

Black Carbon  
from  
Domestic  
Heating and  
Ag Sector  
Open Burning



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# Focus on BC and PM2.5

- Keeping in mind that all emission reductions of BC also reduces PM2.5 proportionally
- The reverse, however, is not always true
- So far little focus on BC but urgency has increased since the revised Gothenburg Protocol was negotiated, along with more experience of dealing with BC, e.g.
  - More knowledge of BC emissions and emissions trends-number
  - Large sources of BC like *domestic heating* (number 1 in Europe and Sweden) and *open agricultural burning* are not being adequately addressed
  - More knowledge and experience on effective abatement measures
  - More information on costs and financing needs
- The LRTAP PWG pointed explicitly to these sources and the need for additional action

# BC and Wood Burning – Three Approaches

- **EXISTING STOVES: "Burn Right!":**
  - Emissions reduced 30-50%-even up to 80 % where people "burn very wrong"
  - Good first step with low costs - local or national information campaigns
  - Guidance aimed at reducing BC/PM2.5 for climate/glacier/Arctic and health benefits
  - Lighting phase most important for emissions of BC
- **NEW STOVES:** Development/introduction of low-BC/PM2.5 stoves and associated measures/regulations
  - Very low-BC and PM2.5 stoves using whole logs already exist ("Bionic stove")
  - Nordic Council of Ministers: new BC testing protocol found low-BC stoves, one BETTER than normal pellet stoves
  - No country (including EU, Nordics and U.S./Canada) has BC standards – great potential for regulation and voluntary "climate-friendly" standards by producers and labeling programs
  - Incentives for buying new stoves-phasing out old stoves: phase-out programs, banning use of old, inefficient stoves in regions and locally.
- **FUEL or TECHNOLOGY switching:**
  - Change to pellets, wood chips, LPG, propane etc. or other domestic heating systems like heat pumps-geothermal, waterborne systems/boilers, district heating

## Burn Right

More heat, better for health and climate

Home

Five Simple Steps to "Burn Right" for Health, Climate and Better Heating

Short-Lived Climate Pollutants and Woodburning

Climate Impacts

Health Impacts

Economic Impacts

Resources

### CHOOSE A LANGUAGE

-  English
-  Swedish
-  Finnish
-  German
-  French
-  Spanish
-  Russian

## Sweden 2017

# TÄND I TOPPEN

Lär din öga i vedsmånen så du får en varm och god, till och med hälsosam, värme.



### Fire grunner til å fyre riktig

#### Miljøvennlig

Fyre du riktig, reduserer du sot- og partikkelutslippene og bidrar dermed til mindre lokal luftforurensning.

#### Klimavennlig

Ved er en fornybar energikilde og derfor et klimavennlig alternativ til fossile oppvarming. Avvik: Soten legger seg på sne og is, og tilhøker seg varme. Riktig vedfyring reduserer disse negative klimaeffektene.

#### Lennsomt og effektivt

Fyre du riktig, sløyfes veden bedre og du oppnår innvi dristelig så mye varme.

#### Trygt og brannikkert

Fyre du riktig, får du best en mer sikker og behagelig behandling. Det betyr mindre vedkøkk, røyk og røykrisiko for sot- og pipstein. Vedfyring varmer også ved strømbredder.

## Norway 2013

• Investér i et rennende vannsystem. Det gir varme og trykkløst vann til alle i huset ditt. • Kjøp en vannvarmer som har god isolasjon og er energieffektiv. • Vær sikker på at vannet ditt er trykkløst og trykkløst vann er trykkløst.

• Hvis du oppnår et så lite vann med vedfyring, så i kontakt med en lokal Norsk Varme eller annen lagmann. Eller et det som er tilgjengelig i ditt område.

## Finland 2014

# ENEMMÄN LÄMPÖÄ VÄHEMMÄN NOKEA

KÄYTÄNNÖN OHJEITA TULISIJAN TEHOKKAASEEN KÄYTTÖÖN – VÄHEMMILLÄ PÄÄSTÖILLÄ

### MIKSI JUURI NOKI ON VAARALLISTA?

Puun polttaminen on tällä hetkellä yksi suurimmista nokipäästöjen aiheuttajista Pohjoismaissa. Hengitystie- ja sydänsairauksille altistavia nokipäästöjä voi vähentää oikealla polttopöydällä. Saman lämmön saa vähemmällä polttopöydällä, huonontamatta lähiympäristön ilmanlaatua ja nopeuttamatta arktisen alueen lämpenemistä. Myös nokipalon riski savu- ja hörmössä pienenee.

