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# “GESTIONE E TRACCIABILITA’ DEI FLUSSI DI BIOMASSA LEGNOSA”

*Domenico Vito*
*Fondazione Lombardia Ambiente*

**Webinar ,07/05/2020**

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# L'inquinamento

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**Inquinamento** : Alterazione o contaminazione di un qualsiasi materiale o ambiente ad opera di agenti inorganici od organici (scarichi, rifiuti, ecc.) o di batteri, derivanti dalle varie attività umane, produttive o stanziali: i. ambientale; i. atmosferico; i. delle acque, del suolo; i. acustico.

**Inquinamento atmosferico:** è l'alterazione delle condizioni naturali dell'aria, dovuta alle emissioni dei gas di scarico di autoveicoli, caldaie, centrali elettriche, fabbriche, impianti di incenerimento

# Inquinamento Atmosferico in Europa

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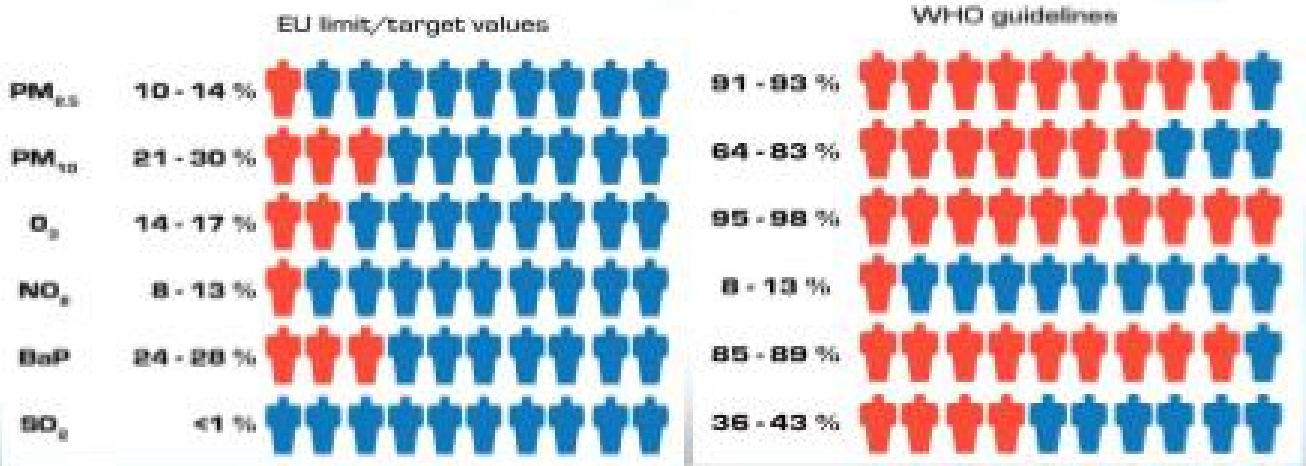
## Inquinamento atmosferico in Europa

Consiglio Nazionale delle Ricerche

Percentuale della popolazione residente in aree urbane dove la concentrazione degli inquinanti è più alta dei valori indicati dalla direttiva, 2002-2012 (EU-28)




> "Despite continuous improvements in recent decades, air pollution is still affecting the general health of Europeans, reducing their quality of life and life expectancy."
>
> *Air quality in Europe 2015 report*, European Environment Agency – EEA Executive Director Hans Bruyninckx

Morti premature attribuite alla esposizione di $PM_{2.5}$, $O_3$ e $NO_2$, nel 2012 in 40 Paesi Europei

| Country | $PM_{2.5}$ | $O_3$ | $NO_2$ |
|---|---|---|---|
| Austria | 6 100 | 320 | 660 |
| Belgium | 9 300 | 170 | 2 300 |
| Bulgaria | 14 100 | 500 | 700 |
| Croatia | 4 500 | 270 | 50 |
| Cyprus | 790 | 40 | 0 |
| Czech Republic | 10 400 | 380 | 290 |
| Denmark | 2 900 | 110 | 50 |
| Estonia | 620 | 30 | 0 |
| Finland | 1 900 | 60 | 0 |
| France | 43 400 | 1 500 | 7 700 |
| Germany | 59 500 | 2 100 | 10 400 |
| Greece | 11 100 | 780 | 1 300 |
| Hungary | 12 800 | 610 | 720 |
| Ireland | 1 200 | 30 | 0 |
| Italy | 59 500 | 3 300 | 21 600 |
| Latvia | 1 800 | 60 | 90 |
| Lithuania | 2 300 | 80 | 0 |
| Luxembourg | 250 | 10 | 60 |
| Malta | 300 | 30 | 0 |
| Netherlands | 10 100 | 200 | 2 800 |
| Poland | 44 600 | 1 100 | 1 600 |
| Portugal | 5 400 | 320 | 470 |
| Romania | 25 500 | 720 | 1 500 |
| Slovakia | 5 700 | 250 | 60 |
| Slovenia | 1 700 | 100 | 30 |
| Spain | 25 500 | 1 800 | 5 900 |
| Sweden | 3 700 | 160 | 10 |
| United Kingdom | 37 800 | 530 | 14 100 |

