k

*Potential LLCOE at pilot site (2022), considering network cost reduction about 15%
**Potential LLCOE in a future decentralised energy system avoiding all network costs (30% European average)

2.2.3. Environmental impact: Share of RES (GHG emissions)

The EC maintains as 2030 target for RES share in Gross Final Energy Consumption of 27%. While there are ambitions to localising, there are no targets for local RES. As baseline, RENAISSANCE therefore aims to demonstrate the commercial feasibility of achieving the 2030 target of 27% of energy production at local level. By offsetting non-RES with RES, the annual CO2 emissions savings - measured against CO2 loads for national energy mixes – for the project are 565 tonnes per year.

Table 7 RENAISSANCE impact on RES in demonstrator sites

	National CO2-intensity gCO2/kWh (2016)	Pilot			
		RES Current	RES Target	MWh Total	Savings tCO2/year
EU-28	275,9	n.a.	n.a.		
VUB (BE)	211,5	3,2%	8%	25000	254
Xanthi(GR)	829,9	3%	20%	1500	212
Eemnes (NL)	451,4	16%	37%	852	81
SJdM (FR)	34,8	35%	50%	3400	18

2.2.4. Social impact: consumer activation

Consumer activation will be explored in two ways; where possible, the percentage of consumers in a defined catchment area voluntarily switching to RENAISSANCE energy communities, and as secondary indicator, the percentage of consumer in a defined catchment actively using supporting applications.

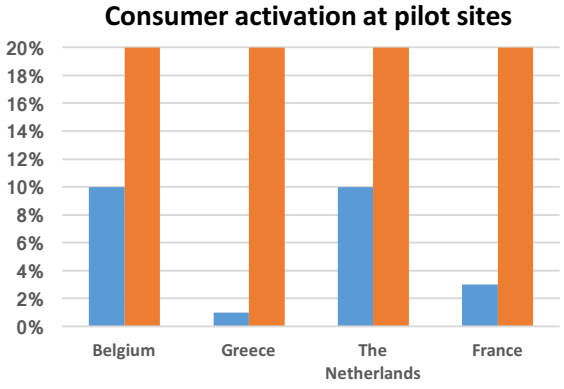


Figure 21. Social impact indicator

To baseline, an approach is to contrast RENAISSANCE activation with the consumer switching rate of change from electricity supplier estimated to be 4% at EU28 level (CEER 2014)[29]. In pilot countries, these rates are range from 1% (Greece) to 10% (Belgium, the Netherlands).
Whereas the consumers in BE and GR are students in university campuses without free choice of energy suppliers, the consumers in FR and NL will be engaged based on market conditions. Here the switching targets are 15-20%, up to double the benchmark rates. For use of applications, the target is to have 15-20% of consumers install and at least annually use the applications.

[29] https://www.febeg.be/sites/default/files/annual_report_2014_nl_newlogo_0.pdf page 33 https://www.ceer.eu/documents/104400/-/-/56216063-66c8-0469-7aa0-9f321b196f9f

2.2.5. Potential market and sustainability impacts

In a more theoretical exercise, the RENAISSANCE project could potentially have a major impact on the overall average costs and environmental impact of energy consumption in Europe once replicated at large scale – across all low voltage energy nodes of Europe. Assumptions; other energy islands have a similar local RES capacity as the demonstrators, and the strategic value of oversized DSO/TSO connections is not taken into account.

Table 8 RENAISSANCE impact on market

Area	Indicators	Concept	Potential impact
Economic	Reduction of TSO, DSO network capacity	reduction of grid investment capacity for increasing share of RES due to self-consumption within the energy communities	-30% * €38bn = **€11,4Bn**[30]
	Average and total cost of energy consumption in Europe	Potential savings for the European economy by enabling LES with lower LLCOE (based on average electricity consumption pro capita and average European electricity prices)	-15% * 1.6 MWh/capita * 0,204€/kWh = **-48,96€/capita**
Environment	Reducing CO2 emissions through offsetting non-RES	Potential reduction of electricity price avoiding TSO (HV) and part of DSO (MV) costs by consuming and producing electricity locally	27%RES * 558gCO2/kWh = **-150,66 gCO2/kWh**[31]
Social	Consumer activation	Potential % of consumers actively participating into the energy market by applying RENAISSANCE approach	20%* 741,4m = **148,3 million**

2.2.6. Other Impacts

In mentioned domains, the RENAISSANCE project would have significant secondary impacts;

Table 9 RENAISSANCE project secondary impacts

Area	Impacts
Economic	• By lowering LLCOE, costs of living for families and cost of business for companies will be reduced, thus boosting purchasing power and competitiveness. • Advancing the state of the art will increase the competitiveness of European energy businesses at global scale, in particular energy consultancy, services and hardware suppliers. The global demonstrator programme will stimulate demand
Environmental	By replacing non-RES with RES solutions, and enabling uptake of electric vehicles, the project will reduce the need for traditionally fuelled energy generators and of non-RES modes of transport – thus improving air quality at local level.
Social	Local energy system design, development and operation will generate skilled, local jobs

2.2.7. Barriers, Obstacles and framework conditions

Systemic barriers to reaching the stated impacts, and mitigating factors have been identified:

Table 10 Main barriers for market uptake

Barrier	Mitigation
Regulation for RES generation and sale	Current regulations set prices for feeding in RES, and typically restrict sale between prosumers. While RENAISSANCE operates from the assumption of liberalised markets, it will ensure proposed solutions are within local regulations. In the case of Eemnes, the Ministry of Economic affairs has granted an exemption to Electricity laws.
Standards on ICT inter-connectivity	Interconnectivity and interoperability of assets within and between grids is not yet standardised at regulatory or technology class level. While the project will operate on an internally aligned layer of communication protocols, it will continuously track emerging standards to ensure pilot would remain integrated with main systems.

[30] *European Energy Industry Investment , Study of the ITRE Committee (2017)*
[31] *https://www.eea.europa.eu/data-and-maps/indicators/overview-of-the-electricity-production-1/assessment*

Proven ROI for all stakeholders	The LLCOE approach assumes a high level of confidence of participants in analysis of future returns. This is relevant when modelling shows long-term optimal solutions require increased short-term investments. RENAISSANCE will use open calculation models and participative decision-making processes to enhance community confidence levels. It remains up to community members to determine it seek short or long term optimisation, or individual or collective optimisation.
Windows of opportunity for **investment**	Achieving a local energy transition is complex as it often requires change in a status-quo for stakeholders. It often is at odds with natural decision-making moments (e.g. economically or technically moments for replacing assets, changing energy provider, …) and requires some level of collective decision-making. RENAISSANCE will apply a transition approach, where a critical mass is available at project start, with continuous development

2.3. Measures to maximise impact

The dissemination and exploitation of RENAISSANCE results are of critical importance for achieving the expected impact within the duration of the project. Two specific Work Packages are devoted to these activities: WP6, WP7.

- WP6: a dedicated task for local energy system regulatory analysis has been included to analyse the governance barriers and maximize the adoption of smart grid solutions in energy communities.
- WP7: Task 7.1 and Task 7.2 design and coordinate the communication and dissemination plan to be implemented in order to achieve a wider impact. Task 7.3 and 7.4 are dedicated to engage with the target audiences and raise international awareness among different stakeholders (general public, market players, regulators, TSO-DSO communities, policy makers, research institutes, energy consumers).
- Task 7.6 will define a market entry strategy to ensure the technology transfer.

Overall Aims Dissemination and Exploitation

By **Dissemination**, we understand the public disclosure of project results by any appropriate means. The objective of RENAISSANCE dissemination is to make public aggregated data and subsequent analysis to key target groups available on relevant platforms. By **Exploitation**, we understand the utilisation of results in further research activities, creating a product, service or process, or standardisation. The main aim of RENAISSANCE is for owners of IPR to bring these to market in commercial approaches and products. Several activities have been defined that for industry and knowledge partners to integrate project results in market-oriented processes. The above is different from **Communication**, which aims to inform the public and stakeholders about the project and its relevance.

Level		Goal	Description
1	Communication	Awareness	Give information about the project, to promote the achievements of the project to all the potential interested parties.
2	Dissemination	Understanding	This includes transferring key messages to specific stakeholders and enhancing their comprehension on the project outcomes itself.
3		Engagement	Foster interaction and active participation of the stakeholder communities, (e.g. through workshops, interviews)
4	Exploitation	Use	Uptake of results by professional stakeholder groups

Dissemination: disclosing project results to professional audience

The goals of dissemination actions are to create understanding of project outcomes and insights, and to identify possible future users of the tools and approaches (exploitation).

There are four core target groups in Europe:

Key target groups	Relevance
Local Energy Communities and their potential members	Citizens and SMEs, mostly - and their sponsors (mostly local authorities). Main decision-makers in creating LECs
Energy Service Aggregators	non-for-profit and for-profit service providers in designing and operating LECs
Strategic stakeholders, especially DSOs	Entities heavily impacted by LECs – positively by avoiding investments, negatively by reduced need for distribution
Policy makers, regulators	high-level enablers of energy markets as they define the rules of the market as a function of policy objectives including environmental and economic

RENAISSANCE takes a global view of the market for LEC products and services, as described in the exploitation plan. With regards to dissemination, outside Europe the project will target the abovementioned groups, but given limited capacity to reach out, approach as single group of professional stakeholders in local energy communities.

A preliminary Dissemination Plan includes the following activities:

Target group	Example of activities	Level	Impact maximised
LECs	Workshops, interviews	3	Engagement through pilots, Global replication programme
ESA	Workshops	3	Business case development
DSO	Conference, Workshop	2	Engagement through pilots, EDSO conference
Policy	Conference, Workshop	2	Targeted products in dedicated activity

2.3.1. Exploitation: delivering innovation to market

RENAISSANCE partners will carry out joint and individual exploitation activities on the different developments they oversee. At the start of the project, concept exploitation strategies and plans will be defined with main partners. Progress will be tracked annually. These partners will be supported by BAX in exploring (commercial) spin-off projects based on RENAISSANCE work, these reports are confidential. A public summary will be produced.

The potential value of LES management services

Highly indicative estimates from RENAISSANCE pilots show that integral management of community LESs, including advanced flexibility services, costs around 5- 10% of user benefits, depending on scale of the system. Assuming RENAISSANCE user savings of €65-344 per user per year (section 2.2.2):

- For a small communities of 500-3500MW and 100-500 users, fees could reach €5-15k/year.
- For larger LESs (25GW), services could be worth €50-100k/year

There are two core target groups in Europe:

Key target groups	Relevance
LECs and their potential members	Citizens and SMEs, mostly - and their sponsors (mostly local authorities). Main decision-makers in creating LECs
Energy Service Aggregators	Non-for profit and for profit service providers in designing, building and operating LECs

Table 11 Categories for exploitation

Target group	Example of activities	Level	Impact maximised
LECs	Workshops, interviews	4	LEC creation process in pilots, global replication programme
ESA	Workshops	4	Business case development in pilots, global replication

Route to market for key results

Main results	Partner	Primary interest
MESA tool	ABB / VUB	ABB's core business is the hardware and software to run smart grids. MESA is part of business opportunity development, it is a pre-commercial sales support tool. Extending the tool to cover multiple energy types and adding location information, and adding a user interface leads to better positioning and a better value proposition towards potential clients.
FUSE platform	ATOS / CERTH	Atos FUSE platform is an operational service for demand side flexibility. Extending the services with trading, modelling, decision and operation algorithms and the use of blockchain smart contracts will result in an integrated management platform
Smart software	IKERLAN	The smart contracts module is a software extension of current people-based expertise. The software will be licensed for integration in platforms like FUSE.
P2H PCM storage	SUNAMP	Lowering the TCO for PCM storages

Table 12 RENAISSANCE main results to market

RENAISSANCE focuses on have a high starting TRL as described in section 1.3. The global presence of key industry partners, and the strategic importance of this project to innovation processes ensure that positive results will find their way to widespread application relatively quickly after project conclusion in 2022. A plan for exploitation of results will be prepared to summarise the partners' strategies and practical actions, and IPR protection strategies.

The potential value of LES design services

The EC estimates a total of €1,5-2 trillion investment in energy grid upgrades. As planning & design fees related to energy infrastructure projects typically are in the 5-10% range, the market potential for services like ABBs MESA is €75-200 billion. For a typical LES project of €1-5 million, such services could be worth €50-500k.

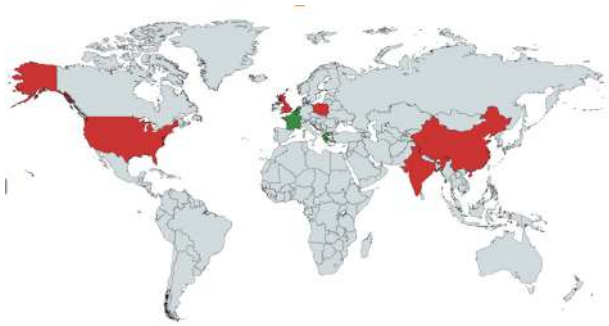
For the route to market of key outcomes, 3 main phases are considered; upon project delivery (2022), medium term (2022-2025), and long term until EC policy milestones (2025-2030). Main novel services include ABB's MESA, ATOS FUSE platform and IKERLANS ESEP.

Table 13 Table explaining the different steps in the road to market for each technology

		Short term (2022)	Medium term (2022-2025)	Long term (2025-2030)
ABB MESA	Multi energy site analysis tool	Commercial Beta-testing, limited group of EU clients	Commercial global roll-out	Adding AI components on optimisation
ATOS FUSE	ICT energy management platform	TRL 8-9 development	Commercial application in Europe; 5-50 clients	Adding AI components on optimisation
IKERLAN	Energy Services Exchange Platform (ESEP)	TRL 8-9 development	Commercial application in Europe; 1-25 clients	
SUNAMP	UniQ Heat Batteries	TRL 8 in the storage size required by this project.	TRL 9, certification and manufacturing process.	Internationalisation of the market, mainly outside Europe.

Joint exploitation programme

To validate the RENAISSANCE approach in market-like environments – and developed market opportunities for the project partners - the project will deliver 10 ´virtual pilots´ in 5 countries across the globe: India, USA, UK, China and Poland. The ambition is to apply the RENAISSANCE approach to urban sites of relevant size (each 100 – 10.000 dwellings). The countries have been selected because of smart grid growth potential, and presence of main industry partners ABB and ATOS.



The aim is to do a ´light´ or ´virtual´ pilot where partners identify acceptable smart grid solutions for an existing or potential LEC. As the project does not fund deployment, actual uptake will be based on overcoming financial and social barriers.

Country	Partner	Event
India	GlobalBusinessInroads	±25 participants
USA	CambridgeCleanTech	±25 participants
UK	CambridgeCleanTech	±25 participants
Poland	NAPE	±25 participants
China	GEIDCO	±25 participants

The project engages will work with local network partners (subcontracted due to small role, except for NAPE), to identify suitable plot sites, arrange interaction with stakeholders and community members, and organise data exchange. **Letters of support of potential sites are attached, a cooperation agreement with Indian entities has been signed**.

The network organisations will also organise a local/national event on smart grids and LECs with at least 25 professional stakeholders. Further details are described in section 1.3.

Individual exploitation plans

Additionally, other partners will also exploit their project activities under the following strategies:

Table 14 Consortium partners' exploitation interests

Partner	Exploitation role	Primary interest
VUB	University	Produce peer reviewed academic papers, PhDs. Improve research – industry connection
IKL	Research Center	Market smart contract software
SOREA	DSO	Enhance modelling, reduce CAPEX for demo site
DUTH	University	Improve consumer engagement, minimise CAPEX
CERTH	Research centre	Market micro grid management software and services
CIRCE	Research centre	Provide scientific/technical knowledge in smart grids, storage and renewable energies to the businesses operating in this sector
EEMNES	Local government	Increase RES, minimise CAPEX
SMB	Engineering partner	Build expertise on grid design and management
DeepBlue	Consultant	Exploit knowledge on human factors in LECs.
BAX	Consultant	Exploit expertise on business case dev't
NAPE	Consultant	Exploit grid design tools, business case dev't

2.3.2. IPR-strategies

The table below drafts a preliminary agreement on the ownership and management of the different exploitable results developed in RENAISSANCE between the different partners involved. A detailed agreement will be further elaborated and signed once the project proposal has been approved, as part of the consortium agreement.

Table 15 IPR ownership within the RENAISSANCE consortium

Result	IPR Ownership & Management	IP protection
MESA tool	ABB and other contributing consortium members, jointly and/or separately	Industrial confidentiality
RenOP	ATOS; CERTH and other contributing consortium, jointly and/or separately	Industrial confidentiality
Smart contracts	Ikerlan and other contributing consortium members, jointly and/or separately	Royalty free, to use within consortium
UniQ Heat Batteries	SUNAMP	Industrial confidentiality
Demonstrators' aggregated data	Consortium ownership	Royalty free to use within consortium

2.3.3. Communication activities

RENAISSANCE will implement an effective communication strategy to inform the general public and professional stakeholders about project activities and its relevance in a way that is universally understandable. Effective and efficient communication requires results that are personalised for the different stakeholder categories i.e., content, style, format and information use. Personalisation will not be limited to information content, but it will also consider the style of the message and the means of dissemination (e.g. document, report, web site, blog, newsletter, forum). The communication plan will include activities which will focus on communicating the innovative nature of the project's research to the scientific community, demonstrate its potential for exploitation to the industrial partners, raise awareness about the relevance of energy communities in tomorrow's energy system to the target groups (policy makers, citizens, DSOs/TSO, Governments).

Table 16 Summary of communication activities and targeted audiences

Targets	Message	Channel	Metrics
General public	Results of EU collaboration Value of energy communities	Website, social and digital media, brochures, etc,	> 1.000 visits per year > 250 followers 2 interactive reports
Policy makers	Value for energy communities Contribution to policy objectives	Blogs, social media and private conversations	> 25 presentations held

Industry	Pilot sites provide evidence tool effectiveness and value added	Professional publications Events, Workshops	4 e-newsletters 5 industry events
Research community	Results of RENAISSANCE approach and solutions	Conferences, Scientific publications, Events	> 10 presentations > 6 scientific publications 500 researchers reached
Local Governments	LEC replication potential	Website, private conversations, workshops, events, social media	>20 local governments reached

Communication channels and measures

The definition of target audiences (WP7) allows to identify the most effective communication channels based on their current mean of dialogue. A dynamic communication will be established with the professional target groups.

- The **project website** enhances its visibility at local through international level. It represents the repository of all RENAISSANCE public information and the main mean of online communication with the target groups.
- **Social Media** will be a primary public channel to raise awareness about the project results and activities. A social media strategy relying heavily on existing Partner network like LinkedIn will ensure effectiveness
- Project partners will engage in **direct private conversations** with strategic people in EU clusters, policy groups and industry positions related to microgrids and local energy systems. Eg through the BRIDGE initiative, the Advisory Board members and Global Explotation Group in India, China and the USA.
- **Scientific publications** such as the Journal of Renewable and sustainable energy reviews, Journal of International Journal of Electrical Power & Energy Systems, Journal of Smart grid and renewable energies, the Electricity Journal and Energy Policy Journal are the main channel for communicating the research advancements achieved.
- **Professional publications** such as E-newsletters will support dissemination by reaching out to the target audiences who can exploit and replicate project results. Other publications such as magazine articles, brochures, posters will be produced by the consortium to raise awareness of the solutions developed and hence generate market demand.
- **Conferences and events** represent high value platforms. By participating in key events RENAISSANCE will maximise the impact. Higher presence is expected to be at the end of the project.
- **Workshops** are effective means for involving end-users in an integrated campaign about energy communities impacts and barriers. Feedback from these sessions will be used to improve RENAISSANCE methodology and end-users' participation. Informal training material will be provided to end-users

3. Implementation

3.1. Work plan – work packages, deliverables and milestones

The RENAISSANCE project is structured in seven work packages which individually contribute to the overall objectives of the project. The interaction between the different work packages is visualised in the image below.

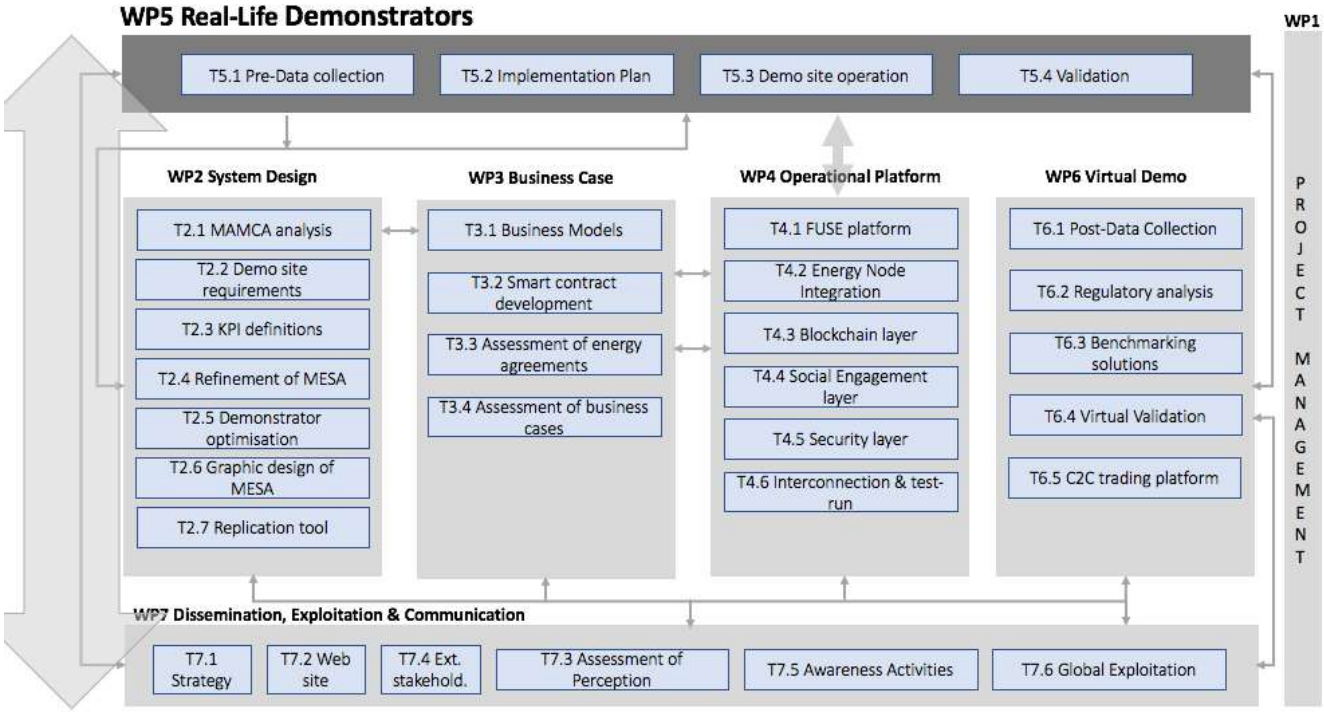


Figure 22 RENAISSANCE Pert Chart

In **WP1 (Project Management)** all administrative project management and coordination tasks are performed.

WP2 (Local decarbonised and integrated energy system design)
The objective of this work package is to determine the system components & connection design of diverse multi-vector (electrical, thermal, etc.) sites based on known boundary conditions, which include technology limitations, economic costs, stakeholder objective, and regulatory, environmental & society constraints. A participatory approach based on multi-actor-multi-criteria-analysis (MAMCA) that takes into account the objectives of all involved stakeholders is used to design and asses viable and acceptable implementation scenarios for the demonstrations sites. The analysis and design of the energy island is then executed by a cloud-based multi-vector design and optimization software (MESA) with defined objectives for integrated energy systems. Feedback from other WPs and the operating demo sites is used to improve the prediction accuracy of the software. In addition, the software will be extended with a graphical user interface in order to provide a user-friendly replicator tool that can be applied to design and assess energy islands, for different levels of integration, for different ecosystems and variable degrees of grid maturity (RENERGiSE).

WP3 Business models and smart contracts defines the feasible business models for each demonstrator site based on stakeholders' requirements and expectations gathered in T2.1 and T5.1. Recommendations from this activity are used as input for the MAMCA (T2.1). Results of this analysis identify those scenarios reflecting stakeholders ambitions, hence, ensuring high social acceptance. In this WP, the selected business models are mapped and turned into smart contracts. Data and transaction models are designed to define the executable and secure actions through which LES actors interact. Assessment and operational validation of the selected business cases is performed by executing the smart contracts in the RENAISSANCE basic block chain network implemented in 2 pilot sites (Greece, France) (WP4).

WP4 Infrastructure implementation and integration aims to develop and implement an interoperable ICT Platform enabling technical management, local energy service market operation and stakeholders involvement. Additional layers are embedded with the core energy management platform allowing for an optimised operation of the LES through advanced modelling, forecasting and control algorithms. RENAISSANCE Information Platform integrates a crosscutting blockchain architecture to perform multi energy exchanges and transactions via smart

contracts. Higher consumer participation in the local energy service market is ensured through interactive and informative applications.

WP5 Demo sites operation, integration and validation
First activities of this WP are crucial for the successful development of the RENAISSANCE approach since they provide the necessary inputs to WP2, WP3 and WP6 with regards to stakeholders' objectives and relevant pilot KPIs. The overall objective of this WP is the demonstration in real-life conditions of the methodology and optimised solutions developed in WP2, WP3 and WP4. This is done at four pilot sites (Belgium, The Netherlands, Greece, France) what gives the possibility to demonstrate RENAISSANCE approach under different circumstances. Assessment and monitoring of the pilots is performed encompassing technical measurements, control of the financial transactions and social acceptance/involvement impact. Outcomes from the performance evaluation of the pilots' operation against the selected KPIs are fed in the benchmarking analysis of WP6 and used to suggest improvements for the RENERGISE tool.

WP6 Benchmark, scalability, replicability analysis and virtual demo validation aims to achieve a widespread uptake of RENAISSANCE solutions beyond project activities. Data from the demonstrator sites along with the outcomes of the regulatory barrier analysis (T6.2) are used to improve pilots configurations and accuracy of the tools. Scalability and replicability potential of the RENAISSANCE approach is explored and validated by applying Renergise tool for the virtual simulation of 5 sites across the globe (Poland, UK, US, India, China) and for smart clustering of energy islands for TSO-DSO services.

Finally, **WP7 Dissemination, Exploitation and Communication** focuses on the definition of detailed strategies for communication, dissemination and exploitation activities, targeting specific audiences to leverage project results as well as support the successful penetration of RENAISSANCE solutions in the market. A key activity in this WP7 is the facilitation of a series of international events (10-15 workshops) to showcase RENAISSANCE approach and solutions to key stakeholder groups at virtual demonstrator sites, unlocking business opportunities in established and emerging markets worldwide.

The following Gantt chart illustrates the project schedule and planning.

Work Packages	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
WP1 Project Management																																				
Task 1.1 Consortium and Project Management																																				
Task 1.2 Progress monitoring including reporting																																				
Task 1.3 Quality and risk management																																				
Task 1.4 Research knowledge and data management mechanism																																				
WP2 Local decarbonized and integrated energy system design																																				
Task 2.1 Consensus driven local smart grid design																																				
Task 2.2 Demo site requirements and expectations elicitation																																				
Task 2.3 KPI definition and selection																																				
Task 2.4 Refinement of multi-vector optimization software																																				
Task 2.5 Optimized design for the demonstration sites																																				
Task 2.6 RENERGISE tool designer interface																																				
Task 2.7 RENERGISE replicator tool																																				
WP3 Business Models and Smart Contracts																																				
Task 3.1 Business case benchmarking																																				
Task 3.2 Development of smart contract																																				
Task 3.3 Assessment and validation of energy agreements																																				
Task 3.4 Assessment of business cases																																				
WP4 Infrastructure, Implementation and Integration																																				
Task 4.1 RENAISSANCE Information Platform ROP																																				
Task 4.2 RENAISSANCE Energy Node integration																																				
Task 4.3 Log-oriented architecture design and implementation of RENAISSANCE blockchain																																				
Task 4.4 Interaction with the stakeholders: RENAISSANCE Social Engine and Personal Assistant																																				
Task 4.5 RENAISSANCE Security Access Control Network																																				
Task 4.6 Integration and Interconnection Phase																																				
WP5 Demo site operation, integration and validation																																				
Task 5.1 Requirements and objectives of the demo sites, definition of data output																																				
Task 5.2 Implementation plan																																				
Task 5.3 Implementation, operation, monitoring of RENAISSANCE approach at demo sites																																				
Task 5.4 Demonstrator validation																																				
WP6 Benchmark, scalability, replicability analysis and virtual demo validation																																				
Task 6.1 Demo site data collection																																				
Task 6.2 Regulatory barriers analysis																																				
Task 6.3 Benchmarking and comparative analysis																																				
Task 6.4 Scalability & Replicability Validation of RENERGISE tool																																				
Task 6.5 Community to Community Trading potential																																				
WP7 Dissemination, Exploitation and Communication																																				
Task 7.1 Communication and Dissemination plan and strategy																																				
Task 7.2 Web site and social media strategy																																				
Task 7.3 Assessment of the Perception and Awareness																																				
Task 7.4 External Stakeholders' Group creation and management																																				
Task 7.5 Communication, Dissemination and Awareness activities																																				
Task 7.6 Global exploitation and market entry strategy																																				

Table 17 Work Packages

Work package number	**1**	**Start Date or Starting Event**											M.01		
Work package title	**Project Management**														
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Short name of participant	VUB	IKL	ATOS	DBL	SMR	SOREA	CIRCE	DUTH	CERTH	BAX	SDM	NAPE	ABB	SUN	EEM
PMs	23	2	2	1.5		1			3	1			2.5		

The overall goal of the project management is to make sure that the defined objectives of the project are realized within the conditions of time, budget, control, effectiveness and quality of output. Based on a proven management structure proposed in section 3.2, the partnership will ensure joint effective guidance of project implementation, under coordination of VUB, with participation of all partners.
Specific objectives of the WP are the following:

- Setting up of project administration and internal communication
- Ensure effective communication between partners and the EC, including reporting and liaising with the EC
- Monitoring scientific progress and project finances by the coordinator
- Assessment of progress in WPs, quality control of deliverables and keeping track of milestones completion
- Developing and executing risk contingency plan

Task 1.1: Consortium and Project Management (M1-M36) VUB 10PM, CERTH 1PM, DBL 0.5PM, ABB 0.5PM, IKL 0.5PM.

This task will focus on strategic management and technical supervision. The necessary structures for the overall management of the project consortium will be set up by VUB encompassing the internal guidelines for communication (D1.1) and working procedures for decision-making and quality control (task 1.3). VUB will organise meetings, teleconferences, and other related activities in order to facilitate the communication within and between the various work packages, under direction of the project management team. VUB will manage the flow of information and data between the WPs and ensure beneficiaries comply with the obligations under the grant agreement, handling of legal and IPR issues. In addition, VUB will manage and keep up to date the online project management platform. VUB will act as a first point of contact for all the issues of the project based on standardised processes and the exploitation of relevant project management tools. All project data will be handled (i.e. storage, updating etc.) by in a centralized manner through the project management platform. To further ensure standardised procedures, a consistent document structure will be established and relevant templates will be developed.

VUB will act as a contact with the European Commission having meetings with EC officer when required. VUB will distribute EC funds amongst partners according to the Grant agreement. VUB will lead this task with support from WP leaders.

Task 1.2: Progress monitoring including reporting (M1-M36) VUB 10PM, CERTH 1PM, DBL 0.5PM, ABB 0.5PM, IKL 0.5PM.

The objective of this task is to ensure the smooth operational management consisting of technical, financial and administrative coordination of the Project. VUB with collaboration of all partners, will set up a detailed project implementation plan (D1.1) at the beginning of the project to be approved in the first kick-off meeting (1 month from project start). The coordinator is responsible for the coordination of the day-to-day management of the project and making sure the WP leaders execute their activities according to the approved plan. WP leaders will monitor the progress of their WPs and coordinate the consistency between WPs/Tasks. Moreover, internal project reporting will be scheduled in a 6-monthly basis or more frequent when needed. Project coordinator VUB is responsible for reporting to the EC with the support of the WP leaders. Main activities are the preparation and post-processing of EC reviews, the preparation, compilation of periodic and final technical and financial reports, execution and post-processing of major project meetings, review of reports to verify consistency with the project tasks.

Task 1.3: Quality and risk management (M1-M36) ABB 1PM, CERTH 0.5PM, SOREA 0.5PM, VUB 2PM, IKL 0.5PM, ATOS 0.5PM.

At the beginning of the project, the coordinator with the support of the Steering Committee will define a quality and risk management plan and practices to ensure project deliverables and outputs possess the required quality. A quality assurance team will be set-up in order guarantee the outgoing quality control of the results of the project. In addition, a risk management plan will be developed to establish and monitor the major risks in the project that can significantly affect the quality and successful implementation of the deliverables. These risks will be handled by means of a risk register, which identifies the risks as well as the strategy to be adopted to handle each of them (see Section 3.2.2). ABB will lead this with task with strong support from VUB, CERTH, IKL, SOREA.

Task 1.4: Research knowledge and data management mechanism (M1-M36) ATOS 1PM, BAX 1PM, CERTH 0.5PM, ABB 0.5PM, IKL 0.5PM, VUB 1PM, DBL 0.5PM, SOREA 0.5PM

BAX together with WP leaders will elaborate a detailed Data Management Plan (DMP), in line with the relevant EC guidelines (FAIR Data Management in Horizon 2020, GDPR, etc.) in order to improve and maximise access to and re-use data generated by the RENAISSANCE project. BAX will direct the overall data management process, with the assistance of the WP leaders. The data management process will outline how the different project data will be collected and how these will be handled during and after the project.

Deliverables

1.1 Project implementation plan & internal communication guidelines (M1, VUB)
1.2 First year progress report (M12, VUB)
1.3 Second year progress report (M24, VUB)
1.4 Quality assurance plan & risk management plan (M3, ABB)
1.5 Data management Plan (M6, ATOS)

Work package number	**2**		**Start Date or Starting Event**											M.01	
Work package title	**Local decarbonised and integrated energy system design**														
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Short name of participant	VUB	IKL	ATOS	DBL	SMR	SOREA	CIRCE	DUTH	CERTH	BAX	SDM	NAPE	ABB	SUN	EEM
PMs	19	6	4	5,5		5	1		18	2		3	22		4

The objective of this work package is to develop a design tool for integrated and decarbonised local energy system (Energy Island) that includes **both socio-economic analysis and stakeholder acceptance**, in addition to technical optimisation results. The RENAISSANCE ENERgy Island SoftwarE replicator tool (RENERGiSE) will be based on current SotA software, but in this WP the software will be further refined and extended with a flexible designer interface in order to provide a user-friendly replicator tool that can be applied to design and assess energy islands, for different levels of integration, for different ecosystems and variable degrees of grid maturity.

Task 2.1: Consensus driven local smart grid design (M5-M18) VUB 8PM, SOREA 2PM, EEM 1PM, DBL 2PM, NAPE 2PM, BAX 1PM, ABB 1PM

The objective of this task is to understand end—users' preferences when it comes to local energy community design. Moreover, it will provide an overview of which scenarios best represents the objectives for the future of local energy community. In order to propose optimised design for the demonstrators including a product/hardware configuration and a basic business model this project will handle a participatory approach involving all stakeholders. VUB will be using MAMCA software[32] (Multi Actor Multi Criteria Analysis) at the demonstration sites in France, the Netherlands, Greece, India and at the virtual demo-sites in order to identify consensus-carried solution. At the end of the project this will allow VUB benchmark in WP6 technical solutions and business models

[32] MAMCA software is been developed by VUB and has been applied in Several European Projects such as: Straightsol, CityLab, Mobility4eu.

that are acceptable by local citizens. The tool will be facilitated through an online decision-making platform. The results form task 3.1 (business models) and from task 2.2 (stakeholder groups, KPIs) will provide input to the software. The produced scenarios will be assessed in task 2.3 and the results will be discussed with the stakeholders at a dedicated workshop in the demonstrator sites, where the outcome of the evaluation process will be presented and discussed. These workshops will be designed and organised by VUB, DEP, CERTH will serve as a consensus-building platform where all stakeholders will come to a consensus on the scenario that best represents their objectives. VUB will lead this task with support of demonstrator site owners SOREA, EEM, DUTH. In addition, DEP and CERTH will support the task in engaging with the stakeholders.

