

Wood burning: impact on air quality in Lombardy

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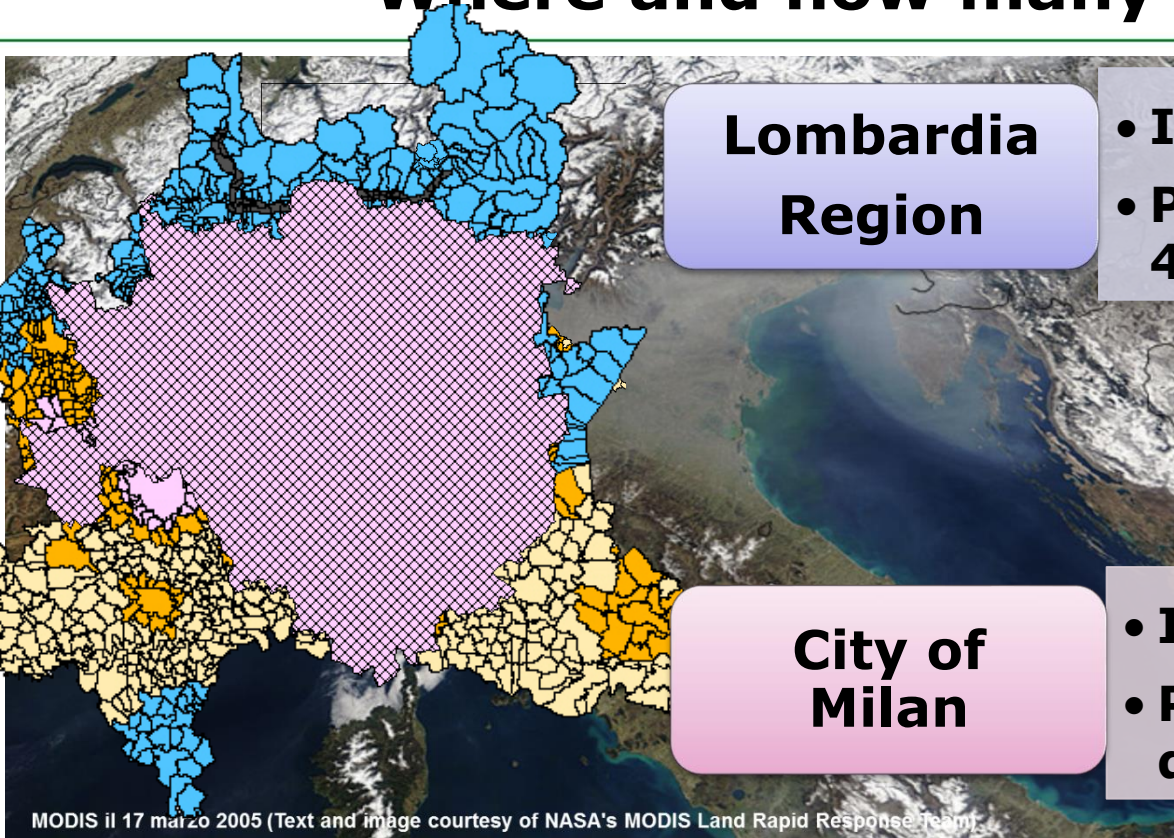
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SOFAIR

European Air Quality Conference 2019

Sofia, 12th April 2019

Milano and Lombardia: Where and how many



Lombardia Region

- **Inhabitants: 9,9 milion**
- **Population density: 419inab/km2**

City of Milan

- **Inhabitants: 1,3 milion**
- **Population density: 7.272inab/km²**

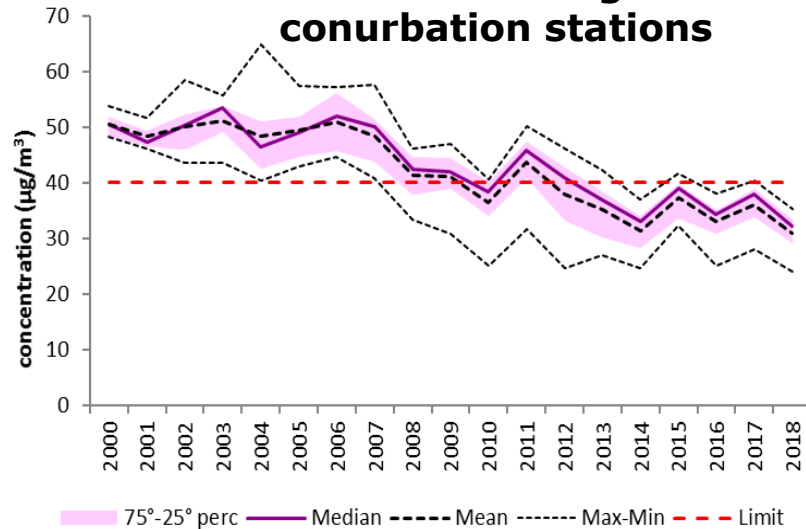
MODIS il 17 marzo 2005 (Text and image courtesy of NASA's MODIS Land Rapid Response Team)

