

Estonian Environmental Research Centre

# Measures to reduce emissions from the residential heating sector in Estonia

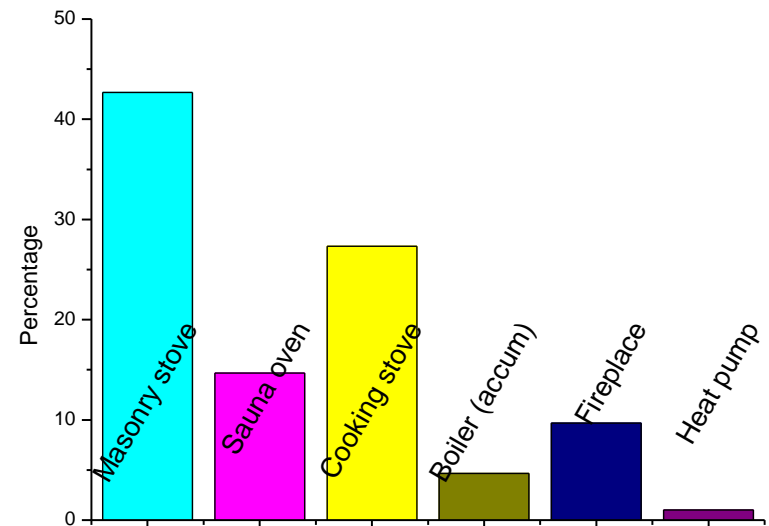
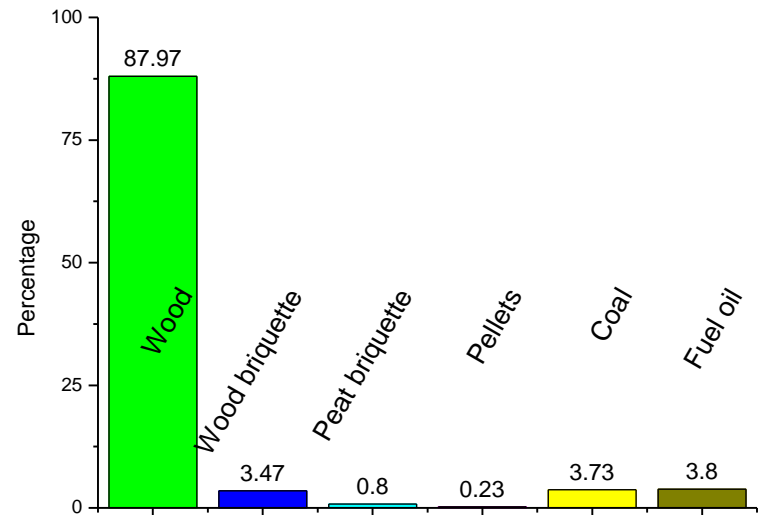
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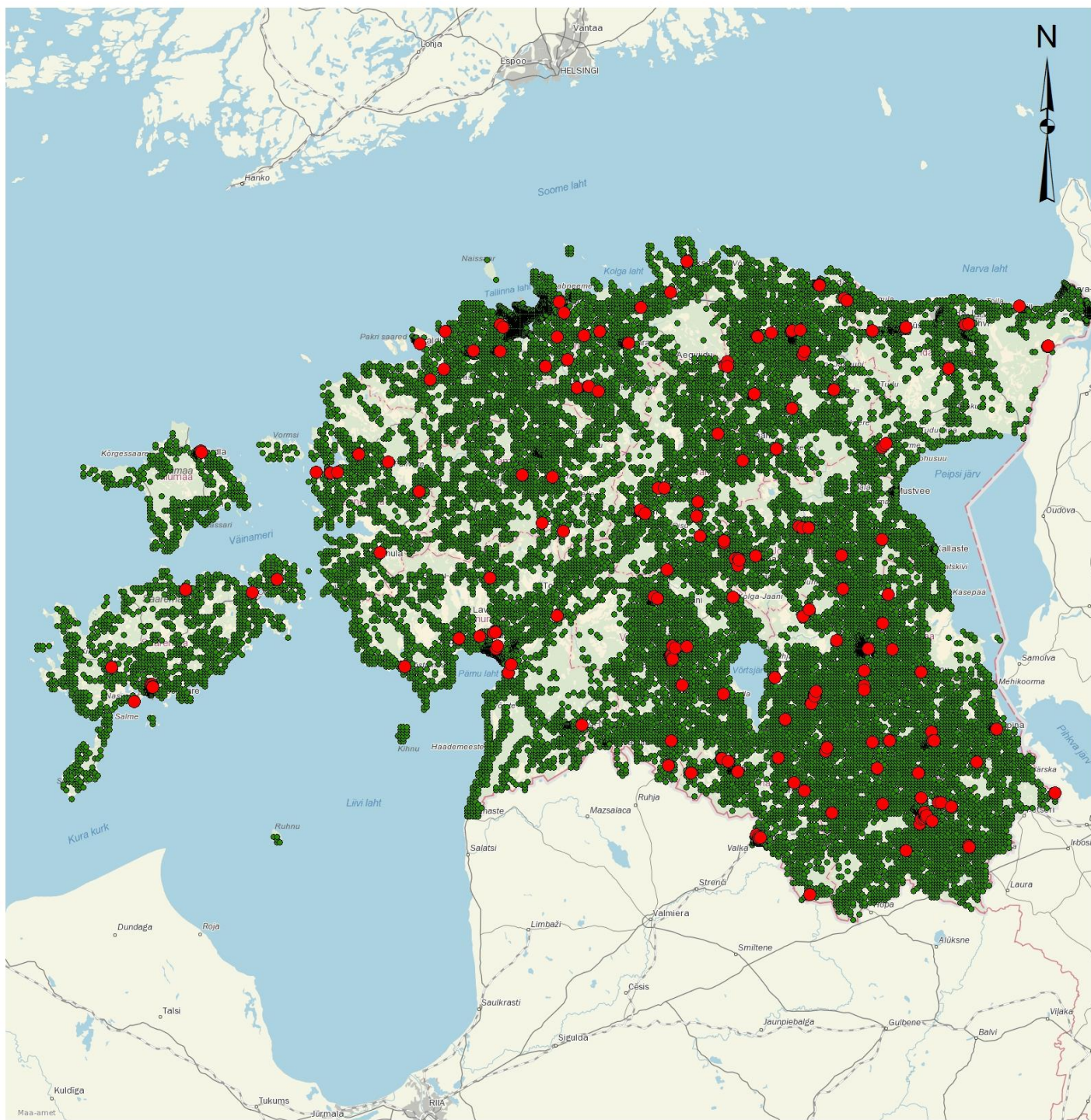