*Air quality in Europe 2015 report*, European Environment Agency

http://www.disba.cnr.it/index.php/en/ariasana

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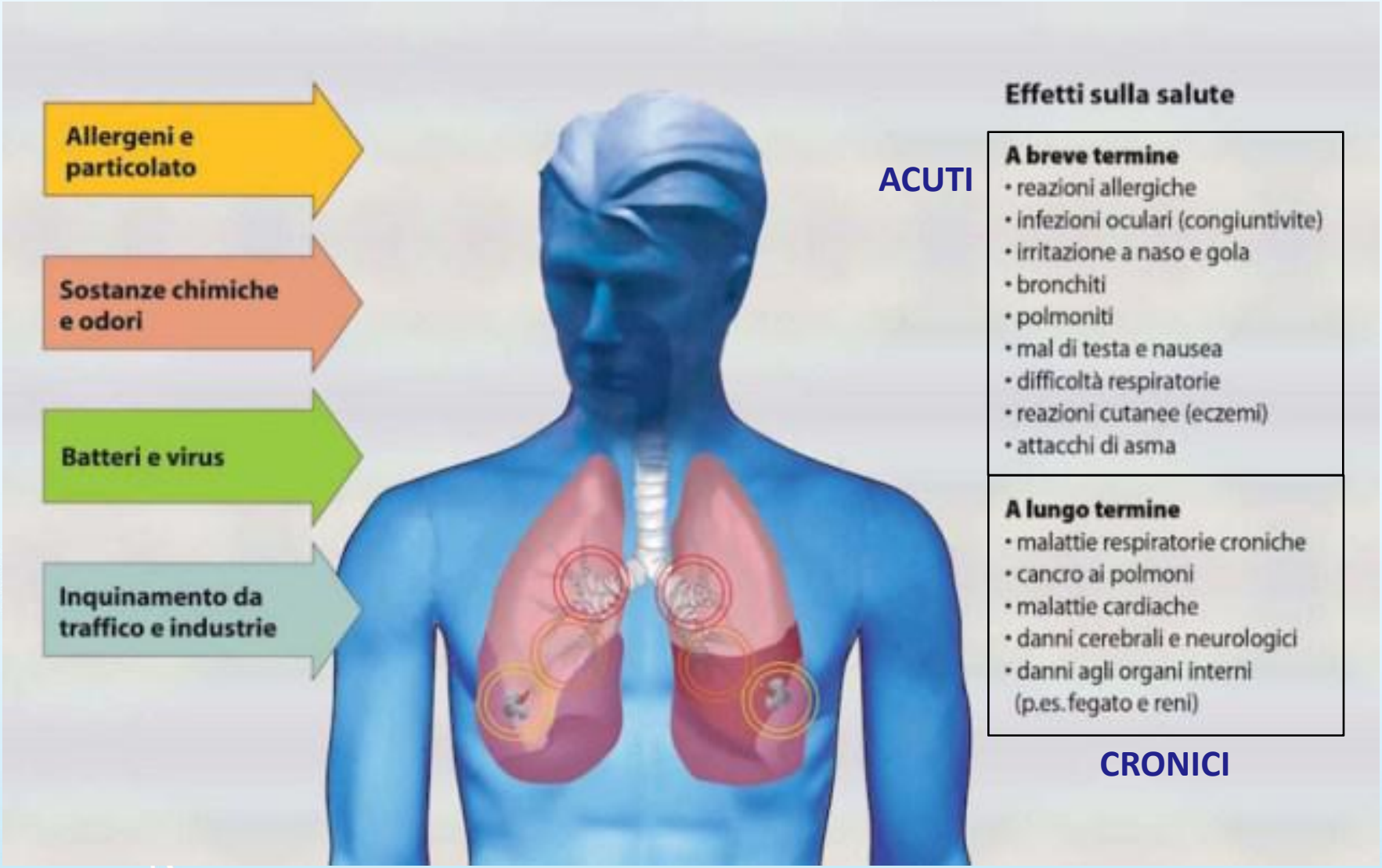
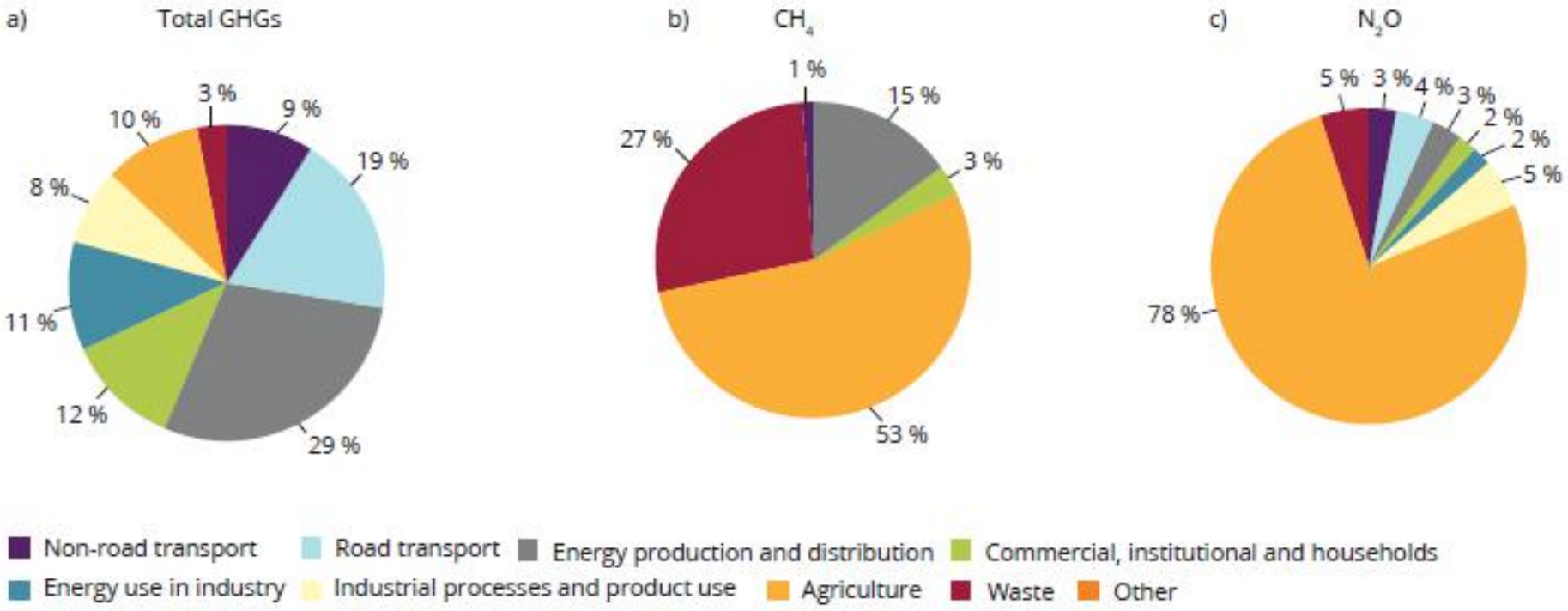
# Effetti sulla salute



# Inquinanti atmosferici & Cause



**Figure 3.2** **Sectoral contribution to the total EU-28 emissions in 2015: (a) GHGs ($CO_2$-eq), (b) $CH_4$, and (c) $N_2O$**




