

Reduction of Black Carbon Emissions from Residential Wood Combustion

ACAP Project co-lead by Norway and Finland



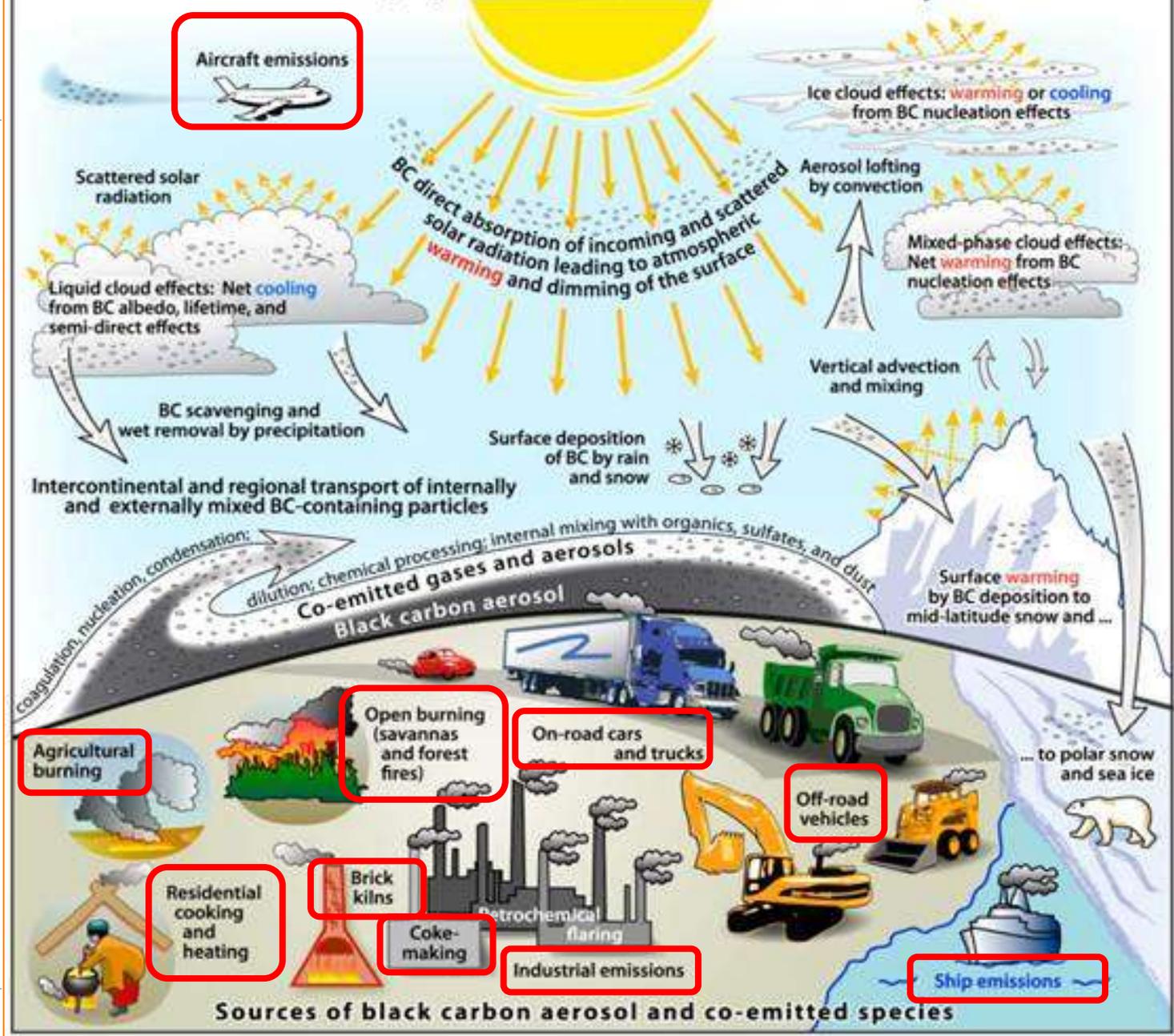
SAO meeting 22 October 2014

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ACAP vice chair

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Black Carbon (BC) Aerosol Processes in the Climate System



Black carbon emission inventories

-an important foundation for policy making

- ▶ Consumption of wood has increased in most AC countries
- ▶ All countries participating in the project have national black carbon inventories that address residential combustion emissions.
- ▶ Residential wood combustion is an important source.