# Introduc

- 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



## PMx sources

- Industry
- RWC sources



Map compiled by:  
Estonian Environmental  
Research Centre  
Marja 4D  
Tallinn 10617  
[www.klab.ee](http://www.klab.ee)  
[info@klab.ee](mailto:info@klab.ee)

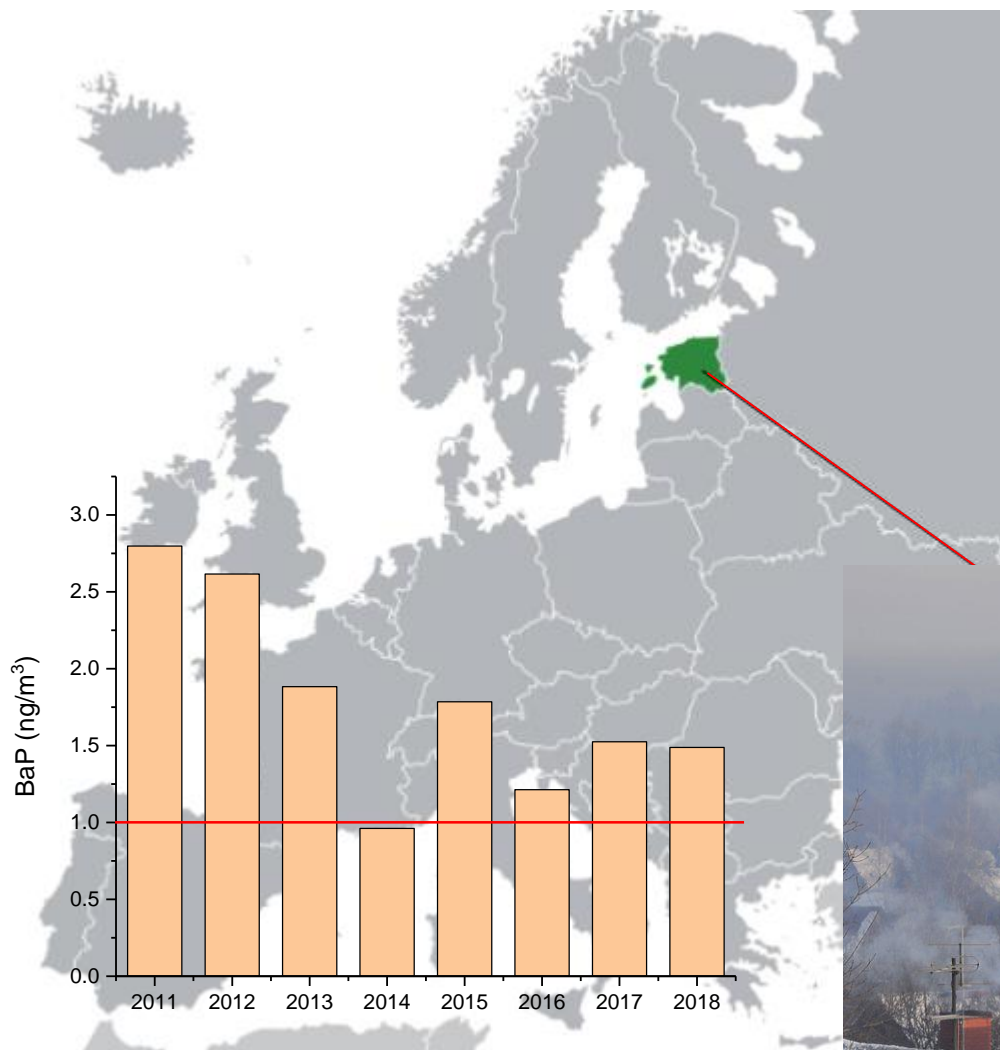
Estonian Land Board base card  
(WMS service)