**Source:** EEA, 2017e.

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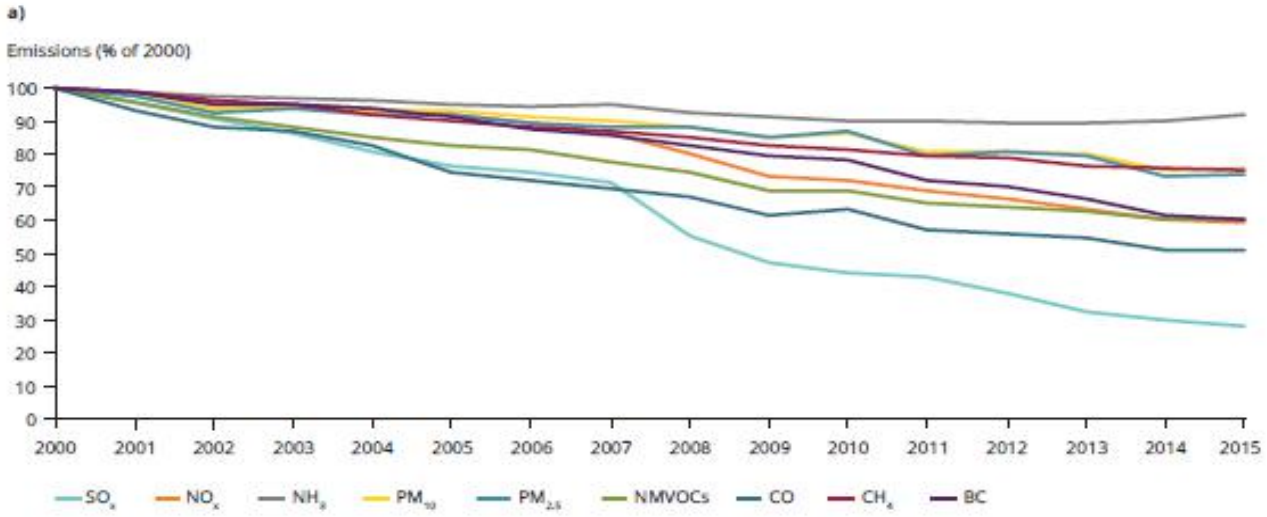
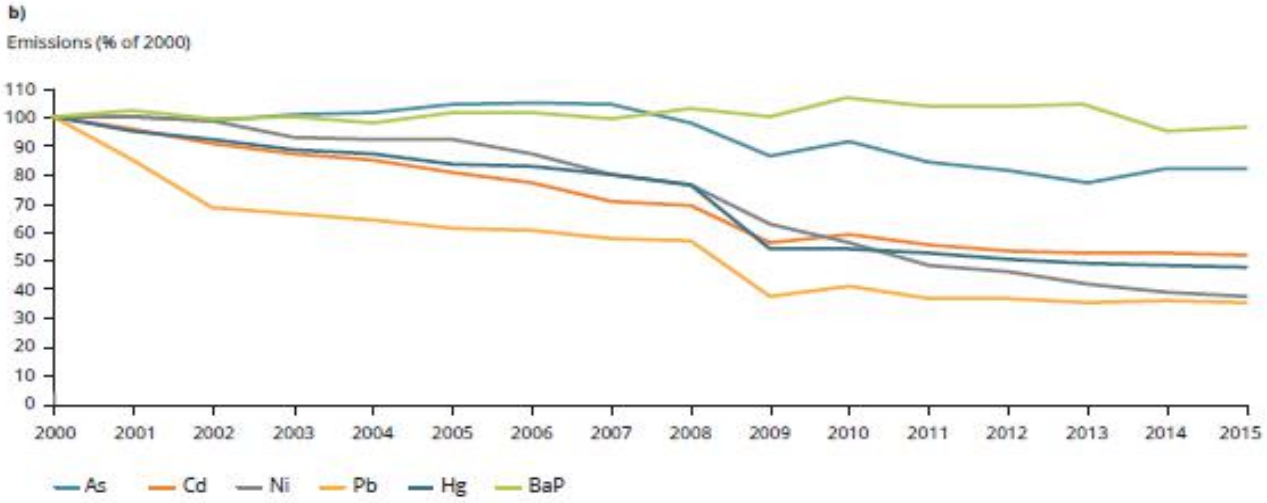
# Emission trend

**Figure 2.1** Development in EU-28 emissions, 2000-2015 (% of 2000 levels): (a) $SO_x$, $NO_x$, $NH_3$, $PM_{10}$, $PM_{2.5}$, NMVOCs, CO, $CH_4$ and BC; (b) As, Cd, Ni, Pb, Hg and BaP




**Notes:** $CH_4$ emissions are total emissions (Integrated Pollution Prevention and Control sectors 1-7) excluding sector 5: Land use, land-use change and forestry. The present emission inventories include only anthropogenic VOCs emissions. Under the CLRTAP Gothenburg Protocol, parties are encouraged to report emissions of BC, one of the constituents of PM. It means that reporting on BC emissions has been voluntary and has not been compulsory for every country.

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# Limiti Europei Qualità dell'aria

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**Table 4.1** Air quality standards for the protection of health, as given in the EU Ambient Air Quality Directives

| Pollutant | Averaging period | Legal nature and concentration | Comments |
|---|---|---|---|
| $PM_{10}$ | 1 day | Limit value: 50 µg/m³ | Not to be exceeded on more than 35 days per year |
| | Calendar year | Limit value: 40 µg/m³ | |
| $PM_{2.5}$ | Calendar year | Limit value: 25 µg/m³ | |
| | | Exposure concentration obligation: 20 µg/m³ | Average Exposure Indicator (AEI) (a) in 2015 (2013-2015 average) |
| | | National Exposure reduction target: 0-20 % reduction in exposure | AEI (a) in 2020, the percentage reduction depends on the initial AEI |
| $O_3$ | Maximum daily 8-hour mean | Target value: 120 µg/m³ | Not to be exceeded on more than 25 days/year, averaged over 3 years (b) |
| | | Long term objective: 120 µg/m³ | |
| | 1 hour | Information threshold: 180 µg/m³ | |
| | | Alert threshold: 240 µg/m³ | |
| $NO_2$ | 1 hour | Limit value: 200 µg/m³ | Not to be exceeded on more than 18 hours per year |
| | | Alert threshold: 400 µg/m³ | To be measured over 3 consecutive hours over 100 km² or an entire zone |
| | Calendar year | Limit value: 40 µg/m³ | |
| BaP | Calendar year | Target value: 1 ng/m³ | Measured as content in $PM_{10}$ |
| $SO_2$ | 1 hour | Limit value: 350 µg/m³ | Not to be exceeded on more than 24 hours per year |
| | | Alert threshold: 500 µg/m³ | To be measured over 3 consecutive hours over 100 km² or an entire zone |
| | 1 day | Limit value: 125 µg/m³ | Not to be exceeded on more than 3 days per year |
| CO | Maximum daily 8-hour mean | Limit value: 10 mg/m³ | |
| $C_6H_6$ | Calendar year | Limit value: 5 µg/m³ | |
| Pb | Calendar year | Limit value: 0.5 µg/m³ | Measured as content in $PM_{10}$ |
| As | Calendar year | Target value: 6 ng/m³ | Measured as content in $PM_{10}$ |
| Cd | Calendar year | Target value: 5 ng/m³ | Measured as content in $PM_{10}$ |
| Ni | Calendar year | Target value: 20 ng/m³ | Measured as content in $PM_{10}$ |

