

Convegno
Fabbrica Futuro
Idee e strumenti per l'impresa manifatturiera di domani

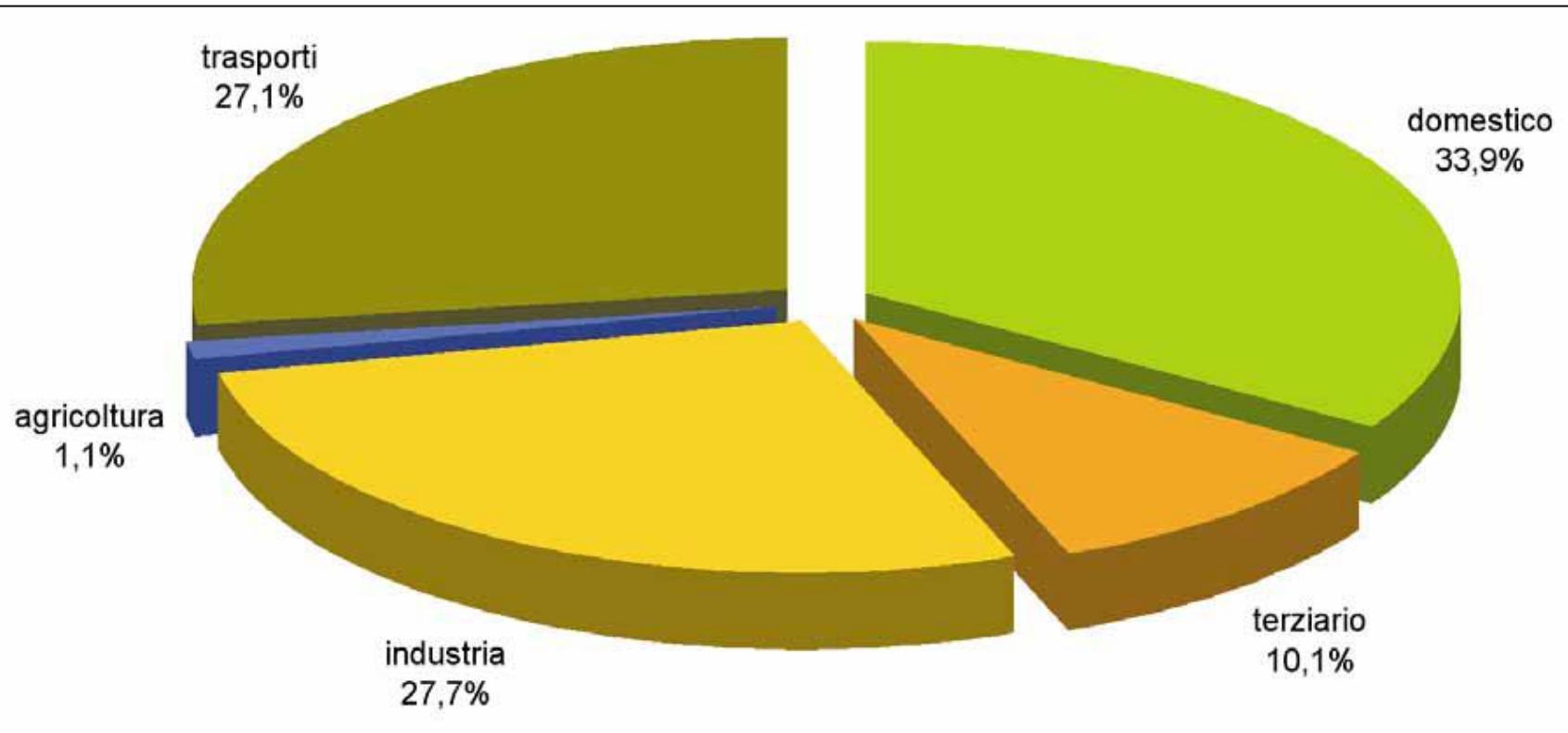
Torino, 21 settembre 2016

European SET Plan
Priorità per il settore industriale

M. Masoero

Dipartimento Energia – Politecnico di Torino

Bilancio energetico nazionale





12 dicembre 2015

Accordo di Parigi, art. 2

«il mantenimento dell'incremento della temperatura media globale **ben al di sotto di 2 °C** al di sopra dei livelli pre-industriali, e proseguire gli sforzi per **limitare l'aumento di temperatura** media globale **a 1,5 °C** al di sopra dei livelli pre-industriali, riconoscendo che questo potrebbe ridurre in modo significativo i rischi e gli impatti del cambiamento climatico»