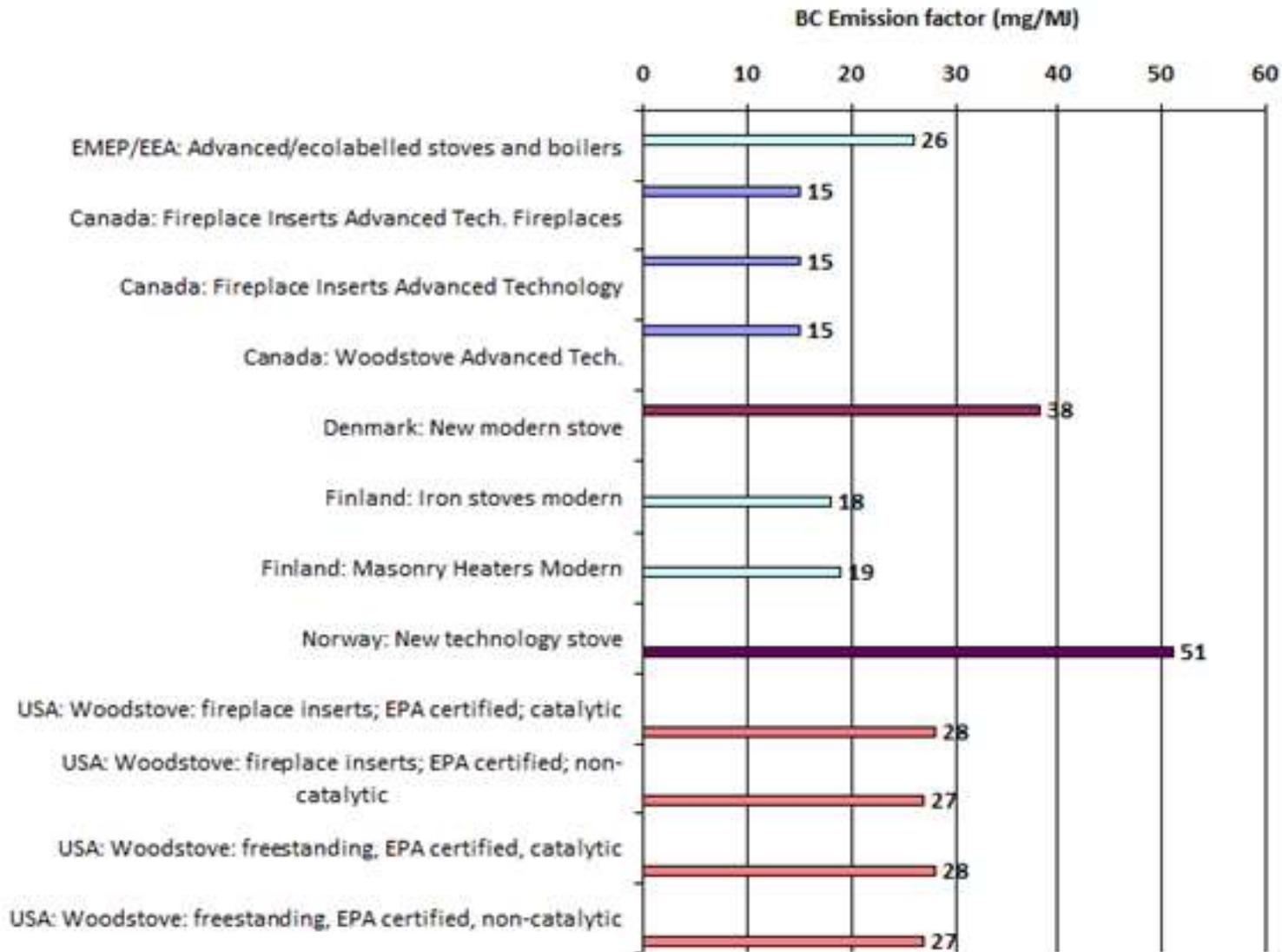
Country (inventory year)	Residential sector (%) of anthropogenic total BC (without open biomass burning)
Canada (2006)	14%
Denmark (2010)	59%
Finland (2010)	47%
Norway (2010)	26%
Sweden	n.a.
The United States (2005)	6%