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# Mappa Europea PM10 2014

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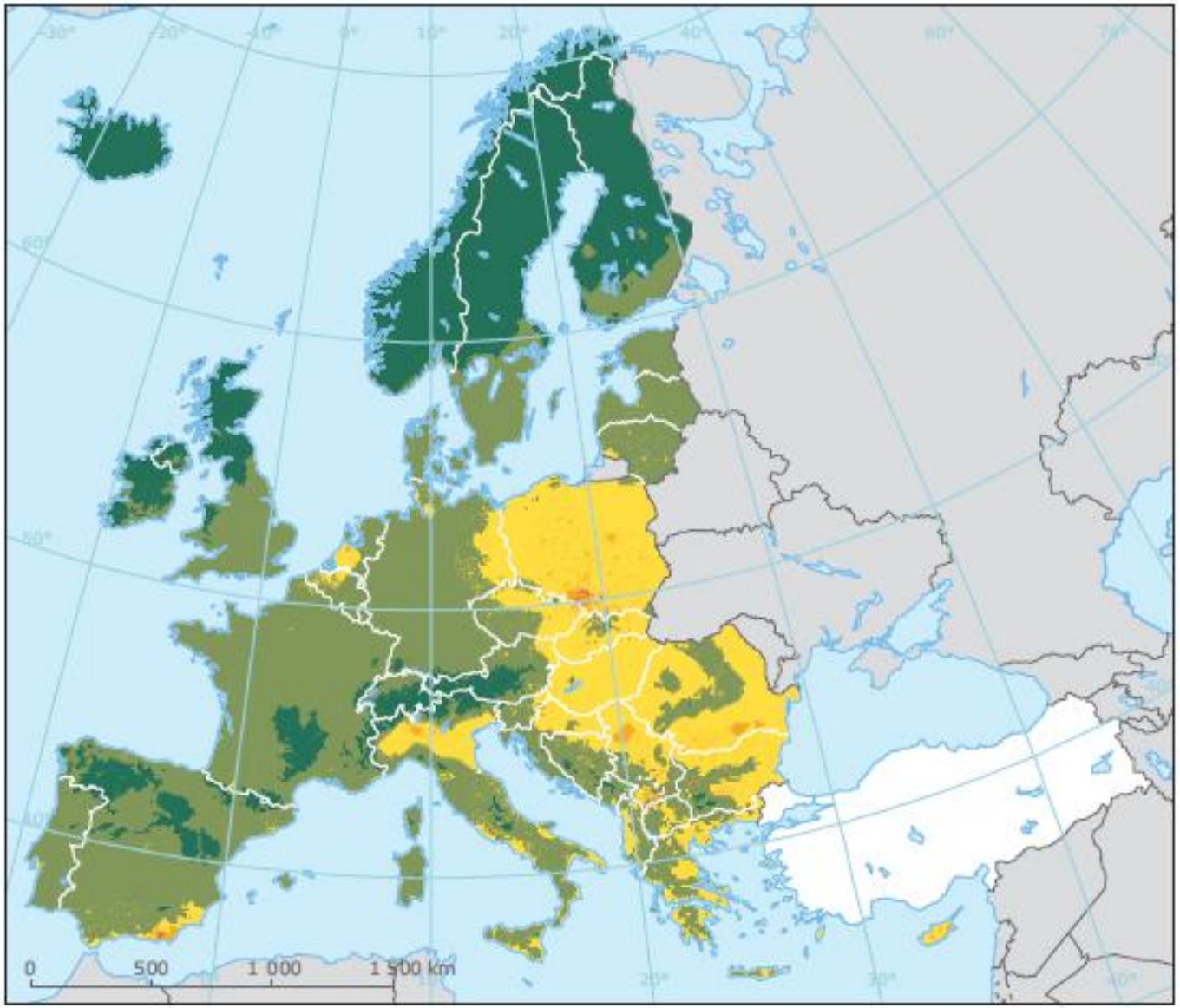