COP21 - Conferenza sui Cambiamenti climatici 2015

Francois Hollande: «*Questo, se lo vorrete, sarà il primo accordo universale sul Clima»*

- 170 Paesi più l'EU
- Firmato ufficialmente a New York il 22 Aprile 2016
- Entrata in vigore: non prima del 2020

Obiettivi ambiziosi

«il mantenimento dell'incremento della temperatura media globale ben al di sotto di 2°C al di sopra dei livelli pre-industriali,

e proseguire gli sforzi per limitare l'aumento di temperatura media globale a 1,5°C al di sopra dei livelli pre-industriali, riconoscendo che questo potrebbe ridurre in modo significativo i rischi e gli impatti del cambiamento climatico»

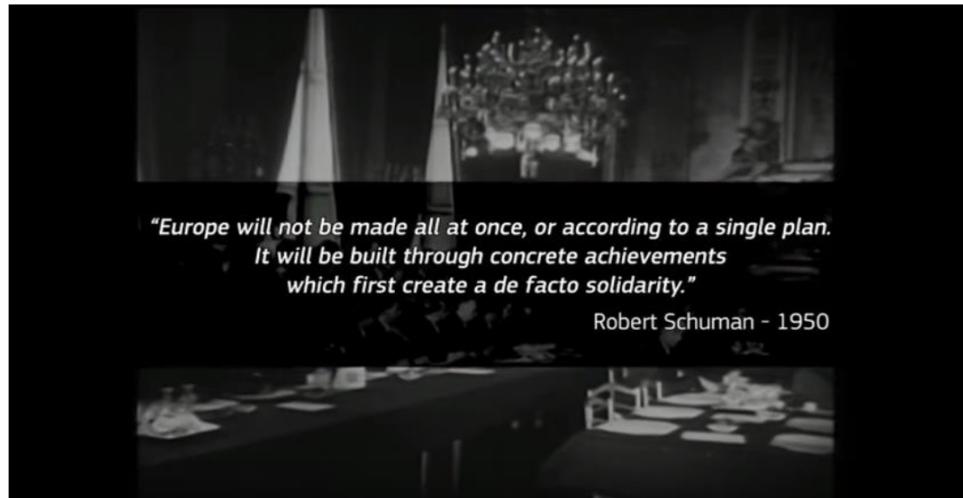
Altri punti chiave

- Climate finance - Differenziazione degli impegni finanziari in base alla diversa responsabilità storica su clima e emissioni tra Paesi Sviluppati e in via di Sviluppo;
- Adattamento e Resilienza
- Trasparenza e Revisione sulle emissioni



L'Energy Union

“Voglio riformare e riorganizzare la Politica energetica dell’Europa in una nuova Unione Energetica europea”