- Po Valley: closed by mountains exceeding 2500 m a.s.l. on three sides (highest peaks exceeding 4000 m a.s.l.)
- Meteorological conditions often adverse to air pollution dispersion

Air Quality

Concentrations are decreasing but

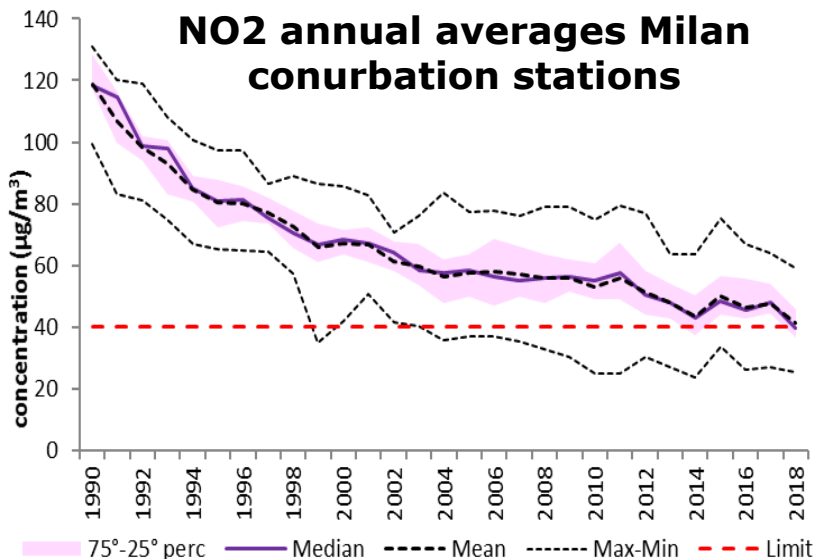
PM10 annual averages Milan conurbation stations



- Widespread **PM10** daily limit exceedances (42-79 in Milan in 2018)