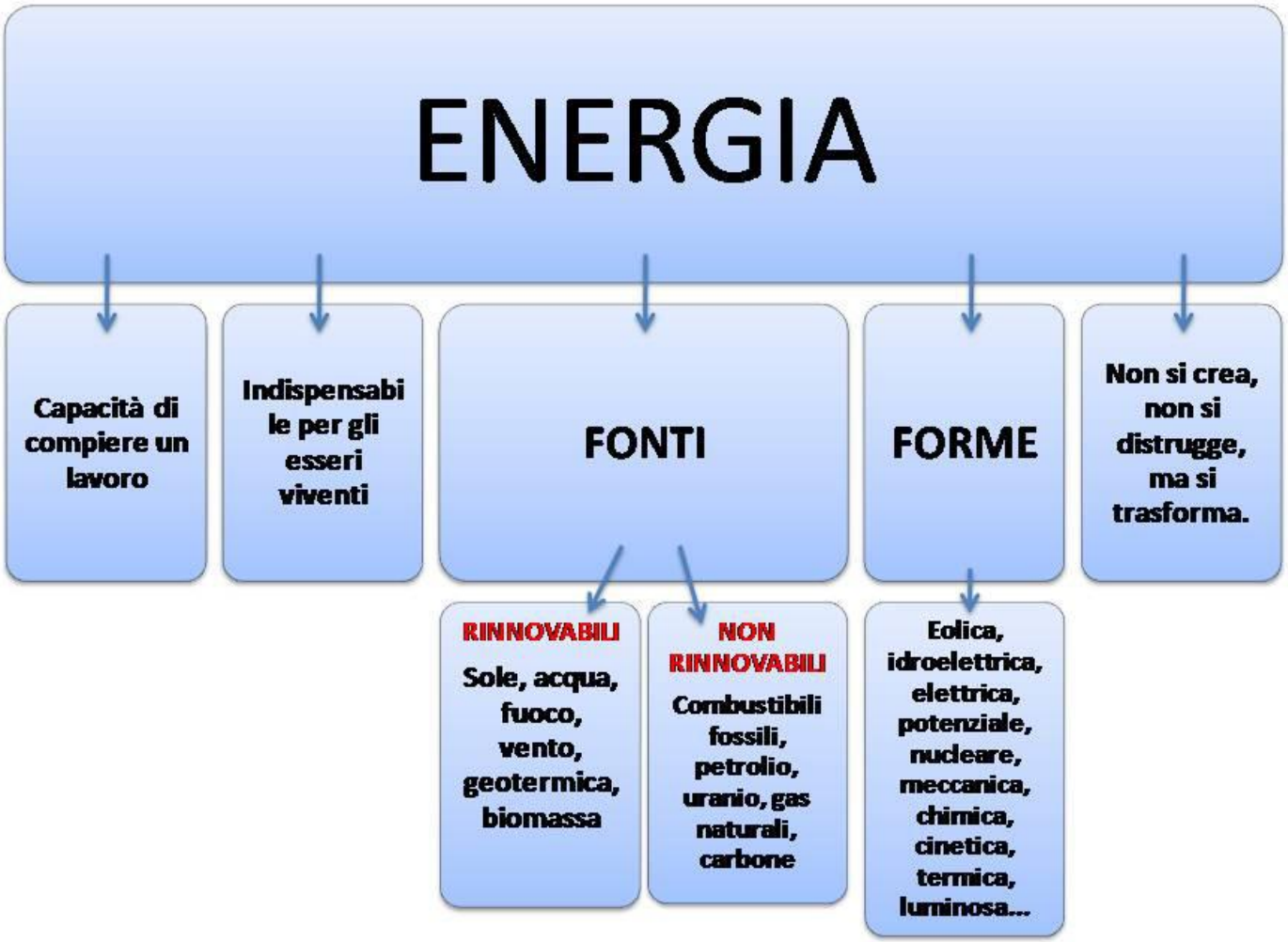

**$PM_{10}$ annual mean in 2014**

µg/m³

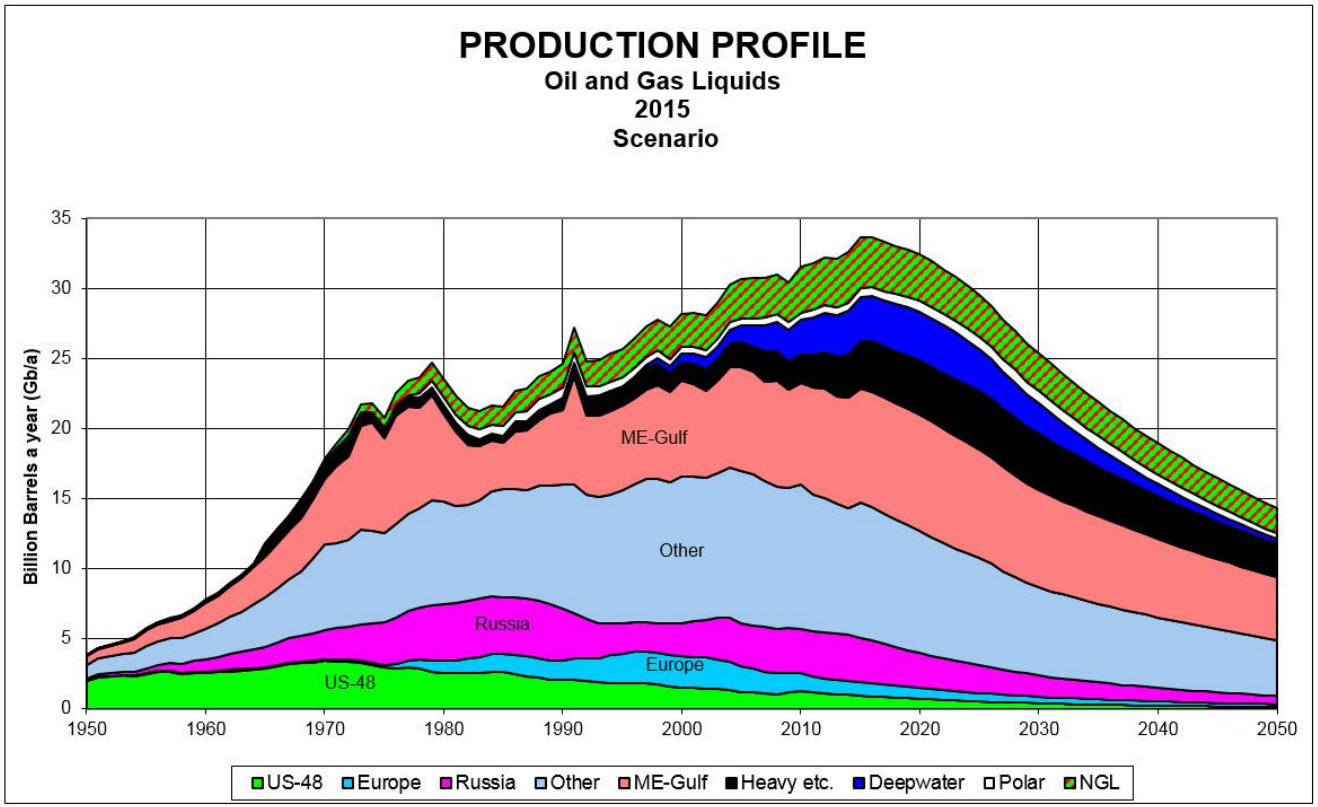
- ≤ 10
- 10-20
- 20-30
- 30-40
- 40-50
- > 50

- No available data
- Countries/regions not included in the data exchange process

# Cos'è l'energia?



# Per quanto tempo disporremo di fonti fossili?




Il **“Peak oil”** è il picco di consumo di fonti fossili previsto per ogni paese.

