# BC from Residential Burning

Kaare Press-Kristensen
Senior adviser, air quality
The Danish Ecological Council
(+45) 22 81 10 27
karp@env.dtu.dk

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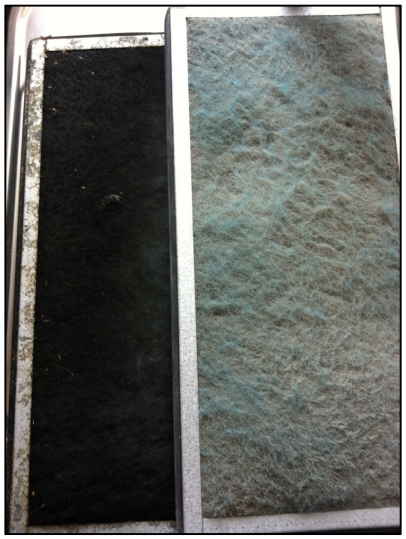
# Winter in Copenhagen, DK



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# Residential burning in EU

- About 45 % of the total $PM_{2.5}$ and BC emissions.
- Contribute significantly to premature mortality and morbidity as well as to climate change (BC).
- IIASA projection: 60 % of BC emissions in 2030.
- The key problem is intensive and increasing use of wood stoves combined with high emission factors and a very long unit lifetime (more than 40 years).

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# IIASA projection for BC in EU

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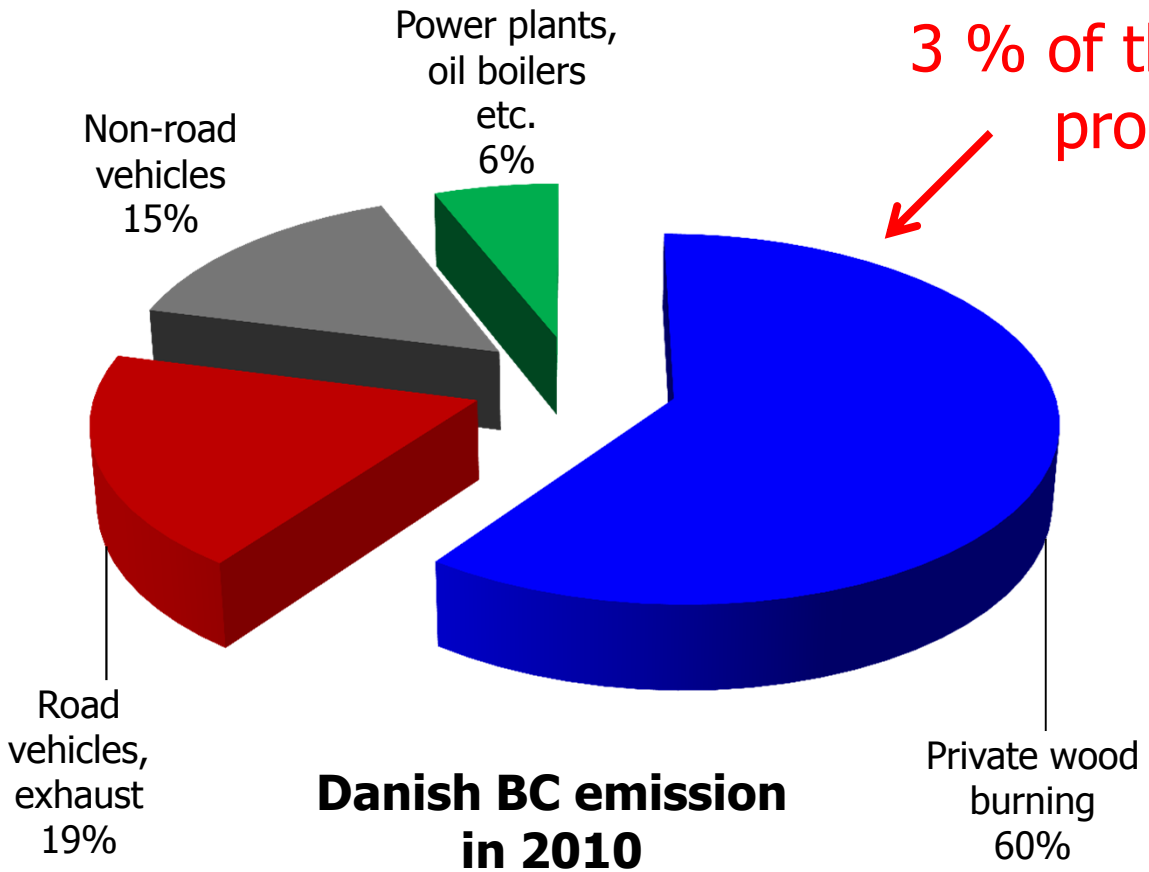
# Residential burning in DK

Covers only about 3 % of the energy production




**Danish BC emission in 2010**

In 2030 private wood burning is expected to emit above 90 % of the Danish BC. All other sources are reduced - wood burning emits the same (less per unit but increased burning).