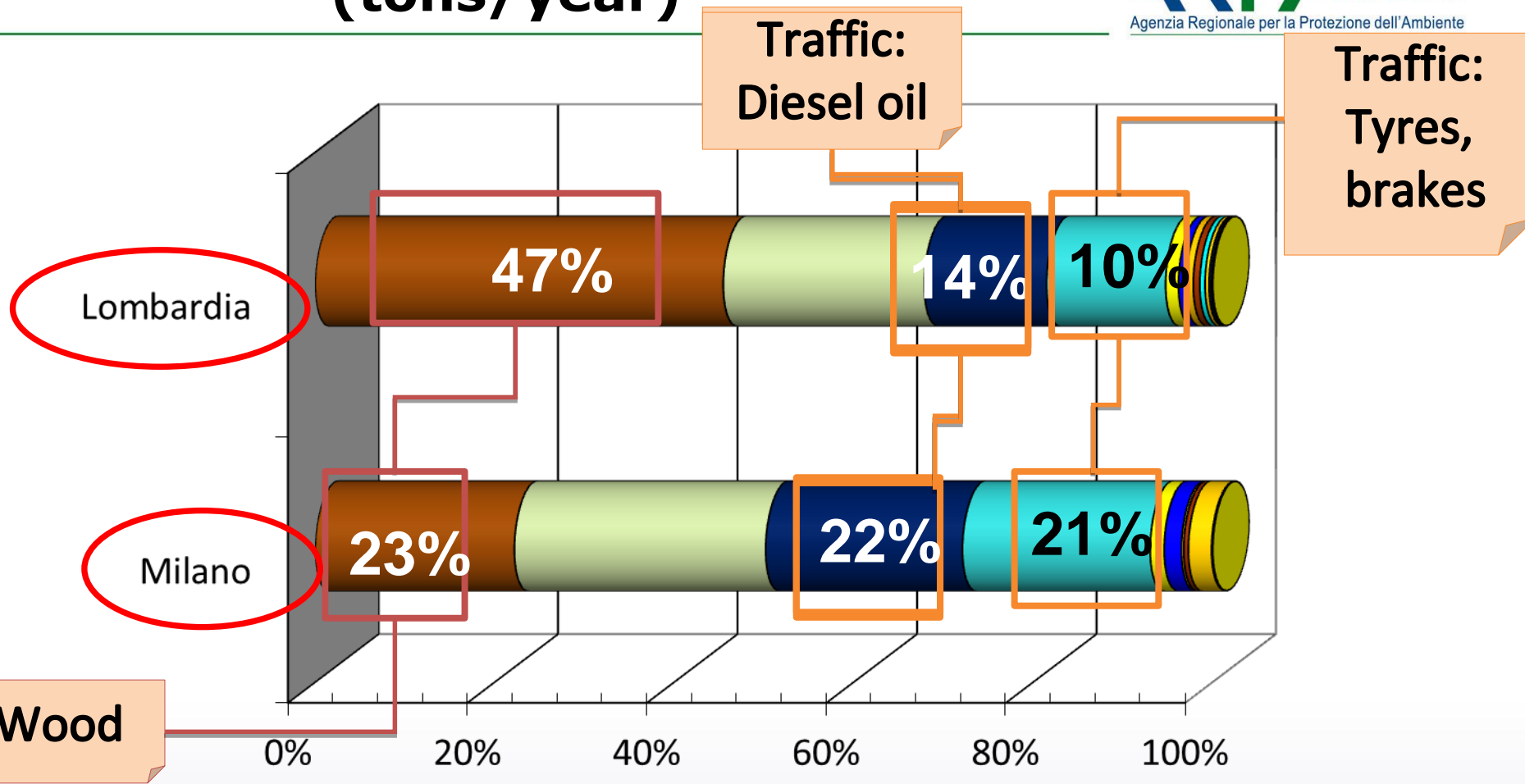
- NO2** annual limit exceedances, especially in traffic stations (2018 worst annual mean 59 µg/m3)

NO2 annual averages Milan conurbation stations



- B(a)P** standard non achieved where wood burning is more diffuse(outside downtown)
- Widespread exceedances of both health and vegetation **Ozone** protection standards (above all leeward of the town)

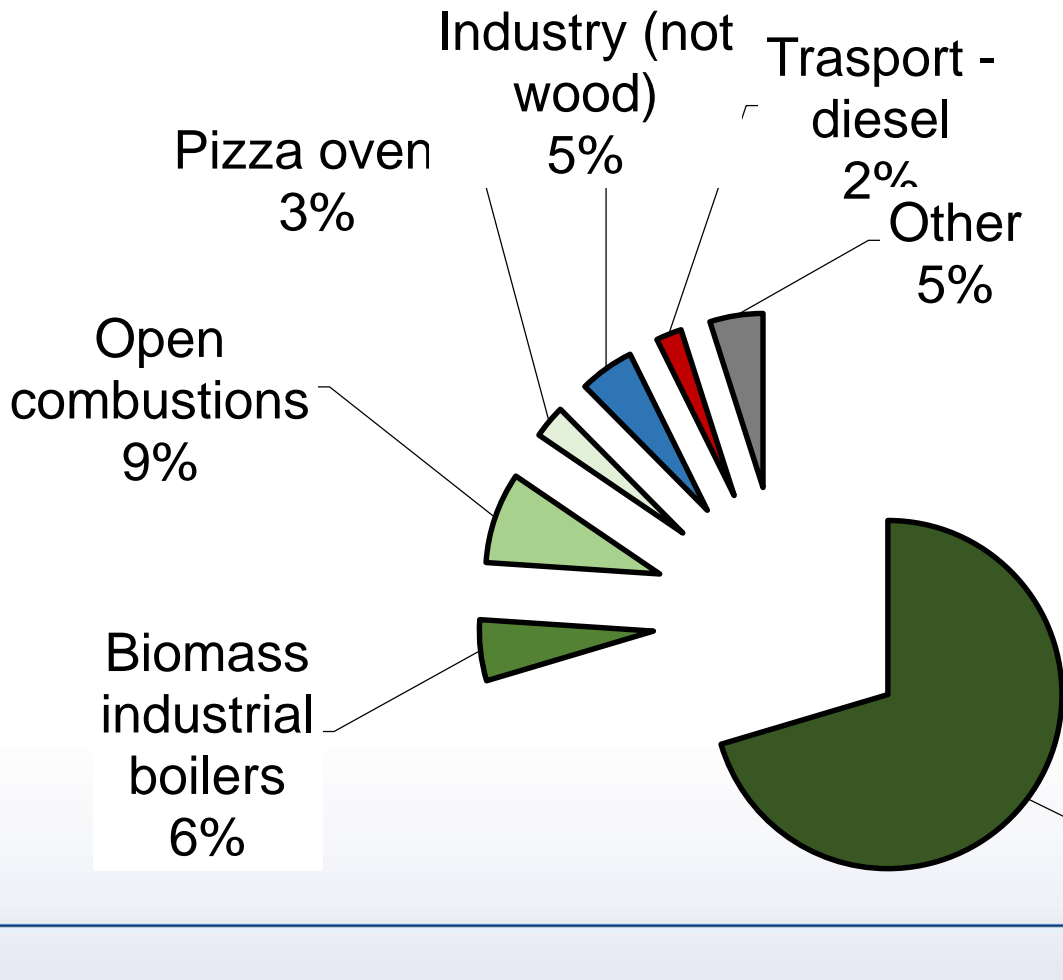
Primary PM10 emissions by fuel (tons/year)