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# Le energie rinnovabili

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## Energia Solare

## Energia Eolica

## Energia Geotermica

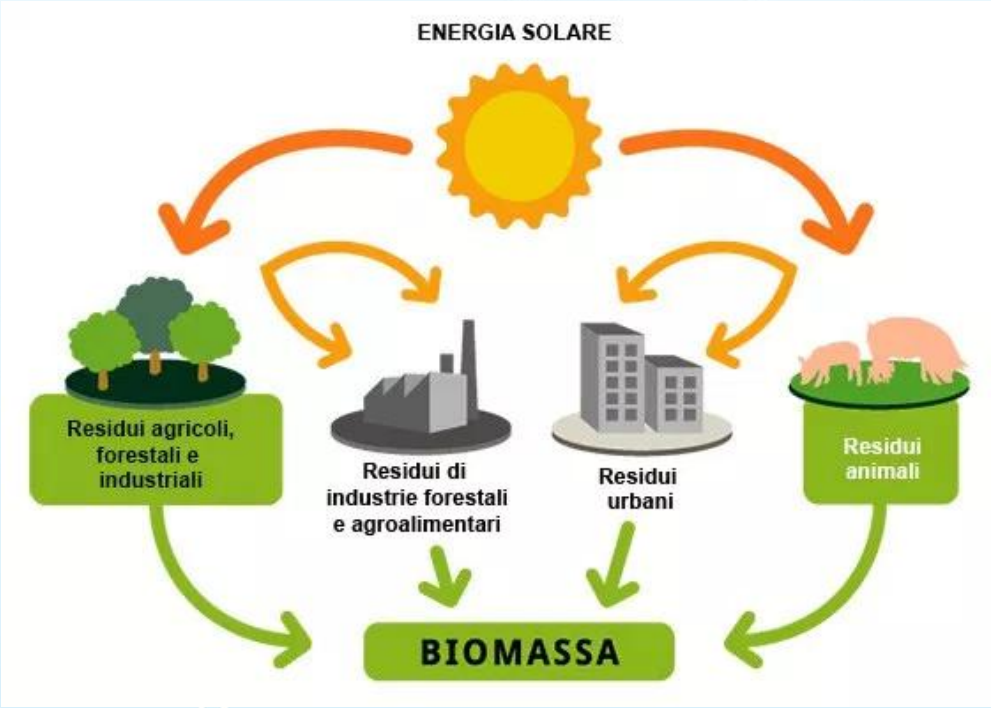
## Energia Biomassa

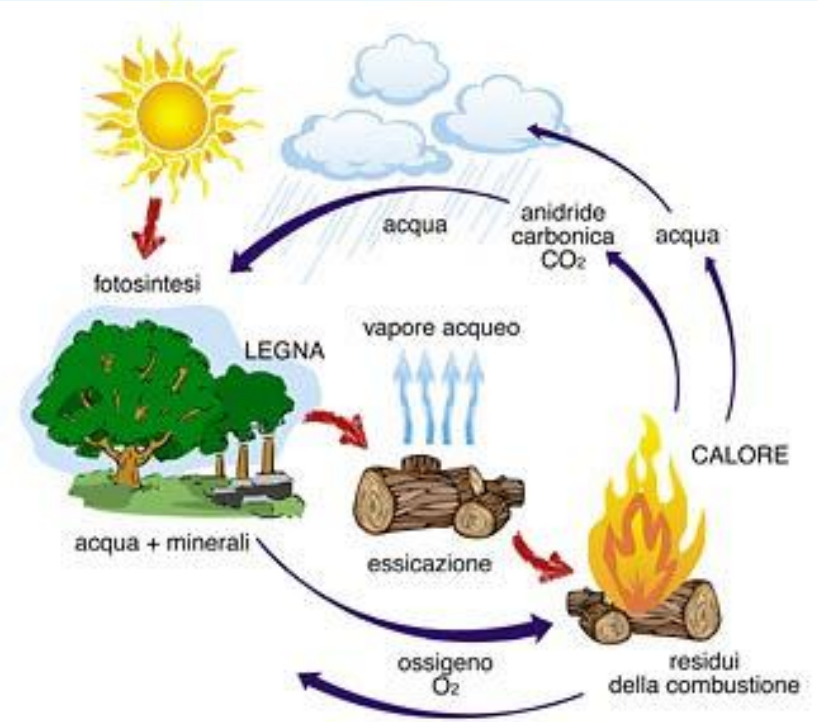
## Energia Idroelettrica

## Energia Marina

# Le biomasse

Le **biomasse**. Sono risorse organiche ( biologiche ) che possono essere utilizzate come **combustibili e/o carburanti**. Ad esempio, gli scarti della lavorazione agroalimentare possono essere impiegati come materia prima per produrre energia termica ( calore ).



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# EU Scenario: "How are the EU members states contributing to the 27% target for EU's renewable energy consuption – the role of woody biomass"

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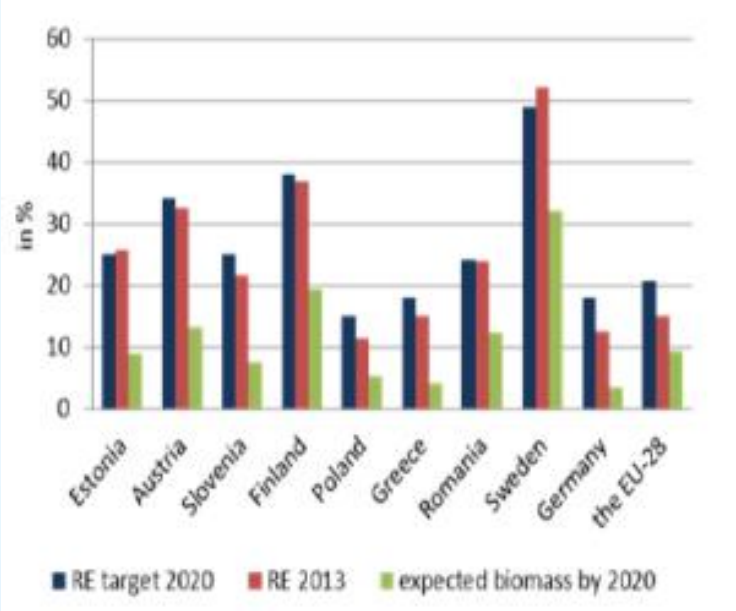
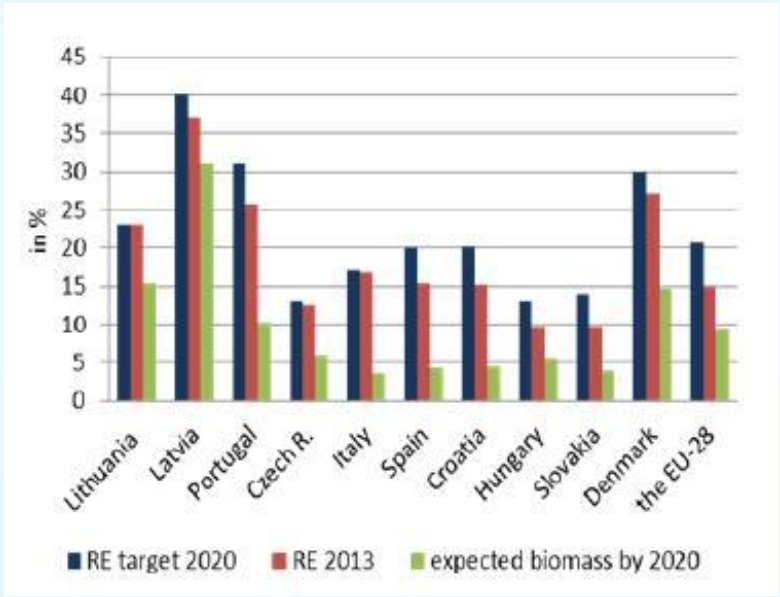
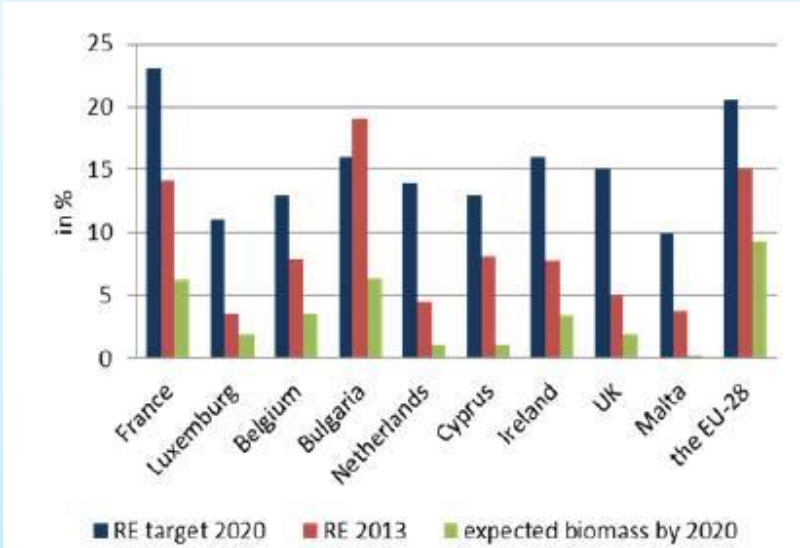



Leading




Intermediate

**"How are the EU members states contributing to the 27% target for EU's renewable energy consuption – the role of woody biomass"**, S. Proskurina, R. Sikkema, J. Heinimö, E. Vakkilainen, presented at the 25th European Biomass Conference and Exhibition.