Task 2.2: Demo site requirements and expectation elicitation (M3-M8) ABB 4PM, ATOS 4PM, EEM 2PM, SOREA 2PM, VUB 2PM, DBL 2PM, IKL 6PM, NAPE 1PM

The objective of this task is to collect both technical and socio-economic data from the demo sites. The task will be coordinated by ABB with the support from CERTH, as this information will be used as a basis for WP4, infrastructure implementation and in task 2.4 when testing the multi-vector optimisation software. The demonstrator owners DUTH, SOREA, EEM will be facilitating the local data collection in T5.1. The in-depth analyses of any balancing features and detailed additional development requirements required for a complete functional system design will be carried out in Task 4.1. Furthermore, VUB and DBL are in charge of supporting the task leader in making sure that all relevant socio-economic aspects are covered. For this purpose, a general framework for requirements & expectations elicitation, based on best practice, will be developed. The elicitation framework consists of a number of different methods including document analysis, interface analysis, interviews, observations, requirements workshops, and survey/questionnaires. In addition, the results from this task will be used in task 2.1 as input for MACMA software tool, in task 3.1 of business model development, and in task 7.3.

Task 2.3: KPI definitions and selection (M1-M6) VUB 4PM, CIRCE 1PM, CERTH 2PM, ABB 2PM

The objective of this task is to identify and define meaningful KPIs that can be used in task 2.1 for MAMCA analysis and in WP6 for benchmarking different solutions. The set of KPIs will provide a measurement framework of how successful each demo site in terms of the set objectives, and the measurement method applicable in all demonstrator is defined for each KPI.
These indicators will be split in four main categories:

- Technical: lifetime, efficiency, safety, resilience of systems and components, reduction of plant reserves, reduced cost from forced power outages, etc.
- Environmental impact: emissions and impact on global warming and air quality, etc.
- Economic: customer profitability score, relative market share, return of investment, business cases etc.
- Social: e.g. end-user comfort, easiness in use, inclusivity, etc.

VUB will coordinate between ABB, CERTH and the demonstrator site owners which KPIs are suitable for each individual demonstrator site. The KPIs will also be used by ABB in the following task 2.4.
CERTH in collaboration with DUTH will provide all input data required to ABB for the analysis and basic dimensioning of the Greek demo site.

Task 2.4: Refinement of multi-vector optimisation software (M5-M36) ABB 5PM, VUB 2PM

The objective of this task is to refine the current settings of multi-energy site analysis software is provided by ABB (existing MESA-tool). CERTH will collaborate with ABB in defining advanced models for integration of innovative forecasting tools for production/consumption. CERTH based algorithms for the prediction of the RES production/consumption different profiles, so that the better fitting of all interrelated electric/thermal loads can be virtually demonstrated. The module will be capable of representing the dynamic in time operation of most of the integrated solutions being demonstrated so that optimised control algorithms for symbiotic operation of multi-energy vectors can be developed for the various locations of the demo-sites. Furthermore, IKL will integrate state-of-the art battery models. These models will be able to predict cycle life and associated capex and opex, dependent on the operational conditions of the batteries (C-rates, depth of discharge, number of cycles, temperature). The software runs on a cloud-based platform, so that all partners can use the software and have access to the results. The use of a cloud-platform allows the software platform to be scaled-up so multiple sites and regions can be analysed. Additional analysis and energy layer modules can be added using the software's open interface. This allows also to assess and design not only energy islands but also clusters of islands and propose optimized designs. The extensive VUB data base with historical data will be used as a test-bed to proof-run the improved platform in a virtual environment.

Task 2.5: Optimised design for the demonstration sites (M5-M30) ABB 4PM, VUB 2PM, CERTH 12PM

The objective of this task is to apply the extended multi-vector optimisation software (task 2.4) on the demonstration sites. The data collected in T2.2, T2.3 and T3.1 will be used for the optimisation analysis. ABB will be running the tool with support of the knowledge partners. As a first step in the analysis the performance of current site configuration will be benchmarked. Secondly, the tool will be used to analyse the site for different scenarios developed in T2.1. Component sizing and optimization of the generation schedules is calculated, and then passed to WP4 for final verification and fine-tuning using practical implementation limitations. The software will automatically include different sizing of new technological solutions, such as battery energy storage or thermal storage, to determine the optimal combination for each demonstrator site.
The outputs are:

- Conceptual system design consisting of the type & size of components, location, and connection topology;
- Operational strategy of when and how to use each component;
- Optimized component designs and/or component specifications;
- Assessment of life cycle CAPEX AND OPEX for all stakeholders, revenue streams, and other societal, technical, environmental and societal KPI's

For the Greek and French demo sites their design for the most important of integrated solutions being demonstrated (WP5) will be in more detail examined, identifying any possible technical barriers towards achieving the maximum of possible interaction among actor groups. In that respect, CERTH will build a dynamic, multi-physical and multi-vector refinement tool, which will be capable of representing the dynamic in-time operation of most of them, using the APROS tool with house-built modules. This tool will provide with a report on best practices of the symbiotic operation of multi-energy vectors. As such the results are expected a) to contribute in the demand / supply harmonization of RES resources on a micro-grid scale and as well the decrease of any RES curtailment, b) act as a preparatory step towards the demand-response readiness of the two sites, during WP5 evolution and c) be used for scalability and replicability of the solutions demonstrated in WP6.

Task 2.6: RENERGiSE tool designer interface (M12-M30) CERTH 4PM, ABB 3PM

Under this task CERTH will be designing an easy-to-use flexible and interactive designer interface combining graphical degisn with textual and numeric features, that allows site owners to easily select and compare different local energy system designs. The interface will be linked to the multi-vector software, and after completing its requirements and input data entry, the owner will access a library of applicable customized components and operational guidelines that will enable a configured design. Fields of input data but also output will follow the determination in T2.2, whereas additional requirements will be requested (i.e. referring to anticipated QoS, level and timeplan of operation, etc.). The RENERGiSE tool will be able to provide as an outcome different optimised design configurations, interfacing different business case scenarios, different ecosystems, different levels of integration and grid maturity and upon varying technological, societal, economic & ecological constraints (fed by the site owners all over the world). CERTH will lead this task with support from ABB. The user experience and user acceptance of the tool will be validated in WP5, WP6 and WP7 and in all demonstration events that will be organised following its development.

Task 2.7: RENERGiSE replicator tool (M12-M34) Leader: ABB 3PM, VUB 1PM, EEM 1PM, SOREA 1PM, DBL 1.5PM, BAX 1PM

This objective of this task is to present RENERGiSE (RENAISSANCE ENERgy Island SoftwarE replicator tool) replicator tool that would allow local communities to easily design and select solutions for decarbonisation of the local energy system based on technical and socio-economic criteria analysis. The extended software form task 2.4 will be further improved by evaluating the KPIs collected in task 6.1 against the performance predictions from T2.4. Significant differences will then trigger an in-depth investigation why the software provided a different result. The investigation results are then used to improve the optimization software and/or product models used in the analysis. The software is then rerun in order to verify the new predicted results against the demo-site data, KPIs and experience. This will allow the software to accurately predict the potential of other sites, and this at various levels. The software will not only run within a single energy island, but also allow to assess the efficient functionality of clustered islands in a virtual power plant and support smart clustering of energy islands. Finally, user friendly designer interface from task 2.6 will be combined with tool.

Deliverables
D2.1 Report on ranking of technology-business designs for demo sites (M12, VUB)
D2.2 Requirements, expectations and objectives for each demo site (M8, ABB)
D2.3: KPI definition and selection (M4, VUB)
D2.5: Refined multi-vector optimisation software tool (M26, ABB)
D2.5. Site design of the demonstrators (M10, ABB)
D2.6: RENERGiSE designer interface (M28, CERTH)
D2.7: RENERGiSE replication tool (M30, ABB)

Milestones
M1.1 Site design of the demonstrators (M10)
M1.2 Refined multi-vector optimisation software tool (M26)

Work package number	**3**		**Start Date or Starting Event**										M.01		
Work package title	**Business Models and Smart Contracts**														
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Short name of participant	VUB	IKL	ATOS	DBL	SMR	SOREA	CIRCE	DUTH	CERTH	BAX	SDM	NAPE	ABB	SUN	EEM
PMs	10	20		2	14	4	11	1	15,5	2,5			2		

The objective of this WP is to analyse the business model side of local integrated community energy systems. IKL-IKERLAN (IKL) will coordinate this WP and together with VUB lead the identification of the project business models, the development of the smart-contracts for the identified relevant types of energy agreements, and the analysis of their impact. This impact assessment will follow upon the development and implementation of the decentralized platform (WP4), the demonstration sites in Greece and France. Furthermore, the results from this WP will be used for the MAMCA analysis in WP2 and as input for the benchmarking exercise in WP6.

Task 3.1 – Business case benchmarking (M2-M10) VUB 7PM, SOREA 2PM, SMR 2PM, IKL 3PM, CERTH 1.5PM, BAX 2.5PM, CIRCE 1PM, DUTH 0.5PM, DBL 2PM

The main objective of this task is to formulate different financial business models for the RENAISSANCE demonstrator sites. In this task, we will, based on a comprehensive literature review (1), a mapping and benchmarking of existing local energy system business model configurations(2), and a thorough investigation of RENAISSANCE's demonstrator cases (3), formulate recommendations on feasible business models as depicted in the scheme:

First VUB with support from CIRCE will be updating the existing business models for local energy system set ups. This will be done from a global perspective and through a literature study and interaction with other ongoing projects. IKL will use the results to create a benchmarking framework in which different business models' configurations are categorized. Secondly, business ecosystems will be mapped to uncover all relevant stakeholders: consumers, citizens, SMEs, large companies, intermediaries, (local) governments, energy providers, etc. Data collection through expert interviews will be done in conjunction with task 2.1 and task 5.1. Finally, this task will formulate recommendations on feasible business models for the demonstration sites to come to fundable business cases, acceptable for all stakeholders involved and matched with local ambitions. In conjunction with the

work from T2.1. where the scenarios are different business models we uncover the most acceptable and viable business cases for the specific demo sites. These results will be used as a basis for task 3.2. and task 3.4.

Task 3.2 - Development of smart-contract (M7-M14) IKL 10PM, CIRCE 4PM, CERTH 7PM

The objective of this task is to design, implement into software modules and audit the smart contracts envisioned in Task 3.1.and assessed in task 2.1. Hence, the design phase will refine the definition of:

- actors involved in the energy agreements: users, and also systems or devices (that permit automating transactions between users), such as smart meters;
- roles of the users involved: energy producers, consumers, retailers, distributors, insurers, etc.;
- clauses defining the actions that they may or may not carry out by each role: e.g. retailers may not sell energy, but can create different types of energy markets for consumers and producers and get a fee per consolidated transaction;
- clauses defining global targets (a energy market may not trade more than 1MWh in a sunny day);
- external interfaces that may provide valuable information (e.g. trustworthy weather information sources).

These definitions are mapped into data models, which specify the information that needs to be represented and managed by the smart contracts (their variables), and into interaction models, which specify the flow of actions that may be executed by the smart contracts (their permissioned functions). The implementation of the data and interaction models in the form of smart contracts will follow best practises[33] and will instantiate high-quality, audited smart contracts and libraries[34] as much as possible. This implementation shall guarantee that the smart contracts are secure, so that no one can execute unintended actions that break the interaction model, such as withdrawing cryptocurrencies from a smart contract without authorisation, transacting with high carbon energy in markets for low carbon energy, transacting with high volumes of energy when the overall limit is low, deriving identities from the users of the platform, etc. The implementation shall also guarantee that the smart contracts are efficient, so that the computational (and economical) cost of the transactions that they execute is as low as possible. In addition, the smart contracts will be audited by means a unit-testing (e.g. Mocka framework[35]) strategy, which will cover both the normal operation and the spectrum of possible failures, errors and abnormal execution cases. Additionally, bug bounty programs may be created in public blockchain networks. In this way, third-parties may complete the smart contracts auditing in exchange for cryptocurrencies, which would be automatically received if the security of the smart contract is successfully bypassed.

In parallel, CERTH will develop automated tools aimed at facilitating the activation and participation of the smart-contracts by the end-user will be designed and implemented. These tools will use predictive strategies to quantify the end-user participation parameters values (mainly prices and kWh) on the energy services by the smart-contracts considering also day and/or periodic peak times for consumption and production. Data for historical consumption and services prices and meteorological prediction among other parameters will be used together with machine learning algorithms to optimize the end-user participation. Prices data will be obtained from the blockchain operation. The automated tools will be a module operating online. During the operation within the market platform, it is fed from the sale or purchase prices of energy at every moment to predict future prices. A comparative price will be also available on internet, due to the European Electricity Spot Market. As a result of this task, IKL will provide the identified smart-contracts code to task 4.3 Also, an application (web or standalone) based automatic decision-making supporting tool will be provided.

Task 3.3 – Assessment and validation of energy agreements (M12-M30) CERTH 7PM, CIRCE 5PM, IKL 3PM, SMR 10PM, SOREA 1PM

Following the completion of Task 4.3 and Task 4.7, this task will provide a detailed evaluation and validation of the energy agreements under various conditional hypotheses posed by the business cases of T3.1 by means of the execution of the smart contracts in the basic RENAISSANCE block chain network and applied in the sites in Greece by CERTH and France by SMR. In a nutshell, the smart contracts related to each business case will be exhaustively evaluated under different conditions that are representative of it through the unit-testing approach that will be adopted. Four inputs will be required to prepare the simulation environments. First, the blockchain implementation delivered in T4.3, which provides the technical benchmarking platform. Second, the smart contracts created for the different business cases, available in T3.2. Third, based on T3.1, a characterization of each business case that includes systems (up to 120 smart meters), information collected from real demo-sites,

[33] https://github.com/ConsenSys/smart-contract-best-practices
[34] https://openzeppelin.org/, https://aragon.one/
[35] http://truffleframework.com/docs/getting_started/javascript-tests

interfaces, processes that will be executed through the smart contracts, processes that will be executed by the smart meters, workload, etc. Fourth, the set of key performance indicators (KPIs) of the business cases from T2.3. The evaluation of smart contract-based business cases, according to the pre-established KPIs, will be a relevant input for the project demonstrators. This input will facilitate the development and testing of their particular applications during the pilot phase (developed in WP5), taking advantage not only of the RENAISSANCE blockchain architecture, but of the whole RENAISSANCE Infrastructure. IKL will develop the smart contract templates and also the automatic decision software modules, while CERTH will develop the web or standalone interface that will be integrated on the personal assistant developed in WP4 (T4.4).

Task 3.4 - Assessment of business cases (M28-M34) SMR 2PM, IKL 4PM**,** SOREA 1PM, ABB 2PM, VUB 3PM, CIRCE 1PM, DUTH 0.5PM

The objective of this task is to develop a comparative feasibility study of business cases described in T3.1. and applied in the demo sites in France, Greece, the Netherlands. The feasibility study would cover the assessment of market viability, technical viability, business model viability, management model viability and economic and financial model viability; and will involve the establishment of the business hypothesis necessary to generate a thorough feasibility assessment framework developed in 3.1. This task will then carry out several sensitivity analyses. Apart of the inputs from task T3.1, this task will receive inputs from task T2.3 on the financial (Capex, Opex, Revenue) data as well as the data collected in T6.1. KPI's of these applied business cases will be transferred to WP6 for benchmarking purposes. This task will be led by SMR with support from IKL, SMR. SMR will provide the information related the demo sites, number of end users, number of potential smart contracts. SMR together with IKL will define the KPI of each smart contract IKL will simulate different conditions and will evaluate the performance (precision, robustness and reliability) of the smart contract. This work will serve to correct and improve the developed smart contracts. SMR and SOREA will provide information related the evolution of the business model cases on each demo sites and will suggest different market evolution for the sensitivity analysis. A deliverable D3.3 will be developed describing the performance of the smart contract. Also, if needed, a new improved smart contracts version will be provided.

Deliverables (brief description and month of delivery)
D.3.1 – Benchmarked business case report (M32, VUB)
D.3.2 – Smart-contracts detailed design and implementation (M12, IKL)
D.3.3 – Validation results of energy agreements (M24, IKL)
D.3.4 – RENAISSANCE business models assessment results (M24, SMR)

Milestones
M3.1 – SMART CONTRACTS detailed design (M12)
M3.2 – Validation of the RENAISSANCE business case models (M24)

Work package number	**4**		**Start Date or Starting Event**						M.01						
Work package title	**Infrastructure implementation and integration**														
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Short name of participant	VUB	IKL	ATOS	DBL	SMR	SOREA	CIRCE	DUTH	CERTH	BAX	SDM	NAPE	ABB	SUN	EEM
PMs	4	26	40	1	2	5	41		36					4	

The objective of this WP is to integrate and prepare the innovative and flexible RENAISSANCE infOrmation Platform (ROP) for use in the multi energy vector energy island demonstrator sites. The platform will allow for daily operational management of local energy communities encompassing technical operation, peer-to-peer trading and interaction with the involved stakeholders.

Task 4.1: RENAISSANCE information Platform (RP) (M3-M33) ATOS 20PM, CERTH 2PM, CIRCE 10PM, IKL 4PM, VUB 1PM

Using as an Input the users' elicitation of needs from task 2.2 the, RENAISSANCE infOrmation platform (RP) will be conceived as an innovative ICT platform that is intended to provide advanced services to a wide variety of stakeholders through a range of end-user applications, including web & mobile browsers, native mobile apps, and IoT & field devices. This will be designed, on the basis of the already existing FUSE platform, provided by ATOS, as a hybrid multi-cloud solution able to integrate collaborative developments, using the exposed APIs or as containerized developments or scripts able to be run on a headless Linux environment. It will follow a mircroservice approach, fostering modularity.This information platform will be built using a four (4) layer approach:

Data Layer. This is closely related to Task 4.2 and FRD integration. It will include access to external systems, data integration and data management. It will also be responsible for the harmonization of the data received/sent to the various standards currently used at those devices. This layer will contain the database management systems used in the platform to store data and it will monitor and Profile data flow (flexibility, DR signals, contextual data, etc.) with know-how provided by ATOS, CERTH and CIRCE.

Data modelling and forecasting. Based on the raw data collected by the information platform, this layer will extract the value out of the information gathered, in an intermediary step towards the decision-making process. The number of functionalities, envisioned to be included in this layer are, and will be primarily developed and integrated in the RP by CERTH:

-Flexibility & DR & Energy (electricity and thermal) forecasting tools to conform to balance responsibility as well as to maximising the gain from properly assessing the available flexibility and the potentially applied DR mechanisms.

-Energy Market price forecasting presenting the financial challenges and opportunities that need to be taken under consideration prior to applying an internal local ecosystem DR strategy, in connection with WP3 and in that respect act as a feed-forwarding mechanism for the business models (e-coins, smart contracts) as implemented in T4.4.

Decision Support System (DSS). The proposed DSS will analyse and take decisions in a fast, efficient and robust approach that will facilitate the optimisation of the energy portfolio. The DSS will incorporate the following modules.

- Grid Stability simulation engine. This first module will be responsible for monitoring the stability within the available portfolio and run background scenarios simulating issues that could occur based on status and forecasting – (DR and energy (electricity, thermal)) models. If a problem is detected an alert will be generated and provided to a Decision Support System (DSS) towards selecting the optimal course of action for solving the situation at hand.

- Self-portfolio energy balancing. This second module will also provide the DSS with assessments of the available energy (excess or shortage) within the energy portfolio, targeting a balanced state where the use of available flexibility is maximised. Subsequently the DSS will inform the RENAISSANCE Social Engine (RSE) in T4.5, with the appropriate actions to be followed by the system's stakeholders (ie. the consumers/prosumers of the network).

- Asset Handling. This module is responsible for analysing and redistributing incoming DR signals, based on information provided by the Energy Nodes (FRDs) for a balanced, stable and DR profitable (both in terms of energy and cost) way.

Energy services Trading Supervision System (TSS): The TSS will be the central regulator of the blockchain based Energy services trade market. The proposed TSS will dynamically establish the limits of the smart-contracts that execute agreements between prosumers in order to assure relevant global properties of the distribution grid, such as its stable operation. In the same way, the TSS will supervise the economic exchange on the trade market to avoid situation that could distort the proper operation of the energy services. Apart from trade market supervisor role, the TSS will deal with the transparent management of the cryptocurrencies used on the energy services market, to ensure that the validation of transactions within the blockchain is not stopped due to a lack of cryptocurrencies to reward the validation. This layer will operate over the smart contracts templates developed in WP3. Overall, the TSS will receive data from Data modelling and forecasting and DSS layers, which will permit to identify the limits of be established in the definition of smart contracts (e.g. maximum energy to be exchanged among the member of the energy community, minimum price of the energy unit). This layer will be developed T3.2 and validated in T3.3, and integrated over the FUSE platform in this WP. This task will be led by ATOS with support of CERTH and IKL.

Task 4.2: RENAISSANCE Energy Node Integration (M5-M20) CERTH 7PM, ATOS 5PM, CIRCE 5PM, VUB 1PM

CERTH with the collaboration of ATOS, will design and deliver Fog Ready Devices (FRDs) to the RENAISSANCE demonstrators, responsible for real-time monitoring and control of their micro grid. FRDs aims to support either the physically located devices equipped with smart meters and/or gateways (named as NODES) interfacing to various sensor networks or the virtual ones, used to measure the overall energy related data (e.g. consumption, generation, emissions, power coefficient, thermal/electricity storage etc.), by bringing computing resources and application services closer to the edge. The smart edge devices to be incorporated and/or upgraded to FRDs are the NOBEL GRID SLAM Class B smart meter provided by ETRA and the EnergyBox MV/LV gateway provided by CIRCE. Both devices offer superior monitoring and control functionalities and are equipped with on board processing power, storage and a set of physical interfaces. Through an intelligent lightweight toolkit, energy data related to real-time flexibility will be provided as an input to the RP, after being aligned to each most fitting selected strategy (i.e. time interval) as being required by each specific Node; thus facilitating permission based peer-to-peer interaction at energy exchange level. FRDs will be designed in a manner that will permit their installation and integration to smart or other types of edge devices or gateways. These will be communicating with either existing or virtually connected to the RP, smart energy technologies and/or building management systems (BMS), through the use of Smart Hubs/gateways. FRDs will be designed to interact physically, at least for the Greek and French demo cases, as the Dutch case will use system designed by Enervalis, with the located their power lines, storage systems and sensors within the infrastructure hosting it, allowing the optimal control distribution of loads, each time a DR signal arrives. In the case of no-smart or virtual environments, facility managers/end-users will have to manually configure each FRD by inserting hard constrains extracted from load usage, so that the FRD can limit the applicable control strategies to the extent this is allowable, upon the each time incoming of a DR signal. In the cases of Smart technologies, FRDs will use simple models and historical data to create these constrains dynamically. Finally, FRDs will have a self-learning capability employing deep learning techniques to analyze historical and forecasting information, towards the improvement of the provided flexibility at each of the demo sites. The extensive set of historical data available in the Brussels demonstration side will be used to develop and validate the developed algorithms.

Task 4.3: Log-oriented architecture design and Implementation of the RENAISSANCE blockchain (M5-M20) CERTH 8PM, ATOS 10PM, IKL 15PM, CIRCE 9PM, SMR 2PM, SOREA 2PM

To ensure the integrity of the data shared among the stakeholders for decision-making, risk assessment and social aspects, as put forward by the RSE, the blockchain technology will be used across the multiple layers of the RP. At the moment FUSE platform is not offering a cross-cutting blockchain layer, and towards this aim ATOS and CERTH will collaborate to develop that. Techniques as that of SSL services will be sued to link the individual secure level current layers of the FUSE. This is necessary, since the smart contracts, as defined in WP3, will be as well designed over a blockchain-based distributed ledger, which will be used for automatic settlement when pre-defined events occur. This blockchain will be adapted to support a smart contract ecosystem, considering as well the necessary architectural properties that are required to be deployed, by the need for a trading layer (T4.1). This is a prerequisite for recording in an efficient, verifiable and immutable way the numerous transactions among the FRDs, succeeding a secure access and immutable storage, and back-bone replication principles. The RENAISSANCE blockchain is, in fact, an extended version of the blockchain implemented in T3.3. As stated in the description of T3.3. In Task 4.3 the infrastructure will be further extended to incorporate more nodes and integrated to the overall architecture by providing the necessary Decentralised Apps (dApps) required for the blockchain network to interface with the rest of the RENAISSANCE building blocks. This includes implementing blockchain nodes or light nodes to smart edge devices, gateways as well as light nodes integrated to users' mobile applications. Essentially, Task 4.3 will allow the use of blockchain to provide an audit trail for energy network data, enabling both energy data traceability and secure access for stakeholders in a transactive decentralized environment. This task adds a data provenance mechanism to assist users to track the usage and aggregation of data related to them via KYC (Know Your Customer) based mechanisms. The final solution will include a) data tracking mechanism to enable users to access their own data and control permissions for access by others, b) mechanisms to assess transparency of the processes employed by individual actors in the ecosystem that handle users' data, c) a visualization framework that intuitively provides the required information to the user and d) mechanisms to integrate with the RSE for transactional logging, facilitate award oriented and trading activities by the production of blockchain based tokens (e-coins) to be used for the purposes of value exchange.

Task 4.4: Interaction with the stakeholders: RENAISSANCE Social Engine and Personal Assistant (M10-M26) CERTH 12PM, VUB 1PM, DBL 1PM, SOREA 3PM

CERTH will develop the following list of tools/services to improve the consumer/prosumers engagement in the demonstration activities foreseen in WP5, while offering a playful and pleasant interactive environment. These tools are:
- A **Collaboration platform** that will enable consumer/prosumer interaction and knowledge diffusion towards promoting best, healthy competition among customers (which will be extensively be research regarding the impact it has in regards to energy management via behavioral modelling), suggestions and incentives and provide, among other features, Q&A, chatting, content posting (text, video, image), timeline of customer activities, social connections among consumers/prosumers ("friends") & followers, notifications for social activities, energy related events, awards view and notifications.
- An **Award-Enabled** energy use assessment service, building on the RENAISSANCE Blockchain architecture, which will be based on pervasive learning and game mechanics for creating a serious game for the Demand Response environment of the RENAISSANCE energy network. Consumers/Prosumers will be rewarded for their participation on DR balancing and fun DR related activities (DR games based on actual DR scenarios) will be provided among them promoting healthy competition, while "demo" applications will be then compared to actual DR scenarios towards improving the user experience.
- **Personal assistant** will be responsible for providing automated recommendations based on demand and response (DR) historical energy data to the user. A user can be either consumer or producer or both of them. Personal assistant will consider user's location, current and historical weather conditions. It will also take into account consumers' and producers' everyday needs, specific time periods such as holiday seasons, away from home, peak energy consumption and production times in neighborhood or larger sub-grids. Most of these modules will be provided as dApps (decentralized applications) from the RENAISSANCE blockchain (T4.3). Personal assistant can be a web or smart phone application.
These services will be developed closely following the requirements set by T2.1 in collaboration with VUB and DEP requirements and consumer expectation.

Task 4.5: RENAISSANCE Security Access Control Network (M10-M26) CIRCE 8PM, CERTH 1PM

Within this task, CIRECE together with CERTH aims to develop the RENAISSANCE Security Access Control (RSAC) Framework. This will be formulated after analyzing the trade-offs aiming to deliver cost-effective solutions for cyber, physical, and cyber-physical protections. The framework development process will result as a result of the following successive steps, i.e. a) Mapping of the technical security issues to economic costs and risk reduction, b) Identification of the most prominent attack plans for the cyber/physical and cyber-physical assets of high criticality, c) Analysis and mapping of economic incentives to invest in security controls that improves the data integrity, privacy, and service resilience in energy infrastructure, d) Realization of a simulation and decision-making tool for selecting the best defensive strategy, e) Investigate the usefulness of cyber-insurance and security derivatives in transferring the residual risk/liability. By adopting a Privacy by Design approach, potential risks will be identified throughout the design and implementation phases, ensuring that appropriate countermeasures are foreseen. Information flow at all levels will be fully shielded and monitored towards preventing violations against EU and National legal frameworks identified in T1.4. For this reason, the Blockchain architecture will be leveraged as a core authentication solution, not only for the end users but also to ensure the non-repudiation of the assets. Use of authorization and encryption solutions will also be deployed across all relevant data storages deployed.

Task 4.6. Integration and interconnection Phase (M14-M34) CIRCE 9PM, CERTH 6PM, ATOS 5PM, IKL 7PM, VUB 1PM

Initial aim of this task is the drafting of an integration plan (tools for integration, validation and deployment in the execution of the Use Cases) after the prompt delivery of the architectural designs of all components of the RP. The aim of this task is, prior to the deployment of the RP to the actual Pilot sites, extensive lab-testing of that to be conducted, for the identification of any type of malfunctions and their repairing, following an iterative process. As a representative case of a very small scale micro-grid, the CERTH smart house and smart building installations, where various of the suggested scenarios can put to actual practice towards testing and validating proper functionality, communication between components and accurate performance regarding DR mechanisms deployed, will be used. However, to emulate the RP performance in much more representative micro grid conditions, CIRCE's Real Time Digital Simulator (RTDS) Laboratory will be used. CIRCE can represent in that, real environmental conditions, where participants will do trades, with the inclusion of the necessary hardware devices connected to a MV/LV power system, within a controlled and safe environment. With this equipment, CIRCE will be able to test any device and control of the RP in real time, allowing to validate its expected real operation before its installation in the demo sites.

Deliverables (brief description and month of delivery)
D4.1: RENAISSANCE Information Platform integrations report (M12, ATOS)
D4.2: Energy nodes integration report (M18, CERTH)
D4.3: Blockchain network implementation report (M18, CERTH)
D4.4: Social Collaboration Engine and Personal Assistant implementation report (M24, CERTH)
D4.5: RP wide security implementation report (M24, CERTH)
D4.6: Report on integration and testing results (M30, CIRCE)

Work package number	**5**	**Start Date or Starting Event**											M.01	
Work package title	**Demo sites operation, integration and validation**													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Short name of participant	VUB	IKL	ATOS	DBL	SMR	SOREA	CIRCE	DUTH	CERTH	BAX	SDM	NAPE	ABB	SUN	EEM
PMs	34.5		29	4	2	37	2	20	19		10		3	16	30

This WP focuses on the operational planning and execution of the demo sites. The requirements, expectations and objectives will be gathered in this WP, but will serve as input for WP2, WP3, WP4, WP6. In a second step a detailed implementation plan is developed for optimising the demonstrator sites. Finally the implementation and operations of the demonstrator is done under this WP.

Task 5.1: Requirements and objectives of the demo sites, definition of data output (M1-M11) SOREA 2PM, VUB 3.5PM, CERTH 3PM, EEM 1PM, SDM 3PM, ATOS 2 PM, DUTH 2PM, DBL 2PM

In coordination with task 2.1, task 5.1. will collect data for each of the pilots the stakeholder requirements and expectations. Also, a detailed specification list of assets already available at the site as well as a list of potential envisaged components and systems will be set up and transferred to T2.1, T3.1 and T4.1. In addition, in collaboration with T2.1 and T2.2 the KPIs for each of the sites will be defined, and prioritized for each demo, which will also serve as a basis for benchmarking in WP6. Finally, the task will define the architecture of the data exchanges, specifying formats, standards and frequency of measurement data, that later will be transferred to WP6 for comparative assessment and for the purposes for C2C virtual trading model. Special attention will be given to maintain privacy of the users, and hence the data exchange will be handled at an aggregated level in which all links to private individual users will be removed. ATOS will provide a cloud based data platform for exchange and storage of data and will make sure that the Data Management process set out in WP1 will be respected.

Task 5.2: Implementation plan (M6-M16) CERTH 2PM, SOREA 2PM, VUB 2PM, EEM 2PM, SDM 3PM, ABB 1PM, SUN 1PM, DUTH 2PM

WP2 will provide a design or optimization scheme for the demonstrators, which will serve as baseline for the further deployment and/or optimization of the sites. In collaboration with WP4 for hardware /software and WP3 business aspects, this task will elaborate a detailed implementation plan containing a roll-out scenario for the envisaged solution and experiments. Hardware and software solution will essentially differ from site to site. e.g the demo sites from Brussels and The Netherlands already benefit from their own energy trading and controlling platform while the RP developed in WP3 will be deployed in Greece and France. Each of the demonstrator coordinators (CERTH, VUB, EEM, SOREA) will develops such a plan in collaboration with the suppliers of the demo site (SUN, ABB, SDM) CERTH will coordinate this task.

Task 5.3: Implementation, operation, monitoring of RENAISSANCE approach at demo sites (M6-M36) SOREA 30PM, VUB 25PM, CERTH 8PM, EEM 25PM, CIRCE 2PM, SDM 2PM, DUTH 8PM, ATOS 22PM, SDM 6PM, ABB 2PM, SUN 15PM, SMR 2PM

The objective of this task is to implement the optimisation changes for demo sites according to the solutions proposed in WP3 and WP4 and WP2 (installing soft and hardware, engage citizens and conclude smart contracts etc.). The daily operation will be carefully monitored and measurement data will be stored on a continuous base

at the demonstrator sites. These measurements encompass technical measurements, monitoring financial transactions, and stakeholder/customer acceptance/behaviour monitoring (surveys, interviews, workshops), needed for the daily operation as well as for the modelling and the assessments of the KPI's in WP6. Aberrations from foreseen operation will be registered and addressed, and if needed support from WP2, WP3 and WP 4 will be given in order to address issues that could origin in the solutions provided by these work packages. Each of the demonstrator coordinators will manage its own site (DUTH, VUB, SOREA, EEM) in collaboration with its stakeholders. In order to monitor the demo sites data from demonstrator sites is collected here but stored in T6.1. Through, the data from demonstrators SUNAMP will further improve their current heat batteries deign.

Task 5.4: Demonstrator validation (M12-M36) ATOS 5PM, VUB 4PM, CERTH 6PM, EEM 2PM, SDM 2PM, DUTH 2PM, SOREA 3PM, DUTH 8PM, DBL 2PM

The objective of this task is to analyse the data from each demo site. The main purpose of the task is to make a first assessment of the real performance of each demo site, and this with respect to the daily functionality and the KPIs from T2.3. This analysis will address the technical performances of the local energy system (energy transfers, stability, reliability, safety security, demand-respond), the financial transactions and efficiency of the business cases, customer acceptance and behaviour, as well as the key KPI's of the demo-site, and form the basis for direct feedback for the providers of the software and hardware solutions. These first conclusions will also be transferred to WP6 for benchmarking purposes and for the demonstrator assessment using the multi-vector software tool in T6.4. Suggestions for improvement resulting from task 6.4. will be implemented where possible. Moreover, the data analysis developed at this task will also evaluate and compare the real operation of each demo site with simulated scenarios, that will be used for improvement of the multi vector tool in WP2.

Deliverables
D5.1: Output data framework (M3, SOREA)
D5.2 Final implementation plan (M8, CERTH)
D5.3. Start of optimized pilots (M12, VUB)
D5.5. Validation report (M24, SOREA)
D5.6. Final Validation report (M36, SOREA)

Milestones
M 5.1Start demonstrators (M12)

Work package number	**6**		**Start Date or Starting Event**												M.01
Work package title	**Benchmark, scalability, replicability analysis and virtual demo validation**														
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Short name of participant	VUB	IKL	ATOS	DBL	SMR	SOREA	CIRCE	DUTH	CERTH	BAX	SDM	NAPE	ABB	SUN	EEM
PMs	19		9	2		6	1	5.5	10	9		12,5	13		

Objectives

- Regulatory barrier analysis Europe and recommendations
- Comparative Analysis and Benchmarking of the demonstration sites
- Replicability validation of the RENERGiSE tool
- Asses potential of C2C market

Task 6.1 Demo site data collection (M12-M36) ATOS 7PM, VUB 3PM, SOREA 2PM, DUTH 5PM, EEM 1PM, CERTH 3PM, IKL 1PM,

Aggregated data from measurements in WP5 (task 5.3) will be stored on a cloud based database hosted by ATOS that is easily accessed by the consortium partners. Data will be formatted and standardized following the agreements in T5.1 and uploaded on a regular basis to the data sharing platform. Atos will be in charge of the data collection and for performing the incoming quality control in collaboration the demonstrator site owners. Format,

extend, frequency of the delivered data are finalized, but will be sufficient for extracting key KPI's for assessment and benchmarking of the demonstrator sites, as well as to improve the multi-vector replicator tool.

Task 6.2. Regulatory barriers analysis (M4-M36) BAX 8 PM, VUB 2PM, SOREA 2PM, ABB 1PM, NAPE 2PM, EEM 1PM

The main objective of this task is to analyse the obstacles and opportunities at the European regulatory landscape for up take for innovative decarbonised local energy systems. The analysis will be taking into account as well the implementation requirements of multi-energy systems, including bi-directional energy flows between existing energy grids. This will allow to identify the major barriers and/or restrictions in implementing RENAISSANCE solutions. Firstly, the analysis will cover the members states where demonstrator sites are located. Secondly, a broader European regulatory review is undertaken to produce a heatmap showing the countries where fully optimized multi-energy sites can be implemented and those countries where regulation limits the maximum potential. In addition, some leading examples in other continents will be analysed as a benchmark. Finally, proposals for regulatory changes, if any, that enable better demo site outcomes will be prepared. This will be backed up by the site analysis results that can show the benefits to the sites when certain regulatory restrictions are removed.
This task will results in:

- Analysis report on the regulatory barriers for each of the demo site;
- European country heatmap showing the ease of implementing optimal local multi-energy communities;
- Proposals for regulatory changes, both at local level as well at European scale;

This task will be led by BAX with the support from VUB, SOREA, DBL, SUN, CERTH, NAPE (Eastern Europe) for their respective countries, ABB will support the analysis with their experience from other European countries they are active in such as CH.