- wood
- without fuel
- diesel
- tyres and brakes
- natural gas
- petrol
- other
- fuel oil
- refinery gas
- gas oil
- coal
- kerosene
- LPG

B(a)P emissions by fuel (tons/year)

Lombardia region



Wood combustion for domestic heating is the first source of BaP

Wood combustion is important also from a toxicological point of view

Wood Stoves and fireplaces
70%

The Regulation of wood burning in Lombardia

Identification of different emission classes of stoves and incentives for substitution of the worst ones

- Different PM10, NOx, CO and OGC classes of emissions are defined for wood stoves and fireplaces
- Incentives to substitute the worst stoves with better performing ones

Rules on maintenance and control

- Regulatory measures for stoves and fireplaces regarding their maintenance and control: they must follow the same rules of all the other heating domestic systems and be registered in Regional census database

Rules for installation and use of the stoves and fireplaces step by step more ambitious

- Wood burning is forbidden from 15.10 to 15.4 in stoves and fireplaces with a yield <63% or CO emissions > 0,5% (ref. 13% O2) from 2006
- The requirements for new stoves are step by step more ambitious in terms of number of stars required: 3 stars from 1.10.18 and 4 stars from 1.1.20
- Progressive ban of the already installed stoves of the less performing classes, starting during high pollution episodes

Key implementation challenges

Cultural – INFORMATION is a KEY FACTOR

- Wood burning is seen as “bio” “green” “environmental friendly”
- Mass media are often skeptical
- People don't appreciate the impact of this source on air quality and health, so it is difficult to implement actions

Legal:

- In Italy it is very difficult to control inside private houses (the best way of action is to work on the rules for new appliances)