Differences in Residential BC

1. **Countries are different, total BC emissions are different!**
 - ▶ Energy production
 - ▶ Industry
 - ▶ Agricultural burning
 - ▶ Infrastructure ...
2. **Countries use different technology**
 - ▶ 1 mg/MJ (pellet fired boiler) to 600 mg/MJ (old boiler)
3. **Countries use different emission factors**
 - ▶ Emission factors have been established based on relatively few measurements and varying methods



The BC emission factors



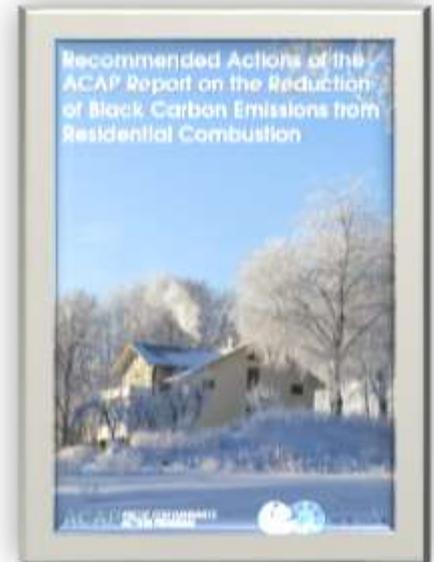
Conclusions

- ▶ The new technologies reduce BC emission, but there is potential to reduce emissions further
- ▶ **Recommendations for both national and pan-arctic action**



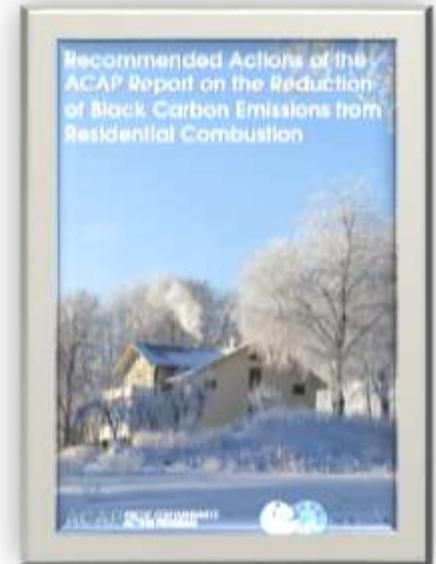
Recommendations for National Level (1)

- ▶ National action plans to reduce emissions of black carbon from residential heating stoves and boilers
- ▶ Establish emission limits for stoves
- ▶ Introduce voluntary black carbon emission testing and ecolabelling
- ▶ Introduce legal instruments that would enable local authorities to implement bans on wood burning
- ▶ Programmes to replace old appliances with clean-burning modern units.



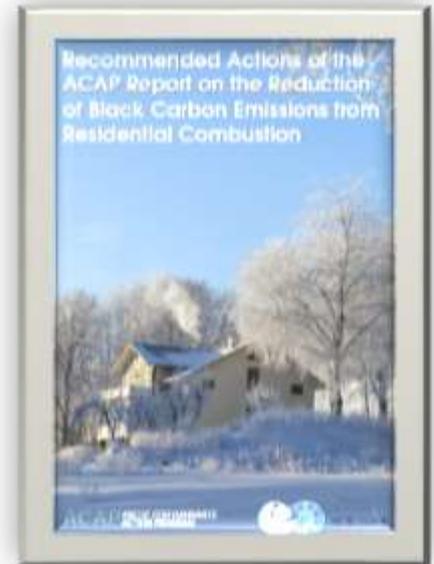
Recommendations for National Level (2)

- ▶ Introduce regular stove inspections, combined with compulsory maintenance.
- ▶ Regular end-user “burn right” information sharing.
- ▶ Establish fuel wood guidelines or information campaigns to promote fuel homogeneity.
- ▶ Advocate the development and use of stoves with improved combustion efficiency or increased heat storage capabilities.
- ▶ Support the transition from wood stoves to pellet stoves.