Task 6.3: Benchmarking and comparative analysis (M18-M36) VUB 4PM, ABB 3PM, CIRCE 1PM, CERTH 3PM, DBL 2PM, DUTH 0.5PM

A comparative framework will be designed in order assess the key KPI's defined in T2.3 (technical, economic, social, environmental) and extract first lessons learned on the effective operation of the various demonstrators and to assess the sensitivity to operational and structural parameters of the demonstrator and to assess the interdependence between these parameters. The measurement data as well as the obtained insights will be fed back to Task 2.5. in order to improve accuracy of the multi –vector replicator tool. In a second step the improved tool will then be used to model and asses each of the demonstrators again in order to suggest improvements, related to (technical) design, financial structure, business model, recommended business ecosystem, social acceptance and citizen engagement. If possible within the timeframe of the project these optimisations will be implemented (e.g. changing energy management or parts of the business model) and the effect of the implementation will be assessed in a second assessment round. In addition, policy measures to foster the roll-out and replication of the energy island will be formulated. This task will be led by VUB (technical, environment, business, curricula) with support from CERTH on efficiency of forecasting and CIRCE and ABB on technology benchmarking, and DBL on social acceptance.

Task 6.4 Scalability & Replicability Validation of RENERGiSE tool (M18-M36) ABB 7PM, VUB 8PM, CERTH 2PM, BAX 1PM, NAPE 10.5PM

The RENERGiSE tool in WP2 need to be scalable and replicable globally, considering all types of areas (rural, urban, sub-urban) and grids (weak, mature) taking into account essential aspects: socio-economic, environmental, safety, technical, regulations and potential involved stakeholders. As such the RENERGiSE tool is an enabler for global deployment for energy-islands and leading to potential exploitation of the results of the project in global markets. The RENERGiSE tool and the accompanying participatory approach have been tested in 4 demonstrators in Europe, but to assess and validate it's applicability in global markets thoroughly it is has to been applied in cases where boundary conditions may be essentially different from what we know in the European Union. Hence, in order to validate the replicability of the tool, different potential energy islands will be evaluated virtually in different locations in Poland, India, US, UK and potentially China or other sites that will be defined during the project. Ecosystem, and stakeholder mapping, requirements and expectations elicitation described in T2.1 (MAMCA) will be carried out in conjunction with task 7.6.

T6.5 Community to Community (C2C) Trading potential (M13-M36) VUB 2PM, ATOS 2PM CERTH 2PM, SOREA 2PM, ABB 2PM

The objective of this task is to assess the potential of smart clusters of energy island that can act as a virtual power plant and enter e.g. R2 markets (secondary reserves) and trade directly with the TSO-DSO market. The RENERGiSE tool will be used to asses a virtual power plant consisting of the 4 demonstrator sites of the project, and based on the collected data in WP5. Of course, since the sites are located at long distance from each other this can only be carried out virtually. Improvements with respect to revenue streams and ROI, grid stabilization and congestion, efficiency and environmental impact will be assessed for various scenario's in which the islands are allowed to carry out peer-to-peer trading. Recommendations for smart clustering of islands will be set up, as well as the potential impact that C2C trading may have on the technical, operational and commercial structure of the individual islands. Finally, policy recommendations towards local authorities and the EC that can foster the development of smart clusters will be developed in conjunction with T6.2.

Deliverables
D6.1: Data Platform (M6, ATOS)
D6.2: Assessment of the demonstrator sites and recommendations towards demonstrator sites. (M24, VUB)
D6.3: Report on replication validation (M30, ABB)
D6.4: Final assessment report: C2C market assessment, second assessment demonstrator sites, policy recommendations local authorities an EC (M36, VUB)
D6.5: Regulatory barriers analysis (M34, BAX)

Milestones
M6.1 Data Platform

Work package number	**7**	**Start Date or Starting Event**												M.01
Work package title	**Dissemination, Exploitation and Communication**													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Short name of participant	VUB	IKL	ATOS	DBL	SMR	SOREA	CIRCE	DUTH	CERTH	BAX	SDM	NAPE	ABB	SUN	EEM
PMs	20	2,5	4	30	2	6	1		12.5	15	1	5	3	2,5	2,5

The objective of this work package is to broaden the impact of the project's results beyond the consortium itself by appropriate documentation, publication and promotion towards different stakeholders. RENAISSANCE will communicate its results to a wide range of target groups, making use of a set of target-group adapted and tailor-made communication tools. In addition, the aim is to engage and get feedback from different, selected stakeholders - targeted dissemination actions will foster interaction to encourage the active participation of the local stakeholder communities, in particular potential end-users, but not only, the general public and a wider range of target audience (e.g. through interactive workshops, world cafes, communication campaigns, conferences, social media strategy, etc.).

Task 7.1: Communication and Dissemination plan and strategy (M1-M36) DBL 7PM, VUB 3PM, BAX 2PM, CERTH 2PM

The communication and dissemination strategy and plan will be developed in the first stages of the project by setting the high-level dissemination objectives (what we want to communicate). This task will provide the description of the target audience and their main interests associated with the project. The different target audience are defined considering who the different stakeholders associated to each demo site, in and who could be directly/indirectly affected by the project results. A stakeholder engagement plan will be developed in order to specify the target audience and tailor the dissemination products to their needs (to whom we want to communicate). In order to ensure maximum impact and return of the effort, the communication and dissemination plan will be annually updated with a detailed planning of the activities along the project. Partners in all the Countries will identify the target audience and channels: map of the target audience orientated to the Countries. In particular:

CERTH: (GR), SOREA: (FR), IKL: (ES), VUB: (BE), BAX: (NL), NAPE: (PL), DBL (IT), ABB (CH, DE) and the Indian partnership members.

Task 7.2: Web site and Social media strategy (M1-M36) DBL 5PM, VUB 1PM , SOREA 1PM , ABB 1PM , IKL 1PM, CERTH 1PM , BAX 1PM

The coordinated image of the project will be created including the logotype, and the set of colours associated to the identity of the project. The project website will provide information on the project itself, its main objective, the activities, the results, events and news. The project website will be regularly updated with project information and research results; it will allow partners to disseminate information, as well as engaging a wider community. A social media strategy will be developed by using applications such as the Linkedin® groups, Twitter, Wiki pages, and video channels (Vimeo® or Youtube®). E-newsletters will be developed and sent out to inform target-groups about the project progress and results. They will be sent out to particular and relevant entities, associations and SMEs that will help to raise awareness to the project and highlight the latest outcomes, events or news. Four editions of the e-newsletter will be published and sent to the target-groups. DBL will develop the identity and set the social media strategy. All WP leaders will be involved, in different phases of the project, in providing contents to be published and disseminated, as well as review the material produced.

Task 7.3: Assessment of the Perception and Awareness (M1-M36) DBL 7PM, VUB 5PM , SOREA 1PM , ABB 1PM, IKL 0.5PM, CERTH 1PM, EEM 1PM, NAPE 2PM

Based on the stakeholder engagement plan, this task will monitor the stakeholders' awareness level and their perception with respect to energy communities in order to early identify potentialities and showstopper to the full exploitation of the project outcomes. Surveys, interviews with experts and semi-automatic monitoring of social-media and literature and press monitoring will be carried out in the geographical areas surrounding the demo sites to better understand the citizens awareness level and their perception with respect to local energy communities. In the early stages of the project, the qualitative and quantitative knowledge gained will be used to set the baseline with respect to the stakeholders' likeability and perception T2.1. This will be used to design targeted and customised communication and awareness campaigns through social media, a set of videos/infographics/tweets on tips and tricks to trigger a positive attitude, informal training materials for end users, policy-makers and the wider community. At the end of the project the evolution of the perception will be measured, in order to assess the impact of the communication strategy in terms of likeability (affective/experience evaluation), and costs (both the financial costs and the social and organizational consequences of adopting the solutions) of the solutions developed.

Task 7.4 External Stakeholders' Group creation and management (M4-M36) VUB 4PM, DBL 4PM, BAX 1PM, SOREA 2PM, IKL 1PM, ATOS 1PM, CERTH 4.5PM, NAPE 1PM

This task will be dedicated to the creation of a stakeholders' community including industrial representatives, policy makers, academy, citizens associations, etc., to ensure relevance of the proposed solutions and foster their adoption in the long term. The External Stakeholders Group (ESG) will consist of members of the project Advisory Board and additional members who will be identified and contacted starting from M3 of the project. Periodic ESG (External Stakeholders Group) workshops will be organised to steer the project activities and validate project outcomes at M12, M24 and M36. The first physical meeting with the first pool of stakeholders will be done through the MAMCA related workshops in WP2. All relevant stakeholder groups will be invited to attend key project events and demonstrations, discussing RENAISSANCE activities and results from their specific perspectives and gathering their feedback. VUB will lead the task and support the creation of the ESG pool and will conduct local workshops that will be planned. DBL will design the workshops and support their execution.

Task 7.5 Communication, Dissemination and Awareness activities (M2-M36) DBL 5PM, VUB 3PM, BAX 1PM, ATOS 1PM, CERTH 3PM, EEM 1.5PM, SUN 2.5PM, NAPE 1PM, CIRCE 1PM, SOREA 2PM, SMR 1PM

The communication means, channels and activities of the project will be targeted towards a number of relevant stakeholders, including potential end users not directly involved in the project. Communication will consist both of traditional and innovative activities:

1. All along its duration, the consortium will produce material such as brochures, posters, video, and participate to scientific conferences, scientific publications, peer reviewed publication.
2. Support will be provided to the organisation of local demo events (in each site), in correspondence with the workshops planned in WP2 and WP5 for collecting needs and evaluating the results, demonstrating to

the local communities involved, the system operation, outcomes and raising awareness around it the project.

3. At least 6 scientific and technical publications in peer-reviewed journals and 10 participations (demo exhibitions/papers/posters) in international conferences will be targeted in the lifespan of the project.
4. Open access publishing ('gold' open access) will be granted to all scientific publications resulting from the project.
5. Organisation of (M18-M34) two Pan-European workshops targeting both at the general public, research/academia world and the interested stakeholders. This will involve other projects in the area and in agreement with the EC aiming to end-up with specific tangible synergies of mutual interest between them in all anticipated layers (technical, business, dissemination). Two interactive reports of the events will be available on the project website in M19 and M35, the reports will include documentation of the event and the material presented.

The design and production of the innovative communication material will be iteratively validated and shared with the end users involved in the project and with the project External Stakeholders Group.

Task 7.6 Global exploitation and market entry strategy (M13-M36) BAX 10PM, VUB 8PM, ABB 2PM, NAPE 2PM, DBL 2PM, ATOS 2PM, CERTH 1PM, NAPE 1PM, SDM 1PM, SMR 1PM

BAX will coordinate a series of events to present RENAISSANCE methodology and results in key markets. A programme of events includes events in India, USA, UK, Poland and elsewhere in Europe with market potential for RENAISSANCE approach. Events are either tailored workshops with 15-50 relevant public and private stakeholders, and/or plenary presentations at larger conferences with 50+ relevant participants. The events will be organised by subcontracted professional network organisations Cambridge Clean Tech (USA, UK), GlobalBusinessInroads (India), NAPE (Poland, Eastern/Central Europe), and RMIT (Australia). The events will link to the virtual demonstrators to create a clear link with the approach as RENAISSANCE business interests, and selected local stakeholders.
Impact analysis: Based on the results of the (virtual) pilots in WP6 BAX will compile a document for a broad professional audience describing the impact of the RENAISSANCE approach for pilots, and the potential broader impacts. The report will cover main indicators including LLCOE, CO2 reduction and consumer engagement.
Individual exploitation plans: At the start of the project, concept exploitation strategies and plans will be defined with main partners. Progress will be tracked annually. These partners will be supported by BAX in exploring (commercial) spin-off projects based on RENAISSANCE work, these reports are confidential. A public summary will be produced.

Deliverables

D7.1: RENAISSANCE visual identity (logo, etc.), web site and social media (M3, DBL)
D7.2: RENAISSANCE dissemination & communication strategy and External Stakeholders Group (M3, DBL)
D7.3: RENAISSANCE communication material (website, brochure, leaflet, poster) (M6, DBL)
D7.4: Report on the stakeholders' engagement campaign (baseline M12, evolution on M36, DBL)
D7.5: Market analysis, exploitation & IPR strategy of the project and business models (M12, BAX)
D7.6: Exploitation and business plans of the project (M36, BAX)

Table 18 List of work packages

WP No	Work Package Title	Lead Part. No	Lead Part. Short Name	Person-Months	Start Month	End month
1	Project Management	1	VUB	36	1	36
2	Local decarbonized and integrated energy system design	13	ABB	83.5	1	36
3	Business models and smart contracts	2	IKL	78.5	2	34
4	Infrastructure implementation and integration	9	CERTH	177.5	3	34
5	Demo site operations, integration and validation	6	SOREA	207	1	36
6	Benchmark, scalability, replicability analysis and virtual demo validation	1	VUB	77	4	36
7	Dissemination, Exploitation and Communication	4	DBL	106.5	1	36

Table 19 List of Deliverables

No.	Deliverable name	WP	Lead	Type	DL	Month
D1.1	Project implementation plan & internal communication guidelines	1	VUB	R	CO	M1
D1.2	First year progress report	1	VUB	R	CO	M12
D1.3	Second year progress report	1	VUB	R	CO	M24
D1.4	Quality assurance plan & risk management plan	1	ABB	R	CO	M3
D1.5	Data management Plan	1	ATOS	R	CO	M6
D2.1	Report on ranking of technology-business designs for demo sites	2	VUB	R	PU	M12
D2.2	Requirements, expectations and objectives for each demo site	2	ABB	R	PU	M8
D2.3	KPI definition and selection	2	VUB	R	PU	M4
D2.4	Refined multi-vector optimisation software tool	2	ABB	O	CO	M26
D2.5	Site design of the demonstrators	2	ABB	R	CO	M10
D2.6	RENERGiSE designer interface	2	CERTH	O	CO	M28
D2.7	RENERGiSE replication tool	2	ABB	O	CO	M30
D3.1	Benchmarked business case report	3	VUB	R	PU	M32
D3.2	Smart-contracts detailed design and implementation	3	IKL	O	CO	M12
D3.3	Validation results of energy agreements	3	IKL	O	CO	M24
D3.4	RENAISSANCE business models assessment results	3	SMR	R	PU	M24
D4.1	RENAISSANCE Information Platform integrations report	4	ATOS	R	CO	M12
D4.2	Energy nodes integration report (M18, CERTH)	4	CERTH	R	PU	M18
D4.3	Blockchain network implementation report	4	CERTH	O	CO	M18
D4.4	Report on Social Collaboration Engine and Personal Assistant	4	CERTH	O	CO	M24
D4.5	RP wide security implementation report	4	CERTH	O	CO	M24
D4.6	Report on integration and testing results	4	CIRCE	R	CO	M30
D5.1	Output data framework	5	SOREA	R	PU	M3
D5.2	Final implementation plan	5	CERTH	R	CO	M8
D5.3	Start of optimized pilots	5	VUB	R	CO	M12
D5.4	Validation report	5	SOREA	R	CO	M24
D5.5	Final Validation report	5	SOREA	R	CO	M36
D6.1	Data Platform	6	ATOS	O	CO	M6
D6.2	Assessment of and recommendations towards the demonstrator sites	6	VUB	R	PU	M24
D6.3	Report on replication validation	6	ABB	R	CO	M30
D6.4	Final assessment report: C2C market assessment, second assessment demonstrator sites, policy recommendations local authorities an EC	6	VUB	R	PU	M36
D6.5	Regulatory barriers analysis	6	BAX	R	PU	M34
D7.1	RENAISSANCE visual identity, web site and social media	7	DBL	O	CO	M3
D7.2	RENAISSANCE dissemination & communication strategy and External Stakeholders Group	7	DBL	R	CO	M3
D7.3	RENAISSANCE communication materials	7	DBL	O	PU	M6
D7.4	Report on the stakeholders' engagement campaign (baseline M12)	7	DBL	R	PU	M36
D7.5	Market analysis, exploitation & IPR of project and business models	7	BAX	R	CO	M12
D7.6	Exploitation and business plans of the project	7	BAX	R	CO	M36

3.2 Management structure and procedures

The project management will focus on creating the necessary governance structure for an effective project direction and management; performing the financial, legal, administrative and technical coordination; establishing the communication flow and methods for reporting, progress monitoring and quality assurance; management of knowledge and intellectual property promoting the gender equality and the networking with other related projects and networks. Measures for managing risks related to financial, legal, administrative and technical coordination will be established from the beginning of the project. The contingency plan will be done at the beginning of the project and will be immediately at disposal to be launched when necessary and updated along the project execution.

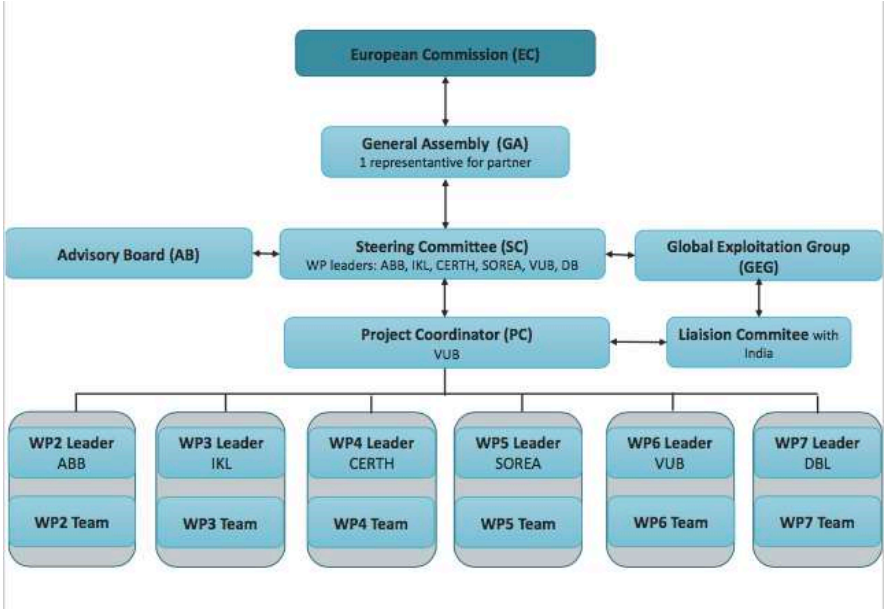


Figure 23 Management structure of RENAISSANCE project

The project management structure is designed to be adequate to the complexity and scale of the project.

Project coordinator (PC)

Prof. Thierry Coosemans of VUB will lead the project implementation. As project coordinator, he will be the main contact point with the EC and he will chair the Steering Committee (SC). Apart from his general coordination role, he will be responsible for setting up effective internal communication and knowledge exchange structures between the WP leaders, the SC and the General Assembly (GA). Additionally, he will be the chair person for the liaison committee set up under the Coordination Agreement between RENAISSANCE partners and Indian counterparts.

Prof dr. ir. Thierry Coosemans will be assisted by Prof Dr. Cathy Macharis and Dr. Maarten Messagie who both have previous experience in large European projects.

Project back-office will be based at VUB and has the main responsibilities

- Monitoring the project: effort, activities and costs of:
- Developing and maintaining the online project management platform;
- Administrative support to project activities;
- Financial management of costs related to overseas activities, networking and dissemination;
- Networking and dissemination;

General Assembly (GA)

The GA is a main decision-making body which holds the highest level of authority in the project, being the responsible to ensure agile and effective decision process and project completion. It consists of 1 representative from each partner, having one vote. The GA will meet in face-to-face meeting once a year. The GA will discuss and decide on strategic project orientation, up-dated work programmes, approval of Periodic Reports and Deliverables, resource allocation. Finally, the GA will act as the highest conflict resolution body within the project.

Steering Committee (SC)

The SC will consist of all Work Package leaders ABB, IKL, CERTH, SOREA, VUB, DBL and it is chaired by the project coordinator, Prof. Thierry Coosemans. The SC supports the coordinator on the technical and scientific work by ensuring and supervising the quality of the project's results through the revision of each deliverable. This includes planning and control of the activities within the WPs, the preparation of deliverables and the collection of the contributions from other partners participating in each WP for internal and external report. The SC can raise important

issues and propose solutions to the GA, but do not have a decision-making capacity. Finally, the SC with the coordinator will ensure an effective knowledge transfer with external bodies and initiatives through the AB. The SC will convene face-to-face at least every 6 months (when possible combined with other meetings, such as General Assemblies) and will keep periodic communication to provide a proper overview of project progress.

Advisory Board (AoB)

The AoB will consist of senior representatives from organisations which have been identified as highly influential and knowledgeable from the partners. In addition to industry representatives, the AoB will include policy makers, academy, citizens associations and consumer groups from the project pilot sites (see letters of support). The AoB will be informed about the project strategic goals and progress and it will provide feedback and valuable knowledge stream based on their own experience and information. Additionally, it will facilitate the dissemination of the project results at different layer of the smart grid value chain. Members at this stage are from industry side: Eandis, European Federation of Local Energy Companies (CEDEC), Flux 50, European Copper Institute, Eurobat, Elia, TEHNI pantelos, Energievan.nu; regulatory: CEER; consumer side: City of Xanthi (GE); GOIENER, S. COOP (ES), Eemnes Energie (NL) deAlliantie GEGon regular basis.

Global Exploitation Group (GEG)

The GEG is led by the Communication Manger (Linda Napoletano from DeepBlue) and consists of VUB, DeepBlue, CERTH, BAX and ATOS. GEG has the role of creating a network of interested Stakeholders around the project, which would include related clusters, R&D hubs, local communities with replicability potential both at European as well at the global scale. The GEG will map, initiate and maintain the contact, with potential replication sites and provides them with necessary information that would allow the easy replicability of RENAISSANCE energy island system designs. Furthermore, it has the role coordinating with other projects funded under the same call topic as well as other related projects for the exchange of relevant (publishable) results and is responsible for coordinating the common dissemination activities with other cluster projects.

Liaison Committee with India

In order, to test and improve the RENAISSANCE approach of smart grid system design in global markets, RENAISSANCE partners have set up a coordination agreement with two organisations from India. This will allow from one hand localisation of the RENAISSANCE design tool to include India technology options and socio-economic parameters. On the other hand, it will allow to transfer knowledge from Europeans smart grid industry to Indian partners and vice-versa. The liaison committee is composed of the Project Coordinator and 1 additional partner from the EU partnership side and all Indian partner organisations. The liaison committee facilitates the collaboration between the EU and Indian partners (the draft agreement is attached as annex 3).

3.2.1 Project management implementation

a) Consortium agreement and progress monitoring

Before the start of the project, the consortium members will sign a Consortium Agreement (WP1). Each WP leader will be responsible for the correct execution of the implementation plan for the corresponding WP. The WPL will be in close contact with the project coordinator (e.g. via email, teleconferences). This bi- lateral communication will allow the coordinator to keep a close watch on the project progress. In addition, regular teleconferences will be arranged by the project coordinator with the Steering Committee including all WPL in order to monitor the progress.

In case there is a deviation from the work plan, the coordinator will initiate corrective actions through the WPL, who will be responsible to implement these actions in dialogue with the different partners involved in the WP.

Consortium Agreement will include rules regarding conflict resolution, clear IPR and exploitation regulations regarding background, foreground, side ground and jointly owned knowledge.

b) Reporting

The WPL will be responsible for preparing individual reports covering WP progress, deliverables, achievement of milestones and compliance with the implementation plan. The PC will have the final responsibility for editing according to a standard layout (use of a project template), summarising the overall project status, looking for inconsistencies, further elaborating the reports (if needed) and taking care of final distribution. The coordinator will also update the person-months chart using the data received from the partners. The progress of the tasks will also be reported in terms of percentage of completion and estimated time to completion, as well as actual person-months spent and person-months needed to complete the task.

Subject to the European Commission contractual requirements, the PC will prepare a progress report following the guidelines provided by the European Commission and submit it as input to the review meetings with the European Commission and the invited experts. A final report will be generated and submitted by the end of the project (month 48). Both reports will include a cost statement and the person-months deployment for the reference periods. Additional periodic progress reports may be forwarded to the EC upon agreement in the initial phase of the project, e.g. quarterly reports.

c) Internal communication

The internal communication strategy (WP7) will focus on maximizing interaction and knowledge transfer between partners to ensure the success of the project. Partners will interact and will organize regular teleconferences (e.g. a teleconference will take place every month) and other multi- and bi-lateral contacts with other partners. If any communication issues are identified, the Coordinator with the support of the project secretariat will intervene to propose solutions and facilitate the opening of direct and fluent communication channels between partners. Furthermore, the project will make use of a number of project management tools to maximize the effectiveness of internal communication and collaboration between partners:

- online secure intranet featuring project and file management tools to be selected according to partners' system compatibility and internal rules;
- appropriate project mailing lists (e.g. Sterring Committee, General Assembly, whole consortium, Liaison Committee with India, Global Exploitation Group) that facilitate the smooth implementation of the project;
- teleconferences and video conferences systems (eg. GotoMeeting, Skype, etc).

d) Quality monitoring

The project consortium is deeply committed on assuring high quality results. All relevant quality assurance procedures and structures will be summarized in a "Quality Assurance Plan" which will be developed in the beginning of the project (WP1). These quality assurance procedures will be applied to all internal and externa results and Deliverables. Quality assurance will be the joint responsibility of all project partners at all levels.

e) Decision making process

The selected representatives of each partner will attend the GA (including those for the conflict resolution). In case a member of the GA cannot take part in a meeting, they can appoint a substitute to attend and (if necessary) to vote at the meeting. Minutes of the meeting will be submitted for acceptance to the partners' representatives. Ordinary decisions will be taken by simple majority vote in order to streamline the decision making process. However, decisions affecting budget allocation, changes in ambition level, amendments to the Description of Work, the exclusion of partners or the introduction of new ones will require a 2/3 majority vote because they affect more profoundly the stakes of the partners in the project. Decision-making processes, regarding the collaboration with external stakeholders will be done within 2 weeks in order to facilitate the smooth project development.

f) Conflict resolution

The conflict resolution attempts to solve issues within the consortium and will be carried out in increasing order of authority. First it will start at WP level (management of WP leader) and then leading on at project level, within the Steering Committee and General Assembly under the leadership of the Project Coordinator. If necessary, the General Assembly will organise a conflict resolution meeting within 30 days following a written request transmitted by any of the project partners. If consensus cannot be reached, the matter shall be resolved by vote of the partners' representatives (one vote per partner). The approval of a decision will require a favourable vote of the majority of the partners. In case of draw the vote of the coordinator will decide. Only for the decisions mentioned in the previous section "Decision making process", a 2/3 majority vote will be necessary.

g) Innovation management

The project coordinator will work along with the consortium exploitation team to ensure a proper exploitation path/route to market for project results.
Innovation management processes will be included in the exploitation and IPR strategy developed at project start (WP7).
These processes will include IPR management, monitoring of project consistency with marketing choices, analysis of targeted markets, planning of initiatives combining technical and exploitation objectives to create business models and exploitation paths.

h) Data management

Critical data in the project is generated by / within the LECs, and owned by LECs. For the prupose of the project, data from the pilots operation will be stored in a cloud based database hosted by ATOS, easily accessible from consortium partners. Data will be formatted and standardized following the agreement of T5.1 in order to ensure consistency and regularly uploaded to ATOS cloud repository. **The metadata will follow the standards as defined by Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020** that specify the action concerned, the grant number, name and/or acronym of the action. Due to privacy concerns and applicable laws, only aggregated data will be shared adhering to relevant ethical and legal principles. At the start of the project, a data policy will be defined in WP1 as a part of the plan for the energy performance monitoring, including a) details on the procedures and criteria that will be used to identify/recruit research participants, b) information on the informed consent procedures that will be implemented, c) information on the procedures that will be implemented for data collection, storage, protection, retention and destruction. The research will comply with ethical principles and applicable international, EU and national law (EU Directives 95/46/EC, 2002/58/EC and 2006/24/EC).

i) List of Milestones

Table 20 List of Milestones

Milestone #	Milestone name	Related work package(s)	Esti-mated date	Means of verification
1	Site design of the demonstrators	2	M10	Report on site design
2	Refined multi-vector optimisation software tool	2	M26	Benchmark report
3	SMART CONTRACTS detailed design	3	M12	Design shared with CERTH
4	Validation of the RENAISSANCE business case models	3	M24	Report on validation
5	Start demonstrators	5	M12	Data is stored from FR, EL, NL demonstrator
6	Data Platform	6	M6	Platform receives data from VUB

3.2.2 Risk analysis and contingency planning

In the first months of the project, the consortium will elaborate the Quality Assurance Plan and Risk Management Plan including planned contingency measures. Below we have identified some of the potential risks and measures to mitigate their negative impact on project successful completion. Risk have been identified and categorised based on a typical risk matrix of likelihood versus potential harm.

	Slightly Harmful (1)	**Harmful (2)**	**Extremely Harmful (3)**
Highly unlikely (1)	Insignificant Risk	Low Risk	Medium Risk
Unlikely (2)	Low Risk	Medium Risk	High Risk
Likely (3)	Medium Risk	High Risk	High Risk

Table 21 Risk Matrix

Table 22 Critical risks for implementation

#	Description of risk	WP(s)	Likelihood	Impact	Risk	Mitigation measures	Residual risk
1	Task that are not completed as desired, or in the specified timing, leading to project delays	1-7	2	2	Medium	Early planning with clear expectations and responsibilities, coupled with monthly coordination and communications will ensure to reduce the likelihood of this risk; if still necessary, partners will agree on contingency plans and acceleration of the project critical path. Also some “buffer” time has been planned in the end of the project that can absorb such delays	Low

2	Lack of stakeholder participation	2,5,7	2	3	Medium	WP 5 is very much focused on raising awareness, foster engagement and following it up. In addition the MAMCA methodology has been proven sound for thorough stakeholder participation.	Low
3	Selection of business models with low stakeholder acceptance	2,3,5	1	3	Medium	Use a participatory approach involving all stakeholders to identify the best viable business models at project start. Direct discussion with the community to select the scenario that best represent stakeholders' objectives.	Low
4	Virtual interoperability issues	2,5	2	3	Medium	Standardization of the communication protocols to arrive to a faster and more interoperable matching of different softwares and software modules. Detailed coordination activities (monthly meetings) among partners to identify the inputs and output needs for every linked activities.	Low
5	Data security	2-6	2	3	High	Deploy a robust security stack and evaluate every IoT development from the security point of view.	Medium
6	Unavailable or limited data or from the demonstration sites	2,6	1	2	High	Expert domain knowledge will be used to create "synthetic" data based on the available information as already applied by ABB.	Low
8	New technologies being tested in demonstrators	5	2	2	High	All technologies are being thoroughly tested prior to implementation. Demo functioning is closely followed data monitoring. Frequent contacts between demonstrator coordinators and suppliers for fast redress of malfunctioning.	Low
9	Pilot site drops out	2,5,6	1	2	Low	BAX has an extensive network across Europe which allows to fast find alternatives	Low

1.1. Consortium as a whole

To achieve the project objectives, RENAISSANCE brings together leading experts in the field of local energy systems consisting of research institutes and universities (VUB, CERTH, CIRCE, IKL, DUTH), technology providers (ATOS, ABB, SUN, SDM), grid regulators (SOREA), innovative SMEs (SMR) and consultancies with a specific profile (NAPE- network organisation in post-communistic countries, BAX- Innovation, DBL- social experts). It should be noted that a number of partners have in the past successfully collaborated or are currently collaborating in a number of European and regional initiatives. This ensures that the consortium collaboration is also very likely to be smooth and ensure to keep the project effective and efficient.

Furthermore, RENAISSANCE will cooperate with international network organisations (NAPE (PL), Cambridge CleanTech (UK, USA), GEIDCO (China), GBI (India)) to broaden the impact of its results and the uptake of its solutions at European and global level. In addition, RENAISSANCE partnership has signed a *draft* Coordination Agreement with Indian site owner Quess Corp Ltd, additional collaboration is currently discussed with Sun Group and city of Panjimin from India.

Complementarity and balance of partners

The implementation of a project proposal for this call naturally requires a multi-stakeholder consortium representing a balanced mix of organisations that covers the entire LES value chain and guarantees high exploitation potential at European and international level.

LES value chain

A large part of the consortium consists of industrial multinational partners leaders in microgrid solutions and energy technologies. Over the project course, SUN and CIRCE will contribute and advance their hardware technologies.

Software solutions developed by ABB, ATOS, CERTH and IKL will represent one of the main output of RENAISSANCE project and create the basis of the overall methodology to scope and optimise LES. The link with **Academia and R&D institutes** will be represented by VUB, CERTH, CIRCE and IKL. All these institutions, will bring to the consortium the required expertise and knowledge in energy system modelling and analysis, enabling the successful achievement of the project objectives. **Involvement of experts in business modelling** and smart contracts (IKL, SMR, VUB, BAX) will allow advancing the current market structures to open, flexible and participative models to be demonstrated at pilot sites. **Because of the relevance of consumers in the project** proposal, DBL covers a key role gathering LES stakeholders' requirements and ambitions as well as analysing social impact of the RENAISSANCE project. Their contribution will ensure high consumer acceptance of the solutions developed and the creation of integrated and effective local energy communities with high consumer participation.

Demonstrator sites

Real life demonstration of the proposed innovations will be carried out in 4 pilot sites coordinated by different entities (SOREA, DUTH, VUB, EEM). These partners are responsible for the implementation, operation and monitoring of the pilot sites. Different type of the pilots' owners will contribute to the development of complementary demonstrators characterised by different scope and priorities. Each of the pilot coordinator will bring to the project its particular experience: grid management (SOREA), operation of local energy systems in public facilities (DUTH, VUB), governance of municipality with high sustainability ambitions (EEM).

Dissemination and exploitation

SMEs BAX and DEB as consultancies specialised in innovation and with experience in several EC funded projects will design the dissemination and exploitation strategy as well as lead the activities to engage with key stakeholder groups. Expanded European networks of BAX, NAPE and DBL and direct link with Cambridge CleanTech, GBI, GEIDCO will facilitate widespread interest in the project results and virtual simulation of other LES across the world (China, India, USA, UK, PL). In line with the impact section, the strong involvement of industrial partners (ATOS, ABB, SDM, SUN) in the project will ensure that the approach and solutions developed in RENAISSANCE will find their practical application and way to market.

Table 23 Overview of the partnership roles

Role	Organisation type	Partner(s)	Main role in the consortium
Pilot sites	DSO	SOREA	Owning the distribution grid at the French pilot site
	Local authorities	EEM	Coordinating the Dutch pilot site
	Universities	VUB, DUTH	Owning the university facilities of the Belgium and Greek pilot sites
LES value chain	Hardware	SUN, CIRCE, SDM	Providing innovative hardware technologies
	Software	ATOS, ABB, CERTH, IKL	Providing innovative software solution for LES management and energy trading
	Research	VUB, CERTH, IKL	Local energy systems and future market modelling
	Business Models	IKL, SMR, VUB, BAX	Innovative multi-actor integrated business models & market models
	Social	DBL	LES Stakeholder analysis and engagement
Dissemination, replication	Strategy	NAPE, BAX, DBL	Network organisations or connected partners with deep EU-wide links towards local authorities, policy makers, innovators and other key stakeholder groups
	Individual plans	ABB, ATOS, SDM, SUN, CIRCE	Industrial partners leading the individual exploitation plans to bring RENAISSANCE solutions to market

Project Support

Implementation of RENAISSANCE demonstrators requires direct interaction with a number of local organisations that can be directly or indirectly affected by the project. To ensure smooth development, all pilots' stakeholders have to be actively informed about RENAISSANCE activities and potential impacts. Leveraging public awareness is crucial for achieving the project objectives and creating local energy systems with higher social acceptance. Demonstrator sites will benefit from the support of a number of local entities (industries, citizens organisations, decision makers) ensuring the validation of the RENAISSANCE approach based on local extensive consensus.

Because of their relatively small role, such organisations have not been involved as full Partners, but have confirmed their collaboration through the Letter of Support (see the Annex).