# Indoor measurements
## Traditional stoves in DK


- Stoves can cause serious indoor air pollution and thereby exposure to soot particles (BC).

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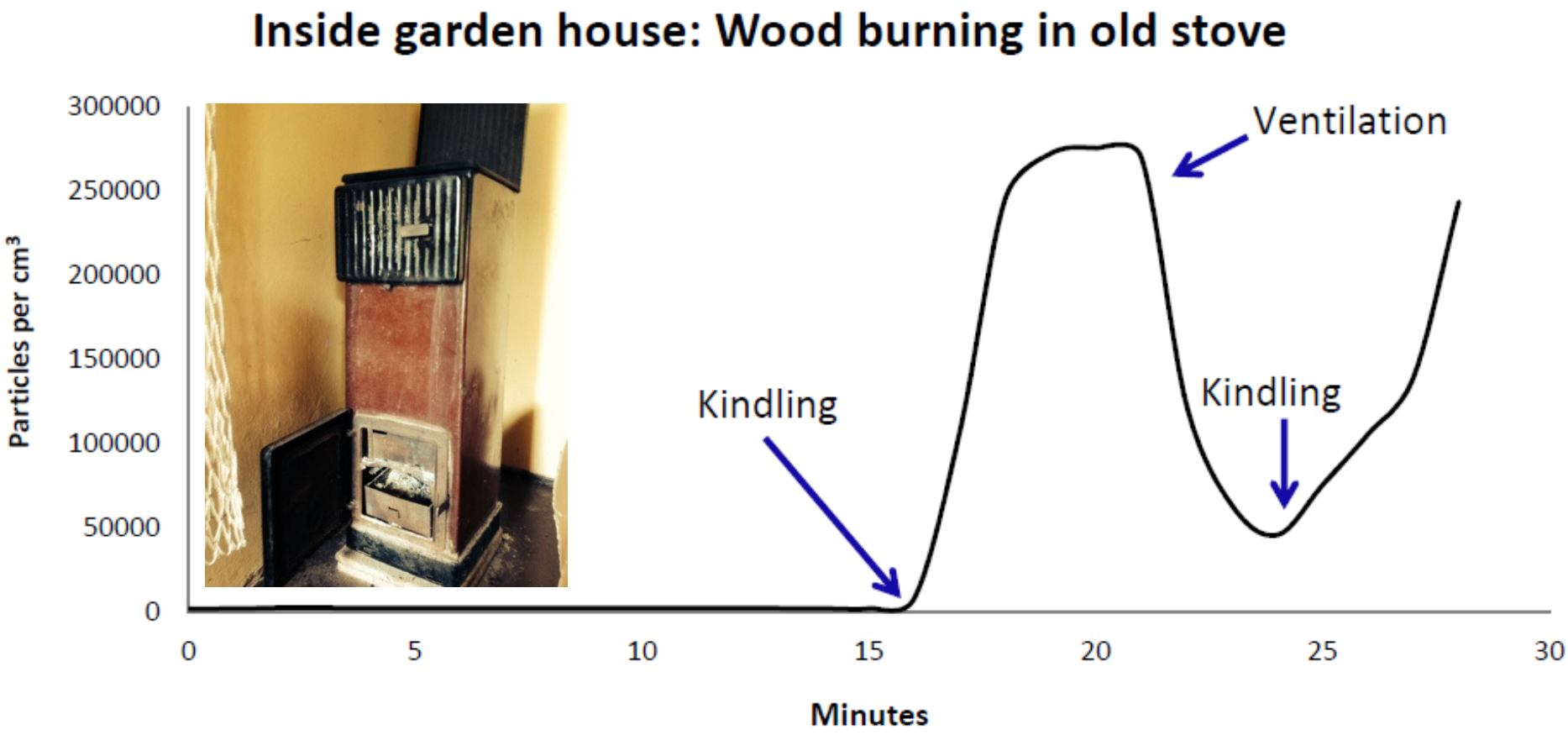
# Traditional stoves in Slovakia