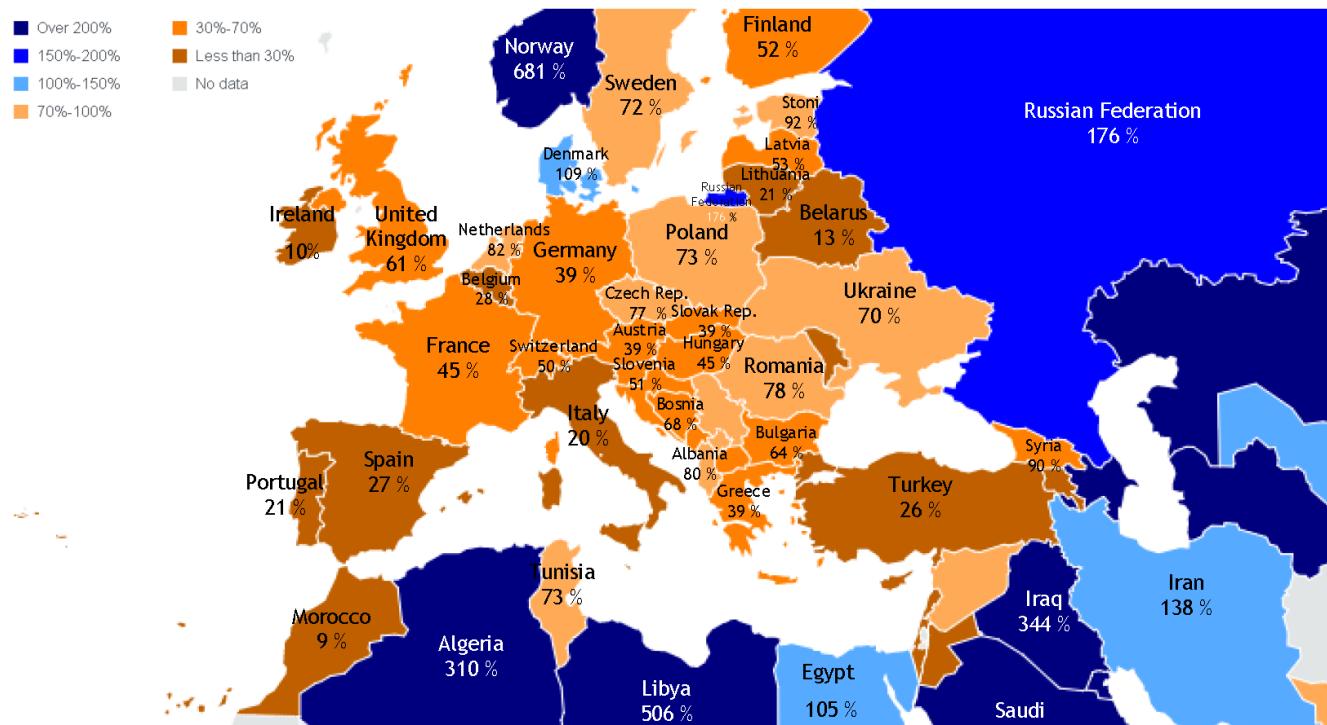
*“Europe will not be made all at once, or according to a single plan.
It will be built through concrete achievements
which first create a de facto solidarity.”*

Robert Schuman - 1950

Jean-Claude Juncker

Presidente della Commissione Europea

Energia : l'attuale autosufficienza degli Stati membri



L'UE IMPORTA IL 53% DI TUTTO IL SUO FABBISOGNO ENERGETICO*
con un costo di
400 mil€/anno