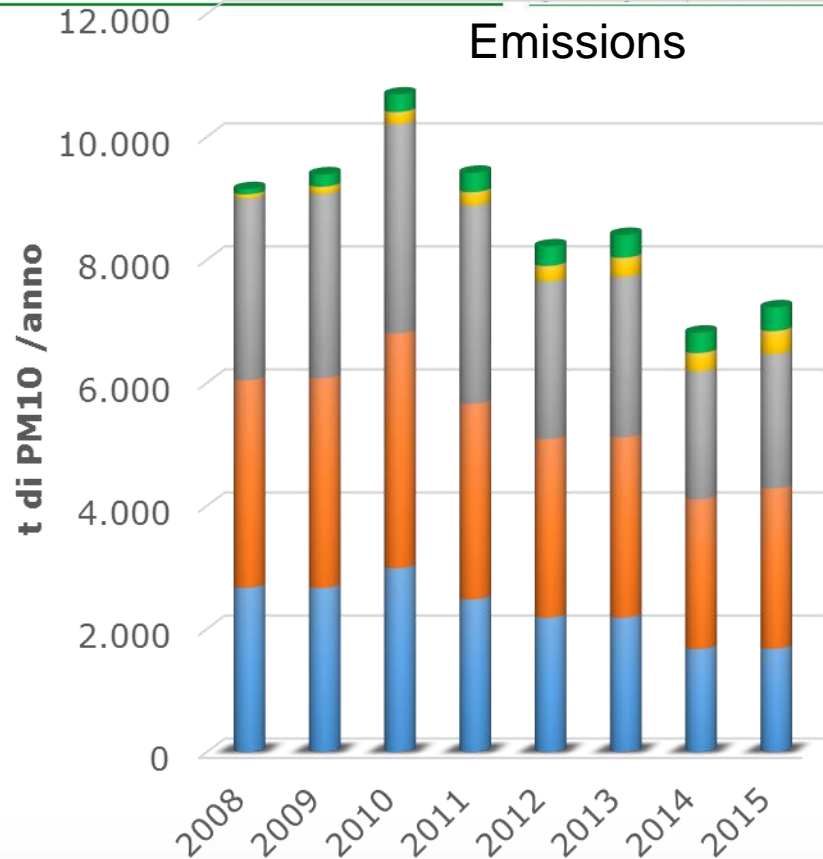
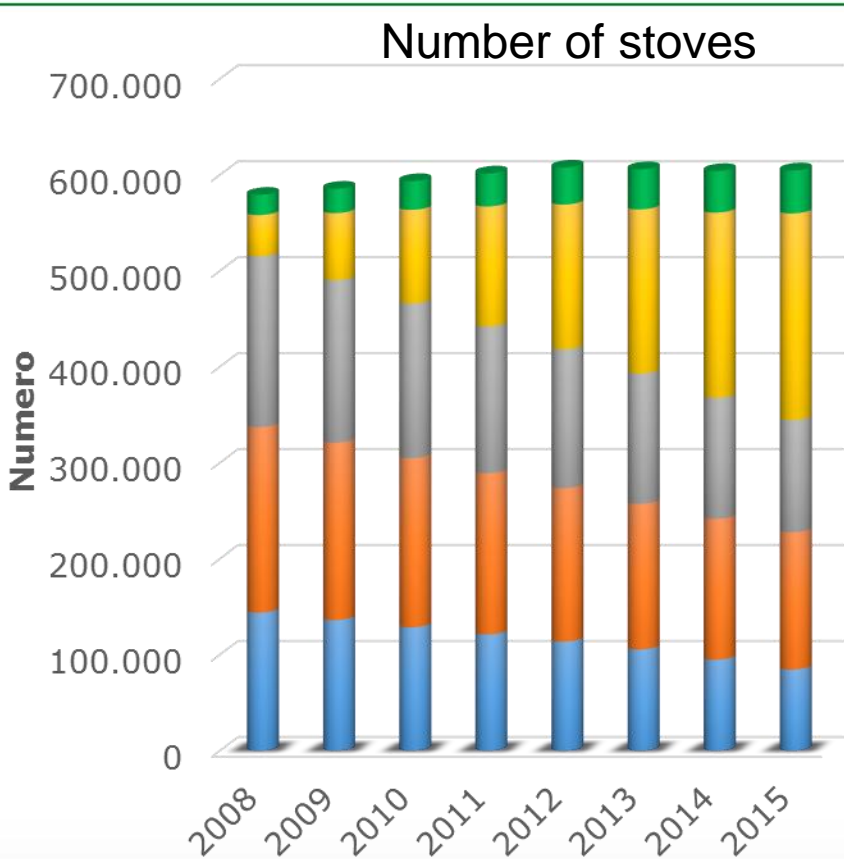
Economical:

- Now heating by wood costs half than by methane or light oil

Technical - technological:

- Methods to measure PM emissions must represent real emissions to avoid another.. Dieselgate also in this field.
- It is necessary to go on in developing products really compatible with air quality

Number of wood stoves <35 kW vs. emissions



- 2.2.9 Innovative stoves .
- 2.2.10 Pellets stoves .
- 2.2.7 Traditional stoves .
- 2.2.8 Traditional close fireplaces .
- 2.2.6 Traditional open fireplaces .

But a lot must still be done!




**Thank you for
your attention**
**Благодаря за
вниманието**

Signs of hope



Before Wood doesn't pollute

Presidente Formigoni, qual è la cosa che scalda, non inquina, si rinnova e fa risparmiare?



La legna.