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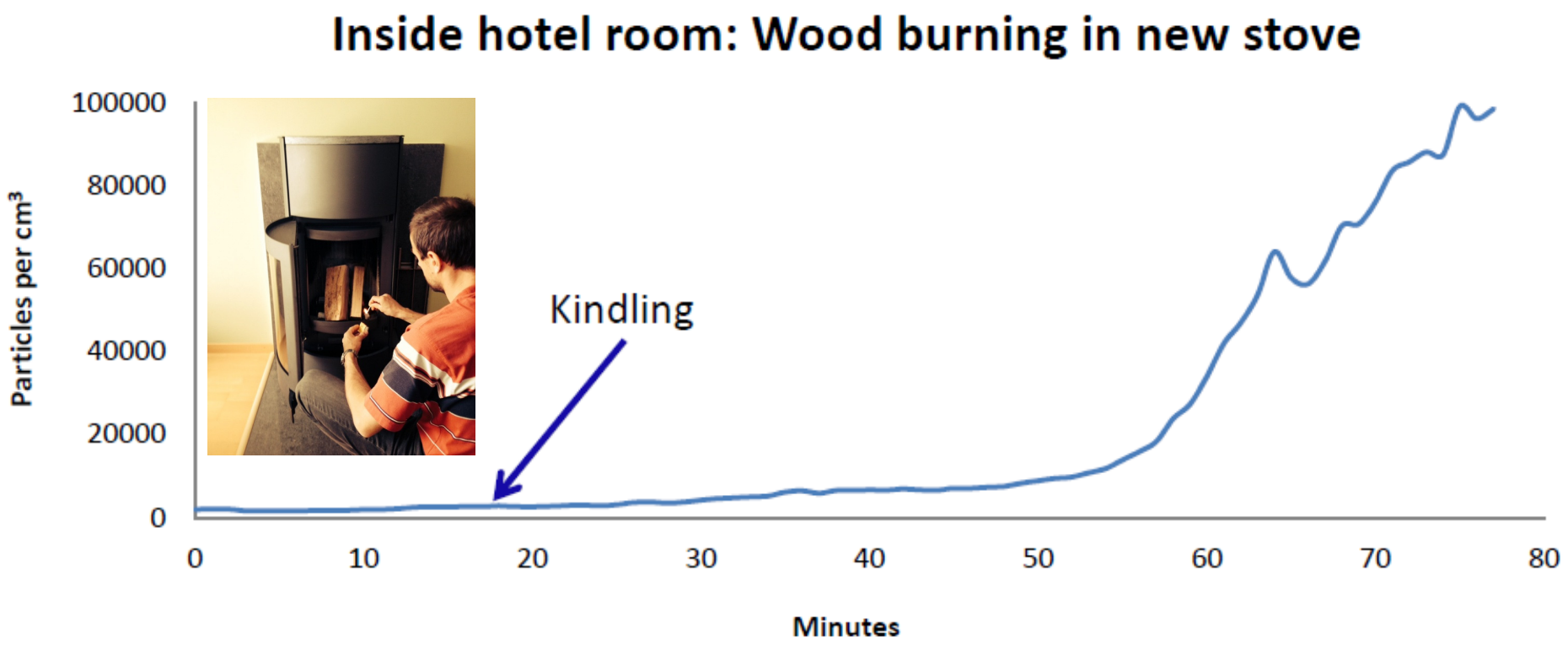
# New stoves in Slovakia



# Outdoor measurements

## New stoves are not solutions

- Measurements are constantly above max. measuring limit - even from a brand new low-emission stove with completely dry small pieces of wood and plenty of air.

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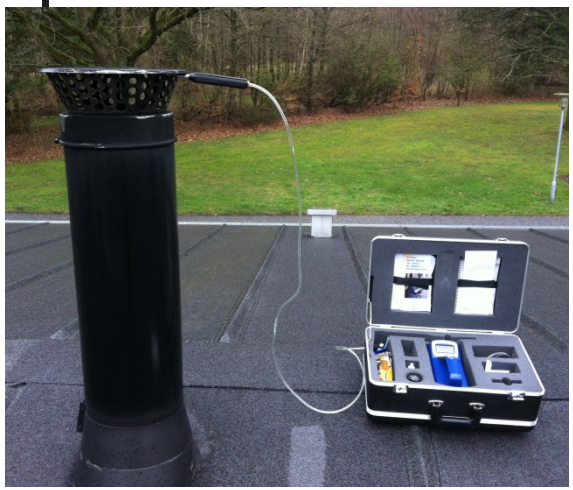
# New stoves vs. new trucks




Top: Before stove measurements.

Below: After 1 h measurements.


**Conclusion:**

New low-emission stoves cause much higher emissions (above 500.000 part/cm$^3$) than new trucks with particulate filters (below 1.000 part/cm$^3$).