# 1:900,000

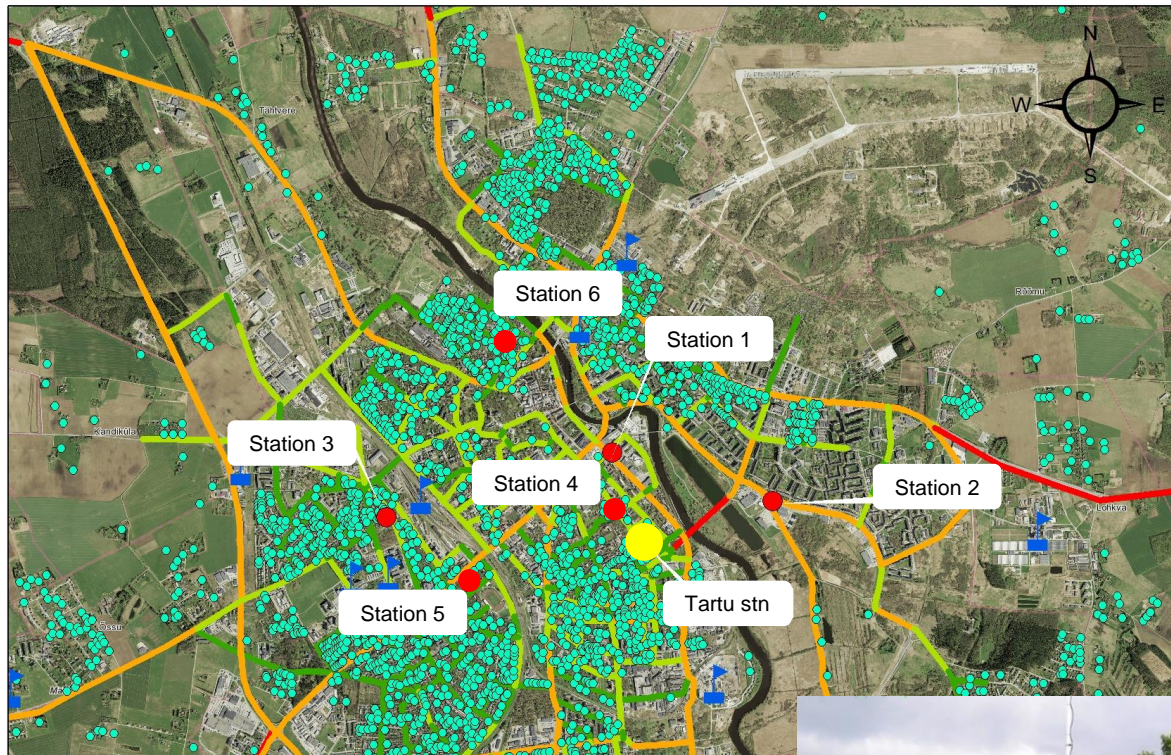


# B(a)P exceedances

- In Tartu (presenting typical RWC area in Estonia) the levels of PM<sub>2.5</sub> have been high during cold season and B(a)P is exceeding target value 1 ng/m<sup>3</sup>