Table 24 Key entities supporting RENAISSANCE demonstrator sites

Site	Supportive org.	Type	Interest in RENAISSANCE
Greece	Tehni Pantelos	Group of Companies	Close interaction with the pilot facilities; provision of consumption profiles for modelling purposes
	Municipality of Xanthi	Local authority	Develop low carbon economy strategic plan for the region
Belgium	Eandis	DSO	Facilitate cross-sector collaboration to enhance Flemish smart grid industry in the transition to low-carbon energy communities
	Flux 50	Research project	
The Netherlands	Eemnes Energie	Non-profit energy cooperation	Create a self-sustainable community of households, business and farmers to jointly produce and exchange renewable energies
	Energievan.nu	Energy service aggregator	Develop a platform for local energy market
	De Alliantie	Housing association	Providing the assets to the demonstrator site
	Business club Eemnes	Business network	Expertise in setting up energy communities
Poland	City of Kozienice	Local authority	To learn in designing the business models for introduction of RES in municipal economy, virtual replication site
	Housing co-operative Szaserow	Housing association	To learn experience in modernization of buildings towards energy independency from utilities by use of RES and smart grid solutions, virtual demonstrator site.

Additionally, RENAISSANCE has collected the support from several European organisations (GOIGER, EUROBAT, CEDEC, ECI) and initiatives (inteGRIDy) which have expressed their strong interest in being informed about the project process and results. Direct interaction with these entities will contribute to the successful dissemination and exploitation of project results through their networks.

Table 25 European organisations/initiatives supporting the RENAISSANCE projects

Org. /Initiative	Type	Interest in RENASSANCE
CEDEC	European Federation of Local Energy Companies	Provide reliable, sustainable and consumer-centric services while supporting the local economic development
ECI	European Copper Institute	Accelerate the energy transition through the decarbonisation of Europe
EUROBAT	Association of European Automotive and Industrial Battery Manufacturers	Study all matters of interest to storage battery manufacturers and their subcontractors Europe, Middle East and Africa
GOIENER	Non-profit energy cooperative (ES)	Develop and manage energy generation units from renewable sources so they will supply the demand of its cooperative members
InteGRIDy	H2020 project	Share results and lessons learned to address common technical, social and regulatory challenges and enable an integrated sustainable energy system
CEER	Council of European Energy Regulators	The Council of European Energy Regulators (CEER) was established in 2000 for the cooperation of the independent energy regulators of Europe. It seeks to facilitate the creation of a single, competitive, efficient and sustainable EU internal energy market.
ELIA	Elia System Operator	Is a Belgian transmission system operator (TSO) for high-voltage electricity, located in Brussels, Belgium.

Geographical spread

From the geographical point of view, the consortium is well balanced with partners from 8 different European countries (Belgium, the Netherlands, Greece, France, Spain, Italy, United Kingdom, Poland) and demonstrator sites

in 4 different climate areas (Belgium, the Netherlands, France, Greece) characterised by different LES types (rural, suburban, urban).

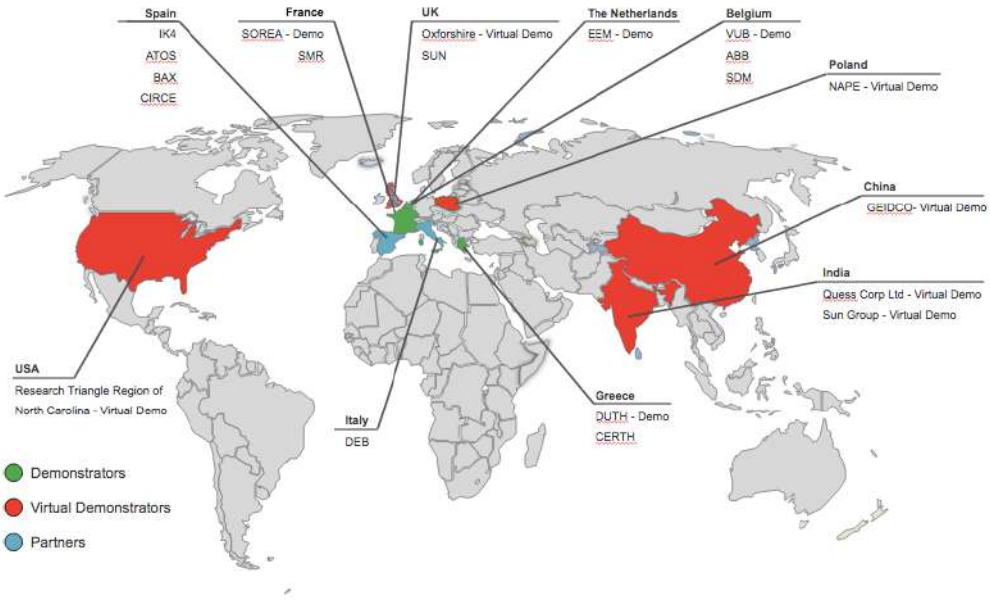


Figure 24 Geographical distribution of the RENAISSANCE consortium + virtual demonstrators

To further broaden the reach and the impact of RENAISSANCE project, cooperation with GEDCO (China), Cambridge CleanTech (UK, US), and GBI (India) will help engaging with key stakeholders worldwide. The establishment of this strong collaborative and business relationships is reflected in the demonstration of 5 virtual pilot sites in UK (Oxfordshire), Poland (NAPE), India (Quess Corp Ltd, Sun Group[36]), China (GEIDCO) and USA (Research Triangle Region of North Carolina).

3.2. Resources to be committed

The RENAISSANCE project budget is line with the call and project aim; to demonstrate tools and solutions that enable to demonstrate highly replicable design and management approaches for integrated local energy systems, that achieve high participation of local consumers.

The overall budget is €6,7 million, and requested EC contribution of €5,95 million – in line with call expectations. A tailored funding structure has been set up to enable implementing not 1 but 4 actual pilots across Europe and 10 replicator pilots across the globe.

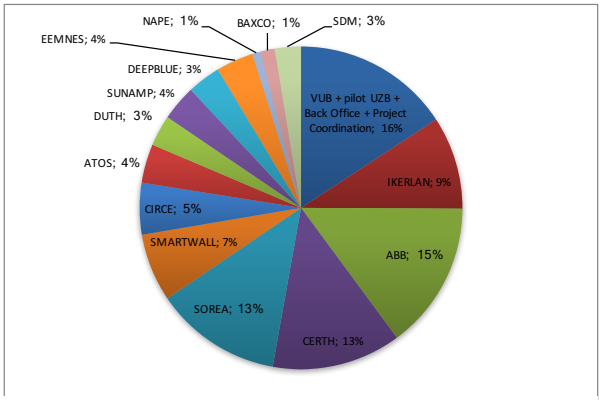


Figure 25 Overview of the budget allocation between partners

The resource contribution per partner reflect the importance of pilot sites and service development. Each pilot reflects roughly 10% of project budget, added to the VUB, Eemnes, SOREA/Smartwall and CERTH. In addition, VUB, IKERLAN, ABB and ATOS each coordinate 5-15% of project budgets for product/service development and (WP) coordination roles. Other partners with specific contributions typically have a 1-3% share of project budget. In addition, coordinator VUB has budget for coordination and subcontracting of specific services, including advisory board and engagement of network organisations to facilitate the global replication programme.

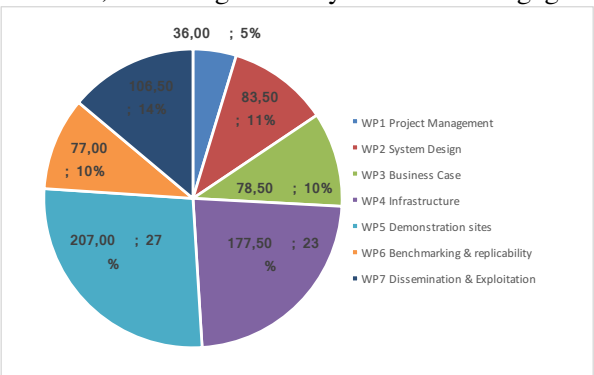


Figure 26 Budget allocation between different WPs

The budget allocation per over budget lines reflects the approach of the project to add value to demonstrators mostly in terms of services, rather than hardware. Over 60% of the budget is direct personnel costs, 15% for other direct costs and 3% of subcontracting – with the remaining to 19% for indirect costs. This means RENAISSANCE manages to leverage significant hardware investments already financed locally, the 4 pilot site owners together will invest an estimated €5.6M in the pilots outside the H2020 framework. The virtual/replication pilots will receive support from RENAISSANCE in the form of capacity

[36] Waiting for signature

(time), but participant effort and potential investments will be self-financed.

The staff effort of the project is 766,5 person-months. Reflecting the importance of partner as described before, the weight per WP is mostly on WP5 Demonstration (over 204 PM, 27%), with WP4 Integration and WP7 Exploitation follow with respectively 20% and 14% of effort. With 36PM for coordination, and 24PM for VUB, a nearly full-time project management office will provide adequate support. Other WPs each have 10% of staff capacity allocated.

Table 26 Summary of staff effort

	WP1	WP2	WP3	WP4	WP5	WP6	WP7	Total
1 VUB	23	19	10	4	34.5	19	20	**129,5**
2 IKL	2	6	20	26	0	0	2.5	**56**
3 ATOS	2	4	0	40	29	9	4	**88**
4 DBL	1,5	5,5	2	1	4	2	30	**46**
5 SMR	0	0	14	2	2	0	2	**20**
6 SOREA	1	5	4	5	37	6	6	**64**
7 CIRCE	0	1	11	41	2	1	1	**57**
8 DUTH	0	0	1	0	20	5,5	0	**26,5**
9 CERTH	3	18	15,5	36	19	10	12,5	**114**
10 BAX	1	2	2,5	0	0	9	15	**29,5**
11 SDM	0	0	0	0	10	0	1	**11**
12 NAPE	0	3	0	0	0	12,5	5	**20,5**
13 ABB	2,5	22	2	0	3	13	3	**45,5**
14 SUN	0	0	0	4	16	0	2,5	**22,5**
15 EEM	0	4	0	0	30	0	2,5	**36,5**
Total	**36**	**89,5**	**82**	**166,5**	**206.5**	**87**	**107**	**774,5**

Table 27 Other direct Costs

VUB	Cost (€)	Justification
Travel	100.000	Travel of AoB members (2 times 15 persons: €20.000); Travel to Virtual Demonstrator sites (3-5 EU and 3-5 international visits €50.000); Travel Events in Europe and Global level (€10.000); Travel for Consensus building workshops (€10.000); Support to partners during project (€10.000),
Equipment	100.000	ICT Data Subscription (€30.000); PLC software licenses (€10.000); Smart meters & Gateways (€60.000);
Other goods and services	50.000	Audit (€5.000); Communication material (€20.000), Events (€20.000);
Total (€)	250.000 €	

Eemnes	Cost (€)	Justification
Travel	5.000	3GA 2 person (€3.000), 2 dissemination events (€2.000)
Equipment	235.000	Gateways (€86.350), Substations (€6000), Battery (€65.300), Platform usage, development and maintenance (€77.350)
Other goods and services	10.000	Audit (€5.000); Events (€5.000)
Total (€)	250.000€	

SUNAMP	Cost (€)	Justification
Travel	5.000	3GA 2 person (€3.000), 2 dissemination events (€2.000)
Equipment	37200	Sunamp PCM storage 60 kWh (2 items) (€18.600) for the Greece pilot site; (€18.600) for the French pilot site (€18.600) taking into account 50% depreciation and shipping costs
Other goods and services	2.000	Audit (€5.000)
Total (€)	44.200 €	

SOREA	Cost (€)	Justification
Travel	22.800	3GA and PM meetings - 2 persons - 2 days = 7 200 €; 6 technical meetings -1 person - 2 days = 4 800 €; 2 fairs / exhibitions in Europe -2 persons - 2 day = 6 800 € (incl. Fee); hosting a GA:4000 €
Equipment	59.000	Libattery = 90000 € -50% depreciation=45000 €; inverter and switches =12000 € -50%depreciation = 6000 €; heatstorage =16000 € -50%;depreciation =8000 €
Other goods and services	17.000	grid controllers = 6000 €; miscellaneous (cables, ….) = 4000€; smart counters & concentrators = 2000€; Audit (€5.000)
Total (€)	98.800€	

Smartwall	Cost (€)	Justification
Travel	18.800	3GA-2persons-2days=7200€; 6 technicalmeetings-1person-2days=4800€; 2 fairs / exhibitions in Europe -2 persons - 2 day = 6 800 € (incl. Fee)
Equipment		
Other goods and services	14.000	50 energy counters = 6000 €; data transmission boxes = 3 000 € Audit 5000EUR
Total (€)	32.800€	

DUTH	Cost (€)	Justification
Travel	16.000	3GA 2 person (€3.000), 2 dissemination events (€2.000); Other travel related to the project technical aspects travel;
Equipment	90.000	ORC turbine of 7kWe (€50.000); Equipment for advances in electrical grid (cabling, switching, etc)(€4.000); Buffer tank of 3000 lt (3 items) (€12.000); Hydraulic equipment for advances in thermal grid (pumps, pipes, etc (€7.000); Smart meters (electric smart meters, smart thermostatic valves, thermal smart sensors) (€17.000);
Other goods and services	2.000	Audit (€2.000)
Total (€)	108.000 €	

NAPE	Cost (€)	Justification
Travel	5000	3GA 2 person (€3.000), 2 dissemination events (€2.000)
Equipment	0	
Other goods and services	10000	Audit (€5.000); Events (€5.000)
Total (€)	15.000 €	

BAX	Cost (€)	Justification
Travel	25.000	3GA, 2p, 2d = 3000€, 3 workshops EU (4000€), 3 trips to remote pilots; Global Replication Group work and support to the exploitation program of the RENAISSANCE project (18000€)
Equipment	0	0
Other goods and services	4.000	Audit (€4.000)
Total (€)	29.000	

Section 4: Members of the consortium

4.1. Participants (applicants)

4.1.1. Vrije Universiteit Brussel (VUB)
www.vub.ac.be

The Mobility, Logistics and Automotive Technology Research Group (MOBI) employs more than 90 specialists and is nested at Vrije Universiteit Brussel (VUB) and has been a leader in socio-economic evaluations for sustainable mobility and logistics and in electric and hybrid vehicles research and development for 40 years. MOBI addresses the challenges that the transport value chain faces from various points of view, by integrating the engineering, economy, policy, sociology & environmental sciences. It delivers Societal, Economical & Environmental Impact Studies, Decision Making Support Tools, Modelling & Simulation, Engineering and Standardization.

MOBI was officially created in 2007 clustering and streamlining VUB's different departments with expertise in sustainable mobility, logistics and electric & hybrid vehicles. VUB-MOBI's track record over the past 5 years includes 21 major H2020 projects for a total VUB budget of almost €10 million, a JTI ECSEL project, many projects in FP7 and a range of projects in other programs (e.g. ERANET, INTERREG, COST), 59 direct contracts with the industry, and 61 projects funded by national organizations. The contracts with the industry include major actors, such as Umicore, Alstom, Enersys, STMicroelectronics, Volvo, CRF (Fiat, IVECO, ...), Bombardier, Bosch, Punch Powertrain, Van Hool, MIVB, De Lijn, Electrabel, ENGIE, Procter & Gamble, Nike, Bpost, Port of Brussels, TNT and Colruyt. VUB-MOBI has a strategic role in the strategic research centre for the manufacturing industry in Flanders (Flanders Make) where it is responsible for the research priority "Clean and energy efficient motion". Thanks to its experience of over 40 years, VUB-MOBI has a leading position in electric and hybrid propulsion systems. The centre possesses state-of-the-art infrastructure and models for the testing, development and design of components - batteries, supercapacitors, power converters -vehicle power trains, and inductive and conductive charging infrastructure. Simulation techniques have been developed to define energy-efficient and low-emission power control strategies in hybrid and electric power systems. VUB-MOBI has strong expertise in the field of smart-grids mainly in a vehicle-to-grid perspective (e.g. Engie). VUB-MOBI is now teaming with the Brussels Health Campus to apply it technological expertise for microgrids and energy islands.

Moreover, VUB-MOBI combines several evaluation methods provides a comprehensive evaluation framework that can be tailored-made according to projects needs. Such a framework offers a combination of the multi-actor multi-criteria analysis (MAMCA©), sustainability assessment through multi-criteria analysis, business modelling, social cost-benefit analysis, life cycle assessment (LCA), and external cost calculations, which will be applied for the sites within the Renaissance project. Multi-Actor Multi-Criteria Analysis (MAMCA©) is a decision-making model developed by VUB-MOBI to enable the simultaneous evaluation of alternative scenarios while explicitly including all stakeholders' opinions at an early stage of the decision-making process and stands for a participatory approach, which has been applied in several H2020 projects (STRAIGHTSOL,CITYLAB,MOBILITY4EU) For assessing sustainability VUB-MOBI develops advanced Life Cycle Assessment (LCA) methods and practical procedures that translate sustainable opportunities into realities. It offers a unique methodology sector to analyse the environmental, economic and societal impacts caused by the development and implementation of new technologies, components, materials and policy measures, applied in several H2020 projects (COLHD, SYRNEMO, GHOST, ORCA, ASSURED). In addition, VUB-MOBI has expertise in the field of Technology & Innovation. This results in studying strategic impact of new paradigms and in defining innovative business models which enable to bring new products and services to the market (BSI Chair Sustainable Company Mobility, B2C-V2G).

UZ-Brussel
www.uzbrussel.be

Universitair Ziekenhuis Brussel is one of the seven university hospitals of Belgium and is part of Vrije Universiteit Brussel. The hospital opened its doors in 1977, and today it spans an area of 132.000 m² and counts 844 beds.

As a hospital we are well aware of our large energy consumption and the impact we have on the environment and society. That's why "Sustainable handling of energy and materials" is part of one of the five strategic policy pillars of the hospital. Within the Technical-Facility Service we therefore have one FTE who exclusively works on the topic of energy, and who uses that expertise to work out projects on energy and reliable energy provision.

In 2013, the Smart Grid Brussels Health Campus project came into existence sprouting from the vision of handling energy in a reliable and sustainable way. As a consequence, today we are able to function together with the whole university campus for at least five days autonomously like an "energy land", which is unique in health care. Our ambition is to further refine this project and make it replicable, so that other hospitals could make use of this technology too and as such we could make the entire health care more sustainable.

The Current expertise will also be used to for the development of a new large-scale CO2 neutral energy community in an adjacent industrial research park in the commune of Zellik. The VUB is currently investigating the feasibility to install a new data centre, 8MW renewables, a thermal and electric connecting 70 companies and a new business incubator.
(http://www.vubtoday.be/nl/node/6863)

Main tasks to be undertaken

VUB-MOBI will be coordinator of RENAISSANCE. Accordingly, VUB will manage and lead WP1. In addition, VUB sill also lead WP6 - Benchmark, scalability and replicability analysis and virtual demo validation. The WP's specific objective is to develop and validate the scalability and replicability of the RENERGISE tool, which will also assess the potential of C2C market. A deep an complete comparative analysis and benchmarking of the demonstration sties will be done, including regulatory barrier analysis from Europe.

Business case benchmarking (WP3 – T3.1) will also be performed by VUB, considering the last state-of-the-art, a benchmarking analysis of existing Energy Islands business models, and the recommendations on feasible business models that will suit the different demonstration sites. Due to the expertise of VUB regarding environmental impact and emissions, in WP2 the key performance indicators in order to target the global objectives from the project will also be developed by the VUB. In addition for this WP, the MAMCA Multi Actor Multi Criteria Analysis will be used as a decision making tool. Also the consensus driven local smart grid design will mainly developed by VUB in the same WP. Dissemination and exploitation activities will also be developed with the collaboration of VUB as well as the rest of the partners (WP7).

Furthermore, the University Hospital (VUB-UZ) will be used as a demo site. Using VUB-US as another demonstration site will give a novel perspective to the aim of the proposal. The microgrid of a hospital needs to be highly reliable, extra security layers of communication and energy will need to be installed.

Key personnel (incl. gender)

- **Prof. dr. Thierry Coosemans [M]** obtained his PhD in Engineering Sciences from Ghent University in 2006. After several years in the industry, he became a member of the MOBI research team at the VUB, where he works now as the 'Electric and Hybrid Vehicle' team leader. He is currently involved in the scientific support for the Green Energy Park Zellik, Flanders Make and had an active role in the Living Labs Electric Vehicles Flanders. On a European level, Thierry was and is involved in the H2020 and FP7 projects SafeDrive, OPERA4FEV, SuperLIB, Smart EV-VC, Batteries20202, GO4SEM, FIVEVB, ELIPTIC, MOBILITY4EU, COLHD, FUTURE-RADAR, and GO4SEM, which he coordinated. His main research interests are electric and hybrid propulsion systems, and the performances of electric-vehicle fleets under real-life conditions, including in a V2G perspective. Thierry Coosemans is an active member of EARPA and EGVIA.

- **Dr. Maarten Messagie [M]** obtained his PhD in engineering from VUB in 2013. He is a full-time post-doc researcher at VUB where he leads the LCA (Life Cycle Assessment) team of MOBI. His focus is on business development and grant writing of large industrial and European projects. Maarten manages specific tasks in several H2020 European projects in which he leads the environmental and socio-economic tasks (SuperLIb, Opera4FEV, Syrnemo, Batteries2020, FiveVB, Assured, COLHD, GHOST, OBELICS, IMAGE, HiFi Elements...). His expertise and research focus is on the system combination of sustainable mobility and energy in futureproofed microgrids and decision support methods for environmental-economic-social evaluation.

- **Dr. Maitane Berecibar [F]** obtained her PhD in Engineering of Sciences at the VUB on August 2017 named "Development of an Accurate State of Health Estimation Technique for Lithium-Ion Batteries". The PhD was a collaboration between the Technology Research Centre IK4-Ikerlan, located in Spain, and the VUB inside the MOBI research group. During her studies she has also collaborated with other universities from abroad, like the New Jersey Institute of Technology (US), and the Brno University of Technology (CZ) developing the following projects "Estimating Storage Requirements for Wind Power Plants" and "Quality of Service of Free Space Optical Links". She is currently working as senior researcher and project manager at the MOBI research group for the H2020 projects like COLHD and writing new promising proposals.

- **Prof Dr Thomas Crispeels [M]** is Assistant Professor at the Vrije Universiteit Brussel at the department of Business Technology and Operations (BUTO). He holds a PhD in Applied Economics (Business Engineer) and promoted with his thesis « Essays on Inter-Organizational Collaboration in the Biotechnology Industry » . Since October 2014 he heads the « Technology & Innovation Team » at the BUTO department. His research is situated in the field of Technology & Innovation, with a special focus on technology transfer and collaborative R&D in high technology industries such as electric vehicles, life sciences and photonics. The team extends the scope of 'traditional technology transfer' to multi-actor, cross-border setting. Thomas teaches several courses on technology entrepreneurship and the business economics of high-technology industries to business and engineering students, both in Bachelor and Master Programs. He also organizes workshops on life sciences entrepreneurship for academic staff members and professionals such as « Workshop Entrepreneurship in Life Sciences » and « Lunch&Learn : The Biotechnology Industry ». He is guest lecturer at the yearly « International Summer School on Technology Transfer in Life Sciences » at TUDresden (2013-Current). He is member of VUB's Innovation & Valorisation Board, Member of the University Council, Member of VUB's Industrial Research Fund Board and Member of the Board of Directors of VUB's Incubators (ICAB and IICB).

- **Prof Dr Cathy Macharis [F]** is Professor at the Vrije Universiteit Brussel. Her research group MOBI – (Mobility, Logistics and Automotive Technology) is an interdisciplinary group focusing on sustainable logistics, electric and hybrid vehicles and urban mobility. Her research focuses on how to include stakeholders within decision and evaluation processes in the field of transport and mobility. She has been involved in several regional, national and European research projects dealing with topics such as the implementation of innovative concepts for city distribution, assessment of policy

measures in the field of logistics and sustainable mobility, development of a multi actor multi criteria analysis framework, etc. She published several books and wrote more than 100 papers. She is the chairwoman of Brussels Mobility Commission and vice-chair of Nectar (Network on European Communications and Transport Activities Research.

- **Jimmy Van Moer [M]** has been working as Manager Energy and Technical Innovations for six years with Universitair Ziekenhuis Brussel. Before, he worked for 22 years with Engie Cofely (Cofeley Services) where he started as a student and grew until he became manager where he was responsible for the project department, being active in the domains of health care, the military and swimming pools within Flanders. In 2013 he worked out the concept for the Smart Grid Brussels Health Campus, where he was responsible for the engineering and implementation.

Relevant past activities/publications

#	Title	Authors	Journal Conference, Vol., Issue, Date
1	Public-Private Collaborations in Drug Development: Boosting Innovation or Alleviating Risk?	Crispeels, T., Willems, J., & Scheerlinck, I.	Public Management Review, 20(2), 273-292. (IF 2016: 2.293), 2018
2	The Development of Hybrid and Electric Vehicles: Emergence and Development of the Patent Network	Crispeels, T., Robert, D., Verbeke, W., Coosemans, T., & Van Mierlo, J.	World Electric Vehicle Journal, 8(3), 609-620. (RG IF 2015: 0.30), 2016
3	How Total is a Total Cost of Ownership?	De Clerck, Q., Van Lier, T., Lebeau, P., Messagie, M., Vanhaverbeke, L., Macharis, C., & Van Mierlo, J.	World Electric Vehicle Journal, 8(4), 736-747, 2017
4	Environmental Performance of Electricity Storage Systems for Grid Applications, a Life Cycle Approach	Da Quinta E Costa Neves De Oliveira, L. M., Messagie, M., Mertens, J., Laget, H., Coosemans, T. C. & Van Mierlo, J	Energy Conversion and Management. 101, p. 326-335, 2015
5	The hourly life cycle carbon footprint of electricity generation in Belgium, bringing a temporal resolution in life cycle assessment	Messagie, M., Mertens, J., Da Quinta E Costa Neves De Oliveira, L. M., Rangaraju, S., Coosemans, T. C., Van Mierlo, J. & Macharis, C.	Applied Energy. 134, p. 469-476, 2014

Previous projects related to this proposal

#	Name	Short Description
1	ASSURED	fASt and Smart charging solutions for full size URban hEavy Duty applications. Large Project Coordination.
2	CITYLAB	City Logistics in Living Laboratories This project will deliver best practice guidance on innovative approaches and how to replicate them, based on a partcipatory MAMCA based approach. CITYLAB also introduced the dashboard concept to monitor urban freight transport trhough dedicated KPIs.
3	NISTO	New Integrated Smart Transport Options, Interreg IV B Project, 2013-2018. NISTO developed an evaluation and planning toolkit for mobility projects which is applicable transnationally and can be adopted by planners. The project focused the three pillars of sustainability (economy, environment and society) as well as the close integration of the stakeholders into the evaluation process are essential for the development of well-functioning, sustainable mobility projects.
4	ORCA	Optimised Real-world Cost-Competitive Modular Hybrid Architecture for Heavy Duty Vehicles (www.h2020-orca.eu/)
5	GHOST	InteGrated and PHysically Optimised Battery System for Plug-in Vehicles Technologies (www.h2020-ghost.eu/)
	Others	Batteries2020, FiveVB, Image, HifiElements, FutureRadar, Mobility4EU, Colhd, Obelics

Relevant infrastructure

Microgrid at Brussels Health campus: a thermal and electricity grid, waste water recovery, a high-speed glass-fibre telecom network and a total of 33 HV transformers divided over HV 18 substations. Energy production and storage include photovoltaics (817 kWHp), CHP 2.8MW, and 3 emergency generators (5.25 MVA), and a total capacity of 2,5 MWh in battery storage, mainly under the form of UPS. During the 2018 -1019 the site will be further extended with 1.200 kWp photovoltaics and a 20MWh ice buffer, additionally in 2022 a Borehole Thermal Energy Storage (BTES) of 1.6MWh system will be installed. The microgrid contains about a 1000 smart-meters feeding a vaste data base with real-life data.

Third parties involved in the project (including use of third party resources)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	Y
VUB will be subcontracting services from CambridgeCleantTech (UK) in order to gain access to virtual demonstrator sites in the UK and in the US. In addition, the two organisations will organise some joint events to scope the stakeholder understanding and needs and promote RENAISSANCE approach globally. VUB will also be subcontracting services from Global Business in Roads working in areas of energy efficiency, for setting up consensus building activities in Indian market and support the Indian Partnership in setting up the replication programme.	
Does the participant envisage that part of its work is performed by linked third parties[1]	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[2] (Article 14a of the General Model Grant Agreement)?	N

[1] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

[2] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

4.1.2. IK4-IKERLAN (IKL)
www.ikerlan.es

IK4-IKERLAN is a Spanish private not-for-profit Technological Research Centre in the north of Spain, Mondragon and Galarreta (Guipuzcoa), and Miñano (Alava), renowned for its capacity for innovation and comprehensive development in three main areas: i) energy efficiency and energy storage, ii) operational efficiency and advanced manufacturing, and iii) product and service development. The Centre works closely together with regional companies to improve their competitiveness, by applying technological knowledge to the development of innovative products, as well as new tools and methodologies for implementation in design and manufacturing processes. It has a staff of more than 233 qualified researchers and engineers, with experience in inter-disciplinary work and capable of tackling complex problems, and an annual turnover of 18M, and counts with 90 enterprises as clients.

From its creation in 1974 in the fold of what is today the Mondragon Corporation, Spain's 7th-largest industrial grouping, IKERLAN has worked for companies from the machinery and capital goods, household appliance, electronics, automotive, railway transport and energy sectors. Our broad base of knowledge and experience allows us to offer a complete service of product development and services, with the right combination of innovative technologies and using the most advanced existing collaborate with companies in developing innovative and competitive solutions. Its expertise comprises diverse technological fields: Embedded Systems, Traction Systems, Energy Conversion Systems, Mechatronic Systems and Structural Reliability, Microfluidic Systems, Microsensors and Microactuators, Electromagnetic Power Systems, Systems and Maintenance Services, Systems and Monitoring and Control Services, Systems Configuration and Software Production Systems, Power Storage, Software Engineering, Processes Design, Manufacture and Operation.

In the field of energy distribution network, IKERLAN works as a technological partner for several relevant energy companies (IBERDROLA RENOVABLES, GAS NATURAL FENOSA) as that are developing new services and product for the smart grid based on new energy management strategies for RES electrical market integration and new equipment for smarted grid supervision.

Main tasks to be undertaken

Due to its previous expertise in EU projects and the alignment of the topic with two of IKELAN´s research areas (ICT and Intelligent energy management and energy storage), IKERLAN will lead WP3 (Business Models and Smart Contracts), where the smart contracts will be developed by IKERLAN.

Apart from leading this WP, IKERLAN will participate in WP2, integrating the state-of-the art battery models for improved and better life cycle modelling. IKERLAN will also take part of WP4, collaborating on the design and implementation of the RENAISSANCE blockchain. Finally, IKERLAN will participate in Dissemination and Exploitation activities in WP7 together with the rest of the partners.

Key personnel (incl. gender)

- **Dr Aitor Milo [M]** obtained the B.SC degree in Electronics from the University of Mondragon (MU), Spain in 1993, the M.SC from the National Polytechnic Institute of Grenoble, Grenoble, France, in 1995 and the Ph.D degree from the MU in 2011. Since 1996 he has been a researcher in the Control Engineering and Power Electronic department of IKL where he has been involved in several research and industrial projects related to the design and application of control techniques to processes and products related to the energy, renewable energy and electrical sector. He has participated in the Working Groups of the European Technological Platform "SmartGrids", and he is member of CTN217 committee of AENOR (Spain) related the connection of distributed generation to the distribution network. His main research areas are the design and development of energy management strategies for optimal integration of energy storage

system and renewable sources into the grid. He is author of several papers and articles in the field of energy management, renewable energy main grid integration.

- **Dr. Haizea Gaztañaga [F]** is a IK4-IKERLAN R&D Engineer, she obtained her PhD in Electrical Engineering from the National Polytechnic Institute of Grenoble (France) in 2006. She has been a researcher and project manager at the Control engineering and Power electronics Area since 2006. Her main technical activities and interests include the design and control of power conversion systems for applications such as microgrid, Transportation, Renewable Energies and Storage.

- **Dr Nerea Nieto [F]** is a researcher in IKERLAN, she obtained her PhD from the School of Engineering of the University of Navarra, TECNUN, in 2014. She has been first a research assistant and then a researcher at the Energy Unit since 2009. Her main technical activities within different industrial and research projects related to electrical storage systems include characterisation and modelling of lithium-ion batteries.

- **Dr. Igor Villareal [M]** is the head of the Energy conversion and storage department. He received his PhD in Electrochemistry applied to Lithium ion batteries (2001, Complutense University, Madrid). He has been working at IKERLAN since 2001, when he was assigned to Lawrence Berkeley National Laboratory in USA until 2003, for fuel cell technology transfer. Since 2010, he is Area Manager and has been involved in developing projects related to electrical storage systems for different industrial applications, such as trains, elevators, e-bikes, etc.

Relevant past activities/publications

#	Title	Authors	Journal Conference, Vol., Issue, Date
1	Enhanced experimental PV plant grid-integration with a MW Lithium-Ion energy storage system	Gaztañaga, H., Landaluze, J., Etxeberria-Otadui, I., Padros, A., Berazaluce, I., Cuesta, D.	IEEE ECCE 2013, Denver (USA), 2013
2	Co-Optimization of Storage System Sizing and Control Strategy for Intelligent Photovoltaic Power Plants Market Integration	A. Saez-de-Ibarra, A. Milo, H. Gaztañaga, V. Debusschere, S. Bacha.	IEEE Transactions on Sustainable Energy, vol. 7, no. 4, 2016
3	Management Strategy for Market Participation of Photovoltaic Power Plants including Storage Systems	A. Saez-de-Ibarra, V. Herrera, A. Milo, H. Gaztañaga, I. Etxeberria-Otadui, S. Bacha, A. Padrós.	IEEE Transactions on Industry Applications, vol. 52, no. 5, 2016.
4	Sizing Study of Second Life Li-ion Batteries for Enhancing Renewable Energy Grid Integration	A. Saez-de-Ibarra, E. Martinez-Laserna, D.-I. Stroe, M. Swierczynski, P. Rodriguez.	IEEE Transactions on Industry Applications , vol. 52, no. 6, 2016
5	Solving the Industry 4.0. challenges on the logistics domain using Apache Mesos"	Conde, A., Arellano, C., Charramendieta and S., Ocariz, O.	Big Data Spain 2016 Conference, 17-18 Nov, Madrid, 2016

Previous projects related to this proposal

#	Name	Short Description
1	BATTERIES2020	Improve performance, lifetime and total cost of ownership of batteries (FP7). In this project they are contributing to better understanding of the battery applications at residential level. Second life battery applications' requirements are being identified in the project. Sizing and managing tools are being developed to optimise the performance of these batteries
2	H2SusBuild	Development of a clean and energy self-sustained building in the vision of integrating H2 economy with renewable energy sources. (FP7). In this project IKL contributed to the definition of the control and communication architecture of the building and carried out the design of the energy management strategy of the building (generation and consumption elements based on H2)

3	ARROWHEAD	Energy efficiency and flexibility at the global scale for five application verticals (FP7). In this project IKL are contributing to the development of a real-time smart power meter. This device offers the real-time monitoring of the consumption as a service via a web service method
4	SAFIRE	Cloud-based Situational Analysis for Factories providing Real-time Reconfiguration (2016-2019)
5	C2NET	Cloud Collaborative Manufacturing Networks (2015-2017)
	Others	REEMAIN, RAMSES, FCDistrict, ALONE, PolySMART and IEE Solar Combi+.

Relevant infrastructure

IKERLAN has a full equipped Power Electronic Laboratory, an Embedded Systems Laboratory, a Laboratory of Medium Voltage for Power Electronics, an Electrical Storage Systems Laboratory and a Cyber Security Laboratory where the activities of WP3 can be tested.

Third parties involved in the project (including use of third party resources)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	N
Does the participant envisage that part of its work is performed by linked third parties[3]	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[4] (Article 14a of the General Model Grant Agreement)?	N

[3] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

[4] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

4.1.3. ATOS
www.atos.net

Atos SE (Societas Europaea) is a leader in digital services with pro forma annual revenue of circa € 12 billion and 100,000 employees in 72 countries. Serving a global client base, the Group provides Consulting & Systems Integration services, Managed Services & BPO, Cloud operations, Big Data & Cyber-security solutions, as well as transactional services through Worldline, the European leader in the payments and transactional services industry. With its deep technology expertise and industry knowledge, the Group works with clients across different business sectors: Defense, Financial Services, Health, Manufacturing, Media, Utilities, Public sector, Retail, Telecommunications, and Transportation. Atos is focused on business technology that powers progress and helps organizations to create their firm of the future. Atos Research & Innovation (ARI) is the R&D hub for emerging technologies and a key reference for the whole Atos group. With almost 30 years of experience in running Research, Development and Innovation projects, we have become a well-known player in the EU context. Our multidisciplinary and multicultural team has the skills to cover all the activities needed to run projects successfully, from scientific leadership to partnership coordination, from development of emerging technologies to the exploitation of project outcomes, with a strong focus on dissemination, innovation adoption and commercialization.