Nokihuikakat imevät auringon säteiden lämpöä ja lämmitävät ilmaa. Arktisilla alueilla ja lumen peittämällä seuduilla – myös Suomessa ja muissa Pohjoismaissa – noki tummentaa lumen puidessaan sen päälle. Tumma lumi imee enemmän auringon säteilyä ja sulaa nopeammin. Nokipäästöjen pienentäminen jarruttaa tehokkaasti lumien sulamista ja vaikuttaa paitsi arktiseen jääpeitteeseen kokoon, myös lumettomien talvien esiintymiseen Pohjoismaissa.

**norsk varme**

Norsk Varme er brannsikkerheten for miljøvennlig, billig og effektiv forvarming. Forskning viser at det vedfyring faktisk skal dekke en viktig del av folkens oppvarmingsbehov i fremtiden.

**Naturvernforbundet**

Naturvernforbundet har 100-årigt medlem i 2014 og er Norges ledende miljø- og naturvernorganisasjon. Vi er en demokratisk medlemsorganisasjon med over 20.000 medlemmer. Som medlemmer i Naturvernforbundet kan du bidra til vårt arbeid for å ta vare på naturen og utøve klimarettspol.

**Bl medlem i Naturvernforbundet**

Send en SMS med **NATUR** til **2277** eller gå inn på [www.naturvernforbundet.no/medlem](http://www.naturvernforbundet.no/medlem)

## RIKTIG VEDFYRING

skåner miljøet og klimaet, reduserer kostnadene og øker brannsikkerheten.

# Revise Annex X of the amended Gothenburg Protocol

Table 12  
Recommended limit values for dust emissions released from new solid fuel combustion installations with a rated thermal input < 500 kWth to be used with product standards

	Dust (mg/m <sup>3</sup> )
Open/closed fireplaces and stoves using wood	75
Log wood boilers (with heat storage tank)	40
Pellet stoves and boilers	50
Stoves and boilers using other solid fuels than wood	50
Automatic combustion installations	50

Note: O<sub>2</sub> reference content: 13%.

(ii) Emissions from existing residential combustion stoves and boilers can be reduced by the following primary measures:

a. Public information and awareness-raising programmes regarding:

i. The proper operation of stoves and boilers;

ii. The use of untreated wood only;

iii. The correct seasoning of wood for moisture content.

b. Establishing a programme to promote the replacement of the oldest existing boilers and stoves by modern appliances; or

c. Establishing an obligation to exchange or retrofit old appliances.

(b) Non-residential combustion installations with a rated thermal input 100 kWth–1 MWth:

- More work needed on requirements for BC emissions and a common testing protocol for BC
- Use testing protocol developed by Nordic Council of Ministers and tested by ICCI/CCAC

- **Dust versus PM** – but not PM2.5 - nor BC
- Dust/PM limits more stringent for EU Eco-design Directive
- No mention of testing protocols for GP limit values (at least not here)

European Commission

## Ecodesign solid fuel local space heaters

Adopted 24 April 2015.  
Requirements for 2022:

Product	Energy efficiency			
Open fronted	30%			
Closed fronted	65%			
Closed fronted pellets	79%			
Cookers	65%			

Product	PM mg/m <sup>3</sup> *	OGC mg/m <sup>3</sup>	CO mg/m <sup>3</sup>	NO <sub>x</sub> mg/m <sup>3</sup>
Open fronted	50	100	2000	200
Closed fronted	40	100	1500	200 (300 fossil fuel)
Closed fronted pellets	20	40	300	200
Cookers	40	100	1500	200 (300 fossil fuel)