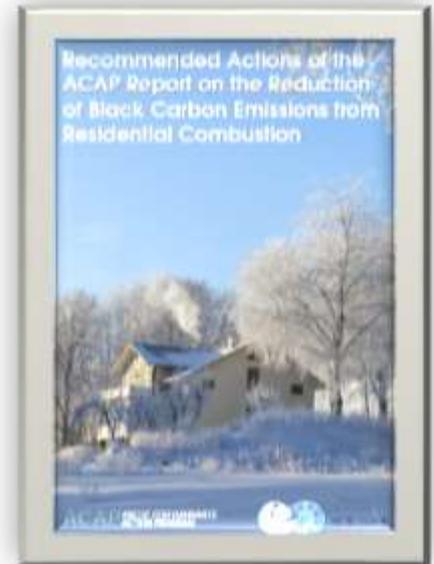
Recommendations for Pan-Arctic Level (1)

- ▶ Establish a black carbon outreach strategy for AC members, observer countries and others.
- ▶ Develop uniform BC measurement methods and emission limits.
- ▶ Establish uniform BC reporting guidelines.
- ▶ Create a regional toolbox for developing national action plans or equivalent measures.



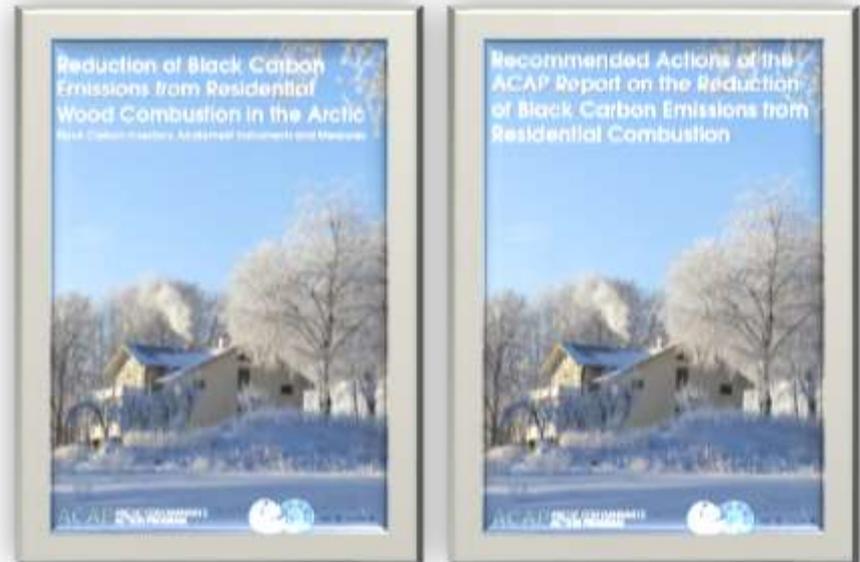
Recommendations for Pan-Arctic Level (2)

- ▶ Facilitate information sharing among institutions working on PM/BC
- ▶ Encourage shared research efforts to close knowledge gaps.
- ▶ Implement demonstration projects to verify the effect of mitigation instruments and measures.



The report may be of interest to:

- ▶ AMAP expert group on black carbon and ozone
- ▶ AC task force on black carbon and methane
- ▶ ACAP project; Arctic Black Carbon Case Studies Platform Project
- ▶ AC PPs and observers





SAOs may wish to approve the ACAP report on "Reduction of Black Carbon emissions from residential wood Combustion", and its recommendations.

The report and recommendations can be made as an ACAP deliverable to the Ministerial meeting in 2015

The report and leaflet can be made available as hard copy and electronically on the ACAP website



Thank you for your attention



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Black carbon emissions from wood stoves in 5 Arctic nations

- ▶ The last decade: relatively stable emissions