*fabbisogno totale di energia primaria

Main EU Policy Elements

- 2030 Climate-Energy Package

From 20/20/20 to 40/27/27

- Energy Union

Energy security, solidarity and trust

A fully integrated internal energy market

Energy efficiency first

Transition to a low-carbon society

An Energy Union for Research, Innovation and Competitiveness

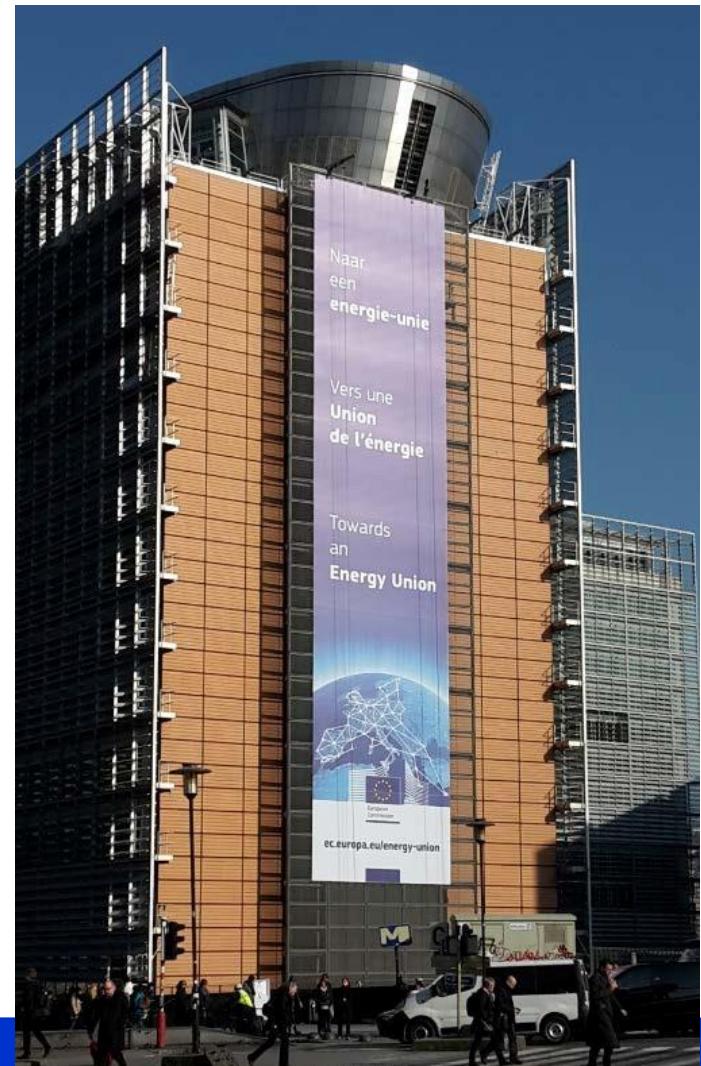
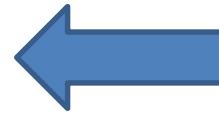
- Set-Plan & Integrated Roadmap