Atos Research & Innovation (ARI) is the R&D hub for emerging technologies and a key reference for the whole Atos group. With almost 30 years of experience in running Research, Development and Innovation projects, we have become a well-known player in the EU context. Our multidisciplinary and multicultural team has the skills to cover all the activities needed to run projects successfully, from scientific leadership to partnership coordination, from development of emerging technologies to the exploitation of project outcomes, with a strong focus on dissemination, innovation adoption and commercialization.
Atos is a founding member of the European Technology Platform NESSI (Networked European Software and Services Initiative). Our company is a major partner in Future Internet-related initiatives being member of the FI PPP Steering Board and Industrial Advisory Board. Since 2014, Atos is a founding member of the Big Data Value Association (BDVA), assuming the roles of Vice-presidency and Deputy Secretary-general. We are also member of the 5G PPP Steering Board. Additionally, Atos is a member of NetWorld2020, NEM, Nanomedicine, ERTICO, CELTIC, NIS, EOS, LSEC, ETSI, OW2, OASIS, Cloud Security Alliance, Eurocities, etc. Finally Atos is a core member of the KIC EIT HEALTH and an official member of the KIC EIT DIGITAL associated node Madrid. At national level, Atos is currently holding the Presidency and Secretary of PLANETIC for ICT, as well as the Vice-presidency of es.Internet for Future Internet technologies, and is member of several others, such as PESI, Logistop, eVIA for Health and Independent Living, NanoMed or the Spanish Railways Technology Platforms (PTFE).

Main tasks to be undertaken

In particular, ATOS brings to the project the expertise of the Energy Sector as a key player in the European research & innovation landscape. The Energy sector covers a range of activities to deliver advanced ICT driven services for the energy domain supporting its main players by providing the necessary interfaces and information exchange. ICT energy systems and applications are at the very centre of the paradigm change within the energy domain, being key enablers for smart energy innovation in the three domains of electricity, water and gas (in WP4 regarding implementation and in WP5 regarding pilot validation). The Energy sector research lines & activities are related to the effective management of distributed energy resources in the grid, the control of Virtual Power Plants (WP6), the efficient management of energy consumption in buildings, energy consumption and charging of electric vehicles, monitoring and control of smart water & gas infrastructures.

Atos, as an ICT company, aims at positioning as platform provider for the REINASSANCE project. In this respect, Atos FUSE platform is provided. FUSE platform is ready to be used as data collector and some functionalities for managing energy services are already included and working. The platform is being used in different projects and pilots, being REINASSANCE a perfect placeholder to push forward

the TRL in terms of advance energy functionalities supported by the platform, either due to Atos internal developments and third party collaboration with other REINASSANCE partners.

This way, Atos will be deeply involved on the REINASSANCE platform development, as well as on the requirement setting and the pilot testing.

Key personnel (incl. gender)

- **Andrea Rossi [M]** holds a degree in Economics and a Master in Business Administration both from the University of Bologna. He started his professional career in 2001 as E-Business Coordinator in the pharma industry in Eli Lilly Italy and then as Product Manager in Eli Lilly UK. In 2005, he became Marketing Manager for Avent-Philips in London. Since September 2007 he has joined the Atos Research and Innovation in Madrid where is currently working as Head of Energy & Transport Market managing a research team of 18 people. In the past 10 years, he has acquired strong R&D experience in managing European FP7 & H2020 projects focusing mainly on Innovation Management, Smart Cities and Smart Grid. He's currently Project Coordinator of the inteGRIDy project.

- **Juan Rico [M]** received a degree in Telecommunications Engineering in 2006 and a Master degree in Information Technology and Communication in Mobile Networks in 2009 from the University of Cantabria Spain. He is currently working in ARI, Research and Innovation in Atos acting as deputy Head of the Energy Sector, focusing on the role of ICT in the boosting of energy sector digital transformation and involved in H2020 initiatives related to the topic. He is also part of the Atos team contributing to AIOTI. Previously, he worked as Senior Researcher at TST and University of Cantabria leading and participating European project and city scale pilots in FP6 and FP7 programs (BUTLER, EXALTED, COSMOS, CLIPS), ENIAC and Celtic PLUS (TILAS, TOISE) programs. In 2012 as technical manager of SICRA project was awarded by ESA (European Space Agency) in the Galileo Master Contest. He also acts as expert for French ANR (Agencie National Recherche) reviewing and evaluating R&D proposals. He is co-author of several magazine papers, book chapters and conference papers, and has participated in panels and round tables discussing about innovation supported by IoT in Smart cities and interoperability as key enabler of the internet of energy.

- **Javier Valiño [M]** received a degree in Telecommunications Engineering (Telematics and Radio-communications) from the University of Cantabria in 2007. He developed his Final Project Degree in the field of point source detection in collaboration with the European Space Agency (ESA) Plank project and the physics department at the University of Cantabria. He worked as a network and systems engineer leading both commercial and research projects related to IoT and 4G/5G (FP7 projects such as EARTH, EXALTED, TALOS or MiWaveS; H2020 projects such as Flex5GWare and Celtic Plus projects such as SHARING and TILAS – acting as Project coordinator and obtaining the CELTIC Plus Award of Excellence -, among others) Since 2016 he began working as a Research & Innovation Engineer in Atos. His research interests cover IoT and Energy related topics.

Relevant past activities/publications

#	Title	Authors	Journal Conference, Vol., Issue, Date
1	Real time energy efficiency optimization in connected electrical vehicles	J. Rico, D. Calvo, J. Sancho, M. Rodriguez, M. Wagner, A. Rossi, M. Mateo	IEEE Ecological Vehicles and Renewables Energies Conference – Monaco 2017
2	Assessment and outlook of the OpenNode smart grid architecture	Florent Leménager, Céline Joannic (EDF R&D), Raul Soriano (ITE), Raul Bachiller Prieto (Iberdrola) Marta Alberto Monferrer (ATOS), Nicolas Espejo Portero (Nucleo), Ralf Mosshammer (SIEMENS)	CIRED, Stockholm, June 2013

3	eDASH e-Mobility Broker	Martin-de-Vidales-Ramirez Maria, Martin Wagner Neumann, Rolando Palma Zelada, (ATOS)	EV27, Barcelona, November 2013
4	FUSE	open source platform that enables the integration of devices at the edge by fully exploiting data available from local and distributed energy resources to build added value services for utilities companies & energy stakeholders	

Previous projects related to this proposal

#	Name	Short Description
1	inteGRIDy	inteGRIDy aims at integrating cutting-edge technologies, solutions and mechanisms in a scalable Cross-Functional Platform of replicable solutions. This platform connects existing energy networks to diverse stakeholders, with enhanced observability of both generation and consumption profiles. inteGRIDy pursues facilitating the optimal and dynamic operation of the Distribution Grid, fostering the stability of the electricity grid and coordination of distributed energy resources, Virtual Power Plants and innovative collaborative storage schemes within a continuously increased share of renewable energy. http://www.integridy.eu
2	SHAR-Q	The SHAR-Q project aims to establish an interoperability network that connects the capacities of the neighbourhooding and wide regional Renewable Energy Sources (RES) and Electrical Energy Storages (EES) ecosystems into a collaboration framework that mitigates the requirement on the overall EES capacities thanks to the shared capacities among the participating actors. The principal assumption of the SHAR-Q concept is that sharing of storage capacities, deployed at distributed locations, will bring significant savings on the required storage capacities and in turn will significantly reduce the unit-cost of energy output of the RES+EES ecosystems that are participating on the sharing process. http://www.sharqproject.eu
3	JOSPEL	The aim of JOSPEL project is the development of a novel energy efficient climate system for the optimization of interior temperature control management in electrical vehicles through an integrated approach that combines the application of the thermoelectric Joule and Peltier effect, the development of an efficient insulation of the vehicle interior, the energy recovery from heat zones, battery life increase duration enhancement as a side effect of thermal management, battery consumption reduction by Peltier cooling integration, innovative automated and eco-driving strategies and the electronic control of power flows. Main objective is the reduction of at least 50% of energy used for passenger comfort (<1,250 W) and at least 30% for component cooling in extreme conditions with reference to electric vehicles currently on the market. http://jospel-project.eu/
4	ELVITEN	ELVITEN aims to boost the usage of all categories of EL-Vs (bicycles, scooters, tricycles and quadri-cycles in urban environment and ultimately to achieve a mind-shift among users by providing them with a better EL-V experience. This will be achieved by designing and offering replicable usage schemes, consisting of support services, ICT tools and policies. The project has three principal objectives: First, it seeks to make users more familiar and facilitate them to use EL-Vs instead of ICE vehicles for their private transport and for light urban deliveries. Second, it attempts to collect rich information sets made of real usage data, traces from dedicated ICT tools, and users' opinions after real trips. Third it will generate detailed guidelines and business models for service providers, Planning Authorities and manufacturers in order to make EL-Vs more attractive and more integrated in the transport and electricity networks. http://www.elviten-project.eu/
5	eDREAM	eDREAM will develop and make available a novel near real time DR scalable secure blockchain-driven technological and business framework aimed to optimize aggregated system services flexibility provisioning to DSOs. The project will research and develop tools and services for: i) optimal DR system design, which includes early detection of flexibility potential via multimodal fusion of aerial, LIDAR and thermal imaging, end users profiling and segmentation by leveraging on big data clustering and large data sets visual interactive exploration and DR optimization services for energy end users; ii) optimal DSO-driven Demand Response management, including novel applications of blockchain decentralized ledger for secure data handling, market-based microgrid control and near real time closed loop DR verification aimed to improve system observability and enable fair DR financial settlement. Novel flexibility market and services/products design, as well as

		cooperative DSO-aggregator business models enabled by incentive sharing will validate the eDREAM DR technical concept from the economic perspective. (edream-h2020.eu)

Third parties

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	N
Does the participant envisage that part of its work is performed by linked third parties[5]	Y
Link to the partner ATOS IT Solutions and Services Iberia S.L. belongs to the Atos group. **Tasks in the project** The activities that will be developed by the third party are those related with the WP4, setting up FUSE platform to be used by RENAISSANCE and work together with project partners to adapt their tools (task 4.2); and WP5, helping on the FUSE implementation in demonstrators and data acquisition and processing (task 5.3). The effort that will be allocated to the third party will be 20 PM for WP4 and 10 PM for WP5, adding up to 30 PM along the whole duration of the project.	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[6] (Article 14a of the General Model Grant Agreement)?	N

[5] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

[6] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

4.1.4. DEEPBLUE (DEP)
www.dblue.it

Deep Blue is specialised in research and consulting in human-centred design and validation in transport, health care and environment. Our mission is to help organisations innovate their business, by analysing problems and procedures, designing ad hoc solutions and validating them in the field. Deep Blue has a wide record of Research and Innovation in human factors, safety, dependability, sustainability as well as professional training.
From its foundation, Deep Blue has significantly contributed to the European research development serving many European and international bodies, including European Commission, Eurocontrol and SESAR Joint Undertaking. The company is regularly used by national and European agencies, to carry out consultancy work in transportation, health care and environment.
Our main research areas are:

- Understanding users' needs, impact and acceptance translating them into requirements and scenarios, validating systems by verifying that they really meet users' needs
- Identifying and assessing Human Performance issues, and defining improvement actions
- Maximising the project impact, by designing and carrying out dissemination and exploitation activities.

A highly qualified multidisciplinary team with background in Cognitive Science, Psychology, Safety, Security, Engineering, Interaction&Graphic Design, service design and Informatics drive us in the delivery of innovative results. Deep Blue has a broad experience in carrying out facilitation processes and dissemination activities with different types of stakeholders in R&D projects.

Main tasks to be undertaken

Deep Blue will be leading the dissemination activities of the project (WP7), by considering the main objectives that the project aims to deliver, the groups of audience they want to reach and the most effective means of communication for each target group. The dissemination approach will follow the perspective of the European Commission, showing how European collaboration has achieved more than would have otherwise been possible, contributing to competitiveness and solving societal challenges.

Deep Blue will support activities connected to the study of the social acceptance, the impact of the outcomes to our everyday lives, in making our lives more comfortable in other ways. Deep Blue will make it sure the results of the evaluation of the social acceptance are taken up by decision-makers to initiate and influence policy-making and by industry and scientific community to ensure follow-up.

Key personnel (incl. gender)

- **Linda Napoletano [F]** holds a Ph.D. in Human Computer Interaction. She has been working since 2002 on EU co-funded projects aiming at designing and validate humans' integration into technology innovation processes. She is part of the Deep Blue team since 2008 as human factors, validation, dissemination and training expert in EU, EUROCONTROL and ENAV funded projects. Linda is Associate Researcher in Human Computer Interaction and Service Design at the University of Sassari and Siena. Since 2009 she is managing the dissemination activities of several R&D projects.

- **Carlo Valbonesi [M]** is a Human Factors and Safety Expert with a Master degree in Human-Computer Interaction. Carlo joined Deep Blue in 2009 and since then he has been working in air traffic management (ATM) projects for EUROCONTROL and Air Navigation Service Providers, with a focus on safety assessment, safety case and automatic safety monitoring. He is also involved in large H2020 aviation safety projects like Future Sky Safety, where he is contributing to research on Human Factors concepts like Human Performance Envelope. Besides ATM, Carlo led the PRIMO project in Italy, aimed at developing and testing a digital platform for risk monitoring in healthcare. He is also

involved in in user experience consultancy works for customer outside safety-critical industries, with a focus on understanding user needs, defining requirements and collaborating with design team to create user-centred services and products. Before joining Deep Blue, Carlo worked for 4 years in User Experience Design consultancies in Italy and Finland, where he was involved in usability studies and user experience research for the consumer products industry.

- **Chiara Muccitelli [F]** is a Visual and UX designer, Chiara graduates in Design at Politecnico di Milano and starts her professional life in Brussels. When back in Milano she starts working at Domus Academy as a designer and at Politecnico as assistant lecturer in semiotics. From then on, Chiara has been working in the design industry as graphic designer and art director, in the web & IT domain as user interface (UI) and user experience (UX) designer, and as lecturer and project leader in different italian design schools. Chiara joined Deep Blue in 2015, and she is currently responsible of the graphical and multimedia activities.

Relevant past activities/publications

#	Title	Authors	Journal Conference, Vol., Issue, Date
1	Personal devices in transportation modes: challenges, issues and emerging needs.	Sara Silvagni, Ana Ferreira, Giuseppe Frau & Simone Pozzi.	Annual Meeting of the Europe Chapter of Human Factors and Ergonomics Society, October 16-18, 2013.
2	Liabilities and Automation in aviation, presented at SESAR Innovation Day.	Contissa G., Lanzi P., Marti P., Sartor G., Tomasello P.	SESAR Innovation Days, Braunschweig 27th-29th november 2012.
3	Classification and applicability of Road Safety principles and best practices across other transport modes.	Evangelos Bekiaris, Stella Nikolaou, Lars Hübner, Dieter Sage, Simone Pozzi, Sara Silvagni	3rd Conference on Human Centred Design, June 14-15 2012, Valencia, Spain.
4	Creative design in safety critical systems.	Marti, P. Moderini, C.	Proceedings of ECCE 11, Cognition, Culture and Design, Eleventh European Conference on Cognitive Ergonomics Catania, Italy, 8-11 September 2002, Catania, Italy.

Previous projects related to this proposal

#	Name	Short Description
1	Mobility4EU	is a CSA Mobility4EU is a Coordination and Support Action of the European Commission started in January 2016 and lasting for 3 years, until 31 December 2018. The project will deliver a vision for the European transport system in 2030 and an ACTION PLAN including a roadmap to implement that vision. Recommendations for tangible measures in research, innovation and implementation will be derived.
2	EXCROSS	was a CSA aiming to enhance cross-fertilization and synergies between safety research initiatives in the different transport modes (e.g. road transportation, aviation, etc.).
3	IMPACT	was a CSA coordinated by Deep Blue, aiming to understand the impact of socio-cultural aspects in the prevention and management of safety and security emergencies in intermodal transport hubs.
4	OPTICS2	is a CSA, coordinated by Deep Blue is delivering a global vision of the aviation safety research landscape, offering strategic recommendations and support to establish safety research priorities. The main goals of the project are to: (1) Provide a comprehensive overview of EU safety-related research and innovation activities. (2) Assess the contribution of the safety research towards achieving the ACARE Flightpath 2050 goals. (3) Evaluate the overall societal and market impact of the safety research. (4) Develop strategic recommendations on the most important research avenues.
5	SECONOMICS'	goal was synthesizing sociological, economic and security science into a usable, concrete, actionable knowledge for policy makers and social planners responsible for

		citizen's security. The project is driven by industry case studies and will specifically identify security threats in transport (air transport and urban and super urban metro) and critical infrastructure (power grid). The research focus places social science and political science at the heart of the modeling framework. Deep Blue is the responsible of the Airport Security Case Study.

Third parties involved in the project (including use of third party resources)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	N
Does the participant envisage that part of its work is performed by linked third parties[7]	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[8] (Article 14a of the General Model Grant Agreement)?	N

[7] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

[8] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

4.1.5. SMARTWALL (SMR)

Website: under construction

SMARTWALL is a French SME founded in 2017 and developing BIPV elements on facades and fully integrated heaters based on Joule effect. BIPV on facade requires nice aesthetics and particularities as low weight and no risk of breakage. SMARTWALL is developing PV elements with a thin polymer front sheet and specific encapsulant materials to reduce water ingress and increase lifetime. SMARTWALL is also active in heating glass using similar technologies and on new smart energy contracts for energy communities.

Main tasks to be undertaken

The main task of SMARTWALL in the project will be encapsulation of PV elements on prefabricated facade elements to answer the need for architectural design in European cities and allows a comparable or lower cost per Wp compared to roof solutions. Samrtwall will collaborate in WP3, working in the benchmarking of the business cases, and in the validation of the energy agreements and business cases.

Key personnel (incl. gender)

- **Dr Guy Baret [M]** received a master degree in electrochemistry in 1984 and the PhD degree from Grenoble Institut National Polytechnique in science materials in 1989. After 12 years in the display industry, he started the DGTec company, a start-up in the field of inorganic nanomaterials, where he participated to 5 European projects. In 2008, he then moved to the photovoltaic industry and started the LUXOL company on PV roof tiles. He is now in charge of the R&D at SMARTWALL.

- **Frederick MARCHAND [M]** got an engineering degree from Ecole Centrale in 1994 and a commercial backgroung from ESSEC in 2005. He started working at EDF R&D, the French electricity supplier where he was successively in charge of R&D and exploitation aspects. In 2007, he merged few local DSO in the French Alps and founded the public DSO company SOREA. He developed renewable energies production (PV & hydro) and optical fiber communications. In 2015, he started SOWATT, a SOREA subsidiary dedicated to electricity contracts and reached a volume of 500 GWh and 5 000 customers. He cofounded SMARTWALL

- **Vincent MARCHAND [M]** has got a degree in electrical engineering. He worked 10 years in the photovoltaic industry and has strong experience in PV installation, design and construction on roofs and solar farms. He is developing knowledge on self-consumption of renewable energies in buildings and districts.

Previous projects related to this proposal

#	Name	Short Description
1	SMARTWALL has design capabilities and an assembly workshop for facade PV modules. In the picture, the assembly line in construction.	

Relevant information

In buildings, when the number of floors increases, the roof surface area per flat becomes low and insufficient to allow installation of significant PV power per flat. Furthermore, roof installation is usually optimized for summer operation, due to the roof angle. As more energy is needed in winter, vertical facade gets strong interest as shown in the graphs below, drawn for the city of Lyon, France. In winter, facade is producing 11% more energy than roof per installed Wp. In addition, available surface area on facade do not depends on the floor number. In a building, the usual mean facade (windows excluded) area per flat is around 35 m². At a PV power density of 125 Wp/m² (in case of colored cells having reduced efficiency), each flat can be fitted with 4.4 kWp of PV what will produce 3 500 kWh in Lyon, France, and mainly in winter. Adding photovoltaic function onto facade elements requires answering the need for architectural design and lowers the cost for additional photovoltaic elements.

Third parties involved in the project (including use of third party resources)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	Y
Software for data transmission and data management = 10000 € Software for data sharing (energy communities) = 12000 €	
Does the participant envisage that part of its work is performed by linked third parties[9]	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[10] (Article 14a of the General Model Grant Agreement)?	N

[9] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

[10] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

4.1.6. SOREA

www.sorea-maurienne.fr

SOREA is a DSO (Distribution System Operator), active in electricity production and distribution in the Maurienne Valley in the French Alps.

SOREA is active in electricity production and distribution and operates its own grid with hydro and PV production and has 15 000 customers (counters), private people and small industry.
SOREA has 52 people and distributes 150 GWh of electricity every year, 42 MW at peak power
The grid is connected to the main French national grid for supply or feed-in.
In order to improve the grid quality and supply new services, including for the green cars (EV ou H2 vehicles), SOREA is making developments in the fields of renewable energies, energy storage and smart grid applications.

SOREA is working on demand-response, peak shaving, intra-day storage with pumped water stations and installation of charging points for electric vehicles (EV).

Main tasks to be undertaken

SOREA operates an electricity distribution grid in a rural area. SOREA will lead WP5 – Demo sites operation, integration and validation. Inside this WP, SOREA will be in charge of the implementation, operation and monitoring of RENAISSANCE approach at demo sites. SOREA will also contribute in other WPs, WP2, WP3, WP6 and WP7. SOREA will be a key partner due to its participation as DSO, and this figure needs to be considered in nearly all process and consequently, all WPs.

Key personnel (incl. gender)

- **Jacques BERNARDIS [M]** got a BSc degree in electrotechnic and industrial data processing in 1987. Jacques BERNARDIS worked previously at the CERN in Geneva and from 1993 at SOREA. He is in charge of the counting service on the high voltage and low voltage branches of the SOREA's grid. He is also participating to the smart grid activity for improved data transfer on the grid and a better use of renewable energies by installing small local storage capacities.

- **Sylvain BERLIOZ [M]** received a master degree in Electrical engineering in 2008 from Ecole supérieure d'ingénieurs en Génie électrique, Rouen, France. He worked 3 years at ASSYSTEM, 1 year at Schneider Electric company in projects in electrical systems (power and control) for big customers as Volvo, Airbus and Astrium. Then he worked 2 years at IFM Electronic as application engineer in industrial communication systems.

- **Elsa RIVET [F]** is a young engineer recently graduated from Polytec Chambery Engineering school. She has background in energy in building and got additional knowledge on electricity distribution grid management & operation in Chalmers University (Sweden).

Previous projects related to this proposal

#	Name	Short Description
1	UTILITEE	working on increasing grid stability by developing Demand-Response at building level
2	UNITED-GRID	working on grid management and operation to increase the level of RES integration

Relevant infrastructure

SOREA operates an electricity distribution grid in a rural area. The grid is connected to local renewable generation (hydro & PV) and has alredy 35% of renewable energy on an annual basis. Few branches of the grid are weak and not compatible with new requirements for more PV connection, EV charging stations, power-to-heat needs or even more counters connection. Improvements on this rural local grid are required to increase renewable energy level to the objective of 60% in 2025 and to integrate the new needs from consumers (Access to new energy contracts, EVs charging, etc …). SOREA operates its own grid:

- 150 GWh distributed every year
- 42 MW at peak power
- 2 stations 63 kV/20kV
- 309 sub-stations
- 400 km of LV and 20 kV lines
- 85% of the distribution lines (20 kV and 400 V) are buried
- 7 small hydro plants (1 to 5 MW)
- 15 PV systems between 25 and 250 kWp directly connected to the grid

Third parties involved in the project (including use of third party resources)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	Y
software adaptation of the SCADA = 18 000 €	
Does the participant envisage that part of its work is performed by linked third parties[11]	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[12] (Article 14a of the General Model Grant Agreement)?	N

[11] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

[12] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

4.1.7. CIRCE
www.fcirce.es

CIRCE Foundation (Centre of Research for Energy Resources and Consumption) was established in 1993 as an independent Research Centre to create and develop innovative solutions and scientific/technical knowledge and to transfer them to the business sector in the field of energy. CIRCE's mission is to drive forward improvements in energy efficiency and to spread the use of renewable energy by means of the development of R+D+I activities and formative actions, thereby contributing to a sustainable development.

Over 190 professionals with a broad variety of profiles compose the team of people working at CIRCE. Since 1993, CIRCE has conducted more than 2.500 R&D&I projects at national and international level and has trained more than 1.850 professionals from 47 countries within the postgraduate courses CIRCE promotes. In year 2001, CIRCE was recognized as National Centre of Innovation and Technology. CIRCE maintains a national leadership position in the field of energy, being the second national research centre getting more projects in competitive calls during period 2014-2015 in Spain. The main research topics in CIRCE are: energy efficiency, wind and solar power, natural resources, biomass, electrical substations, smart-grids and storage, thermal power systems and emissions reduction, sustainable mobility and energy socioeconomics. CIRCE is also a very active actor in the R&D and Renewable Energy integration projects at Spanish and European level. As a proof of its experience in international projects, CIRCE is currently involved in 23 FP7 projects, being the coordinator of 6 of them and 31 H2020, being coordinator of 10.

CIRCE carries out R+D+i activities with the ultimate aim of ensuring the energy efficiency of products, processes and services that contribute to reducing energy demand without compromising supply comfort and safety. The concept of energy efficiency ranges from the search for better technology on thermal and electric systems in a broad scope of sectors, to changes in behaviour regarding energy usage, encouraging a wiser more sustainable consumption.

Main tasks to be undertaken

CIRCE will collaborate in WP3 by working in the benchmarking of the business case, development of smart-contracts and the validation of energy agreements and business cases. Inside WP4, CIRCE will contribute in all tasks, with a special focus on the RENAISSANCE security access control network (T4.5) and the integration and interconnection phase (T4.6).
In addition, CIRCE will collaborate in WP6, helping on the data collection, benchmarking, validation, and C2C trading. With a minor contribution, CIRCE will collaborate in WP2 and WP5.

Key personnel (incl. gender)

- **Dr. Jesús Muñoz-Cruzado Alba [M]** a M.Sc in Telecommunications Engineering in 2007, a M.Sc. in Electronics in 2011, and a PhD (International and Cum Laude distinction) from the US in 2016. He has more than 8 years of industrial experience developing power converters in the company GPTech for a wide range of power. Furthermore, he has been in several research centres as lecturer and researcher: Signal Theory and electronics departments of University of Seville (Spain); power electronics team of University Federico de Santa María (Chile); Microelectronics National Centre (Spain); and since 2017, he is part of the power electronics team of CIRCE Foundation. During his professional career, he has published several top quality publications about power electronics topics: 3 journal articles, 2 patents, and has collaborated in several articles and conferences. In addition, he has participated in more than 13 international and national research projects. Among others, some specific for HV applications up to 6MVA and 30kV (MACAS, SMARES and Smat HVDC 2.0 projects); in them he collaborated actively in the design and implementation of the control system. Finally, he has great experience in industrial products in areas such as renewable energies, defense and energy storage; He has been in charge of the control design and implementation of power converters

of GPTech, including solar converters of 30,100,500 and 3.6MW, or 100kW B2B converters for wind turbines, among others. Moreover, he has been project manager with strong requirements, for example, a 300kW DC/DC converter for the S-80 Spanish army submarine.

- **Laura Giménez de Urtasun [F]** is the Head of the Grid Studies and Smart Grids Group of the Networks and Substations Area – CIRCE. MSc Industrial Engineer, E. Eng. Currently pursuing her PhD in Renewable Energy at the University of Zaragoza. Working in CIRCE since 2005 , she has developed her job as Project manager at the Electric Power Systems Area (since 2005), area manager on 2015 and Head of Network Studies and Smart Grids Group since 2016. Her work involves R&D projects related to: Power system modelling, protection and automation; IEC61850 implementation; EV, PHEV integration studies; and Smart grids with special interest in power quality studies & evaluation methods using KPIs for renewable energy integration optimization. At this research group she has participated in renewable energy and smart grid projects supported by Spanish & European organizations, and in several research papers, technical books and conferences.

- **Noemí Galán [F]** is a Researcher at the Grid Studies and Smart Grids Group of the Networks and Substations Area – CIRCE. She received the degree in electronic engineering and M.Sc. degrees in renewable energies and energy efficiency from the University of Zaragoza, Spain. She is currently pursuing the Ph.D. in Renewable Energy at the University of Zaragoza. She is a Researcher at Centre of Research Energy and Resource Consumption (Circe). Her main research interests include power electronics, electronic converter, smart grid evaluation methods using KPIs for renewable energy integration and HVDC (High voltage DC).

- **Jesus Torres [M]** has a MsC in Telecommunication Engineering and Master in Big Data and Data Science, with 9+ years of experience in the Smart Grid Sector. Head of ICT Integration Group in CIRCE. During his career he has specialized in architecture design, data models and IT services for Smart Grid scenarios, covering several subsystems (e.g. distribution automation, IoT in LV networks, EV charge management or smart metering) in several national and european R&D projects. The most representative recent references are H2020 Flexcoop and Flexiciency. In this last case, CIRCE is the technical responsible for the spanish demo, developing and integrating a complete web platform and local gateways for flexibility and optimization services in Smart Grid real facilities.

Relevant past activities/publications

#	Title	Authors	Journal Conference, Vol., Issue, Date
1	Evaluation of new network functionalities for Smart Grids	L Gimenez, S Borroy, N Galan	III Smart Grid Congress, 2016, Madrid
2	Impact of massive renewable energy and power electronics connection on grid security	E Martinez, M Abad, S Borroy, D López, R Andrino, L Pindado	III Smart Grid Congress, 2016, Madrid
3	Smart grid technologies evaluation through KPIs Network planning and access options	Mariano Gaudó, Roberto González Sainz-Maza, Samuel Borroy Vicente, Laura Giménez De Urtasun, Susana Martín Arroyo, Miguel García-Gracia	CIRED 2014 Workshop. Rome (Italy
4	RE Grid Integration and Distributed Generation, Electric Markets and Standards	Bruna Romero, Jorge; Garcia Gracia, Miguel; Gimenez De Urtasun, Laura; Melero Estela, Julio Javier; Watson, David; Fernandez Gonzalez, Jose Luis; Yusta Loyo, Jose Maria. Libro	(Book) Editorial CIRCE (2013). 978-84-695-7750-9
5	Smart grid technologies evaluation through KPIs Network planning and access options	Mariano Gaudó, Roberto González Sainz-Maza, Samuel Borroy Vicente, Laura Giménez De Urtasun, Susana Martín Arroyo, Miguel García-Gracia	CIRED 2014 Workshop. Rome (Italy).

Previous projects related to this proposal

#	Name	Short Description
1	FLEXCoop	Democratizing energy markets through the introduction of innovative flexibility-based demand response tools and novel business and market models for energy cooperatives. FLEXcoop aims to develop the necessary tools to provide users a higher flexibility in their energy consumption, and new business models to the energy services companies. (http://www.flexcoop.eu/).
2	FLEXICIENCY	"energy services demonstrations of demand response, FLEXibility and energy effICIENCY based on metering data". FLEXICIENCY aims to show that the deployment of novel services in the electricity retail markets (ranging from advanced monitoring to local energy control) can be accelerated thanks to an open European Market Place for standardized interactions among all the electricity stakeholders, opening up the energy market also to new players at EU level. (www.flexiciency-h2020.eu/)
3	TRIBE	"TRaIning Behaviours towards Energy efficiency". Play it! TRIBE project, coordinated by CIRCE, aims to contribute to a behaviour change towards energy efficiency, through the users' engagement in a social game, linked by ICT to real time data collected from 5 pilot buildings hosting around 1.300 regular users and almost 12.000 eventual users. http://tribe-h2020.eu
4	MIGRATE	Massive InteGRATion of power Electronics devices. This project is focused on the challenge coming from the integration of renewable energies that cannot introduce electricity constantly in the system (wind or solar energy). In order to solve this problem, MIGRATE purposes innovations regarding real time system monitoring and different control solutions. https://www.h2020-migrate.eu/
5	DISCERN	"Distributed Intelligence for Cost-Effective and Reliable Distribution Network Operation". The main objective is the enhancement of European distribution grids with technical and organisational solutions for the optimal level of smart grid intelligence. (http://www.discern.eu/index.html)

Relevant information

CIRCE is member of the Spanish Energy Efficiency Technology Platform (PTE-EE) and runs the technical secretariat of the Spanish SmartGrids Technology Platform (FutuRed). At European level, CIRCE is member of the European Energy Efficient Association (E2BA), the European Construction Technology Platform (ECTP) and other platforms and associations related to Energy Efficiency and Renewable Energy such as: the European Energy Research Alliance (EERA), Institution of Engineering and Technology (IET), European Zero emissions Platform (ETP ZEP), European Association of Research and Technology Organisations (EARTO), European Renewable Energy Centres Agency (EUREC), Sustainable Process Industry through Resource and Energy Efficiency (SPIRE), European Wind Energy Association (EWEA), European Academy of Wind Energy (EAWE).

Third parties involved in the project (including use of third party resources)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	N
Does the participant envisage that part of its work is performed by linked third parties[13]	N

[13] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[14] (Article 14a of the General Model Grant Agreement)?	N

[14] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

4.1.8. DUTH
www. duth.gr

Democritus University of Thrace, DUTH, (www.duth.gr) was publicly established in 1973 with the purpose to strengthen the national and cultural identity of the region of NE Greece, Thrace, while contributing to the high level of education in Greece. DUTH serves society at large with high quality teaching and scientific research results and by developing competencies and skills of staff and graduates. DUTH has a total student population of 26.000, offering 18 undergraduate degree courses, 7 of which are integrated master degrees, as well as doctoral and post doctoral study degrees in engineering, health, agricultural, social, political and economic, and humanitarian sciences.

DUTH has a dedicated and specialised unit in contractual, legal and financial issues of European projects, its Special Account for Research Funds (SARF) http://rescom.duth.gr/en/homepage-en/, which is also ISO 9001 certified. SARF assists in submitting and implementing proposals, and has a long management experience in several national and EU-funded programs. SARF managed 27 projects under FP7, 4 of which are Marie Curie Actions (MSCA). So far under the current H2020 program (2014-2020) DUTH has been granted 11 projects, 2 of which are MSCA. DUTH has been granted with 1 Jean Monnet Chair, 2 Life actions, and participates in 3 Erasmus+ actions and in several interregional and transnational projects (Interreg, Med, SEE).

Main tasks to be undertaken

DUTH participates in RENAISSANCE project as the owner of the Greek demo site located in DUTH's student's residences in Kimmeria, Xanthi, Greece. Therefore, DUTH's expected tasks include the operation of the Greek demo site that will be used to demonstrate and validate in real-life innovative and replicable business models for local energy communities (WP5 and WP6). DUTH will responsible for the procurement and installation of innovative infrastructure and equipment at the Greek demo site. DUTH's expects to gain significant insights and knowledge in innovative business models of local energy communities that will be tested in Greek and other demo sites of the project.

Key personnel (incl. gender)

- **Professor Pantelis Botsaris [M]** is an electrical and computer engineer with a specific areas of interest in environmental conscious mechanical design for sustainable manufacturing and energy savings, diagnostics and prognostics of electromechanical systems and structures (especially renewable energies), structural health monitoring, experimental measuring systems and techniques for the development of smart meters especially for energy consumption, Non Destructive Techniques (NDT-thermography), CAD/CAM/CAE. P. Botsaris is currently Deputy Rector of Research and Innovation of DUTH as well as Head of SARF (since 2013), responsible managing national EU projects, research and development of the university. Major responsibilities include: management of SARF yearly budget (about 17 million EURO per year), management of research funding from any type of source, acquiring new sources of funding for the university. He is the Director of the Mechanical Design Laboratory (MeDiLab ©, http://medilab.pme.duth.gr) of the Department of Production Engineering and Management, School of Engineering, which has developed in recent years series of collaborations with a range of local and regional institutional actors and businesses leading to the operation of an open space lab for new product development. He has also implemented as a scientific coordinator two large pilot project of installing innovative RES technologies within the university systems. Pantelis is the Scientific Coordinator of the Innovation and Entrepreneurship Unit of DUTH that aims to develop the employability competences and entrepreneurial culture, skills and attributes of students and graduates. He has coordinated actions designed for providing real practice based experience of students to existing enterprises solving real challenges. He holds a Patent (No.1005235) and of a Utility model certificate (No. 20060200084) from the Industrial Property Organisation of Hellas (O.B.I.) and he has long teaching and management experience of national and EU projects.

- **Konstantinos Lymperopoulos [M]** is a Mechanical Engineer in the background and currently a PhD Candidate at the Department of Production and Management Engineering (DUTH). His research focuses on application of medium temperature solar thermal systems in industrial processes. He holds an M.Sc. from Cardiff University, UK, in the subject of *'Sustainable Energy and Environment'*. He has worked in energy projects specializing in decentralized renewable energy systems for collective energy generation and consumption of building complexes and has successfully accomplished studies for the development of geothermal district heating networks and hybrid solar/biomass and solar/geothermal innovative energy systems. He has five years working experience as an expert in collaborative international projects.