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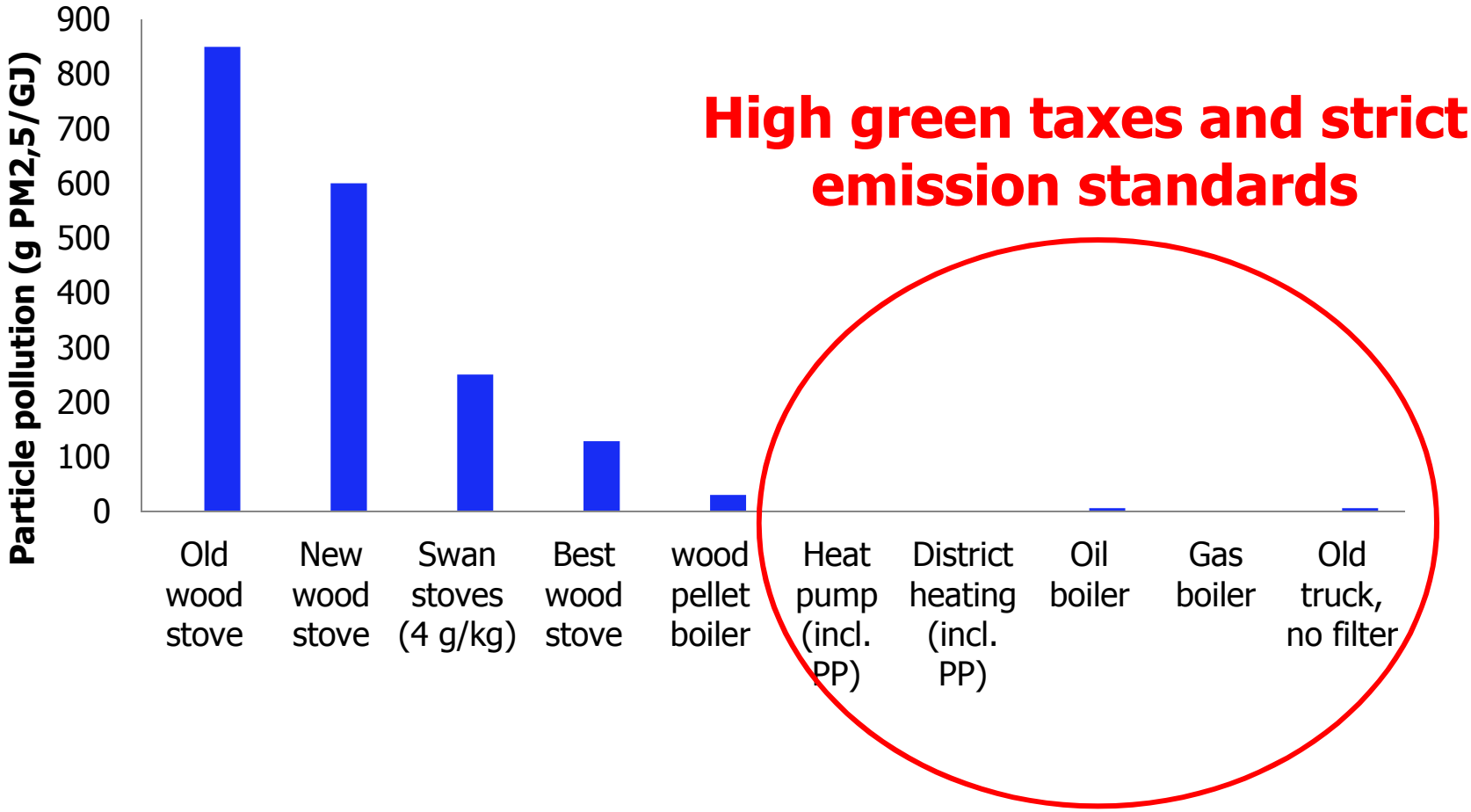
# The cause of the problem



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# Technical solutions in the EU

- Better insulation
- Heat pumps
- District heating
- Wood pellet stoves/boilers
- New two-chamber stoves
- Gas stoves

**Reduction potential > 90 %**

(Air pollution control technology: Filters etc. ?)

**The solutions are ready – but not profitable !**

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# What should be done in EU ?

- Strict emission limit values for new stoves/boilers.
- Strict $PM_{2.5}$ emission limits in the NEC Directive.
- Financial instruments to promote replacement.
- Financial instruments to promote alternatives.
- Laws to promote alternatives / ban in large cities.
- Information on health/climate issues – media !!!
- Information on stove management – campaigns !!!

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# What are we doing ?

- Started a one-year European campaign focusing on BC from residential burning → Global perspective !!!

- **The basis of the campaign is:**

ClimateWorks

1) Knowledge sharing among NGOs: Web platforms with material about problems and solutions.

2) Expert team doing measurements, presentations and press work abroad to assist local NGOs.

3) Alliances with health organizations, authorities etc.

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# Global perspective

- **China:** Residential burning of coal, wood etc. are the largest source to BC. Emissions from industry and transport will be reduced towards 2050. (*Environ. Sci. Technol.*, **2012**, *46* (14), pp 7595–7603)
- **India:** Residential burning of coal, wood etc. are the largest source to BC now and in the future. (*UNEP, 2012, ISBN 978-92-9029-529-7)*
- Appropriate knowledge from our European campaign must be shared on a global level. We are looking for NGOs (and money) to share knowledge on a global level … and to continue our European campaign.

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# Questions