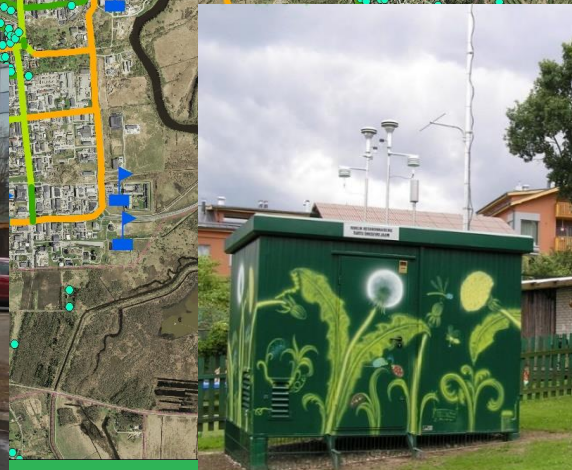


# Measurement campaigns



- Monitoring stations
  - ▲ Industry, PM2.5 source
  - RWC, PM2.5 source
- Road, PM2.5 g/s
- 0.000 - 0.001
  - 0.002 - 0.010
  - 0.011 - 0.100
  - 0.101 - 1.000

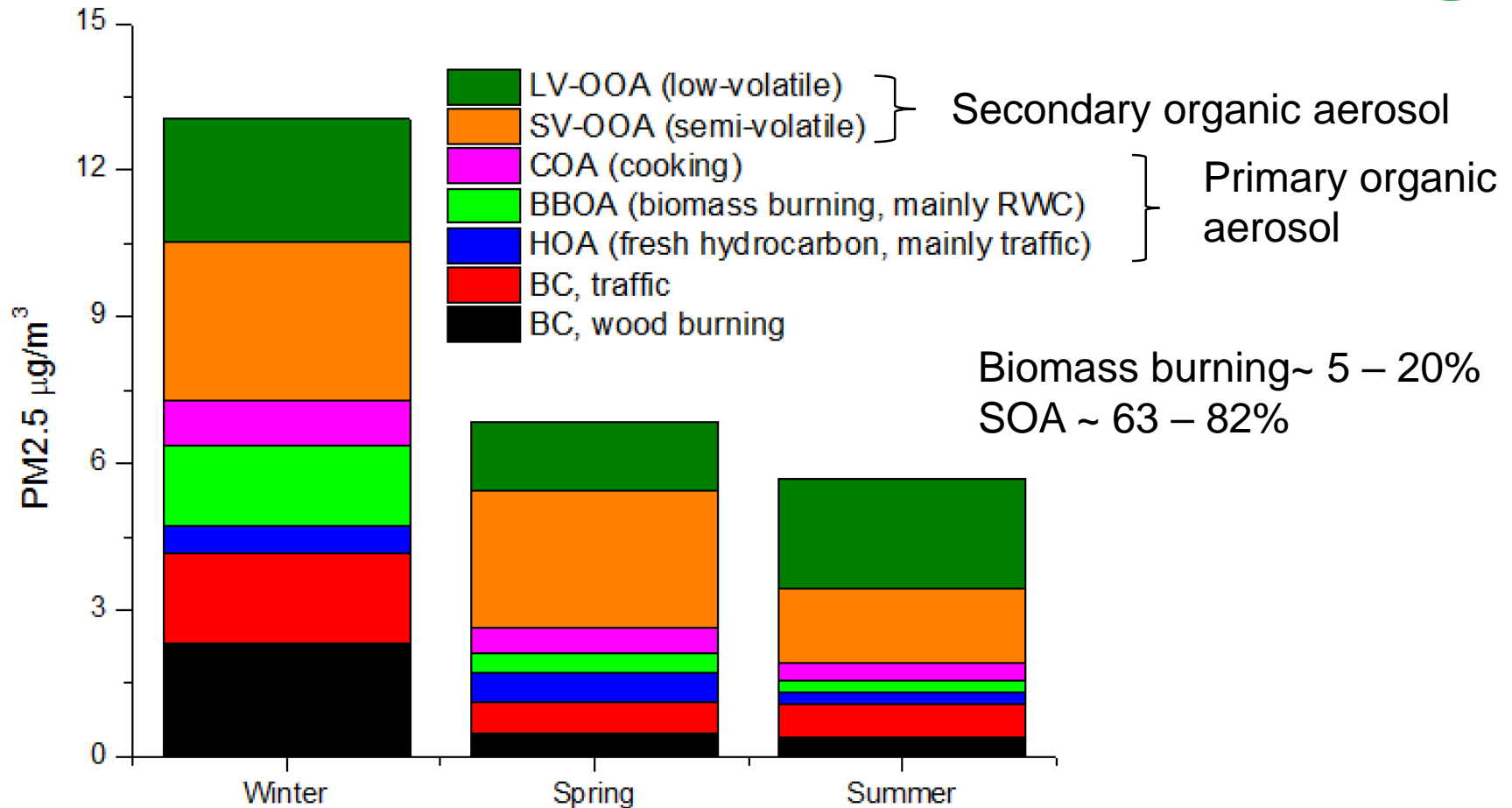
- Four separate measurement campaigns are carried out since 2013 in Tartu
- 2013/2014 – Station 1, Station 2 and Station 3
- 2014/2015 – Station 4
- 2016/2016 – Station 5
- 2017/2018 – Station 6