PALAZZETTI
IL CALORE CHE PIACE ALL'ANIMA

Corsera, 17-02-2006

After The right way to not pollute with wood



O, RING
sistema di depurazione con velocità pratica automatica che ottimizza la combustione e abbatta tramite una reazione chimica l'80% delle sostanze inquinanti presenti nei fumi.

FUMI DI COMBUSTIONE
80% sali minerali non nocivi
20% IPA Idrocarburi
Turbidità elevata
Inquinanti nocivi

FUMI DEPURATI
-80% di IPA

REAZIONE DI OSSIDAZIONE DI ARIA TRASPARENTE

COLLE E RING
LUBRIFICAZIONE
PROTEZIONE

IPA SOSTANZE TOSSEGENE

Questo dispositivo, che contiene elementi attivi di oro e platino, viene sottoposto alla base della cappa fumaria. Oltre a garantire la purificazione dei fumi, il sistema mantiene una combustione più costante, con un incremento del rendimento del focolare. In parole povere, serve meno legna per ottenere lo stesso quantitativo di calore.

La manutenzione prevede una semplice pulizia tramite aspirapolvere una volta l'anno ed assicura al dispositivo una validità di nove anni.

O'Ring è una soluzione perfetta per l'ambiente, che risponde in particolare alle esigenze di quelle zone geografiche in cui le disposizioni di legge limitano l'uso di biomassa in sistemi a carica non controllata, dove funzionano a legna (spazzetti e inseri). Superando questo limite, gli inseri possono utilizzare come principale combustibile per il riscaldamento domestico la legna: una delle fonti energetiche rinnovabili più economiche, disponibili e facilmente reperibili.

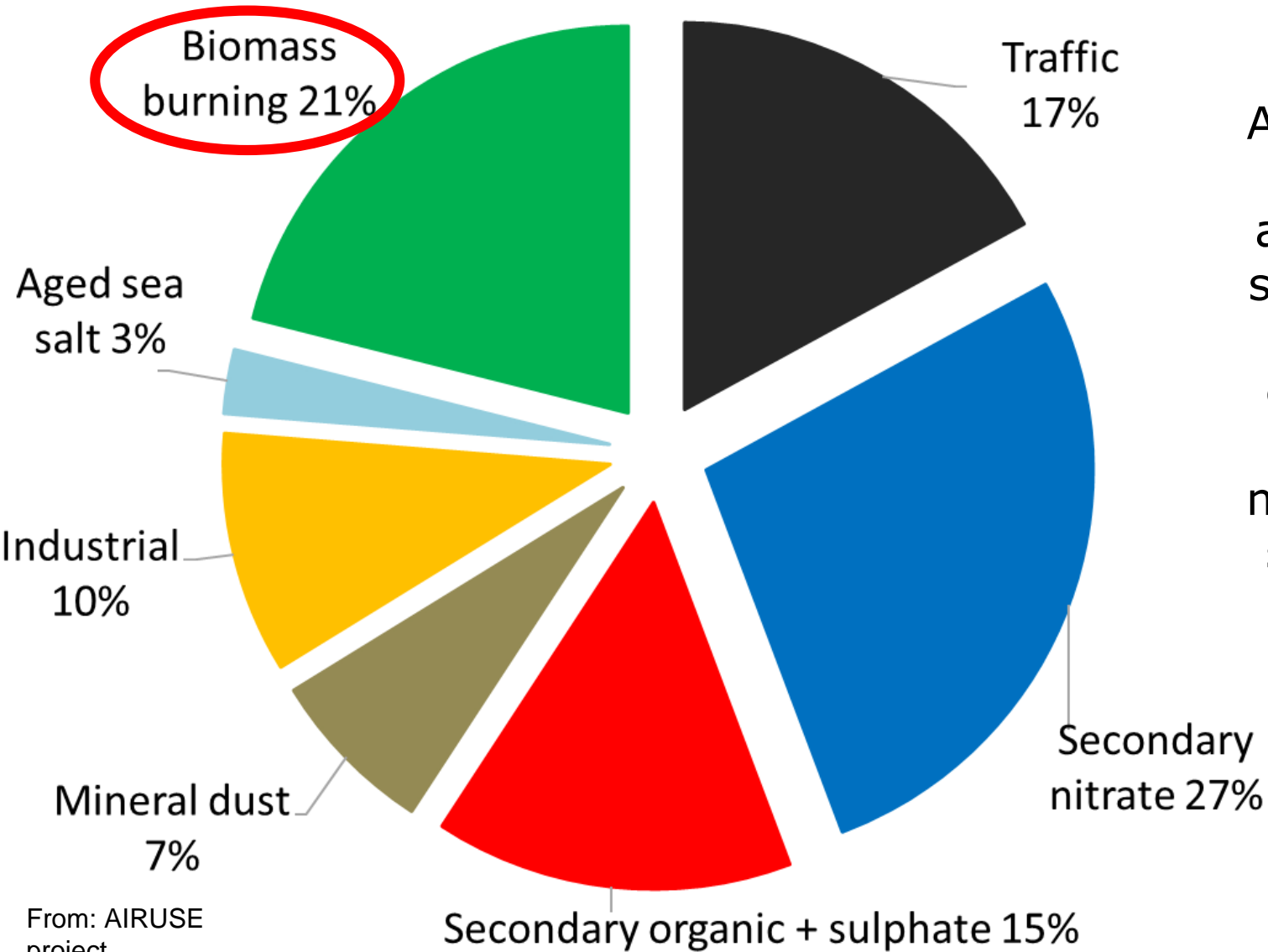
PALAZZETTI
IL CALORE CHE PIACE ALL'ANIMA