HORIZON 2020

- After Paris COP 21

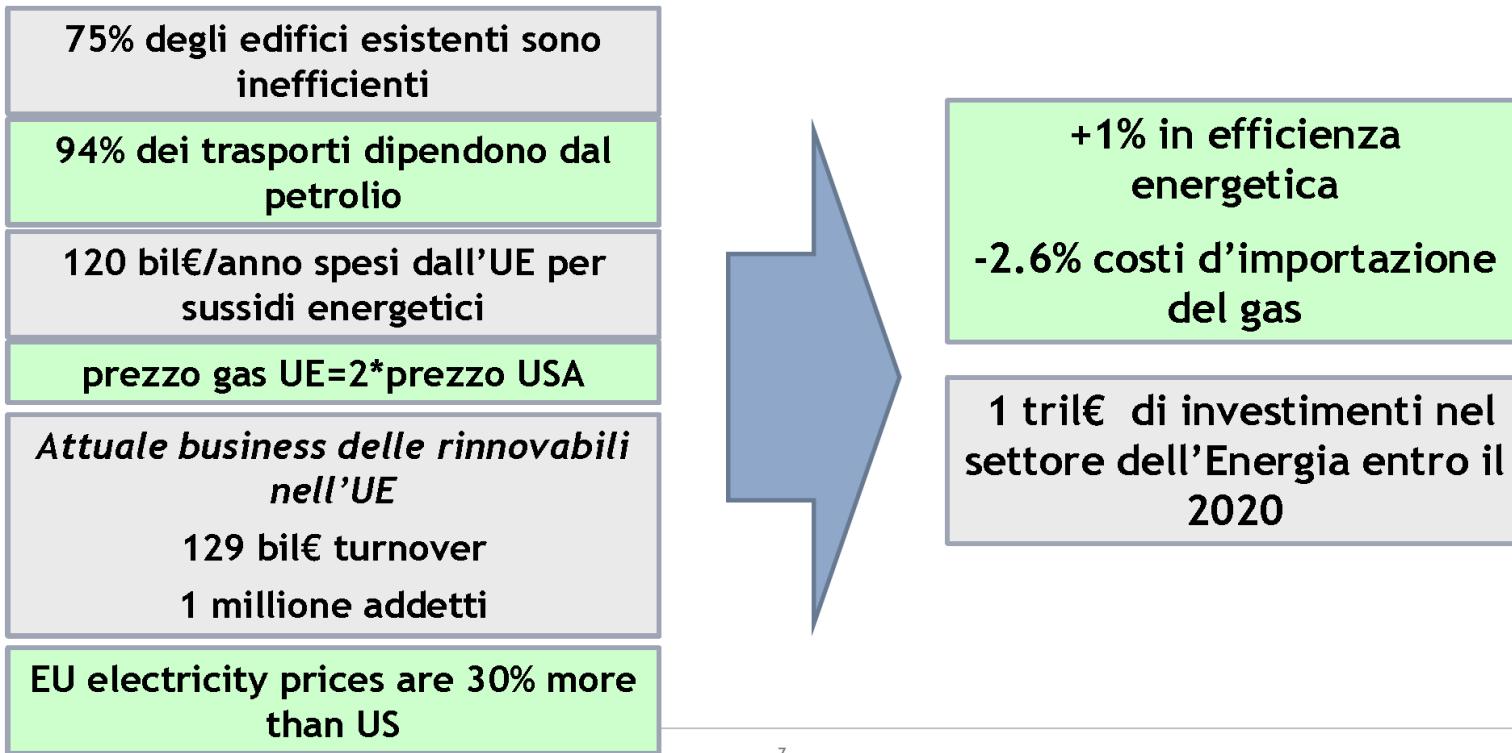
“MISSION

INNOVATION”



Energia nell'Unione Europea oggi : qualche numero

53% di energia importata
(400 mil € /anno)



- 7 -

L'Energy Union : Obiettivi e Dimensioni

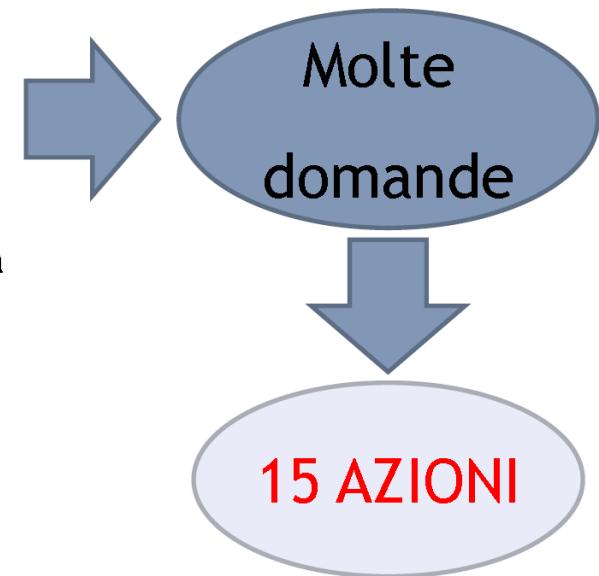
L'Energy Union assicurerà all'Europa un'energia:

- **sicura**
- **sostenibile** (economicamente)
- **competitiva**

Garantendo uno nuovo slancio all'economia e creando nuovi posti di lavoro

LE 5 DIMENSIONI

1. Sicurezza energetica, solidarietà e fiducia
2. Piena integrazione del mercato europeo dell'energia
3. Efficienza energetica
4. Decarbonizzazione dell'economia
5. Ricerca, innovazione e competitività



**SET Plan Integrated Roadmap
(13 themes)
In origin they were 30**

**ENERGY UNION
R&I & Competitiveness
priorities**

**SET Plan
(10 key actions)**

T10: Development of renewables

T8: System flexibility

T1: Engaging consumers
T2: Smart technologies for consumers

T6: Modernising the electricity grid
T7: Energy storage
T8: System flexibility
T9: Smart cities & communities

T3: Energy efficiency in buildings
T4: Energy efficiency in heating & cooling
T5: Energy efficiency in industry & services