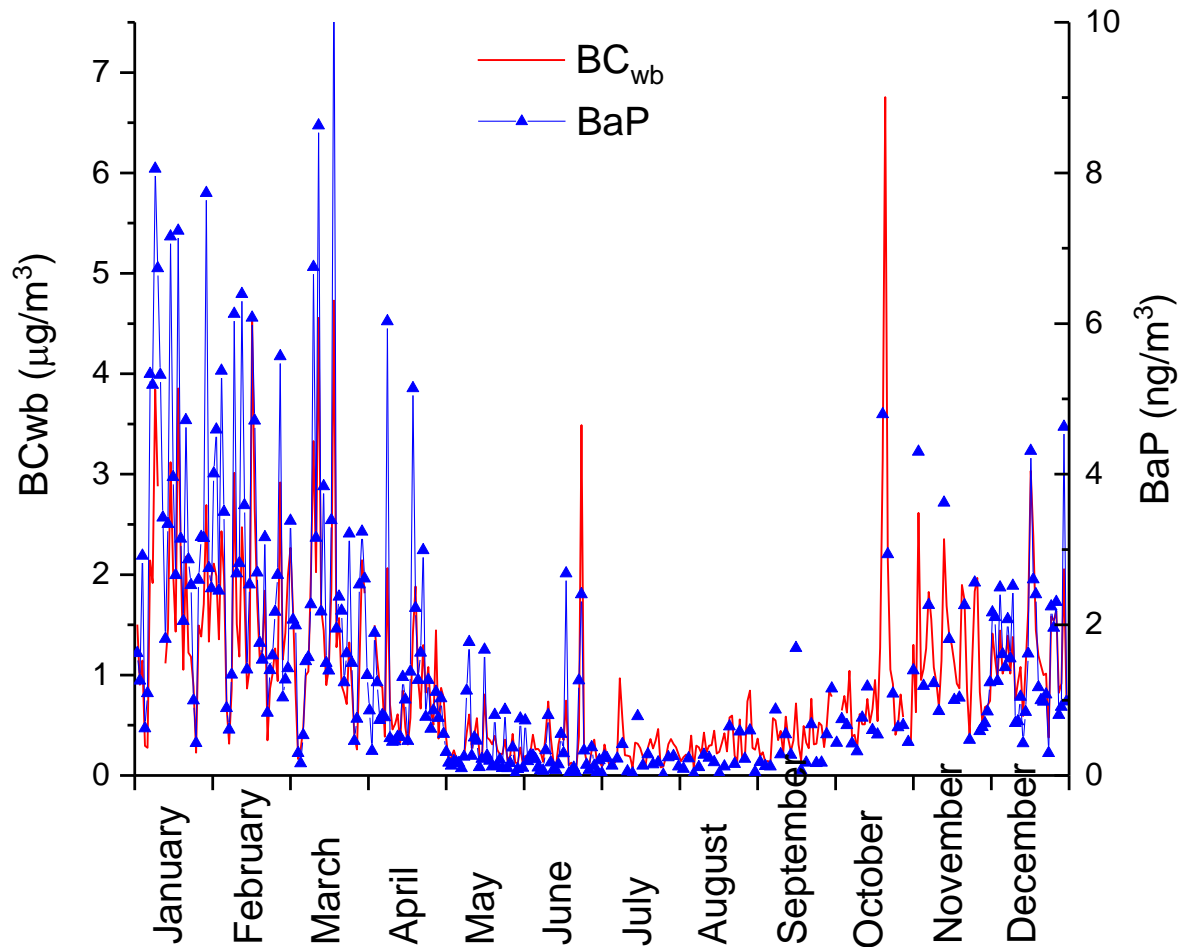
1:22



# PMF analysis using ACSM and aethalometer dataset



# BC<sub>wb</sub> and B(a)P



	Correlation R <sup>2</sup>
January	0.93
February	0.90
March	0.94
April	0.75
May	0.75
June	0.73
July	0.56
August	0.81
September	0.80
October	0.99
November	0.98
December	0.88