- **Dr. Paraskevi Giourka [M]** is a Civil Engineer in the background, and a strong innovation research professional with a PhD focused in Innovation Management from University of Leeds, UK. She holds an MBA from the University of Portsmouth, UK and she is an experienced Technology Transfer and Commercialisation Consultant at Democritus University of Thrace. She has a demonstrated history of working in the business sector specialising in technology prospecting/scouting and start up coaching while she has been designing and delivering business acceleration programs, international entrepreneurship summer schools, fast track business bootcamps and Virtual Incubation programs with institutions in Greece and abroad. Skilled in *Business Planning*, *Business Modeling*, *Analytical Skills*, and *Innovation Management* as well as procuring, organizing, and running international projects. She has worked as an expert for collaborative international projects for ten years addressing topics such as *a) increasing innovation capacity of SMEs, b) building entrepreneurial diversity and resilience,* and *c) developing policy recommendations for supporting entrepreneurial growth, d) teaching entrepreneurship and providing young people with skills and competences for advancing their entrepreneurial careers.*

Relevant past activities/publications

#	Title	Authors	Journal Conference, Vol., Issue, Date
1	Management of linked knowledge in industrial maintenance	P. Pistofidis, C. Emmanouilidis, A. Papadopoulos, P.N. Botsaris	International Journal of Industrial Management and Data Systems, Emerald, vol. 116, No. 8, pp.1741-1758, 2016.
2	The Impact of Gas Turbine Component Leakage Fault on GPA Performance Diagnostics	E.L. Ntantis, P.N. Botsaris	Journal of Engineering Science and Technology Review, vol. 9, No. 1, pp. 116-123, ISSN:1791-2377 (open access), 2016.
3	Sustainable energy action plans of medium-sized municipalities in north Greece	Botsaris P., Lymperopoulos K., Gaidajis G., Angelakoglou K.	Advances in Energy Research, Vol 3, No 1., 2015.
4	Carbon Footprint Analysis of Municipalities – Evidence from Greece	Botsaris P., Lymperopoulos K., Gaidajis G., Angelakoglou K.	Journal of Engineering Science and Technology Review 8 (4) 2015, 15-23.
5	Entrepreneurial path: decoupling the complexity of entrepreneurial process	Galanakis, K., Giourka, P.	International Journal of Entrepreneurial Behavior and Research (IJEBR), Vol 23, Issue 2., 2017.

Previous projects related to this proposal

#	Name	Short Description

1	ENERGEIA	"ENERGEIA" includes the development of a hybrid solar – geothermal park that produces thermal and electrical energy. The hybrid park utilized solar parabolic collectors and an ORC turbine. The solar energy operations in hybrisation with low enthalpy geothermal energy of 60oC in order to produce electricity (ORC) and heating for a nearby greenhouse and one school building.

Relevant infrastructure

DUTH owns important Renewable Energy Technology systems installed at student's residences in Kimmeria, Xanthi, that will utilised as demo site within RENAISSANCE project. The RES systems include, solar thermal park of 2000 m^2, biomass boiler of 1 MW, geothermal heat pumps of 275 kW, vertical axis wind turbine of 1 kW, autonomous PV system of 52 kW with batteries, absorption chiller of 316 kWc, as well as metering devices. All equipment has been procured within "REUNI" project funded by EEA Grants.

Third parties involved in the project (including use of third party resources)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	N
Does the participant envisage that part of its work is performed by linked third parties[15]	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[16] (Article 14a of the General Model Grant Agreement)?	N

[15] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

[16] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

4.1.9. CERTH
www.certh.gr

The **Centre for Research and Technology Hellas (CERTH,** www.certh.gr**)** is one of the largest research centres in Greece. It was founded in 2000 and is located in Thessaloniki, Greece. The mission of CERTH is to promote the triplet ***Research – Development – Innovation*** by conducting high quality scientific research and developing innovative products and services while building strong partnerships with industry (national and international) and strong collaborations with research centres and universities in Greece and abroad.

CERTH consists of five (5) Institutes and the Central Directorate and is governed by its Board of Directors. The five institutes are: ***Information Technologies Institute (ITI)***, Chemical Process & Energy Resources Institute (CPERI), *Hellenic Institute of Transport (HIT)*, Institute of Applied Biosciences (INAB), Institute for Research & Technology of Thessaly (IRETETH). CERTH is essentially a self-supported Research Centre generating an ***average annual turnover of ~ € 22 Million*** coming from: >30% from bilateral industrial research contracts, >60% from competitive research projects, and <10% as government institutional funding.

More than ***600 people work at CERTH*** with the majority being scientists. CERTH has participated successfully ***in more than 1,000 competitive research projects*** (with a total budget exceeding 423 M€ and ***involving more than 1,100 international partner organizations***) financed by the European Union (EU), leading industries from USA, Japan and Europe and the Greek Government. Four spin off companies have been already launched through CERTH research activities. CERTH is ***listed among the Top-20 Research Centres of the EU*** with the highest participation in FP7 competitive research grants for the period 2007-2012 (16th place, up from 18th in 2011). CERTH has received numerous awards and distinctions such as: the European Commissions' Descartes Prize (2006), the European Research Council (ERC) Advanced Grant (2010), the 1st Prize in the Microsoft International Contest (2010) and many more. Since 2003, CERTH has been appointed by the General Secretariat for Research and Technology (GSRT) as the coordinator of the Greek EURAXESS Network, a European initiative aiming at offering personalised assistance to mobile researchers.

In 2008, CERTH was among the first Greek research organisations to undersign and accept the principles of the Charter and Code for researchers while at the same time CERTH's representatives were members of the Greek delegation at the Steering Group for Human Resources and Mobility (SG HRM). Its latest achievement in the field of human resources is the ***"HR EXCELLENCE IN RESEARCH" logo awarded by the EC in April 2012*** as a proof that CERTH is committed to offer the best possible working conditions, regardless the socioeconomic environment, and at the same time work towards the realisation of the European Research Area (Innovation Union, Commitment #4). CERTH is involved in strong and long term collaborations with significant international partners. At this point it must be underlined that, **on behalf of CERTH**, three (3) different Institutes participate.

HR EXCELLENCE IN RESEARCH

Short Profile of Institute/Organization

The Information Technologies Institute (ITI - Web Site: www.iti.gr**)** was founded in 1998 as a non-profit organisation under the auspices of the General Secretariat for Research and Technology of Greece, with its head office located in Thessaloniki, Greece. Since 10.3.2000 it is a founding member of the CERTH also supervised by the General Secretariat for Research and Technology (GSRT). CERTH/ITI is one of the leading Institutions of Greece in the fields of Informatics, Telematics and Telecommunications, with long experience in numerous European and national R&D projects. It is active in a large number of research domains such as Energy Efficiency, Security and Surveillance, Image and Signal Processing, Computer & Cognitive Vision, Human Computer Interaction, Virtual and Augmented Reality, Machine Learning & Deep Learning, Multimedia, Visual and Data Analytics, Database and Information Systems and Social Media Analysis. Since its establishment, CERTH/ITI has participated in more than 175 research projects funded by the European Commission (IST FP5-FP6-FP7 & H2020) and more than 160 research projects funded by Greek National Research Programmes and Consulting Subcontracts with the Private Sector (I&T Industry). ITI currently has 300 employees including Scientific Personnel (Researchers, Collaborating faculty members, Postdoctoral Research Fellows, Postgraduate Research Fellows, and Research Assistants), Administrative and Technical Staff. In the last 10 years, the publication record of ITI includes 330 scientific publications in international journals, 680 publications in conferences and 100 books and book chapters. These works have been cited in more than 6500 times.

The **Chemical Process & Energy Resources Institute (CPERI)** was established in March 2012 by the merging of the Chemical Process Engineering Research Institute (CPERI) and the Institute for Solid Fuels Technology and Applications (ISFTA). The new Institute is a member of CERTH. CPERI contributes to the increased competitiveness of the Greek and European industry by providing unique and innovative solutions to research problems of technological and/or commercial interest. CPERI is classified among the Institutes of Excellence in Greece and employs a scientific staff of about 250 people, while its inflows is around to EUR 10 million €/year. In this light, the total budget of bioenergy and energy recovery projects by the utilisation of clean fuels is until now over 14 million €. Moreover, it holds the 16th position among the European Research Institutes (top 50 REC organisations) having signed grant agreements in FP7 in terms of counts of participations for the period 2007-2013.

The **Hellenic Institute of Transport (HIT)** (www.imet.gr) is the Greek National Institute for the promotion of Transport Research and Policy support. It focuses on applied research in all fields and modes of Transport, providing input for policy formulation, documentation of major trends and impacts, formulation of operational rules and procedures, improvement of the operation and management in the field of Transport.

Main tasks to be undertaken

The Chemical Process and Energy Resources Institute (CPERI), participating in relevant EU smart-grid projects, as those of inteGRIDy and SMILE, has a considerable know-how relevant to the development of transient Modelers of energy systems when these are interconnected on a micro-grid level, up to the level of DSO. The aim of CPERI is to develop and apply such tools (WP2) to enhance the better dimensioning/topology design of multiple type of RES and storage solutions, towards the best fitting of production and consumption profiles for all three main energy vectors (heating/cooling/electricity). In addition, such type of models allow the characterization of the micro-grid in an operation level, at least virtually, especially for the case that it interacts with the macro-grid (WP6); thus contributing in the definition of practises and decision-making of its basic configuration.

Information Technologies Institute (ITI) as a core technology provider will be involved in WP2, by contributing on the specification & design tasks to inform the overall implementation of the RENAISSANCE platform (RIP). In WP3 CERTH/ITI will be providing a basic Blockchain infrastructure along with a smart contract editor to facilitate the configuration of smart contracts that will be leveraging the RENAISSANCE platform and overall architecture in achieving the business model directives outline in the same work package. ITI as a coordinator of WP4 will be leading the development of some of the basic components of the RIP platform. It will transform smart metering devices to Fog Ready Devices (FRDs) and thus drive forward Machine-to-Machine interaction by bring intelligence to the edge. A Decision Support System (DSS) will be developed and implemented, incorporating forecasting intelligence, to analyse network data and take decisions in a fast, efficient and robust approach that will facilitate the optimisation of the energy portfolio. A fully-fledged Blockchain architecture will be implemented to support non-repudiation of data and decentralization of use in the RENAISSANCE demonstrated smart energy networks. In this context, Blockchain technology will provide an audit trail for energy network data, enabling both energy data traceability and secure access for stakeholders of the Fog Ready Devices, the Decision Support System and the Social Collaboration Platform The latter to be implemented and support consumer/prosumers engagement in the demonstration activities foreseen in WP5, while offering a playful and pleasant interactive environment. Within the purposes of WP4, ITI will also work together with other partners to implement and maintain the complete RENAISSANCE Information Platform (RIP) and render it an interoperable framework for future interaction with similar services/systems. Finally, all three CERTH Institutes will participate in the pilot integration processes (WP5) and assist in achieving scalable and replicable pilot results, through specific assessment and validation procedures (WP6). Finally, the three Institutes of CERTH will participate in the dissemination activities of the project in the context of WP7.

The Hellenic Institute of Transport (HIT), having participated in the past in the NOBEL project and as a follow-up, is involved in WP4 of RENAISSANCE project, delivering the end-user application. In the same context, it is also involved in the decision-making supporting tool of WP3 (in the context of smart contracts issue). In addition, it is delivering the Graphical UI that will be developed in WP2, allowing site owners to design a viable energy island and being linked to the multi-vector software.

The main motivation of CERTH in participating in RENAISSANCE projects, lies on the development, testing and validation of both simulation and real-time decision tools for the operation of the micro-grid, on the basis of actual worth making business models, which can add value for the benefit of all relevant stakeholders (prosumers, distributors, end-users). This set of tools is envisioned to be applied both for the specific Greek demo site, but also for any type of micro-grid operating in an islandic mode, in the EU territory; especially for the case of Greece, where there is a strong potential of replicability, as that of the many Greek islands.

Key personnel (incl. gender)

- **Dr. Dimitrios Tzovaras [M]** is the Director (and Senior Researcher Grade A') of the Information Technologies Institute. He received the Diploma in Electrical Engineering and the Ph.D. in 2D and 3D Image Compression from the Aristotle University of Thessaloniki, Greece in 1992 and 1997, respectively. Prior to his current position, he was a Senior Researcher on the Information Processing Laboratory at the Electrical and Computer Engineering Department of the Aristotle University of Thessaloniki. His main research interests include network and visual analytics for network security, computer security, data fusion, biometric security, virtual reality, machine learning and artificial intelligence. Dr. Tzovaras has conducted very important scientific and research work, which is summarized in 2 books, 114 publications in International Journals with Referees (of which 41 are IEEE papers), 37 book chapters, and 317 presentations in International Conferences with Referees. Dr. Tzovaras has also acted as a reviewer of a large number of submitted scientific papers for a plethora of International Journals and Magazines, such as IEEE, ACM, Elsevier and EURASIP, as well as International Scientific Conferences (ICIP, EUSIPCO, CVPR, etc.). Since 2004, he has been the Associate Editor in the following International journals: Journal of Applied Signal Processing (JASP) and Journal on Advances in Multimedia of EURASIP. He is also an Associate Editor in the IEEE Signal Processing Letters Journal (since 2009) and a Senior Associate Editor in the IEEE Signal Processing Letters journal (since 2012), while since mid 2012 he has been also an Associate Editor in the IEEE Transactions on Image Processing journal. During the period 2007-2009, he has been elected to participate in the group of National Representatives of Greece in the European Commission for the FP7 Programme of International Cooperation.
  Since 2000, Dr. Tzovaras has also been the Leader of the Research Group on Visual Analytics, Augmented and Virtual Reality at ITI. His group currently consists of 92 researchers (24 post-doc, 5 PhD students, 27 MSc holders, 32 research associates and 4 technical supporters). He has participated with his team in more than 80 Research and Development projects of ITI. He has a very large management record having been the project coordinator of the H2020 projects, SATISFACTORY, RAMCIP, myAirCoach, Scan4Reco, the FP7 ICT projects adapt4EE, INERTIA, I-SEARCH, ACCESSIBLE, ACTIBIO, NOTREMOR, MOVESMART the FP6 IST projects HUMABIO, Good Route, VICTORY, the technical manager of the FP7 IP VERITAS and the project manager of many national projects. He has also been the scientific and technical manager in more than 50 EU projects.

- **Dr. Dimosthenis Ioannidis [M]** a Senior Researcher Associate in CERTH/ITI. He received the Diploma degree in electrical and computer engineering and the MSc. in Advanced Communication Systems and Engineering from the Electrical and Computer Engineering department of the Aristotle University of Thessaloniki in 2000 and 2005 respectively. He has been a teaching assistant at TEI Thessaloniki (2006-2010). His main research interests include computer vision, stereoscopic image processing and signal analysis, linguistics algorithms, web services, semantics, visual analytics, energy efficiency, IoT platforms development, as well as research in ethics, biometrics and standardization. During the last five years, he has been the (co)author of more than 46 papers in refereed journals, edited books, and international conferences. He has served as a reviewer for several technical journals. He has also been involved in more than 10 research projects funded by the EC and the Greek secretariat of Research and Technology. During his involvement in these projects, he involved as a leader of several WPs, where he had the supervision of large team of developers and technical teams, where he acted in four of them as a Quality Manager of the project. He is also currently acting as an Ethics evaluator of running projects executed under the auspices of EC, providing services such as monitoring of research activities performed in projects in respect to assigned ethics requirements. Services are related to the assessment of the human participation in real-life trials, privacy enhancing technologies used for the protection of personal data as well as other ethics issues that shall be tackled within a project lifetime (i.e. dual use, misuse and personal sensitive data). He is also a member of the Technical Chamber of Greece.

- **Dr. Konstantinos Votis [M]** is a computer engineer and a senior researcher (Researcher Grade C') at Information Technologies Institute/Centre for Research and Technologies Hellas (CERTH/ITI) and Director of the Visual Analytics Laboratory of CERTH/ITI. He is also a visiting professor at the De-Montfort University in UK in the field of Human Computer Interaction, VR, AR. He received an MSc

and a Ph.D. degree in computer science and service oriented architectures from Computer Engineering and Informatics department, University of Patras, Greece. In addition, he holds an MBA from the Business School department in the University of Patras. His research interests include Human Computer Interaction, information Visualisation and management of big data, knowledge engineering and decision support systems, as well as pervasive computing, with major application areas such as m-Health, eHealth, and personalized healthcare. His PhD was in the domain of service Oriented Architecture and Information management systems in e-inclusion and healthcare. Since 2001, he has published more than 80 international scientific articles on eHealth, m-health, human-technology interaction visualisation (AR, VR, information visualisation with visual analytics), mobile and ambient technologies as well as human-centred design, etc

- **Dr. Stelios Krinidis [M]** is a postdoctoral researcher in CERTH/ITI. He received the Diploma degree and the Ph.D. degree in Computer Science from the Computer Science Department of the Aristotle University of Thessaloniki (AUTH), Thessaloniki, Greece, in 1999 and 2004 respectively. He has also served as an adjunct lecturer at the Aristotle University of Thessaloniki, the Democritus University of Thrace, and at the Technological Institute of Kavala during the period 2005-2012. He is currently working on H2020 projects, focusing on smart IoT devices, FoG computing and infrastructures, big data analysis & analytics, visual analytics, smart buildings, energy efficiency buildings, occupancy analysis and energy disaggregation. His main research interests include computational intelligence, computer vision, pattern recognition, signal processing and analysis, 2D and 3D image processing and analysis, occupancy detection, tracking and analysis, and visual analytics. He has authored more than sixty five (65) papers in international scientific peer review journals in international and national conferences. He has also been involved in thirteen (13) research projects funded by the EC and the Greek secretariat of Research and Technology.

- **Angelina Bintoudi [F]** is a Research Associate at CERTH/ITI and a PhD student. She received the diploma degree in Electrical and Computer Engineering, with specialization in electrical power engineering from the Aristotle University of Thessaloniki in 2013. Her diploma thesis concerned model circuits of the human body, during various occasions of accidental electrocution, the result of which was that current practices might lead to faulty grounding and protection systems. After graduation, Ms. Bintoudi worked in a multi-national aerospace company as a designer of power supplies for satellite applications. Since October 2015, she has been working on her PhD dissertation on the design of control systems for space-based DC microgrids. In parallel and since June 2017, she has been employed in CERTH/ITI as a research associate in the ERANETMED-funded project "3DMicrogrid", the objective of which is the design of a hybrid control system for three real-site microgrids in Mediterranean countries. Her main research interest include power electronics, distributed control systems, AC and DC microgrids, stand-alone power systems, multi-agent systems and RES/storage integration. She is also a member of the Technical Chamber of Greece.

- **Nikolaos Tsoniotis [M]** is a Senior Innovation & Product Manager, who holds a Master-of-Engineering in Electronic Engineering & Electronic Communication Eng. from the University of Hull. He has worked as a Telecommunications R&D Engineer for over a decade. He is a serial entrepreneur with Product & Business Development experience in the ICT and Energy sectors. His current focus lies in Innovation/Product Management and Research Commercialization. His interests include emerging technologies, namely A.I., Big Data and Blockchain, and how they can be applied in sectors such as Financial, Insurance, Energy and Health.

- **Anastasia Theodouli [F]** is a Cryptography Expert received her Diploma in Electrical and Computer Engineering, and her MSc. in Information Systems from Aristotle University of Thessaloniki in 2008 and 2011, respectively. Currently, she is working as a research assistant at CERTH / ITI with focus on Blockchain Technologies. More specifically, she is dealing with cryptographic algorithms on the Blockchain and secure Smart Contracts, Blockchain solutions and platforms evaluation, development of Smart Contracts for Ethereum custom applications, research on mobile Blockchain clients and applications of Blockchain to the Healthcare domain. In her area of specialisation are also Cryptography, Big Data Analytics and Web Accessibility.

- **Mr. Ioannis Moschos [M]** is a Research Associate at CERTH/ITI. He received his Diploma degree in Electrical and Computer Engineering from the Polytechnic Faculty of Democritus University of Thrace, in Greece, in 2010. He also holds the MSc. in Smart Electrical Networks and Systems from the Royal Institute of Technology in Stockholm, Sweden, and the MSc. In Intelligent Systems and Control for Smart Grids and Electricity Market, from the Karlsruhe Institute of Technology in Germany, since 2014. His main research interests include power system economics, distributed energy resources' management, electricity markets' frameworks, energy efficiency and demand response programs design. During the last three years, he has been the (co)author of 5 papers in refereed journals and international conferences. In the past, he has been involved in research activities regarding the PREEMPTIVE FP7 project, dealing with cyber threats on electricity, gas and water industrial processes. In this project, he contributed in the design of a simulation environment that models cyber attacks in electricity networks. Moreover, he participated in IDE4L FP7 project, where he developed demand response optimization algorithms from an Aggregator's perspective. He is currently involved in the GreenSoul FP7 project, which aims in boosting users' ecoawareness by utilizing a novel ICT platform. Finally, Mr. Moschos is also a member of the Technical Chamber of Greece and a member of KIC Innoenergy.

- **Christina Tsita [F]** is a Research Assistant at CERTH/ITI. She graduated from Early Childhood Education Department of Aristotle University of Thessaloniki in 2012 and received her M.Sc in Cultural Informatics & Communication/Museology from University of the Aegean in 2014. Her activities include 3D graphics & animation production for education and culture. She is active in the field of fine arts where she has received international award - Fine Art Prize, International Art Exchange Exhibition, Kobe, Japan, 2015. Since 2016 she is a research assistant in CERTH/ITI, Visual Analytics, Virtual & Augmented Reality Lab. She is involved in serious games for cultural heritage, virtual & augmented reality and visual analytics graphical representation techniques.

- **Dr. Evangelos Bekiaris [M] - Director at CERTH/HIT.** He is Mechanical Engineer of the National Technical University of Athens and he is the Director at the Hellenic Institute of Transport. His field of expertise ranges from road safety, clean vehicles issues and smart grid applications to specialized telematics applications for private vehicles and public transportation. He has participated in over 100 research projects, in 35 of which with the Management/ Coordination role and is currently ***National Representative for the H2020 "Smart, Green and Integrated Transport" Programme Committee,*** since February 2014. He has served as President of the European Association HUMANIST-European Centre of Excellence in Human Machine Interaction (HMI) in Transport from November 2012 until November 2015, as well as President of the Forum of European Road Safety Research Institutes (FERSI) from 2008 until 2011. He is the board member of the Hellenic Researchers Union, since 2012. He has over 250 publications in peer-reviewed journals and conference presentations.

- **Kalogirou Kostas [M]** has a BSc in Software Engineer, and MSc in Digital Signal Processing at Communication Systems. He is specialised in designing and developing software applications in many programming languages (C, C++, C#, Java, Web standards) in many fields such as smart phone devices, vehicle area, wireless communications, home automation and distributed systems. He has participated in many European research and industrial projects such as AIDE, IN-SAFETY, SENSATION, PROLOGUE, TeleFOT, 2BESAFE, ASK-IT, OASIS, SAFERIDER, REMOTE, SAFEWAY2SCHOOL, NOBEL, AEGIS, SAVEME and CLOUD4ALL. He was the senior developer of NOBEL Brokerage Front end web application (http://www.nobel-baf.eu) and Android energy management application which is available from Google play at https://play.google.com/store/apps/details?id=com.certh.nobel.androidOffline. He has more than 30 research publications in conferences and journals, 2 participations in books and 1 patent (reference number: **1008064**) with title "METHOD OF TRANSFERRING MESSAGES REGARDING THE CURRENT STATE OF THE GRAPHICAL ENVIRONMENT OF A SOFTWARE APPLICATION ON TERMINALS" in the Industrial Property Organization (http://www.obi.gr/obi/Portals/0/ImagesAndFiles/Files/EDBI/2014/A/EDBI_A_2014_03.pdf, page 220).

- **Dimitris Margaritis [M]** has BSc in Automotive Eng, MSc in Environment Protection, and is a graduate of the Pedagogical and Technological Education institute. He is also PhD on air quality and Dipl.-Ing. Mechanical Engineer candidate, both at AUTh. He is a Research Associate primarily in the area of Traffic Safety and Transport Greening. From 1999-2006 he worked at TNO Automotive in The Netherlands and since 2006 he works at CERTH/HIT. He has been involved in more than 40 national (Greek and Dutch) and EU research projects. He has authored and co-authored about 45 journal and refereed conference articles. He joins relevant to energy and environment networks such as EGVIA, EEA and HELIEV (a member of AVERE).

- **Pavlos Spanidis [M]** has a BSc in Software and Telecommunications Engineering and an MSc in IT and Data Communications. He is specialised in design and development of software applications in programming languages such C++, Java, PHP in different fields like android smart phones, vehicle simulators, accessible web applications, server installation and maintenance. He has participated in EU projects like ASK-IT, IN-SAFETY, OASIS, AEGIS, FOTSIS, SAFERIDER, 2BESAFE, SOLUTIONS, etc. He has developed a web application on transport and energy related EU project (NOBEL) and he reformed the conventional car simulator of HIT to electric car simulator. He has 10 research publications in conferences and journals and 1 participation in book.

- **Dr. Panagiotis Grammelis [M]** is is Director of Research at the Chemical Process and Energy Resources Institute of CERTH (CERTH/CPERI). During the last decade, he has participated as a Scientific Responsible in 93 research projects funded by the EU and other national and international industries (total budget exceeds 13,3mi. €). The scope of his research is the exploitation of solid fuels, i.e. biomass/waste and coal, with emphasis on the thermochemical conversion technologies. Since May 2011, Dr Grammelis is Director of the Laboratory of Alternative Fuels & Technologies, member of CPERI's Scientific Council and guides a team of 25 researchers. He is Steering Committee member of the Biomass Panel in the RHC-ETP (responsible for industrial boilers and district heating), national expert for the standardisation of solid biofuels in CEN/TC 335/WG 2 and member of DHC+ (District Heating & Cooling) Platform. Member of the Editorial Board in IJER and IJGW and the Scientific Committees of international conferences (EUBCE, GCGW, WSED). He is co-author in three hundred thirty papers in scientific journals, international conferences, workshops and books, with 1889 citations and h-Index 25 according to Scopus.

- **Dr. Nikolaos Nikolopoulos [M]** is appointed as Senior Researcher at CERTH since 2012. In the last decade, he has participated as researcher or scientific responsible, in more than 22 research projects and engineering studies for the exploitation of energy sources in the power sector. He was a Marie-Curie Fellow (IEF) in CITY University of London and has a long-term expertise in the CFD and process modelling of energy systems. 103 papers in scientific journals, international conferences, workshops and seminars and more than 1050 citations (h-index=18) (according to Scopus). Supervisor of 4 PhDs.

- **Dr. Konstantinos Atsonios [M]** is a PhD Mechanical Engineer from the National Technical University of Athens (NTUA) and he is a Research associate at CERTH/CPERI since 2010. Expert in advanced energy systems and processes, mainly related to low carbon emissions. Having participating in several national and European funded projects, he has experience in process modeling and performing thermodynamic calculations on various industrial processes and advanced energy systems such as thermal plants, energy storage concepts, biorefineries, etc. Over 40 papers in scientific journals, international conferences, workshops and seminars and 330 citations (h-index=11 according to Scopus).

- **Mr. Spiros Chapaloglou [M]** is a Research Associate at CERTH/CPERI. He received his Diploma degree in Mechanical Engineering from the Mechanical Engineering Department of the National Technical University of Athens (NTUA), Athens, Greece in 2016. His diploma thesis concentrated on numerical and experimental investigation of the thermal behavior and flow characteristics of a plate heat exchanger implemented in Fluent CFD code. He is currently completing his Msc Thesis in Automation Systems of the Mechanical Engineering Department in NTUA. His main interests include Smart Grids, Machine Learning, Power Electronics and Optimal/Robust control system design.

Relevant past activities/publications (ITI)

#	Title	Authors	Journal Conference, Vol., Issue, Date
1	Using Blockchains to strengthen the security of Internet of Things	C. S. Kouzinopoulos. G. Spathoulas, K. M. Giannoutakis, K. Votis, P. Pandey, D. Tzovaras, K. Katsikas	CyberSecurity Workshop 26 January 2018
2	Occupancy Driven Facility Management and Building Performance Analysis	D. Ioannidis, S. Zikos, S. Krinidis, A. Tryferidis, D. Tzovaras, S. Likothanassis	WIT International Journal of Sustainable Development and Planning, Vol. 12, No. 7, pp. 1155-1167, 2017
3	Enabling New Tehnologies for Demand Response Decentralized Validation using Blockchain	Tudor Cioara, et.all	IEEE 18th International Conference on Environment and Electrical Engineering, 2018 (accepted for publication)
4	Novel Hybrid Design for Microgrid Control	Bintoudi, L. Zyglakis, T. Apostolos, D. Ioannidis, S. Al-Agtash, J. Martinez-Ramos, A. Onen, B. Azzopardi, L. Hadjidemetriou, N. Martensen, C. Demoulias, D. Tzovaras	2017 IEEE PES Asia-Pacific Power and Energy Engineering Conference (APPEEC), India
5	Framework for the Integration of Active Tertiary Prosumers into a Smart Distribution Grid	J. Jimeno, N. Ruiz, K. Tsatsakis, A. Tryferidis, D. Tzovaras	PowerEng Conference, 2015, Riga, Latvia.

Relevant past activities/publications (HIT)

#	Title	Authors	Journal Conference, Vol., Issue, Date
1	Evaluation of an Agent based Monitoring and Brokerage System for Neighbourhood Electricity Usage Optimization	Bekiaris, E., Prentza, L.	Journal of Energy and Power Engineering, Vol.7, No 10, pp. 1915-1921, ISSN: 1934-8975 (Print), ISSN: 1934-8983 (Online).
2	Energy Management web application: Brokerage Agent Front End application	Evangelos Bekiaris, Christos Petsos and Kostas Kalogirou	2012 International Conference on Power and Energy Systems (ICPES 2012), Hong Kong, April 12-13, 2012
3	Android Application Front-end for an Energy Brokerage Agent	Petsos, C., Kalogirou, K., Bekiaris, E.	2014 International Conference on Power Systems, Energy, Environment (PSEE '14)-Joint program, Interlaken, Switzerland, February 22-24, 2014.
4	Energy Footprint of the Transport Sector in Greece and Future Perspectives for Green Energy Use	Giannopoulos, G., Margaritis D., Tromaras A.	Conference entitled Energy and Transport in Greece: Requirements and countermeasures for clean and sustainable energy resources in transport, Academy of Athens, Athens, October 2016.

Relevant past activities/publications (CPERI)

#	Title	Authors	Journal Conference, Vol., Issue, Date
1	Modelling and simulation of a predictive BESS controller based on load forecasting in a South European island power system.	S. Chapaloglou, A. Nesiadis, K. Atsonios, N. Nikolopoulos, Panagiotis Grammelis, Emmanuel Kakaras.	Proceedings of ECOS. Guimaraes, Portugal 2018.
2	Power to Fuel Concept: Process Analysis and Economic Evaluation	D.S. Kourkoumpas, E. Papadimou, K. Atsonios, S. Karellas, P.Grammelis, E. Kakaras.	Proceedings of ECOS 2015-The 28th International Conference on Efficiency, Cost, Optimization, Simulation

			and Environmental Impact of Energy Systems. June 30-July 3, 2015, Pau, France.
3	AMADEUS: Next Generation Materials and Solid State Devices for Ultra High Temperature Energy Storage and Conversion.	A. Datas, A. B. Cristobal, C. del Cañizo, N. Nikolopoulos, A. Nikolopoulos, M. Zeneli, N. Sobczak, W. Polkowski, M. Tangstad, J. Safarian, D. Trucchi, A. Bellucci, M. Girolami, R. Marx, D. Bestenlehner, S. Lang , A. Vitulano, G. Sabbatella, and A. Martí.	26-29 September 2017, Santiago de Chile.
4	Silicon Storage of Concentrated Solar Power with Integrated Thermophotovoltaic Energy Conversion.	A. Datas, M. Zeneli, C. del Cañizo, I. Malgarinos, A. Nikolopoulos, N. Nikolopoulos, S. Karellas, A. Martí Molten.	SolarPACES, 26-29 September 2017, Santiago de Chile.

Previous projects related to this proposal (ITI)

#	Name	Short Description
1	DELTA	DELTA proposes a DR management platform that distributes parts of the Aggregator's intelligence into lower layers of a novel architecture, based on VPP principles, in order to establish a more easily manageable & computationally efficient DR solution, ultimately aiming to introduce scalability & adaptiveness into the Aggregator's DR toolkits; the DELTA engine will be able to adopt & integrate multiple strategies & policies provided from its energy market stakeholders, making it authentically modular & future-proof.
2	eDREAM	eDREAM will develop and make available a novel near real time DR scalable secure blockchain-driven technological and business framework aimed to optimize aggregated system services flexibility provisioning to DSOs.
3	inteGRIDy	inteGRIDy aims to integrate cutting-edge technologies, solutions and mechanisms in a scalable Cross-Functional Platform connecting energy networks with diverse stakeholders, facilitating optimal and dynamic operation of the Distribution Grid (DG), fostering the stability and coordination of distributed energy resources and enabling collaborative storage schemes within an increasing share of renewables.
4	3DMicroGrid	3DMicroGrid facilitates the design, development and demonstration of a future-proof active smart micro-grid system to integrate and optimize multiple small to medium sized energy sources and loads. The overarching objective is to capitalize on the availability of local and large renewable energy resources and adapting them for solutions to sustainability in terms of electric power demand and supply. A demo smart micro-grid system will be built integrating all energy components, in an effort to (i) maximize renewable energy utilization, (ii) reduce the carbon footprint by minimizing consumption, (iii) improve the power quality while ensuring economic feasibility, and (iv) replicate similar setups to institutions and commercial and rural sites.
5	INERTIA	INERTIA introduced the Internet of Things/Services principles to the Distribution Grid Control and DSM Operations. It provided an overlay network for coordination and active grid control, running on top of the existing grid and consisting of distributed and autonomous intelligent Commercial Prosumer Hubs. This way, it addressed the present "structural inertia" of DG by introducing more active elements combined with the necessary control and distributed coordination mechanisms.

Previous projects related to this proposal (HIT)

#	Name	Short Description
1	KRIPIS	The project objective is the practical approach of the "holistic energy chain" research and implementation processes of production and distribution of "clean" raw materials and energy, through the implementation of selected pilot plants and their uses in a realistic environment. In this context, the project will apply methods for saving energy in buildings ("smart buildings") and transport (use of efficient and clean engines, use of electric cars, motorcycles and bicycles), with emphasis on both cases in interfacing with advanced/realistic management and routing algorithms.

2	NOBEL	NOBEL European research project developed an energy brokerage system with which individual energy consumers can communicate their energy needs directly with both large-scale and small-scale energy producers, thereby making energy use more efficient.

Previous projects related to this proposal (CPERI)

#	Name	Short Description
1	SMILE	In order to facilitate the transition, the Smart Islands Energy Systems (SMILE) project will implement three large-scale pilot projects in different regions of Europe with similar topographic characteristics but different policies, regulations and energy markets. The objective is to test solutions while establishing mutual learning processes and providing best practice guidance for replication in other regions. The three pilots will test different combinations of technological solutions according to local specificities and conditions and the existing infrastructure. It will also involve all value chain actors needed to efficiently implement projects system-wide. Moreover, crosscutting activities among the pilots will be devoted to solve common technical, organizational, legal, regulatory and market-related issues as well as to evaluate the solutions from the economic and business points of view.
2	RES Actions towards Development of Local Community of Grevena	The overall objectives of the proposed action include the increase of share of RES and at the same time the reduction of Greenhouse gases emissions at the boundaries of the "Community". The above will be achieved through a series of integrated actions that include RES actions in the buildings and the facilities of the "Community", while the local society awareness is achieved through the familiarity of the residents with practices of sustainable development and the improvement of their life quality.

Third parties involved in the project (including use of third party resources)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	N
Does the participant envisage that part of its work is performed by linked third parties[17]	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[18] (Article 14a of the General Model Grant Agreement)?	N

[17] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

[18] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

4.1.10. SDM-Projects (SDM)
www.groupsdm.com

SDM-Projects is responsible for the delivery and installation of electromechanical assembly projects at the final client's premises. Repairs and revamps are part of our expertise.

Our experts are at our clients' disposal to help translate their requirements into workable solutions: we will assist the client and the design team with developing concepts and implementation of medium-tension applications, emergency generators, UPS systems, cogeneration and renewable energy sources. Similarly, the same goes for power distribution at a client's site, guaranteeing business continuity and economic returns. All PLC and SCADA software is developed in-house by a team of 7 qualified engineers.