Lagging

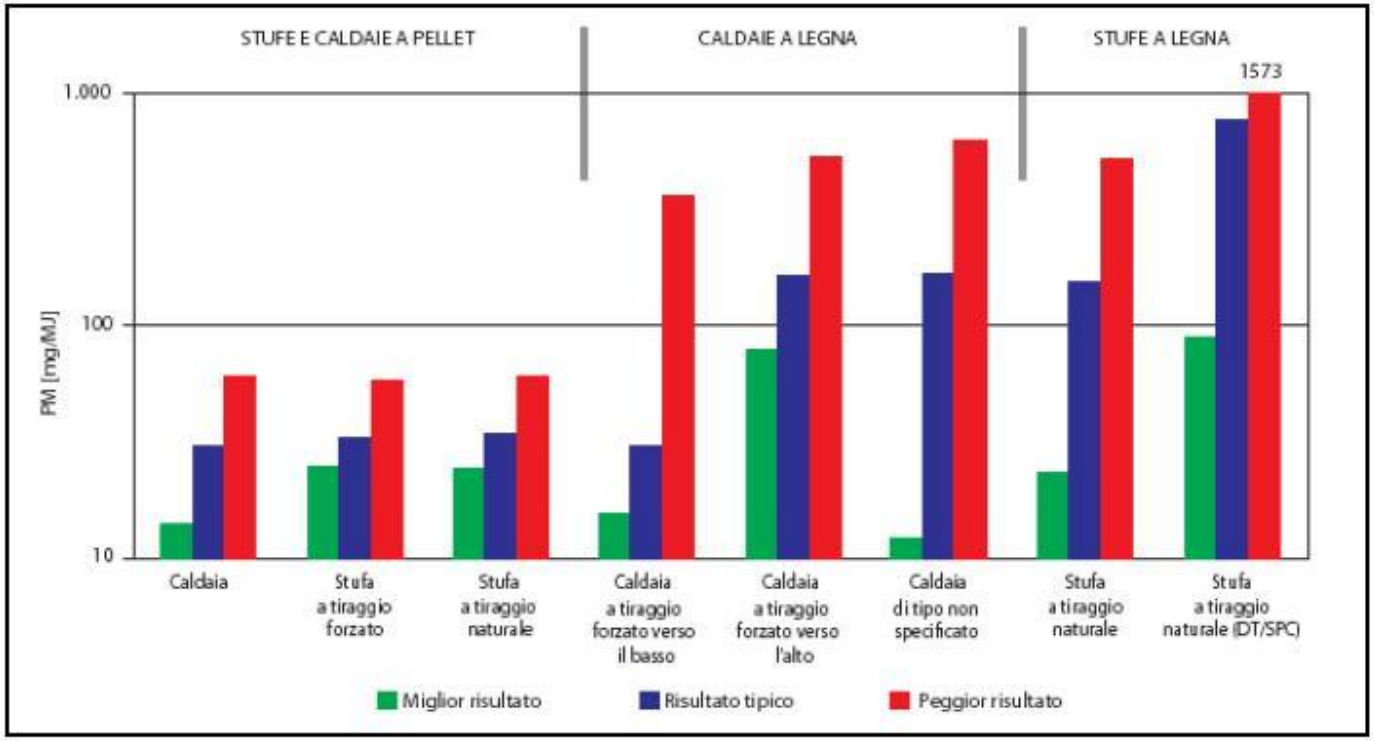
# Energie rinnovabili e inquinamento



| Energia solare | Energia eolica | Energia marina | Energia idroelettrica | Energia geotermica | Bioenergia |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| *Fonte:* **Sole** | *Fonte:* **Vento** | *Fonte:* **Onde, maree** | *Fonte:* **Corpi idrici** | *Fonte:* **Terra** | *Fonte:* **Biomassa, rifiuti** |
| *Tecnologie:* **Fotovoltaico, solare termico** | *Tecnologie:* **Turbine eoliche** | *Tecnologie:* **Dighe, centrali maremotrici** | *Tecnologie:* **Centrale idroelettrica** | *Tecnologie:* **Pompe geotermiche e pompe di calore** | *Tecnologie:* **Combustione di biomassa, impianti a biogas, biocarburanti** |
|  |  |  |  |  |  |
| *Applicazioni:* **Energia elettrica, riscaldamento e raffrescamento** | *Applicazioni:* **Energia elettrica** | *Applicazioni:* **Energia elettrica** | *Applicazioni:* **Energia elettrica** | *Applicazioni:* **Energia elettrica, riscaldamento e raffrescamento** | *Applicazioni:* **Energia elettrica, riscaldamento e raffrescamento, trasporti** |

# Le biomasse inquinano?

Figura 5.4: fattore di emissione medio, migliore e peggiore a confronto per alcuni tipi di apparecchi termici




Fonte: qualenergia.it

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# Il progetto LIFE-IP PREPAIR

## Po Regions Engaged to Policies of AIR

- **2 stati EU coinvolti:** ITALIA, SLOVENIA.
- **7 Distretti Amministrativi convolti** : Regioni Emilia Romagna, Piemonte, Lombardia, Veneto, Provincia Autonoma di Trento, Regione Autonoma Friuli Venezia Giulia, Regione Autonoma Valle d'Aosta, Slovenia
- **Expected end date:** 31/01/2024
- **Total Integrated Budget:** 16.805.939 €

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# LIFE PREPAIR Project thematic pillars

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**In addition to the introduction of measures that various administrations of the Po basin introduced to reduce pollution due to the use of biomass, the LIFE PREPAIR project also defines specific actions on this important air pollution source.**

**AGRICULTURE**
- Development of a common model for the assessment of ammonia emissions produced by farms, through a holistic approach that also includes odor and climate-altering emissions;
- Promotion of good practices for the use of fertilizers in order to optimize the application and reduce ammonia emissions, also through field analysis

**WOODY BIOMASS**
- Training and professional qualification for the design, maintenance and control of domestic biomass combustion plants
- Communication and awareness raising of citizens on the correct methods of combustion of biomass
- Optimization of local production chains and use of woody biomass

**TRANSPORTS**
Development of common tools for the promotion of public transport, cycling and electric mobility and for a rational management of freight transport, also through the implementation of demonstration actions

**ENERGY EFFICIENCY**
- Development of guidelines and training actions mainly dedicated to small and medium enterprises
- Development of an integrated approach for the training of all the actors involved in the chain of buildings
- Creation of regional info-points to support local authorities to facilitate access to energy efficiency initiatives and promote the spread of green purchases

**EMISSIONS AIR QUALITY MONITORING**
- Creation of a permanent platform for data sharing
- Monitoring and evaluation of air quality in the Po Valley, including the effects of transboundary pollution between Italy and Slovenia

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# Woody biomass & heating: context

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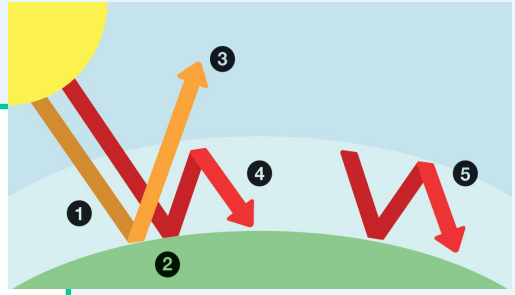
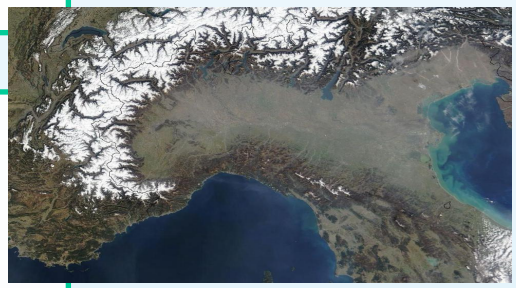
## Biomass and Climate Change

• In the production of energy from alternative sources, biomass plays an important role, especially in **fighting climate change**. For these reasons, **National and Regional policies in recent years have encouraged the use of woody biomass** during energy production and non-industrial combustion.