A change in the point of view,
a new opportunity got by industries

Corsera, 26-05-2011

PM10 source apportionment

Milano Annual average



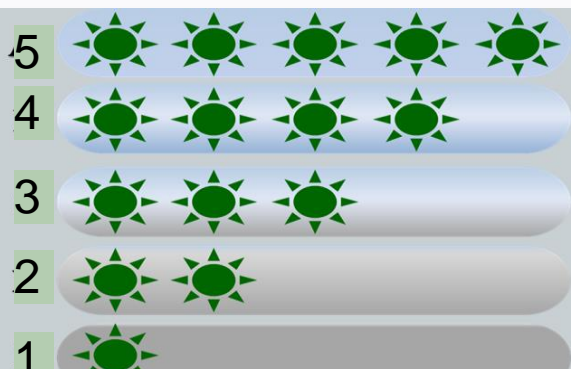
Also the results of source apportionment studies confirm that wood combustion is one of the most important sources of PM

The Regulation of wood burning in Lombardia

Identification of emission classes

- Different PM10, NOx, CO and OGC classes of emissions for wood stoves are defined
- It is the base for policies of bans and incentives
- It is the base to stimulate technological development

5 stars = in someday future but achievable and already present on the market in some cases
4 stars = the best currently present in the market
3 stars = actual market with good performances (equivalent to ecodesign levels of 2022)



Italian Decree 2017.11.7 n. 186

Regulation of wood burning in Lombardia

Step by step stricter requirements for the installation of new stoves

- From 1.10.2018 only 3 stars stoves can be installed
- From 1.1.2020 only 4 stars stoves can be installed

Progressive ban of the use of the most emitting stoves

- From 2006 stoves must have at least a yield >63% and CO emissions < 0,5 % (13% O₂)
- From 1.10.2018 only 2 stars stoves can be used
- From 1.1.2020 only 3 stars stove can be used

Limitation of the use of non-BAT wood stoves during high pollutions episodes

- From 2016 during high pollution episodes only stoves with at least 3 or 4 stars stoves (depending on the duration of the episode) can be used

Regulation of wood burning in Lombardia



Rules on maintenance and control

- Regulatory measures for stoves and fireplaces maintenance and control
- Census and mandatory registration of new and existing appliances

Goal: regulating small (<35 kW) domestic heating appliances fueled by woody biomass to limit impact on air quality that must follow the same rules of other domestic heating systems in terms of maintenance and control and must be registered in the regional census of domestic heating system.

Opportunities:

- More SAFETY in small stoves and fireplaces → LESS domestic INCIDENTS
- Less OUTDOOR EMISSIONS but also INDOOR POLLUTION
- Sector development: new WORK opportunity
- ENERGY SAVING and ECONOMIC for population (less biomass burned)
- With DB of all existing installations: possibility of incentives for substitution of oldest appliances

Scientific publications and presence in workshops, conferences ...

Communication to public

- Brochures
- Advertising campaigns
- Websites
(http://ita.arpalombardia.it/ita/legna_come_combustibile/)

Presence in public meetings

- Organized by municipalities or NGO or sectorial associations