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
- PM<sub>x</sub> 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 can not 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



Pigieemaldaja (1 kg)

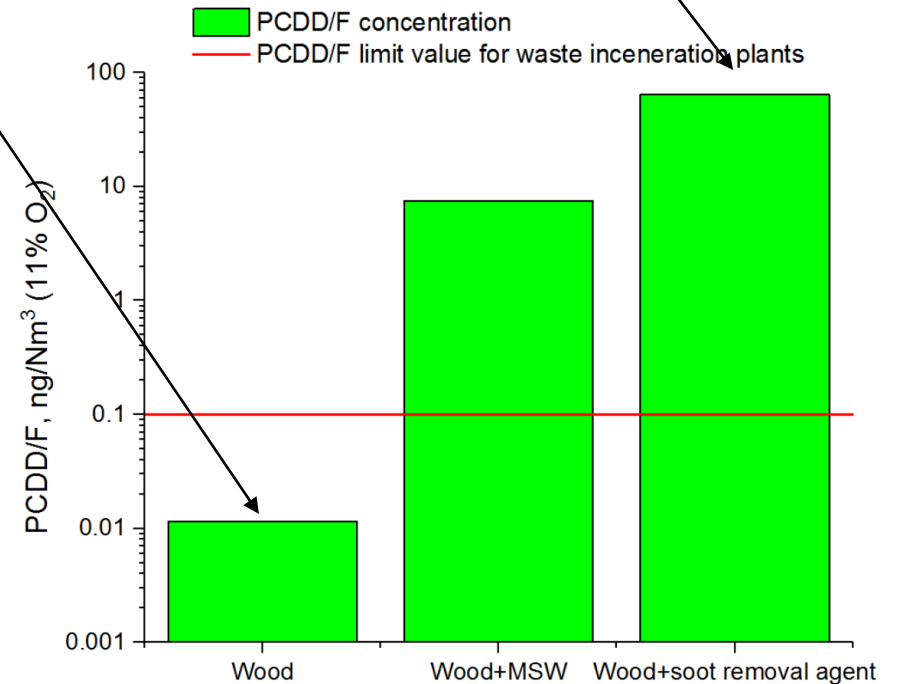
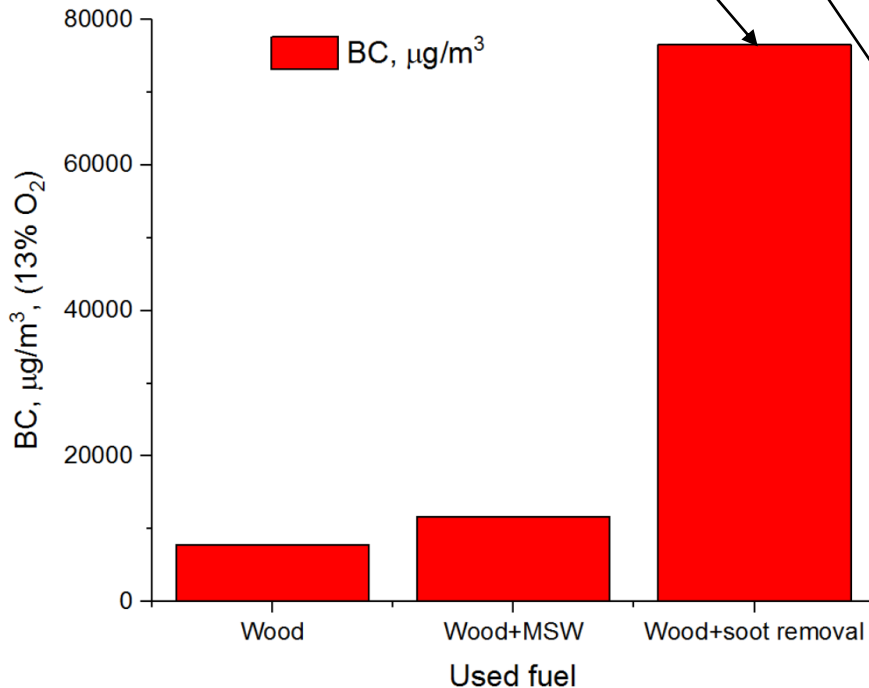
EAN kood: 4779022360183  
Kogus pakendis: 12 tk.