Our engineers can rely on thorough E-plan experience and will produce one- or multiwire schemes, technical specifications, lay-outs, detailed material and cable lists. The communicative cooperation between designer, programmer, engineer and board-assembler ensured that each delivered board is fully compliant with every safety measure. All designs and drawings are submitted to the client for prior approval. The client is also provided with a As-Built file following assembly and installation so as to have the most recent version at hand. Unambiguous and open communication is our motto.

Main tasks to be undertaken

SDM-Projects, will work together with the Brussels Health Campus containing the university Hospital and part of the Vrije Universiteit Brussel (VUB- UZ) on the Project RENAISSANCE.

SDM will collaborate in the whole WP5- Demo sites operation, integration and validation. SDM will together with the VUB develop and introduce the scenarios in the controllers of the Priva Building Management System. In addition, the demo site will take into account the *extension of the renewables* and storage (PV, ICE, Borehole, Batteries) in this context, and study and implement the use of additional storage in terms of curtailment mitigation. SDM-Projects will collaborate in carrying out this taks, based on the multi-vector design tool developed in WP2.

RENAISSANCE will study the potential of R1 trading with the local DSO in Brussels (Sibelga) and the potential ROI and the potential implementation of an innovative Universal Power Device (UPD) developed by SDM projects, serving to control a complex hybrid power production plan. (Potential savings of R1 trading are currently estimated 14%).

Key personnel (incl. gender)

- **Mr. Bavo De Man [M]** is the General Manager (and owner) of the SDM-Group since 2000. He leads the whole SDM-Group (SDM-Engineering, SDM-Projects, SDM-Technics, SDM-Elektro & SDM-International). He support the whole team where needed. Together with our technical director, he ensures the sale of large projects nationally and internationally for SDM-Projects and SDM-International.

- **Mr. Tom Erkens [M]** is the Technical Director of SDM-Projects. He supports the whole engineering team of SDM-Projects. If the engineers has a technical problem on site, then they can count on him for technical assistant. He takes technical decisions where needed. He goes regular on a customer visit and searches with them for the best solution for their installation. He helps the General Manager with the sale of large projects.

- **Mrs. Ellen Vanderdood [F]** is the office manager of the SDM-Group. She has been working for SDM since 2007. She started at SDM as receptionist. After a few months she was able to handle quotations,

orders, etc. even handle some technical questions. In 2009 she become office manager and supports the engineering team in terms of planning of interventions, ensure that all material is present to go on site, technical search work, make arrangements with customers. She is also the secretary of our Technical Director who leads our entire engineering team. She is also manager of the accounting department of the SDM-Group and handle all the administration files that come in for SDM like for example Horizon 2020.

Relevant past activities/publications

#	Activity	Description
1	Publication	Smart Energy management for Microgrid case
2	Service	Implementation & Development intelligent load controle systeme
3	Product	Deif Advanced power management assistant
4	Product & service	Programing of: • the power generation who is controlled by a DEIF systems • the swichboards and controllers for load-balancing and emergency scenario's in the HV Grid which are controlled by Siemens software VUB and SDM-Projects will develop and introduce the scenario's in the controllers of the PRIVA Building Management System in collaboration. The VUB and SDM-Projects will also carry out a study. The project will study the impact of extension of the storage capacity on the possibility of trading with the local DSO in Brussels (Sibelga) and the potential ROI.

Previous projects related to this proposal

#	Name	Short Description
1	AZ Zeno Campus Knokke-Heist	2* diesel engines: emergency power
2	Gasthuisberg Leuven	4* diesel engines: emergency power
3	Brussels Airport Zaventem	7*diesel engines: emergency power
4	Congo - Brasserie de Beni	Emergency power plant
5	Djibouti	4* Cummins 2600kVA Production plant of Tadjourah

Third parties involved in the project (including use of third party resources)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	N
Does the participant envisage that part of its work is performed by linked third parties[19]	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[20] (Article 14a of the General Model Grant Agreement)?	N

[19] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

[20] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

4.1.11. BAX&CO

www. baxcompany.com

Bax & Company(BAX) is a specialized consultancy firm dedicated to defining and facilitating Open Innovation strategies for large industrial corporations as well as smaller high-tech companies, research institutes and governments. For more than 20 years BAX has supported its clients in defining their R&D and Business Creation strategies. In addition, Bax & Company has substantial experience in strategic analysis of business opportunities that can be addressed through the co- operation of various stakeholders, and in the design of products & services that can be offered within such business opportunities. and consumer preferences into attractive product and service offerings. BAX has over 20 years experience in setting up and managing collaborative R&D projects, in most cases within the respective Framework Programmes. Its team consists of some 30 people; annual turnover is between 1,5 and 2 million euros.
One of the main areas of expertise of BAX is that of sustainable building, energy efficiency, energy project financing and city planning. BAX is widely experienced in EU collaborative projects in the field of the energy efficiency in residential housing sector, energy systems and smart cities.

Main tasks to be undertaken

Bax&Company will lead the exploitation activities (WP7.6) of the RENAISSANCE project by setting up a series of international events to showcase the RENAISSANCE methodology and key results. Additionally, BAX will assess the impact of RENAISSANCE approach on project demonstrators and on the wider energy system, providing a document to inform the professional audience. Bax will work with main partners to define individual exploitation plans of technologies with the highest potential for triggering the creation of energy communities.

BAX will carry out the European landscape regulatory analysis to identify main barriers hindering the implementation of multi-energy local energy systems (WP6.2). In addition, BAX will support VUB in characterising and mapping the local pilots' business ecosystem for the definition of the suitable local business models (WP3.1). BAX will also support ABB in the evaluation of the KPIs enabling improved performance.

Additional contribution from BAX will be provided to partners for the communication activities reaching out to relevant professional networks (WP7) and for the management of the project (WP1).

Key personnel (incl. gender)

- **Rolf Bastiaanssen [M]** is managing partner at BAX. He graduated as MSc in Business Administration from the Rotterdam School of Management with specialization in stakeholder management and interest representation. He has been involved in creating and leading international collaborative R&D projects and in business planning for start-ups and industry. His fields of experience include energy efficiency, smart grids and construction.

- **Maarja Meitern [F]** is a consultant at Bax & Company and a PhD candidate at Universitat Oberta de Catalunya researching on the topic of smart city connection to policy and regulations. She has graduated Public Policy Studies at Maastricht University. She has also worked as a research assistant at the Barcelona Supercomputing Center on topics related to EU's innovation and digital policy, in the field of cybersecurity and ethics & algorithms. Her field of expertise is energy efficiency, smart energy systems and public policy.

- **Giulia Rinaldi [F]** is a consultant at Bax & Company. Before joining BAX, she worked as research engineer at the R&D UK Centre of EDF Energy developing projects about smart energy applications and future energy systems integration. She has graduated as MSc in Energy Enginering at Politecnico di Torino. Her field of expertise are renewable energies, smart energy systems and energy efficiency.

Relevant past activities/publications

#	Title	Authors	Journal Conference, Vol., Issue, Date
1	Energy refurbishment for sustainable social, public and cooperative housing.	Bastiaanssen R., Zietara P., Taylor S., Dijol J.	BEEM-UP Project. 2014. http://www.powerhouseeurope.eu/
2	Building energy Efficiency for Massive Market Uptake	Bastiaanssen R., Zietara P., Quistgaard, L.	BEEM-UP Project Publication. 2013. www.Beem-up.eu
3	Long-term renovation strategies for housing providers: 4 international case studies.	Meitern M.	International Passive House Conference. 2018
4	Cybersecurity White Paper	Meitern M., Gagliardi F., Hankin C., McGettrick A., Gal-Ezer J.	Association for Computing Machinery, Europe Policy Committee. 2017 www.acm.org

Previous projects related to this proposal

#	Name	Short Description	
1	DREEAM	Demonstrating an integrated Renovation approach for Energy Efficiency At the Multi-building scale	www.dreeam.eu
2	Build-up	The European Portal For Energy Efficiency In Buildings	http://www.buildup.eu/
3	TABULA	National Building Typologies	http://episcope.eu/building-typology/
4	Umbrella	Business Model Innovation for High Performance Buildings Supported by Whole Life Optimisation	http://www.umbrella- project.eu/
5	MaTriD	Market Transformation Towards Nearly Zero Energy Buildings Through Widespread Use of Integrated Energy Design	http://www.integrateddesign. eu
6	North Pass	Promotion of the Very Low Energy House Concept to the North European Building Market	www.northpass.eu

Relevant information

B&C is active member of EIRMA; the European Industrial Research Management Association which brings together senior managers from most of the leading research-intensive large industries in Europe like ABB, Siemens, Intel, Microsoft, IBM, Telefonica, BASF, etc.

Third parties involved in the project (including use of third party resources)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	N

Does the participant envisage that part of its work is performed by linked third parties[21]	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[22] (Article 14a of the General Model Grant Agreement)?	N

[21] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

[22] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

4.1.12. ABB

www.abb.com

ABB is a pioneering technology leader in electrification products, robotics and motion, industrial automation and power grids, serving customers in utilities, industry and transport & infrastructure globally. Continuing a history of innovation spanning more than 130 years, ABB today is writing the future of industrial digitalization with two clear value propositions: bringing electricity from any power plant to any plug and automating industries from natural resources to finished products. ABB operates in more than 100 countries with about 135,000 employees. ABB's success has been driven particularly by a strong focus on research and development. ABB has seven global R&D centers located in Sweden, Germany, Poland, Switzerland, India, USA and China.

ABB has unmatched expertise in designing and building off-grid and grid-connected microgrids. These are small-scale power grids that integrate multiple distributed generation sources including conventional diesel and gas, and/or renewables and even combined heat and power (CHP), together with energy storage. ABB's portfolio encompasses the full range of enabling technologies including conventional and renewable power generation, automation, grid stabilization, grid connection, battery energy storage and intelligent control technology, as well as consulting and services to enable microgrids globally. The microgrid solutions ensure power supply resilience, power quality, sustainability and cost-effectiveness in a broad range of applications and provide the overall control to coordinate generation resources to meet the requirements of industrial, residential or consumer loads.

ABB is a European leader with respect in the following domains directly related to the objectives of the RENAISSANCE project: power generation, distribution, transmission and storage, wind and solar power, electric vehicle charging infrastructure, and power electronics. In Europe, the BENELUX has a high interest in developing smart and microgrid systems, where the use of renewable energies are maximized. ABB BENELUX is a key contributing member of ABB's smart cities and microgrid programs.

A Competence Center for Smart Grid and Microgrids is being formed in ABB Belgium and it will be a strong and key partner in the RENAISSANCE project, and form the link to the rest of the ABB organisation.

Committed to innovation

As part of our commitment to technological prowess and innovation, ABB invests heavily in university collaborations, as reflected by our existing partnerships with more than 70 universities worldwide, to develop long-term disruptive technologies as well as mid- to short-term evolutionary innovations for our existing products and services.

Innovation is ABB's lifeblood, where we are constantly striving to find new ways to make our customers more competitive and minimize environmental impact. That is why we work with the very best academic talent in a wide range of disciplines, such as materials science, software, power electronics and electromagnetics, to name but a few.

Main tasks to be undertaken

Due to its leading ABB will be leading WP2 regarding local decarbonised and energy system design. In addition, in WP3, ABB will also contribute in the validation of business cases. Concercing WP5, ABB will help in both, the implementation plan (T5.2) and the implementation, operation and monitoring of RENAISSANCE approach in the demo sites (T5.3). Inside WP6, ABB will actively collaborate in the regulatory barrier analysis, benchmarking, validation and community to community trading activities.

Key personnel (incl. gender)

- **Luc Picard [M]** joined ABB in 2000 and is today the Benelux Business development manager Mobility and Energy. Luc is engaged in several development projects on smart grids and smart communities. Luc takes a leading role in sector organisations such as Agoria and Flux50 and cooperates with diverse actors to boost implementation of demonstration projects and living labs. Luc Picard is working closely together with DSOs, Utility companies planning smart grid uptake but also with cities, local authorities in a smart city context. Luc has been a coordinator for a local feasibility study around Local energy communities. This study will be used as a base for the further implementation of real LEC into the Belgium energy landscape.

- **Simon Round [M]** received his PhD in Electrical and Electronic Engineering from the University of Canterbury, New Zealand in 1993. He has over 20 years of experience in the digital control of power electronic systems, both as an academic and working in industry. Since 2008 he has worked for ABB Switzerland as a Control Technology Manager and, most recently, as the Technology Manager for ABB's Microgrid Program. Previously, he was a Professor at the University of Canterbury in New Zealand for 9 years, and was with ETH Zurich as a Senior Researcher. Dr Round has published over 100 journal and conference papers, ranging from active harmonic filters to microgrids.

- **Peter Van-Den-Heede [M]** joined ABB as Sales Manager for Building Automation in 2007 and shortly after, he was appointed General Manager for the Low Voltage product division in Belux. Since 2011, he has managed all smart-grid related activities in the Benelux, in addition to his LBU role. He started his new role as Marketing and Business Development Manager, Smart Grids for the CEU Region in 2014. In 2015 he set up a European Smart Grid cluster inside ABB. Peter is member of the board of Flux50. Currently also the president of the Agoria Smart City committee in Belgium and board member of USEF in The Netherlands. Peter was voted on of the 40 most influential people in European Smart grid by Metering & Smart Energy international in 2015. Since 2016 Peter became leader of the account and segment teams as Country Head of Sales in the Benelux. He is also connected to ABB's Micro grid team as local expert.

Relevant past activities/publications

#	Title	Authors	Journal Conference, Vol., Issue, Date
1	Decentralized control of a microgrid	A. Tuckey, S. Zabihi and S. Round	19th European Conference on Power Electronics and Applications (EPE'17 ECCE Europe), Warsaw, 2017

Previous projects related to this proposal

#	Name	Short Description
1	Red Cross	Supply, installation and commissioning supervision of a microgrid system at the Red Cross Logistics Center, Nairobi, Kenya. The aim was to provide a reliable and stable power supply despite outages and power quality issues, and to reduced fuel costs and carbon footprint. The project consisted of a battery ESS, Microgrid Plus Control System, Solar PV and a Diesel generator.
2	Longmeadow	750kW PV and diesel microgrid with 1MW battery energy storage system to maximize solar contribution and ensure security of power supply at an industrial plant in Johannesburg, South Africa

3	Ausnet	Implementation of the first Embedded Generation system with Battery Grid Energy Storage for distribution network support in Australia. The system manages peak demand through active and reactive power support, and transitions into isolated/off-grid operation without supply interruption.
4	Kodiak Island, USA	Provide frequency regulation for an island grid by managing the intermittencies from a 9 MW wind farm via flywheel and battery energy storage systems. The project results in reduced reliance on diesel generators.
5	Thornton Science Park	Deploying a state-of-the-art microgrid control system for the new Energy Centre at the Thornton Science Park in Cheshire, UK. The controller enables the integration and optimum deployment of multiple energy sources and storage units connected to the same local power network. It has the capability to connect/disconnect seamlessly from the main grid and operate in an islanded mode, thus ensuring continuity of supply in case of an outage.

Relevant infrastructure, relevant information

ABB is leader in the field of Battery Energy Storage Systems (ESS), they provide high technology solutions in a wide range of power and for multiple industrial applications. The power range of the ESS solutions they provide from 20kW until 2.5MW. In addition they offer different communication possibilities, like CAN or Modbus TCP/RTU, being flexible and modular. The ESS can be implemented in several industrial applications like Smart Grids, using them as islanding mode, black starts, peak shaving, virtual generators and even making possible the introduction of renewable energies. On top of this, the novel solutions from ABB so also provide support to the networks, by regulating the voltage and frequency. With all this high technology solutions, ABB ensures power quality, making possible the voltage balancing solutions in a neighbourhood, generating reactive power and mitigating harmonics.

Apart from ESS solutions, ABB is expert in providing software tools adapted to the requirements and needs to any application. That is the case of MESA (Multi Energy Site Analysis). This software tool defines the energy system which is most suited for a given specific case. It use as input, the real load and generation profiles, used components and subsystems, locations and most updated technologies. With all this data, the tool is capable of giving:

- A conceptual system design, considering type and size of components, locations and connections.
- The most suitable operation strategy that should be followed, describing when and how each component needs to be used
- Best fitting optimized component design.

Third parties involved in the project (including use of third party resources)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	N
Does the participant envisage that part of its work is performed by linked third parties[23]	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[24] (Article 14a of the General Model Grant Agreement)?	N

[23] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

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4.1.13. SUNAMP

www.sunamp.com

Sunamp

Sunamp was founded to respond to the need for low to zero-carbon heating, cooling and hot water systems in domestic and commercial settings. Sunamp develops, manufactures, and distributes a novel, high-efficiency heat energy storage and processing technology: the Heat Battery. This is a packaged store of heat energy which internally uses Phase Change Material to store four to sixteen times more heat than an equal sized hot water tank. During a 'phase change', such as a transition from liquid to solid, a lot of heat is stored or released.

Sunamp has perfected the mechanical design that makes a Heat Battery long-lived and easy to integrate: stackable like Lego bricks and easy to connect into heating systems. Heat Batteries are integrated with various energy sources, e.g. solar PV and thermal panels, micro combined heat and power units, and heat pumps. This delivers extremely efficient systems for recovering waste heat and generating renewable heat.

The concept is now being explored in sectors as diverse as heating buildings at lower cost, industrial processing and automotive design.
Sunamp's ultimate goals is deployment of its technology in innovative products that reduce fuel poverty, reduce energy consumption, and reduce carbon intensity of heating systems by harnessing free or low-cost renewable heat.

Main tasks to be undertaken

Sunamp will be a technology provider, as its Heat Batteries will be used in the pilot plants to ensure optimal performance of the heating and cooling systems. Sunamp will be involved in the sizing and design of each technology, integration with other technologies, installation and monitoring of the thermal stores, concretely inside WP5.

Key personnel (incl. gender)

- **Maurizio Zaglio [M]** – International Business Development Manager, former Mechanical and Chemical Engineer at Sunamp. Maurizio is a Chemical Enginerr with a PhD in Chemical Engineering. He has been with Sunamp almost since the beginning (he was the 2nd employee in a Company currently employing 21 persons) and has worked on the fundamentalm development of the technology, before moving to a business development position to mainly manage the relationship with OEMs and intenational partners. Maurizio will be responsible to the daily managements of the wp involving Sunamp, connecting the technical tasks to the commercial ones, as well as dialoguing with all the partners to develop the best feasible solution for the project.

- **Susan Lang-Bissell [F]** – COO Susan will ensure that operation involving Sunamp's contribution will be succesfully developed and brought to conclusion. Susan has succesfully managed tens of project of different size and involving numerous technologies to be integrated to Sunamp Heat Batteries.

- **Evan Tuer [M]** – Lead Engineer. Evan leads all the development projects involving Sunamp Heat Batteries, from R&D to industrialization to commercialisation. He will lead the technical tasks according to the requirements set by the partners.Evan routinely works with systems from a few kWh storage capacity to a multiple tens and hundreds of kWh and on their integration into heating and cooling systems.

Relevant past activities/publications

#	Product	Short Description
1	SunampPV	A system composed by Sunamp Heat Batteris designed to be integrated to solar PV panels to convert excess electricity generated by the panels into hot water, store it, and use it to produce hot water at low cost and low carbon content. Sunamp has developed every components of this unit, including the electronic control to ensure best operation with the PV panels.
2	SunampStack	A system composed by Sunamp Heat Batteries designed to be integrated to heat pumps and mCHP units. It has been designed to be connected to both the hot water and the central heating systems, to minimise the cost of heating and air conditioning. With heat pumps, Sunamp has large experience into integrating the two technologies as well as modifying the heat pump to best fit the thermal store requriements, e.g. its control strategy. This has led Sunamp to develop a large expertise with heat pumps, demonstrated in the laboratory as well as in the field. About mCHP, SunampStack is used to maximise running time of them, of paramount importance to ensure short payback times.
3	SunampCube	A scaled up Heat Battery for large residential, commercial, and industrial applications. SunampCube can be easily connected to a multitude of energy sources, both electric and thermal, preferentially renewable, to store large amount of heat and generate high flow rates of hot water to serve multiple services at the same time.

Previous projects related to this proposal

#	Name	Short Description
1	DECC (UK Department of Energy and Climate Change) Advanced Heat Storage Competition	Phase 1: this project investigated to feasibility of a heat pump + Sunamp Heat battery system through calculations, modelling, analytical analysis. Main outcomes from Phase 1, were that a conventional air source heat pump used with high capacity and density Phase Change Material Thermal Store (PCM-TS): a) Can time-shift nearly 100% of the daily heat pump electricity demand to cheaper off-peak tariff without affecting the thermal comfort of the householder or restricting the freedom to use the system as they wish. b) It is small, modular and affordable enough to be deployed in dwellings.
		Phase 2: To test and validate the main findings from Phase 1, the main objectives of Phase 2 (all successfully achieved) were: a) To design and install air source heat pump (ASHP) and PCM-TS based systems in 10 field trial dwellings to shift nearly 100% ASHP electricity consumption to UK E10 off-peak periods. b) To monitor the thermal and comfort performance of the trial systems from summer 2013 to March 2014 and report the findings including the analysis of bills and savings to the customers. c) Produce a report analysing the potential to gain further value to both the utility and the occupants with widespread deployment of PCM-TS under Smart-Grid control. d) A further year of laboratory based life cycle testing of PCM heat batteries to increase confidence in the technology and its applications.
2	HeastHeat project for LECF – Local Energy Challenge Fund in Scotland	Sunamp Ltd for EASTHEAT to develop innovative local heat storage solutions, which will help alleviate fuel poverty for over 1,000 tenants of a Scottish Housing Association. The proposed solutions to be installed involve 650 SunampPV and other systems composed by Heat Batteries with heat pumps or mCHP units. Every step of every installation is developed by Sunamp, including pilot building assessments, design of the systems, installation, monitoring and support.

Relevant information

Sunamp has large expertise in both sizing heating and cooling systems including its thermal stores, development of highly efficient solutions, and monitoring of performance of the installed systems. Sunamp has full control on every component of its technology and can therefore easily adapt it to every installation requirement. Sunamp has been successful bringing to commercialisation a disruptive technology in a field that has not changed in centuries, that of the residential thermal storage, and especially to integrate it various heating and cooling equipment. Sunamp always work to reduce fuel poverty, reduce energy consumption, and reduce carbon intensity for heating and cooling applications.

1) Test rigs – Sunamp has multiple test rigs available for the testing of single components or whole systems simulation realistic operating conditions, e.g. charge – discharge cycles, tapping cycles;

2) Chillers and heat pumps – Sunamp can easily investigate various architectures of energy source + heat batteries + energy sinks by using in-house chillers and heat pumps;

3) Fully equipped workshop and production centre: Sunamp manufactures its Heat Batteries systems in-house, in ranges between 1 unit to thousands of units, and from 1kWh to hundreds of kWh. Sunamp will therefore manufacture the components and assembly the proposed solutions in-house. Sunamp has also a fully equipped electronic laboratory to develop the required control and monitoring systems;

4) Fully equipped chemical workshop: Sunamp produces all its phase change materials in-house and has comprehensive quality control processes in place to ensure that each unit shipped is performing as expected.

Third parties involved in the project (including use of third party resources)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	N
Does the participant envisage that part of its work is performed by linked third parties[25]	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[26] (Article 14a of the General Model Grant Agreement)?	N

[25] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

[26] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

4.1.14. Gemeente Eemnes

www.eemnes.nl

The municipality of Eemnes is a public body, containing 50 employees, and is the local authority of the village Eemnes. The village Eemnes onsists of around 9.000 in habitants, 3600 households and is located in the centre of the Netherlands.

The municipality has the ambition for Eemes to be energy neutral by 2030. By 2020, already 43% of emitted greenhouse gases will be reduced. Plan is to be gas disconnected by late 2020's, and therefore already actively approaches business, farmers and households to increase the energy performance. Per capita the amount of produced electricity with Solar PV on homes as a percentage of their use, is unmatched in the Netherlands (17%).

Eemnes has set up an Energy Cooperation – under Dutch law, a member-driven not-for profit organisation with sole purpose to support the uptake of sustainable energy solutions.

The pilot has been granted a 10-year exemption to the Dutch Electricity laws by the Ministry of Economic affairs, which allows it to test with new electricity market models, and underlying soft/hardware and business models.

Main tasks to be undertaken

The main task of the municipality of Eemnes is to coordinates the collaboration between the housing corporation De Alliantie, public authorities, farmers, local business, the energy cooperation and households in order to realise and scale up the local peer-to-peer energy market pilot. The municipality will also be involved in the communication and acquisition towards (potential) participants of the pilot. Therefore, together with De Alliantie, an offer is currently rolling out with PV panels at attractive, subsidised rates to all the tenants in Eemnes with roofs. Based on previous experience with similar projects, De Alliantie expects that around 25% of the 850 households will participate in the PV programme. The energy cooperation is used as a vehicle by the municipality of Eemnes to offer energy services to (potential) participants of the pilot. The services are mainly focused at providing advice and information regarding, participation at the smart grid pilot (inside WP5).

The municipality also works together with Enervalis in the pilot project. Enervalis is a software provider and one of the leaders regarding energy management systems in Europe and has a unique position in this field. The Blockchain enabled, peer-to-peer trading software planned to be demonstrated has been developed and tested within the R&D environment of Enervalis. This pilot will enable to test this kind of software for the first time in a real living lab inside WP2 and WP6.

Key personnel (incl. gender)

- **Niels Rood [M] is** City Council member at the municipality of Eemnes since 2014. He leads the whole sustainability department of the Muncipality of Eemnes with the main ambition of disconnected from the gas network from 2030. He coordinates sustainability projects with local and national actors; e.g.: Installation of solar fields, realizing up-take of solar panels by households and disconnecting from gas network by connecting construction companies and housing providers.

Relevant infrastructure

The smart grid would be operational in a mostly residential setting where a considerable amount of dwellings are renovated with renewable energy generation capacity, resulting in energy neutral homes. It will also contain homes which still need energy (natural gas for heating) but have enough solar panels to equal their own electrical consumption.

For 2019, the development of a solar field consisting of 13.000 solar is planned. Given the involvement of the municipality of Eemnes in this project a potential connection is foreseen between the solar field and the smart grid.

Third parties involved in the project (including use of third party resources)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	N
Does the participant envisage that part of its work is performed by linked third parties[27]	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[28] (Article 14a of the General Model Grant Agreement)?	N

[27] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

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4.1.15. NAPE

www.nape.pl

Narodowa Agencja Poszanowania Energii S.A. (National Energy Conservation Agency - NAPE) was created in 1994 as an initiative of Polish Energy Conservation Foundation and Polish Development Bank as the respond to the growing market demand for energy efficient investments in Poland. NAPE is a consulting and engineering company, SME employing 14 people on full-time and around 30 experts on project basis.

The range of NAPE's activities is formed of services, studies, programmes and projects within all energy sectors, with particular emphasis on technical, financial and organisational problems. NAPE`s offer of services is dedicated to resolution of energy supply problems as well as to modernisation of existing systems on both supply and demand sides. NAPE serves municipalities, companies, enterprises and budgetary units as well as owners of buildings. NAPE acts also as verifier of energy efficiency projects financed by divers financial institutions, like European Investment Bank, European Bank for Reconstruction and Development, Global Environmental Facility, Polish National Fund for Environment Protection.

Main tasks to be undertaken

NAPE will facilitate access to 2 or more ´virtual demonstrator´ sites in Poland and possibly elsewhere in Eastern Europe. This means; providing access to the organisations and data of a site; basic technical description including energy profile (generation, storage, demand for main vectors). Facilitate 1 or 2 site visits with interviews of professional stakeholders (<5) and end users (<5). Data will be used to map energy vectors, let VUB/ABB tool assess the potential for micro grids. In addition, NAPE will collaborate in WP6 when it comes to the research in regulations and will host a Polish event on smart grids; presentation of technology and business cases, internationally and locally. Inside RENAISSANCE NAPE will contribute in WP2 for consensus driven local smart grid design, in WP6 inside the regulatory barriers. And finally in WP7 for the development of exploitation and market entry strategy.

Key personnel (incl. gender)

- **Ph. D. Andrzej Wiszniewski [M],** President of NAPE is expert in energy efficient buildings and energy sources technologies, including RES, with over 30 years of experience in drafting and assessing of technical-economic concepts, feasibility studies for energy efficiency projects performed in buildings, energy sources and in SME`s, coordination of EU projects, supervising of energy auditing department of NAPE, lecturing at the Warsaw University of Technology in environmental technologies, heat, ventilation and air conditioning.

- **M.Sc. Andrzej Rajkiewicz [M],** Vice-President of NAPE, communication expert, responsible on relations with municipalities, building owners, co-operatives, condominiums, and SMEs, supervisor of over 3000 services in form of energy audit of buildings and SMEs and coaching their owners in fund raising from different financing sources from EU and domestics. Product developer in the field of energy efficient refurbishment of buildings like RES installations on residential multi-storey buildings. Well communicated with media like monthly Administrator and internet portal for facility managers http://www.administrator24.info/ magazines like "Czysta energia" http://czysta-energia.abrys.pl/ and associations of landlords like "Mieszkanicznik" http://mieszkanicznik.org.pl/polish-residential-landlords-association/ . Project co-ordinator of NAPE teams in over 20 EU co-financed project.

- **M.Sc. Eng Marek Amrozy [M]**, Proxy at NAPE, licensed ISO 9001 lead auditor, analyst and verifier of energy efficiency projects in buildings, enterprises and of Renewable Energy Sources, like biogas , PV, solar heating, heat pumps.

- **Ph. D. Joanna Rucińska [F],** energy auditor of buildings with use of different softwares, – licensed for energy performance certification of buildings. She has elaborated over 100 energy audits, 40 expertise concerning energy efficiency in construction projects of building`s and SME`s.

- **M.Sc. Barbara Domaradzka [F],** Project Manager, working as public relation manager of NAPE, responsible on communication with outside and internal within EU co-financed projects: BioEnergy Farm and SME Energy Check-up.

Previous projects related to this proposal

#	Name	Short Description
1	AOZE.PL	Development of own IT online software for calculation of economic of implementation of the alternative energy sources in buildings.
2	Shadow	Building Renovation RoadMap for Poland together with KAPE, BPIE, IES in co-operation with PwC (2014). Project co-financed by European Climate Foundation, led by Institute of Environmental Economics from Cracow, aimed to analyse the market needs and barriers for deep renovation of buildings in Poland. NAPE provided calculations of costs of renovations related to the energy efficiency standards of residential buildings. http://renowacja2050.pl/
3	DREEAM	Demonstration of an integrated Renovation approach for Energy Efficiency At the Multi building scale (Horizon2020) http://dreeam.eu/
4	RentalCal	Focuses on the current level of energy efficiency investments in the rented housing sector (Horizon2020) http://www.rentalcal.eu/
5	Reno Value	Training program for real estate valuers on sustainable building`s valuation factors (IEE 2017) http://renovalue.eu/
6	RenewSchool	Promotion of sustainable renovation and construction of educational buildings with utilization of wooden framework technology (IEE 2017)
7	BioEnergy Farm II	Promotion of small biogas plants (IEE2017) http://www.bioenergyfarm.eu

Third parties involved in the project (including use of third party resources)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	N
Does the participant envisage that part of its work is performed by linked third parties[29]	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[30] (Article 14a of the General Model Grant Agreement)?	N

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[30] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

Section 5: Ethics and Security

5.1 Ethics

No ethics issues were found in the project.

5.2 Security[31]

Please indicate if your project will involve:

- activities or results raising security issues: (NO)
- 'EU-classified information' as background or results: (NO)

[31] See article 37 of the Model Grant Agreement. . For more information on the classification of Information, please refer to the Horizon 2020 guidance: https://ec.europa.eu/research/participants/data/ref/h2020/other/hi/secur/h2020-hi-guide-classif_en.pdf.

CEER
Council of European Energy Regulators

Helsinki, 4 April 2018

Prof. Dr. Thierry Coosemans
Vrije Universiteit Brussel
Technology Research Group MOBI – Mobility Logistics and Automotive Technology Research Centre
Building Z (ZE103), Pleinlaan 2, 1050 Brussel, Belgium

Subject: Letter of Support to the RENAISSANCE Project

Dear Dr Coosemans,

I would like to hereby confirm the strong interest of myself, Veli-Pekka Saajo, with regard to the European project "RENAISSANCE: RENewAble Integration and SuStainAbility iN energy CommunitiEs" that will be submitted to the call H2020-LC-SC3-ES3-one-stage.

The RENAISSANCE project's main objectives are:

- Creation of self-sustainable clean energy communities.
- Coordination of a better and more efficient energy vectors, considering electricity, heat and transport.
- Development of exchangeable mechanisms for new and existing energy resources.
- Development of new market models in order to create more transparent and participative energy exchange possibilities.

The mission of Council of European Energy Regulators (CEER) is to facilitate the creation of a single, competitive, efficient and sustainable EU internal energy market, and thus, the abovementioned topics are of high important for our organisation. Hence, I would like to take this opportunity to express our interest in being informed in the progress of the RENAISSANCE project and in participating in meetings/workshops that will be organised along the duration in the framework of an advisory board order to contribute as far as possible to the achievement of the final aim of RENAISSANCE. Please note my joining the advisory board is provisional, as this will need to be confirmed by CEER's internal processes in the next few weeks. You will be informed of that confirmation by the middle of May 2018 at the latest.

Yours sincerely,

Veli-Pekka Saajo
Vice-Chair, Distribution Systems Working Group

Council of European Energy Regulators ASBL
Cours Saint-Michel 30a, box F, B-1040 Brussels, Belgium
Tel: +32 2 788 73 30 | Fax: +32 2 788 73 50 | e-mail: Brussels@ceer.eu | http://www.ceer.eu|

VAT BE 0861 035 445 | RPM Brussels | IBAN BE24 3101 8020 1838 - BIC BBRUBEBB

5 April 2018 Brussels

To: Prof. Dr. Thierry Coosemans
Vrije Universiteit Brussel
Technology Research Group MOBI – Mobility Logistics and Automotive Technology Research Centre
Building Z (ZE103), Pleinlaan 2, 1050 Brussel, Belgium

Subject: Letter of Support to the RENAISSANCE Project

Dear Sir,

Hereby, I would like to confirm the strong interest of Elia Group with regard to the European project "RENAISSANCE: RENewAble Integration and SuStainAbility iN energy CommunitiEs" that will be submitted to the call H2020-LC-SC3-ES3-one-stage.

The RENAISSANCE main objectives are:

- Creation of self-sustainable clean energy communities.
- Coordination of a better and more efficient energy vectors, considering electricity, heat and transport.
- Development of exchangeable mechanisms for new and existing energy resources.
- Development of new market models in order to create more transparent and participative energy exchange possibilities.

One of the missions of Elia Group is to lead the way in the energy market and the ancillary services by engaging the "kW prosumer", and thus the abovementioned topics are of high important for our organization. Hence, I would like to take this opportunity to express our interest in being informed in the progress of the RENAISSANCE project and in participating in meetings/workshops that will be organized along the duration in the framework of an advisory board order to contribute as far as possible to the achievement of the final aim of RENAISSANCE.

Yours sincerely,

Gillès Adrien
Innovation Manager
Elia Group
Bd de l'Empereur - 1000 Bruxelles - Brussel

From: 熊飞 <fei-xiong@geidco.org>
Date: Thursday, 29 March 2018 at 02:08
To: Thierry COOSEMANS <Thierry.Coosemans@vub.be>
Cc: Li Yi <Li.Yi@vub.be>, Maitane Berecibar <Maitane.Berecibar@vub.be>
Subject: Cooperation Project and Invitation Letter--Attached Document

Dear Professor Thierry ,

Thank you for your kind response, and I am really appreciate yours efforts to put forward the substantially bilateral cooperation. Please find the attched fomal signature document which is signed by Belgium Elia Grid International in November 2017, and one more GEIDCO brocher is also provideded for you to be taken as an reference material.Moreover we are really interested about the Renaissance Project and willing to co-work together under the framework of the Membership document has been granted by both sides, so it would be great honor for us to cooperate together and looking forword to hear from you as soon as possible, if any questiones please don't hesitate to contact me!