\* also Norwegian and British test methods allowed with separate limit values





# “Other Stove” Considerations

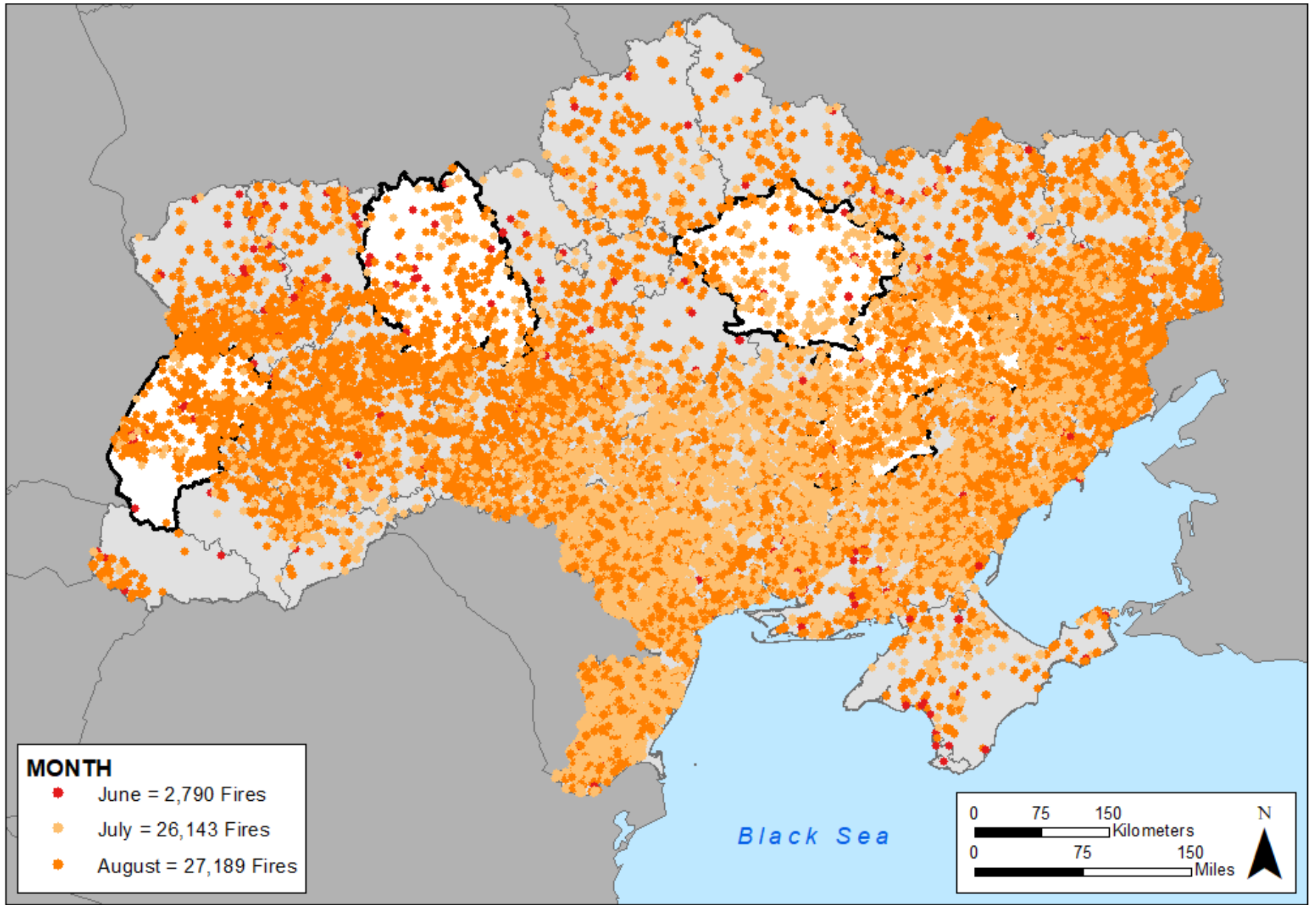
- **Coal Stoves:** wide use in Poland, other parts of Central and Eastern Europe
- **Combined Stoves:** Used for BOTH heating and some cooking, mostly coal
- Heating water often most important auxiliary to heating function
- Often poorest households, with very low-quality coal = high emissions and health impacts
- Poorly characterized; CCAC/ICCI Warsaw Summit (May 2017) began examining, CCAC may follow up
- Important future focus. However, there are emission standards under the Eco-design directives also for coal fired stoves.

# Open Agricultural Burning – *the other large, unaddressed source of PM2.5 and BC*

- **Define** as all agricultural sector burning: not “just” stubble burning (typical “emissions” definition) but also pasturelands, clearing to [re]place land in-use, clearing of forest understory prior to timber harvest, ***AND fires that spread from all of the above***
- **Appears underestimated** or simply “left out” of many national inventories (including CO2 for UNFCCC)
- **New satellite technologies (VIRSS)** makes far easier to map and estimate emissions based on crop and conditions, enabling more accurate inventories and also incentives/climate-based financing