- 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





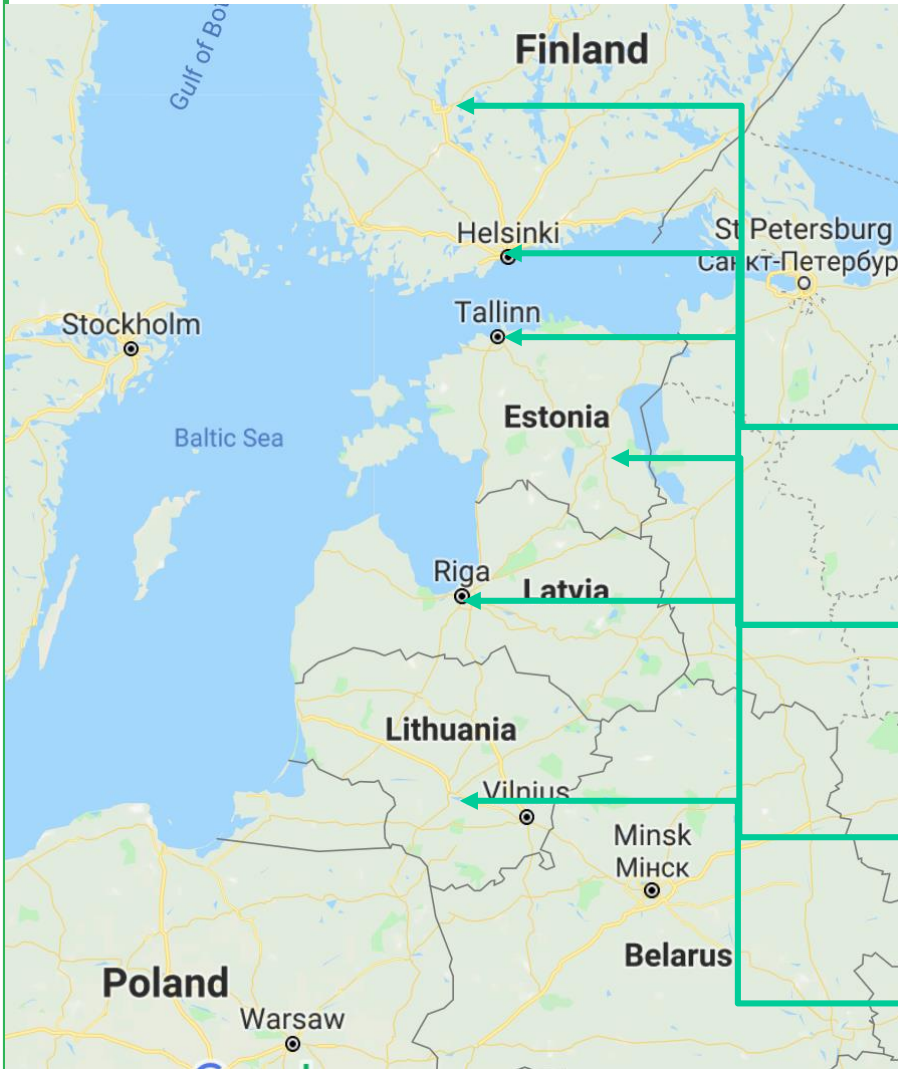
# Co-operation

- 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)



# BALTAIR

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 + SME-s

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 PM<sub>x</sub> 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



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**Thank you for your attention!**