Kind Regards
Xiongfei

Fei Xiong
Senior Manager,Europe Office
Global Energy Interconnection Development and Cooperation Organization
Rue Du Duc100,1150 Brussels Belgium
Email: fei-xiong@geidco.org M: +32-499394465 （Belgium）
Website: http://www.geidco.org
熊飞
欧洲办公室
全球能源互联网发展合作组织
宣武门内大街8号,北京,100031,中国
电子邮箱:fei-xiong@geidco.org 联系电话：+86-13426077920

GMINA KOZIENICE
26-900 Kozienice, ul. Parkowa 5
Telefon: 0486117100, Fax: 0486142048, NIP: 812-18-28-216, Regon: 670223333, Teryt: 1407053

GMINA FAIR PLAY

Letter of Interest in RENNAISANCE-project

Project acronym	IMPRESSme-project RENNAISANCE-project
Project title	**RENewAble Integration and SuStainAbility iN energy CommunitiEs**
Name of the signing organisation (English), including department if relevant	City of Kozienice
Description of the organisation's role	To support the achievement of the project´s main and sub-objectives by providing the necessary information about energy consumption of energy consumers located in the municipal area and about technical opportunities to introduce RES in buildings and municipal infrastructure.
Description of the organisation's contribution	Own staff to be involved in data gathering and providing for the RENNAISANCE-project purposes. Involving different stakeholders, like energy consumers, utilities, RES providers
Particular interest Particular benefit	To learn experience in designing the business models for introduction of RES in municipal economy including application of smart-grids solutions. Study concerning indication of potential, technology package that could maximise/optimise such system from energetic and/or financial perspective especially for development of elector mobility in public transportation and use of RES for heating purposes.

Further, we hereby confirm:
- that we were informed about the preparation of the above-mentioned project,
- that the topic tackled by this project is in line with our organisation's policy,
- that we acknowledge the contribution of the above-mentioned project

Z up. BURMISTRZA
mgr inż. Igor [illegible]
Zastępca Burmistrza ds. Technicznych

GMINA KOZIENICE
26-900 Kozienice, ul. Parkowa 5
tel. 48/ 611-71-00, fax 48/ 614-20-48
www.kozienice.pl
e-mail: urzad@kozienice.pl
Regon 670223333 NIP 8121828216

Quess

Bangalore, 4th April 2018

To: Prof. Dr. Thierry Coosemans
Vrije Universiteit Brussel
Technology Research Group MOBI – Mobility Logistics and Automotive Technology Research Centre
Building Z (ZE103), Pleinlaan 2, 1050 Brussel, Belgium

Subject: Letter of Support to the RENAISSANCE Project

Dear Sir,

Hereby, I would like to confirm the strong interest of Quess Corp Ltd with regard to the European project "RENAISSANCE: RENewAble Integration and SuStainAbility iN energy CommunitiEs" that will be submitted to the call H2020-LC-SC3-ES3-one-stage.

The RENAISSANCE main objectives are:

- Creation of self-sustainable clean energy communities.
- Coordination of a better and more efficient energy vectors, considering electricity, heat and transport.
- Development of exchangeable mechanisms for new and existing energy resources.
- Development of new market models in order to create more transparent and participative energy exchange possibilities.

The mission of Quess Corp Limited is to introduce innovative and sustainable technology in India, and thus the abovementioned topics are of high important for our organization. Hence, I would like to take this opportunity to express our interest in being informed in the progress of the RENAISSANCE project and in participating in meetings/workshops that will be organized along the duration in the framework of an advisory board order to contribute as far as possible to the achievement of the final aim of RENAISSANCE.

Yours sincerely,

Quess Corp. Limited Bangalore

Saurav R Lenka
Business Head – QINFRA – Infra Division of Quess Corp

Quess Corp Limited
Quess House, 3/3/2, Bellandur Gate, Sarjapura Road, Bengaluru - 560103, Karnataka, India
Tel: +91 80 6105 6001 | connect@quesscorp.com | CIN No. U74140KA2007PLC043909

www.quesscorp.com

CEDEC

Brussels, 19 February 2018

To: Prof. Dr. Thierry Coosemans
Vrije Universiteit Brussel
Technology Research Group MOBI – Mobility Logistics and Automotive Technology Research Centre
Building Z (ZE103), Pleinlaan 2, 1050 Brussel, Belgium

Subject: Letter of Support to the RENAISSANCE Project

Dear Sir,

Hereby, I would like to confirm the strong interest of CEDEC with regard to the European project "RENAISSANCE: RENewAble Integration and SuStainAbility iN energy CommunitiEs" that will be submitted to the call H2020-LC-SC3-ES3-one-stage.

The RENAISSANCE main objectives are:

- Creation of self-sustainable clean energy communities.
- Coordination of a better and more efficient energy vectors, considering electricity, heat and transport.
- Development of exchangeable mechanisms for new and existing energy resources.
- Development of new market models in order to create more transparent and participative energy exchange possibilities.

I would like to take this opportunity to express our interest in being informed in the progress of the RENAISSANCE project and in participating in meetings/workshops that will be organized along the duration in the framework of an advisory board order to contribute as far as possible to the achievement of the final aim of RENAISSANCE.

Yours sincerely,

Gert De Block
Secretary General

Rue Royale 55 B 10 – 1000 Brussels

To: Prof. Dr. Thierry Coosemans
Vrije Universiteit Brussel
Technology Research Group MOBI – Mobility Logistics and Automotive Technology Research Centre
Building Z (ZE103), Pleinlaan 2, 1050 Brussel, Belgium

Subject: Letter of Support to the RENAISSANCE Project

Dear Sir,

Hereby, I would like to confirm the strong interest of Flux50 with regard to the European project "RENAISSANCE: RENewAble Integration and SuStainAbility iN energy CommunitiEs" that will be submitted to the call H2020-LC-SC3-ES3-one-stage.

The RENAISSANCE main objectives are:

- Creation of self-sustainable clean energy communities.
- Coordination of a better and more efficient energy vectors, considering electricity, heat and transport.
- Development of exchangeable mechanisms for new and existing energy resources.
- Development of new market models in order to create more transparent and participative energy exchange possibilities.

The mission of Flux50 is to facilitate cross-sector collaboration between energy, IT and building companies to enhance the competitiveness of the Flemish smart energy industry in the transition towards low carbon systems, including topics such as local energy communities, and thus the abovementioned topics are of high important for our organization. Hence, I would like to take this opportunity to express our interest in being informed in the progress of the RENAISSANCE project and in participating in meetings/workshops that will be organized along the duration in the framework of an advisory board order to contribute as far as possible to the achievement of the final aim of RENAISSANCE.

Yours sincerely,

18/03/2018
Frederik Loeckx
Managing Director

Koningsstraat 154-158
1000 Brussel
www.flux50.com

BTW BE 0824.769.323
IBAN BE 43 7310 1040 1001
BIC KREDBEBB

Melle, March 23, 2018

To: Prof. Dr. Thierry Coosemans
Vrije Universiteit Brussel
Technology Research Group MOBI – Mobility Logistics and Automotive Technology Research Centre
Building Z (ZE103), Pleinlaan 2, 1050 Brussel, Belgium

Subject: Letter of Support to the RENAISSANCE Project

Dear Sir,

Hereby, I would like to confirm the strong interest of Eandis with regard to the European project "RENAISSANCE: RENewAble Integration and SuStainAbility iN energy CommunitiEs" that will be submitted to the call H2020-LC-SC3-ES3-one-stage.

The RENAISSANCE main objectives are:

- Creation of self-sustainable clean energy communities.
- Coordination of a better and more efficient energy vectors, considering electricity, heat and transport.
- Development of exchangeable mechanisms for new and existing energy resources.
- Development of new market models in order to create more transparent and participative energy exchange possibilities.

The mission of Eandis is to manage and operate utility networks, and thus the above mentioned topics are of high importance for our organization. Hence, I would like to take this opportunity to express our interest in being informed in the progress of the RENAISSANCE project and in participating in meetings/workshops that will be organized along the duration in the framework of an advisory board in order to contribute as far as possible to the achievement of the final aim of RENAISSANCE.

Yours sincerely,

Donald VANBEVEREN
Director Regulation & Strategy
Eandis
Brusselsesteenweg 199, 9090 Melle

Madrid, March 21st 2018

To: Prof. Dr. Thierry Coosemans
Vrije Universiteit Brussel
Technology Research Group MOBI – Mobility Logistics and Automotive Technology Research Centre
Building Z (ZE103), Pleinlaan 2, 1050 Brussel, Belgium

Subject: Letter of Support to the RENAISSANCE Project

Dear Sir,

Hereby, I would like to confirm the strong interest of H2020 inteGRIDy project with regard to the European project "RENAISSANCE: RENewAble Integration and SuStainAbility iN energy CommunitiEs" that will be submitted to the call H2020-LC-SC3-ES3-one-stage.

The RENAISSANCE main objectives are:

- Creation of self-sustainable clean energy communities.
- Coordination of a better and more efficient energy vectors, considering electricity, heat and transport.
- Development of exchangeable mechanisms for new and existing energy resources.
- Development of new market models in order to create more transparent and participative energy exchange possibilities.

The mission of inteGRIDy is to integrate cutting-edge technologies, solutions and mechanisms in a scalable Cross-Functional Platform connecting energy networks with diverse stakeholders, facilitating optimal and dynamic operation of the Distribution Grid (DG), fostering the stability and coordination of distributed energy resources and enabling collaborative storage schemes within an increasing share of renewables, and thus the abovementioned topics are of high important for our organization. Hence, I would like to take this opportunity to express our interest in being informed in the progress of the RENAISSANCE project and in participating in meetings/workshops that will be organized along the duration in the framework of an advisory board order to contribute as far as possible to the achievement of the final aim of RENAISSANCE.

Yours sincerely,

Andrea Rossi – andrea.rossi@atos.net
inteGRIDy project coordinator
Atos Research & Innovation
C/ Albarracin 25
28037 - Madrid (Spain)

Atos
C/ Albarracín, 25
28037 Madrid
CIF: A-28240752

T +34 91 214 88 00
F +34 91 754 32 52
www.es.atos.net

POWER TO THE PEOPLE
goiener
Energia berriztagarrien sorkuntza eta kontsumo kooperatiba
Cooperativa de generación y consumo de energía renovable

2018-03-28

To: Prof. Dr. Thierry Coosemans
Vrije Universiteit Brussel
Technology Research Group MOBI – Mobility Logistics and Automotive Technology Research Centre
Building Z (ZE103), Pleinlaan 2, 1050 Brussel, Belgium

Subject: Letter of Support to the RENAISSANCE Project

Dear Sir,

Hereby, I would like to confirm the strong interest of GOIENER, S.COOP. with regard to the European project "RENAISSANCE: RENewAble Integration and SuStainAbility iN energy CommunitiEs" that will be submitted to the call H2020-LC-SC3-ES3-one-stage.

The RENAISSANCE main objectives are:

- Creation of self-sustainable clean energy communities.
- Coordination of a better and more efficient energy vectors, considering electricity, heat and transport.
- Development of exchangeable mechanisms for new and existing energy resources.
- Development of new market models in order to create more transparent and participative energy exchange possibilities.

The mission of GOIENER, S.COOP., as a non-profit citizen energy cooperative, is to develop and manage energy generation units, from renewable sources, so they will supply the demand of its cooperative members, and thus the abovementioned topics are of high important for our organization. Hence, I would like to take this opportunity to express our interest in being informed in the progress of the RENAISSANCE project and in participating in meetings/workshops that will be organized along the duration in the framework of an advisory board order to contribute as far as possible to the achievement of the final aim of RENAISSANCE.

Yours sincerely,

Santiago Ochoa de Eribe Usabiaga
CEO
GOIENER, S.COOP.
Mallutz 18 – 20240 – Ordizia – GIPUZKOA (SPAIN)

POWER TO THE PEOPLE
goiener
Energia berriztagarrien sorkuntza eta kontsumo kooperatiba
Cooperativa de generación y consumo de energía renovable

European Copper Institute
Copper Alliance

Brussels, 19 March 2018

To: Prof. Dr. Thierry Coosemans
Vrije Universiteit Brussel
Technology Research Group MOBI – Mobility Logistics and Automotive Technology Research Centre
Building Z (ZE103), Pleinlaan 2, 1050 Brussel, Belgium

Subject: Letter of Support to the RENAISSANCE Project

Dear Prof Coosemans,

Hereby, I would like to confirm the strong interest of European Copper Institute (ECI) with regard to the European project "RENAISSANCE: RENewAble Integration and SuStainAbility iN energy CommunitiEs" that will be submitted to the call H2020-LC-SC3-ES3-one-stage.

The RENAISSANCE main objectives are:

- Creation of self-sustainable clean energy communities.
- Coordination of a better and more efficient energy vectors, considering electricity, heat and transport.
- Development of exchangeable mechanisms for new and existing energy resources.
- Development of new market models in order to create more transparent and participative energy exchange possibilities.

The mission of name of your organization is to accelerate the energy transition through the decarbonization of Europe, and thus the abovementioned topics are of high important for our organization. Hence, I would like to take this opportunity to express our interest in being informed in the progress of the RENAISSANCE project and in participating in meetings/workshops that will be organized along the duration in the framework of an advisory board order to contribute as far as possible to the achievement of the final aim of RENAISSANCE. In addition, ECI will be pleased to help spreading the findings of the project through its Leonardo ENERGY network of 25,000 sustainable energy professionals, e.g. through webinars, social media outreach and other media channels.

Yours sincerely,

Hans De Keulenaer

Director – Energy & Electricity

European Copper Institute Avenue de Tervueren 168, b-10 - 1150 Bruxelles – Belgium - Phone :+32 2 777 70 70 - Fax : +32 2 777 70 79
VAT : BE 0465 825 474 - info@copperalliance.eu - www.copperalliance.eu
Registered office: 5 Grovelands Business Centre, Boundary Way, Hemel Hempstead HP2 7TE, UK
A Company limited by Guarantie

Xanthi, March 9, 2018

To: Prof. Dr. Thierry Coosemans
Vrije Universiteit Brussel
Technology Research Group MOBI – Mobility Logistics and Automotive Technology Research Centre
Building Z (ZE103), Pleinlaan 2, 1050 Brussel, Belgium

Subject: Letter of Support to the RENAISSANCE Project

Dear Sir,

Hereby, I would like to confirm the strong interest of **TEHNI S.A.** with regard to the European project "RENAISSANCE: RENewAble Integration and SuStainAbility iN energy CommunitiEs" that will be submitted to the call H2020-LC-SC3-ES3-one-stage.

The RENAISSANCE main objectives are:

- Creation of self-sustainable clean energy communities.
- Coordination of a better and more efficient energy vectors, considering electricity, heat and transport.
- Development of exchangeable mechanisms for new and existing energy resources.
- Development of new market models in order to create more transparent and participative energy exchange possibilities.

ENTRANCE DOOR, ALUMINIUM & PVC SANDWICH PANES, INSECT SCREEN

Our company is located in Xanthi, Northern part of Greece, close to the facilities of Democritus University of Thrace, demo-site of RENAISSANCE project. RENAISSANCE project includes elements that are of high interest of our company and therefore our company is willing to actively participate in the implementation of the project through cooperation with Democritus University of Thrace, with the provision of electricity, heating, fuel consumption profiles, which will be used for the evaluation of the modeling activities foreseen.

Therefore, I highly recommend this project for funding.

Yours sincerely,

EUROBAT
ASSOCIATION OF EUROPEAN AUTOMOTIVE AND INDUSTRIAL BATTERY MANUFACTURERS

Telephone: + 32 2 761 1653
Twitter: @eurobat_org
eurobat@eurobat.org
www.eurobat.org

Brussels, 30 April 2018

To: Prof. Dr. Thierry Coosemans
Vrije Universiteit Brussel
Technology Research Group MOBI – Mobility Logistics and Automotive Technology Research Centre
Building Z (ZE103), Pleinlaan 2, 1050 Brussel, Belgium

Subject: Letter of Support to the RENAISSANCE Project Proposal

Dear Sir,

Hereby, I would like to confirm the strong interest of EUROBAT with regard to the European project "RENAISSANCE: RENewAble Integration and SuStainAbility iN energy CommunitiEs", that will be submitted to the call H2020-LC-SC3-ES3-one-stage.

The RENAISSANCE main objectives are:

- Creation of self-sustainable clean energy communities.
- Coordination of a better and more efficient energy vectors, considering electricity, heat and transport.
- Development of exchangeable mechanisms for new and existing energy resources.
- Development of new market models in order to create more transparent and participative energy exchange possibilities.

The mission of EUROBAT is to study all matters of interest to storage battery manufacturers and their subcontractors in Europe, Middle East and Africa, and thus the abovementioned topics are of high important for our organization. Hence, I would like to take this opportunity to express our interest in being informed in the progress of the RENAISSANCE project and in participating in meetings/workshops that will be organized along the duration in the framework of an advisory board order to contribute as far as possible to the achievement of the final aim of RENAISSANCE.

Yours sincerely,

René Schroëder
Executive Director
EUROBAT
Avenue Jules Bordet 142 – B1140 Brussels, Belgium

21 March 2018, Xanthi

To: Prof. Dr. Thierry Coosemans
Vrije Universiteit Brussel
Technology Research Group MOBI – Mobility Logistics and Automotive Technology Research Centre
Building Z (ZE103), Pleinlaan 2, 1050 Brussel, Belgium

Subject: Letter of Support to the RENAISSANCE Project

Dear Sir,

Hereby, I would like to confirm the strong interest of Municipality of Xanthi with regard to the European project "RENAISSANCE: RENewAble Integration and SuStainAbility iN energy CommunitiEs" that will be submitted to the call H2020-LC-SC3-ES3-one-stage.

The RENAISSANCE main objectives are:

- Creation of self-sustainable clean energy communities.
- Coordination of a better and more efficient energy vectors, considering electricity, heat and transport.
- Development of exchangeable mechanisms for new and existing energy resources.
- Development of new market models in order to create more transparent and participative energy exchange possibilities.

Municipality of Xanthi can be considered as a medium sized European city. Municipality of Xanthi has recently concluded its Sustainable Energy and Climate Action, within the Covenant of Mayors Initiative. The vision of Xanthi is to become a sustainable, green and energy efficient city of Europe by 2030. To achieve this vision, the municipality has developed a strong strategic plan consisting of specific actions and activities towards the transition to a local low carbon economy.

The city of Xanthi, capital of the Municipality of Xanthi is located very close to the facilities of Democritus University of Thrace, demo-site of RENAISSANCE project. RENAISSANCE project includes elements that are of high interest for the municipality and our citizens and therefore the municipality is willing to actively participate in the implementation of the project through cooperation with Democritus University of Thrace.

Therefore, I highly recommend this project for funding.

Yours sincerely,

Chrysanthos Dimarchopoulos
Mayor
Municipality of Xanthi, Greece

SPÓŁDZIELNIA MIESZKANIOWA „SZASERÓW"

ul. Szklanych Domów 13, 04-347 Warszawa, Poland

Letter of Interest in RENNAISANCE-project

Project acronym	RENNAISANCE-project
Project title	**RENewAble Integration and SuStainAbility iN energy CommunitiEs**
Name of the signing organisation (English), including department if relevant	Housing Co-operative Szaserów
Description of the organisation's role	To support the achievement of the project´s main and sub-objectives by providing the necessary information about energy consumption of energy consumers located on the co-operative`s area and about technical opportunities to introduce RES in buildings and common areas of the settlement.
Description of the organisation's contribution	Own staff to be involved in data gathering and providing for the RENNAISANCE-project purposes. Involving different stakeholders, like energy consumers, City of Warsaw, utilities
Particular interest Particular benefit	To learn experience in modernisation of buildings and surrounding areas towards energy independency from utilities by use of Renewable Energy Sources and smart grid solutions. Study concerning indication of potential, technology package that could maximise/optimise such system from energetic and/or financial perspective

Further, we hereby confirm:

- that we were informed about the preparation of the above-mentioned project,
- that the topic tackled by this project is in line with our organisation's policy,
- that we acknowledge the contribution of the above-mentioned project

ZASTĘPCA PREZESA
S. M. „SZASERÓW"
Ewa Ł...szo

PREZES ZARZĄDU
S. M. „SZASERÓW"
mgr inż. Krzysztof Jurewicz

SPÓŁDZIELNIA MIESZKANIOWA
„ SZASERÓW "
04-346 Warszawa, ul. Szklanych Domów 13

Eemnes, 22/3/2018

To: Prof. Dr. Thierry Coosemans
Vrije Universiteit Brussel
Technology Research Group MOBI – Mobility Logistics and Automotive Technology Research Centre
Building Z (ZE103), Pleinlaan 2, 1050 Brussel, Belgium

Subject: Letter of Support to the RENAISSANCE Project

Dear Sir,

Hereby, I would like to confirm the strong interest of Arjan Bijman with regard to the European project "RENAISSANCE: RENewAble Integration and SuStainAbility iN energy CommunitiEs" that will be submitted to the call H2020-LC-SC3-ES3-one-stage.

The RENAISSANCE main objectives are:

- Creation of self-sustainable clean energy communities.
- Coordination of a better and more efficient energy vectors, considering electricity, heat and transport.
- Development of exchangeable mechanisms for new and existing energy resources.
- Development of new market models in order to create more transparent and participative energy exchange possibilities.

The mission of Energiecoöperatie Eemnes Energie is to create a self-sustainable community of households, business and farmers that jointly produce and exchange renewable energy. Therefore, the abovementioned topics are of high important for our organization. Hence, I would like to take this opportunity to express our interest in being informed in the progress of the RENAISSANCE project and in participating in meetings/workshops that will be organized along the duration in the framework of an advisory board order to contribute as far as possible to the achievement of the final aim of RENAISSANCE.

.

Yours sincerely,

Arjan Bijman
Board member
Eemnes Energie - Aartseveen 11, 3755 VA Eemnes, Nederland

Eemnes, 22/3/2018

To: Prof. Dr. Thierry Coosemans
Vrije Universiteit Brussel
Technology Research Group MOBI – Mobility Logistics and Automotive Technology Research Centre
Building Z (ZE103), Pleinlaan 2, 1050 Brussel, Belgium

Subject: Letter of Support to the RENAISSANCE Project

Dear Sir,

Hereby, I would like to confirm the strong interest of René Pie with regard to the European project "RENAISSANCE: RENewAble Integration and SuStainAbility iN energy CommunitiEs" that will be submitted to the call H2020-LC-SC3-ES3-one-stage.

The RENAISSANCE main objectives are:

- Creation of self-sustainable clean energy communities.
- Coordination of a better and more efficient energy vectors, considering electricity, heat and transport.
- Development of exchangeable mechanisms for new and existing energy resources.
- Development of new market models in order to create more transparent and participative energy exchange possibilities.

The mission of Energievan.nu is to develop a platform or local energy market in Eemnes where prosumers can exchange locally produced renewable energy among each other. Therefore, the abovementioned topics are of high important for our organization. Hence, I would like to take this opportunity to express our interest in being informed in the progress of the RENAISSANCE project and in participating in meetings/workshops that will be organized along the duration in the framework of an advisory board order to contribute as far as possible to the achievement of the final aim of RENAISSANCE.

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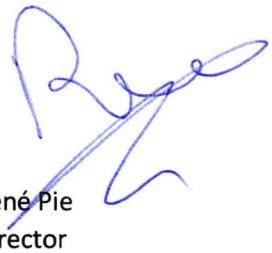
Yours sincerely,



René Pie
Director
Energievan.nu - Scharwoudestraat 3, 3826CL Amersfoort

Intentieverklaring De Alliantie - Micro Energy Trading project

Ondergetekende, Mano Otten namens De Alliantie, verklaart dat de volgende partijen: de Alliantie, Enervalis, ABB, Alklima, Gemeente Eemnes en Energiecoöperatie Eemnes Energie gesprekken hebben gevoerd en in onderhandeling zijn getreden omtrent het realiseren van een demonstratieproject ´Micro Energy Trading´. De doelstelling van dit project is het demonstreren in de praktijk van een smart grid met zogenaamde smart trading capaciteiten.

De ondergetekende thans een aantal uitgangspunten en afspraken in verband met deze onderhandelingen en de daaruit eventueel voort te vloeien overeenstemming vast te leggen in de onderhavige intentieverklaring.

De ondergetekende komen het navolgende overeen:

1. De partijen zullen onder de voorwaarden zoals overeengekomen in de onderhavige intentieverklaring gezamenlijk de mogelijkheden nader onderzoeken om tot overeenstemming te komen over een overeenkomst inzake het realiseren van een project ´Micro Energy Trading´.

2. Indien partijen tot overeenstemming komen inzake het realiseren van een project ´Micro Energy Trading´ zal de beoogde overeenkomst in ieder geval een uitwerking van het navolgende dienen te omvatten:

- De locatie, omvang en doelstellingen van dergelijk project
- Rollen en taken van betrokken gemeente Eemnes De Alliantie, Enervalis, Alklima, ABB en de Energiecoöperatie Eemnes Energie
- De voorziene investeringen en kosten/baten van elk van de betrokken partijen
- Een model om belangen van bewoners (huurders) van De Alliantie en andere partijen te verzekeren. In het bijzonder betreft dit de energie-coöperatie als instrument en een model voor het berekenen van kosten en inkomsten uit het verbruik en opwekking van energie

3. Op de onderhavige intentieverklaring zijn geen andere voorwaarden waaronder begrepen algemene of bijzondere leverings- of betalingsvoorwaarden of enige andere of bijzondere voorwaarden van welke partij dan ook van toepassing.

4. Elk van de partijen verplicht zich hierbij om te goeder trouw te onderhandelen en zich in te spannen om tot definitieve totstandkoming van de beoogde overeenkomst te komen.

5. Partijen zijn zich bewust van het vertrouwelijke karakter van hun samenwerking uit hoofde van de onderhavige intentieverklaring en zullen geen informatie aan niet-betrokken derden verstrekken over het bestaan en de aard en inhoud van de onderhandelingen, voorafgaand aan het sluiten van de beoogde overeenkomst of na het afbreken van de onderhandelingen, tenzij de ene partij daarvoor aan de andere partij uitdrukkelijk schriftelijk of elektronisch toestemming heeft verleend.

BAX & COMPANY/ 6. Een overeenkomst komt eerst tot stand indien aan de volgende voorwaarden is voldaan:

i Een volledige overeenstemming van De Alliantie, Enervalis, ABB en Alklima over de beoogde overeenkomst.

ii Één of meerdere ontheffing op de Electriciteitswet wordt verleend door de Rijksdienst voor Ondernemend Nederland voor het uitvoeren van het Micro Energy Trading Experiment.

iii. Voor de voorwaarden i en ii geldt dat een relevante reden voor het onthouden van de goedkeuring dient te worden verstrekt.

7. Indien de onderhavige intentieverklaring wordt beëindigd, ontbonden en/of vernietigd, blijft artikel 5 van de onderhavige intentieverklaring onverminderd van toepassing.

8. Op deze intentieverklaring is Nederlands recht van toepassing.

Alle geschillen welke tussen partijen mochten ontstaan, naar aanleiding van de onderhavige intentieverklaring dan wel van nadere overeenkomsten die daarvan het gevolg mochten zijn of uit enige andere bestaande of toekomstige rechtsbetrekking zoals bij voorbeeld zij het niet uitsluitend ter zake van onrechtmatige daad, onverschuldigde betaling en ongegronde verrijking, zullen worden beslecht door de rechtbank te Utrecht, zulks behoudens voor zover dwingende competentieregels aan deze keuze in de weg zouden staan.

9. De bepalingen van deze intentieverklaring gelden niet voor zover daarvan bij latere, al of niet nadere overeenkomst tussen partijen wordt afgeweken.

Aldus is overeengekomen en in tweevoud ondertekend te Amersfoort op 6 september '17

Namens De Alliantie

Mano Otten

Manager Vastgoed

Intentieverklaring Business club Eemnes Micro Energy Trading project

Ondergetekende R.Koot namens de business club Eemnes, verklaart gesprekken hebben gevoerd en in onderhandeling zijn getreden omtrent het realiseren van een demonstratieproject 'Micro Energy Trading'. De doelstelling van dit project is het demonstreren in de praktijk van een smart grid met zogenaamde smart trading capaciteiten.

De ondergetekende thans een aantal uitgangspunten en afspraken in verband met deze onderhandelingen en de daaruit eventueel voort te vloeien overeenstemming vast te leggen in de onderhavige intentieverklaring.

De ondergetekende komen het navolgende overeen:

1. De partijen zullen onder de voorwaarden zoals overeengekomen in de onderhavige intentieverklaring gezamenlijk de mogelijkheden nader onderzoeken om tot overeenstemming te komen over een overeenkomst inzake het realiseren van een project 'Micro Energy Trading'.

2. Indien partijen tot overeenstemming komen inzake het realiseren van een project 'Micro Energy Trading' zal de beoogde overeenkomst in ieder geval een uitwerking van het navolgende dienen te omvatten:

- De locatie, omvang en doelstellingen van dergelijk project
- Rollen en taken van de betrokkenen
- De voorziene investeringen en kosten/baten van elk van de betrokken partijen
- Een model om belangen van bewoners (huurders) van De Alliantie en andere partijen te verzekeren. In het bijzonder betreft dit de energie-coöperatie als instrument en een model voor het berekenen van kosten en inkomsten uit het verbruik en opwekking van energie

3. Op de onderhavige intentieverklaring zijn geen andere voorwaarden waaronder begrepen algemene of bijzondere leverings- of betalingsvoorwaarden of enige andere of bijzondere voorwaarden van welke partij dan ook van toepassing.

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6. Een overeenkomst komt eerst tot stand indien aan de volgende voorwaarden is voldaan:

i Een volledige overeenstemming van De Alliantie, Enervalis, ABB en Alklima over de beoogde overeenkomst.

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iii. Voor de voorwaarden i en ii geldt dat een relevante reden voor het onthouden van de goedkeuring dient te worden verstrekt.

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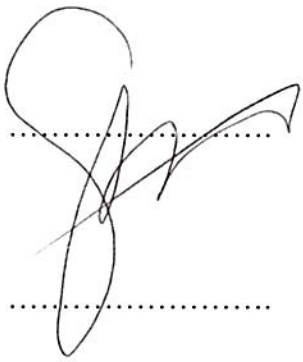
9. De bepalingen van deze intentieverklaring gelden niet voor zover daarvan bij latere, al of niet nadere overeenkomst tussen partijen wordt afgeweken.

Aldus is overeengekomen en in tweevoud ondertekend te Eemnes op 12 september

Namens de Business club Eemnes:
R.Koot



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DRAFT Coordination Agreement
Version 1.1, April 2018

RENAISSANCE
"RENewAble Integration and SuStainAbility iN energy CommunitiEs"

&

Indian partner
Quess Corp Ltd

Table of Contents

1. Introduction

This document provides non-buinding guidance to the participants of the consortium of Renaissance collaboration with Quess Corp Ltd in a call for H2020-LC-SC3-2018-2019-2020.

2. Parties

The parties of this coordination agreement are from the Indian side:
QUESS CORP LTD

and from the EU side:
VRIJE UNIVERSITEIT BRUSSEL
IKERLAN S COOP
ATOS SPAIN SA
DEEP BLUE SRL
SMARTWALL
SOREA SOCIETE DES REGIES DE L'ARC
FUNDACION CIRCE CENTRO DE INVESTIGACION DE RECURSOS Y CONSUMOS ENERGETICOS
DEMOCRITUS UNIVERSITY OF THRACE
ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS
BAX INNOVATION CONSULTING SL
SDM-PROJECTS BVBA
NARODOWA AGENCJE POSZANOWANIA ENERGII SA
ABB OF ASEA BROWN BOVERI
SUNAMP LIMITED
GEMEENTE EEMNES

3. Preamble

The purpose of this CooA is to specify with respect to the Project the relationship among the Parties, in particular concerning the organisation of the work between the Parties, the management of the collaboration and the draw up the rules for coordinating the work of the Parties concerning divison of tasks, coordination of the project and the set-up ways of conflict resolution.

4. Definitions

The Partners: the organisations responsible for the activities carried out within the context of the Project, and for coordination of these activities.

The Partnership: the cooperation between the Partners set up specifically for the execution of the Project and for the duration of the Project

5. Subject

The coordinate parties aim to test and improve the RENAISSANCE approach of smart grid system design approach on the Indian market. This will allow from one hand localisation of the RENAISSANCE design tool to include India technology options and socio-economic parameters. On the other hand it will allow to transfer knowledge from european smart grid industry to Indian partner and vice-versa.

6. Technical Provisions & Managerial Provisions

This section will define the necessary technical details for the coordination of the project.

Tasks of each party

The parties from both side will set up a liaison committee. The liaison committee is compoased of the Project Coordinator and 1 additional partner from the the EU partnership side and all Indian partner organisations. The liaison committee facilitates the collaboration between the EU and Indian partner.

The Management Support Team assists the liaison committee.

The Project Coordinator shall chair all meetings of the liaison committee, unless decided otherwise by the General Assembly of the entire Consortium

The chairperson shall convene ordinary meetings of the liaison committee at least once every six months and shall also convene extraordinary meetings at any time upon written request of any Member, these meetings could be presencial or may also be held by teleconference or other telecommunication means.

The voting rules: each member of the liaison committee has one vote, the decision will be taken by simple majority, while in case of a tie the chairperson shall have the desicive vote.

The liaison committee will follow-up and supervise the completion of tasks. It will also check the progress of the work, coordinates the research teams, coordinates the preparation of the reports, advises and directs changes to the work and provides a channel for formal communication between the parties.

Project Implementation

Below and estimation of the project schdeula and the inter-relation of the tasks between the parties.

In M6-16 the partner will concentrate on the elaboration of Task 2.4 in WP2, that deals with site analysis for using the multi-vector optimization software. Indian parties will provide the necessary data for the tool to run, while the EU partners will make the calculations.

Meanwhile in the WP3, in task 3.1 and task 3.2 the partner organisation from India together with experts from EU side will analyse alternative business models that could be used at the Indian market. In addition in WP6 regulatory analysis results from India will be compared with the EU results (M12-M33). Between M12-M30 the results of the Task 2.4 will be anlaysed and when appropriate emerged at the Indian pilot sites. M13-M36 undert task 7.6 explotationa and market strategy for India will be developed in collaboration between parties from both sides.

Changes to the above described project implementation startegies can be made by the liason committee at the regular meetings. Furthermore, at the M1-M3 the project implementation strategy described here, will be reviewed and futher detailed with the associated parties.

To deal with highly volatile situations, the liason committee could decide to terminate certain tasks, arrange withdrawal of certain parties, or the inclusion of new partners etc. In the latter cases the project consortium general assembly shall take decisions by a majority of two-third.

7. Financial Provisions

There will be no mutual payments nor commonly shared project budget between the parties.

8. Provisions Regarding Intellectual Property Rights, Dissemination and Use

There will be no commonly shared IPR developed under this project. The dissemination of results will be decided once the project starts.

9. General Provisions

This CooA will be reviewed once more before the Grant Agreements enters into force by all parties. The CooA will be in force throughout the duration of the EU grant agreement.

10. Signatures

AS WITNESS:
The Parties have caused this Coordination Agreement to be duly signed by the undersigned authorised representatives in separate signature pages the day and year first above written.

On Behalf on Indian Partnership

ORGANISATION: Quess Corp Ltd.

Signature(s)

Name(s): SAURAV R. LENKA

Title(s): BUSINESS DIRECTOR - QINFRA - DIVISION OF QUESS CORP

Date: 3rd April 2018.

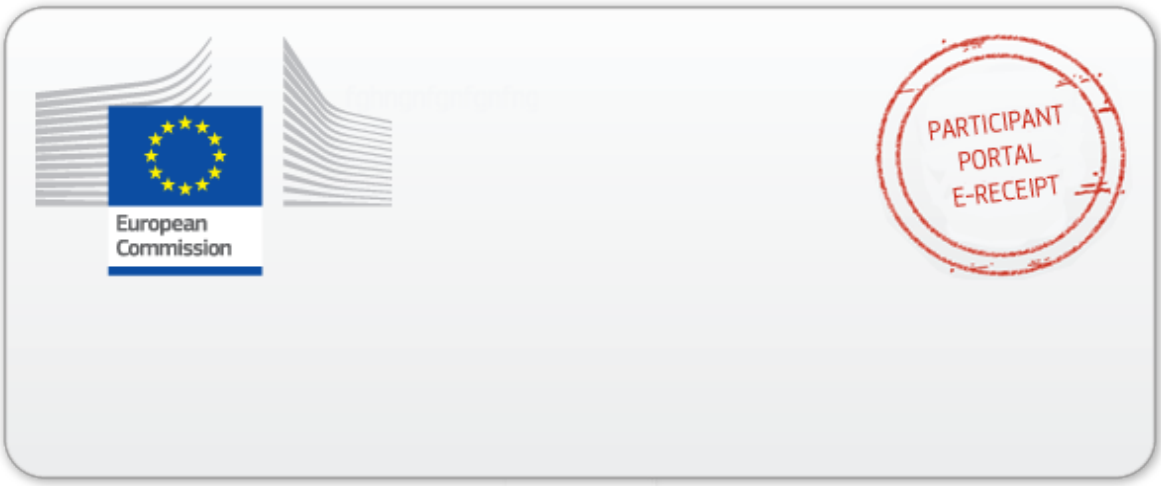
On Behalf of RENAISSANCE Consortium
ORGANISATION: VRIJE UNIVERSITEIT BRUSSEL

Signature(s)

Name(s): Thierry Coosemans

Title(s): Prof. Dr. ir.

Date: April 3rd, 2018



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