## Biomass and Air Quality

• Biomass devices can have **negative effects on air quality**, especially in Po Valley where air quality standards are not met and infringement procedures for non compliance of EU standards, are ongoing.



## Economical and social aspects

• In recent years, due also to the economic crisis, habits of Italian people for domestic heating have increasingly shifted towards the use of woody biomass, which is characterized by **lower costs compared to methane**, and is also favored in some geographical areas by a wide availability of wood resource.

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# The impact of the combustion of woody biomass in the Po valley

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| Sector | NOx | $NH_3$ | PM10 | NMVOC |
|---|---|---|---|---|
| Energy production and refineries | 7 % | 0 % | 1 % | 0 % |
| Residental combustion | 9 % | 0 % | 55 % | 8 % |
| Industrial combustion | 15 % | 0 % | 3 % | 1 % |
| Production processes | 3 % | 0 % | 3 % | 5 % |
| Extraction and distribution of fuels | 0 % | 0 % | 0 % | 3 % |
| Solvent use | 0 % | 0 % | 1 % | 25 % |
| Road Transport | 53 % | 2 % | 23 % | 7 % |
| Other mobile sources | 11 % | 0 % | 5 % | 1 % |
| Waste treatment and disposal | 1 % | 1 % | 0 % | 0 % |
| Agriculture | 1 % | 97 % | 6 % | 18 % |
| Other sources and sinks | 0 % | 0 % | 2 % | 32 % |

mostly from burning biomass

Fonte: database PREPAIR 2019

**In Po Valley the residential heating sector is the first source of primary PM10 emissions. In particular, in recent years, wood combustion has assumed a predominant role compared to other emissive sources, especially for fine particulate matters.**

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# Technical and specialist training for installers and designers of domestic biomass systems

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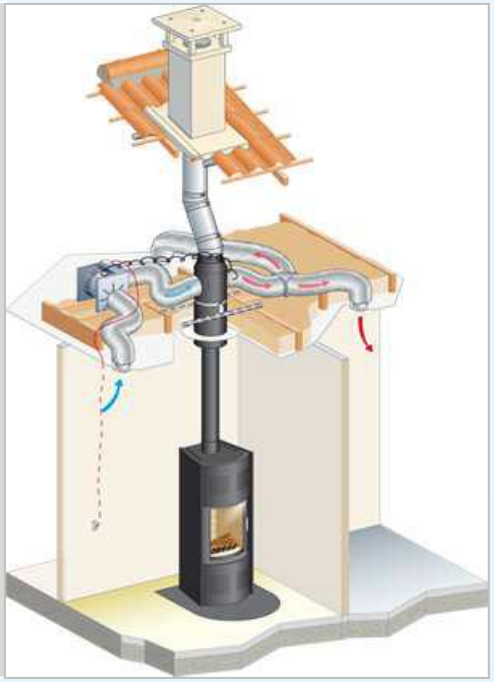
## Aims of the action

1. **Qualification of the technical competences** of installers, maintenance engineers and designers of civil and residential biomass systems
2. **Promote the sustainability** of domestic burning biomass for a cleaner and safer use, through the important role played by technicians in providing information to end users.



## The action is coordinated by the Province of Trento

- Creation of a shared **training format**
- Organization of **training courses** in the Po Basin Regions involved in the action

## Expected results:

- Training of about 80 professionals in each partner region involved
- Dissemination of importance of domestic burning biomass for air quality protection
- Dissemination of a culture of proper design, construction and maintenance of domestic biomass facilities to reduce emissions of pollutants

**Start: July 2017** - **End: March 2022**

# Technical and specialist training for installers and designers of domestic biomass systems

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**First results:**

1. **A shared training format** for the course
2. **1st experimental edition of the training course** organized in Trento -> 42 professionals trained by the end of 2018
3. **1st edition of the training course** organized in Veneto (Padua) -> 12 professionals train
4. **2nd edition of the training course** organized in Veneto (Padua) -> to be concluded within the 2019

**Next steps:**

- **Second and third editions of the training course** organized in Trento (to be held between Sep. 2019-Oct. 2020)
- **Training courses organized in the other partner Regions**


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# Communication campaign
# "Burn wood well. Don't burn your health"


**Main objectives**

1. **Raising public awareness** of the risks of domestic woody biomass heating systems;
2. **Debunking clichés**;
3. **Communicating complex concepts** through effective communication;
4. **Change habits and behaviors**;
5. **Stimulate new investments** aimed to replace the most polluting woody biomass devices.

## Riscaldamento a legna e tutela della salute: al via la campagna del progetto PREPAIR

Realizzati un video e un opuscolo informativo focalizzato sul corretto utilizzo della legna come combustibile e sulle strategie per ridurre l'inquinamento da legna

Mercoledì 7 Novembre 2018

ANSA.it › Ambiente&Energia › Inquinamento › Parte nel Nord la campagna per i caminetti puliti

## Parte nel Nord la campagna per i caminetti puliti

Con lo slogan 'brucia bene la legna, non bruciarti la salute'

Redazione ANSA 15 novembre 2018 10:49 Scrivi alla redazione Stampa

**Start: November 2018** **End: December 2022**

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# ACTION C.8

## Analysis of the logistics of consumption and supply of woody biomass

TESAF Dipartimento Territorio e Sistemi Agro-Forestali Università di Padova

Università degli Studi di Padova

Fondazione Lombardia per l'Ambiente

# Analysis of the logistics of consumption and supply of woody biomass

| | Sub-action |
|---|---|
| **C.8.1** | Study of **supply flows of woody biomass** |
| **C.8.2** | Definition of **biomass management plans** to optimize the production and use of biomass |
| **C.8.3** | Application of a **traceability system** to ensure and improve the management and quality of biomass produced |
| **C.8.4** | **Stakeholder engagement and activation of clusters** that can ensure the promotion of sustainable and efficient short chains |
| **C.8.5** | **Collection and dissemination of good practices** related to the use of biomass |

With the contribution
of the LIFE Programme
of the European Union

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# Grazie per l'attenzione

www.lifeprepair.eu – info@lifeprepair.eu

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Regione del Veneto
Regione Lombardia
Regione Piemonte
Regione Autonoma Friuli Venezia Giulia
Provincia Autonoma di Trento
arpae agenzia prevenzione ambiente energia emilia-romagna
arpav Agenzia Regionale per la Prevenzione e Protezione Ambientale del Veneto
Arpa Piemonte Agenzia Regionale per la Protezione Ambientale
ARPA Lombardia Agenzia Regionale per la Protezione dell'Ambiente
ARPA Valle d'Aosta
arpa FVG Agenzia Regionale per la Protezione dell'Ambiente del Friuli Venezia Giulia
ARSO Environment Slovenian Environment Agency
Comune di Bologna
Comune di Milano
Città di Torino
ART-ER Attrattività Ricerca Territorio
FLA Fondazione Lombardia per l'Ambiente