Estonian Environmental Research Centre

Measures to reduce emissions from the residential heating sector in Estonia

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Introduction

- About 1/2 to 2/3 of total PM, POP and PAH emission in Estonia is attributed to residential wood combustion (RWC)
- Wood logs and wood chips account >90% of the fuel used for residential heating
- Typical masonry heaters (hand made) are used in >40% of Estonia’s residential households
• Using own heater and wood has long historical background and is counted almost as “must be” when private house is built
• Fire safety regulations are followed and chimneys/heaters are checked after every 1-5 years by professional chimney sweepers and is required by the insurance companies
• No special regulations regarding environmental requirements yet
B(a)P exceedances

- In Tartu (presenting typical RWC area in Estonia) the levels of PM2.5 have been high during cold season and B(a)P is exceeding target value 1 ng/m³
Measurement campaigns

- Four separate measurement campaigns are carried out since 2013 in Tartu
  - 2013/2014 – Station 1, Station 2 and Station 3
  - 2014/2015 – Station 4
  - 2016/2016 – Station 5
  - 2017/2018 – Station 6
PMF analysis using ACSM and aethalometer dataset

Secondary organic aerosol

Primary organic aerosol

Biomass burning: ~5 – 20%
SOA: ~63 – 82%
**BC_{wb} and B(a)P**

Gas-phase BaP attributes approximately 7-9% of the total BaP
Further steps

- AQ action plan to reduce RWC emissions is currently under preparation in Tartu
  - Complex measures should be used
- PMx and B(a)P reduction from the residential sector is challenging
  - People are very sensitive about this topic
  - Guidance documents about the cost-effective reduction measures are missing - so far project based approach has been used
Further steps

- Emission reduction from the RWC sector cannot be achieved only by replacing the old heaters with the new ones
  - The key factor is the end-user
  - Household insulation
- Continuous awareness raising campaigns (incl. chimney sweepers), about the proper wood usage in heaters, have to be conducted
  - Closer cooperation with local community and chimney sweepers/potters
- People like masonry heaters better than factory made heaters
  - Potters and chimney sweepers awareness raising about the environmental standards
Need to involve chimney sweepers into emission reduction activities

• Some people are using for stove and chimney cleaning “magic” powders or logs as this is recommended (!) by several chimney sweepers

• Powder consist Cu, which raises concerns about possible PCDD/F formation
Not clear whether higher BC concentrations are caused by removal effect or some additional BC is created.

NB! Ca 5600 x higher results compared to clean wood experiments.
Co-operation

• Looking forward to have closer co-operation with other countries
  – Interested to introduce similar to USEPA “Burn right” program

• Coordinated activities with chimney sweepers/potters at the local and international level
  – Including Estonian Potters Association and their partners in Europe (like VEUKO)
Recently Interreg project proposal **BALTAIR** by Finland, Estonia, Latvia and Lithuania has been submitted (18 partners)

**Finland:**
FMI, TuT, Tampere and Helsinki city, Vaisala, Pegasor

**Estonia:**
EERC and UoT
MoE and Tallinn City + SMEs

**Latvia:**
UoL and Riga City + SMEs

**Lithuania:**
KTU + Kaunas City + SMEs
BALTAIR

• **BALTAIR** is intended to tackle the challenge of air pollution in the Baltic Sea Region through international and innovative high-tech co-operation between partners.

• **Local community** and **Citizen Science** approach will be used – local people will be involved in air quality monitoring using sensors and mobile app-s to report about bad air quality in neighborhood.
  – Based on this information more precise and effective measures can be taken at the local level.
Conclusions

- Elevated levels of PMx and B(a)P are mainly related to the local emissions from the residential heating
  - Nevertheless the share of the regional pollution can be remarkable
- Work with the local community and with experts (fire fighters, chimney sweepers/potters) in order to take local scale measures
- Funding for the awareness raising and stove replacement campaigns
Thank you for your attention!