# Ukraine VIIRS Active Fire Detections

JUN - AUG 2016 Detected Fires; Total Fires = 56,122

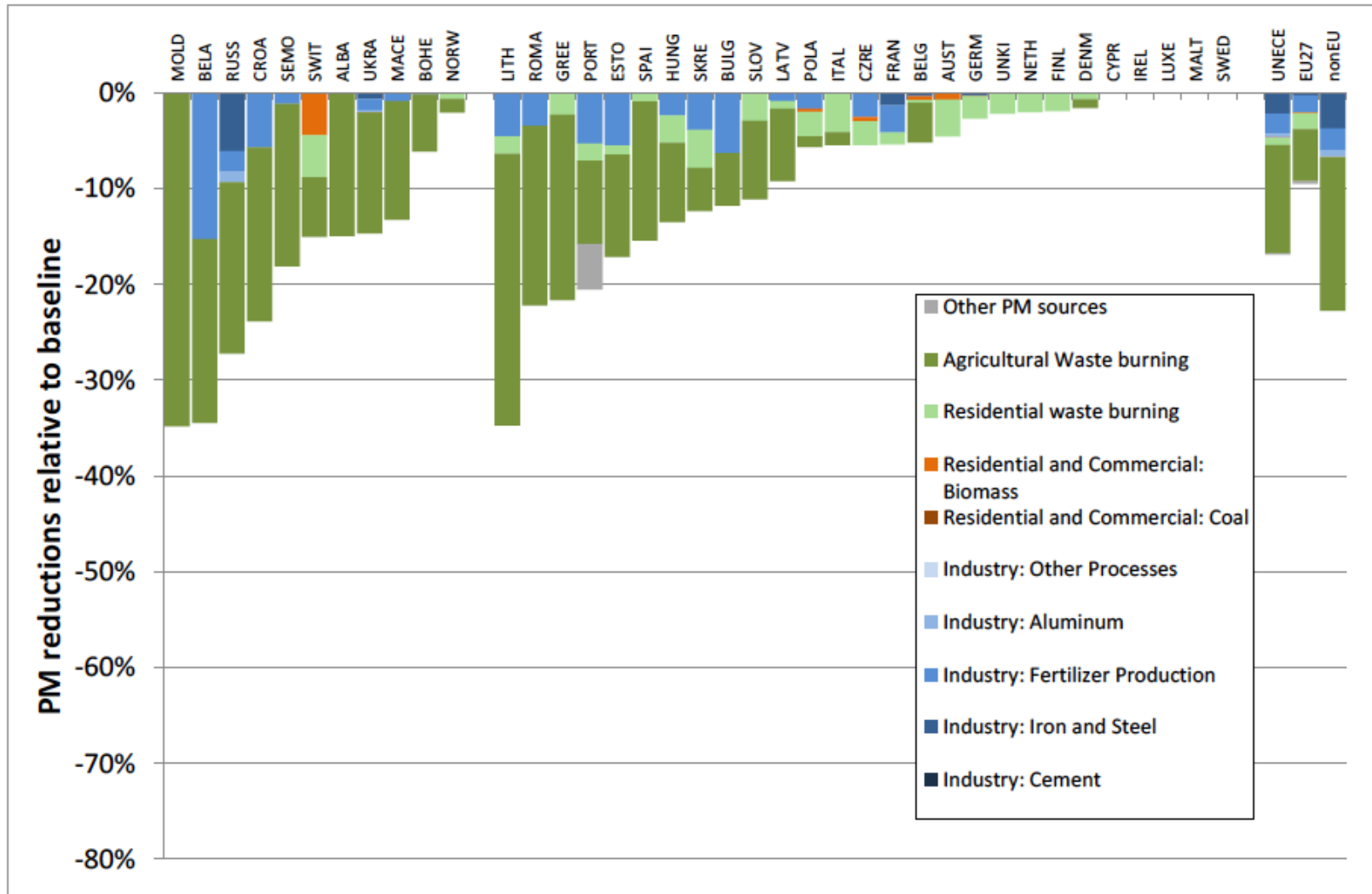




# Open Agricultural Burning – *the other large, unaddressed source of PM<sub>2.5</sub> and BC*

- **No-burn alternatives**, like low till or conservation agriculture, bring greater profit over time due to co-benefits (higher yields, less erosion, less need for fertilizer) are low-cost or (over time) even negative-cost = potential rapid adoption by farmers with incentives + meaningful regulation+microfinancing when needed
- **Demonstration projects** in Russia and Ukraine, planned in Moldova
- **Eastern Europe** largest source region of open burning emissions, but higher than expected in EU and North America
- **Implicated** in several recent (urban) health emergencies, leading to greater attention from WHO;

# Low-cost Options for Reducing PM2.5 under the Revised Gothenburg Protocol



# Recommendations for Further Work

- **Develop guidance document on :**  
**Burn Right** - Awareness Raising, National Campaigns, Burn Right Instructions and support and **Phase out programs for old stoves** – economic and other incentives for replacing old stoves by new stoves.
- **Review and revise Table 12 of the Annex X of the revised GP** concerning emission limit values for new stoves on the market:
  - Addressing testing protocols for BC and PM2.5
  - Reviewing and revise emission limit values, taking into account BAT since 2012
- **Voluntary Eco-labelling:** Consider guidance on undertaking voluntary performance labelling of new stoves using more stringent emission limit values for PM2.5 and BC, working pro-actively with stove producers
- **Agricultural Burning: Ensure properly defined and captured in emissions inventories!** Give credit where credit due to enable GP compliance
- **Develop a Guidance Document or BAP** for reducing or eliminating the practice of open agricultural burning; preliminary case for action previously presented to WGSR; LRTAP: Assign to TFTEI **and** TF on Reactive Nitrogen