T7: Energy storage

T13: Biofuels, fuel cells & hydrogen, alternative fuels

T11: Carbon capture storage/use

T12: Nuclear energy

N°1 in Renewables

**Smart EU Energy
System with
consumers at the
centre**

**Efficient Energy
Systems**

Sustainable Transport

1. Performant renewable
technologies integrated in the
system

2. Reduce costs of technologies

3. New technologies & services
for consumers

4. Resilience & security of
energy system

5. New materials & technologies for
buildings

6. Energy efficiency for industry

7. Competitive in global battery
sector (e-mobility)

8. Renewable fuels

9. CCS/CCU

10. Nuclear Safety





HORIZON 2020 (78 MLD)



Tre priorità:

- 1 **Scienza di Eccellenza**
- 2 **Leadership Industriale**
- 3 **Sfide della Società**

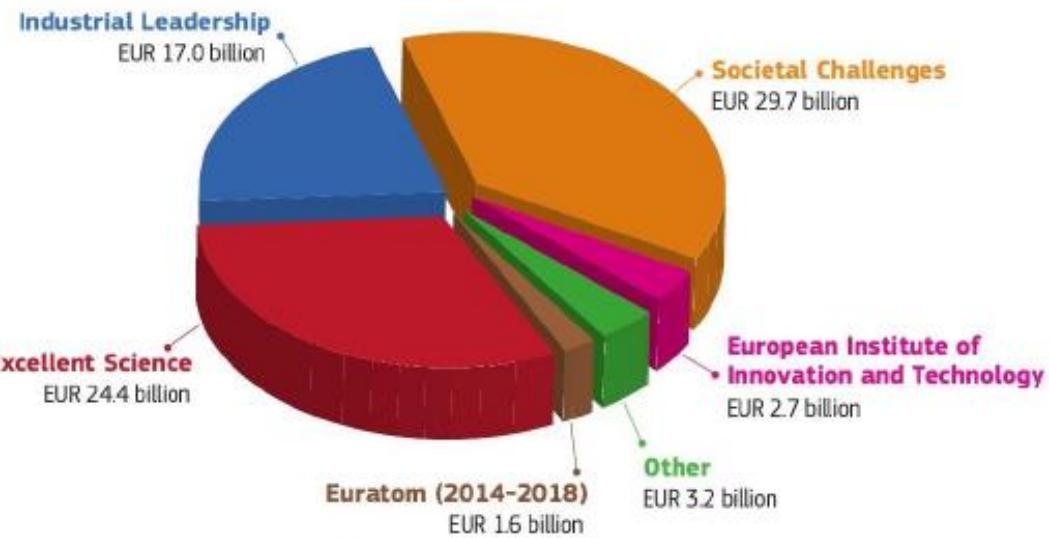


Figure 7: H2020 budget distribution in current prices. Source: EC.



Energy Efficiency

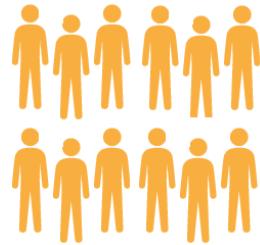
Types of action



Funding areas



**Heating &
Cooling**



Consumers



Buildings



**Industry,
Services &
Products**



**Innovative
financing for
Energy
Efficiency**

WP 16-17 : Energy Efficiency



Topics group

- 1. Heating and cooling**
- 2. Engaging consumers towards sustainable energy**
- 3. Buildings**
- 4. Industry, products and services**
- 5. Innovative financing for energy efficiency**



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Dipartimento Energia

WP 16-17 : Energy Efficiency

Industry, products and services

- **design of manufacturing processes,**
- **energy recovery,**
- **energy audits and energy management systems,**
- **re-use of industrial waste**
- **optimisation of the value chain**
- **development and market uptake of innovative highly efficient energy-related products, systems and services**



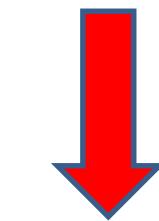
The SME Instrument

- Completely bottom-up – all areas of the Energy Challenge covered
- Only open to SMEs – also single-beneficiaries possible

3 phases of support (no need to start with phase 1)

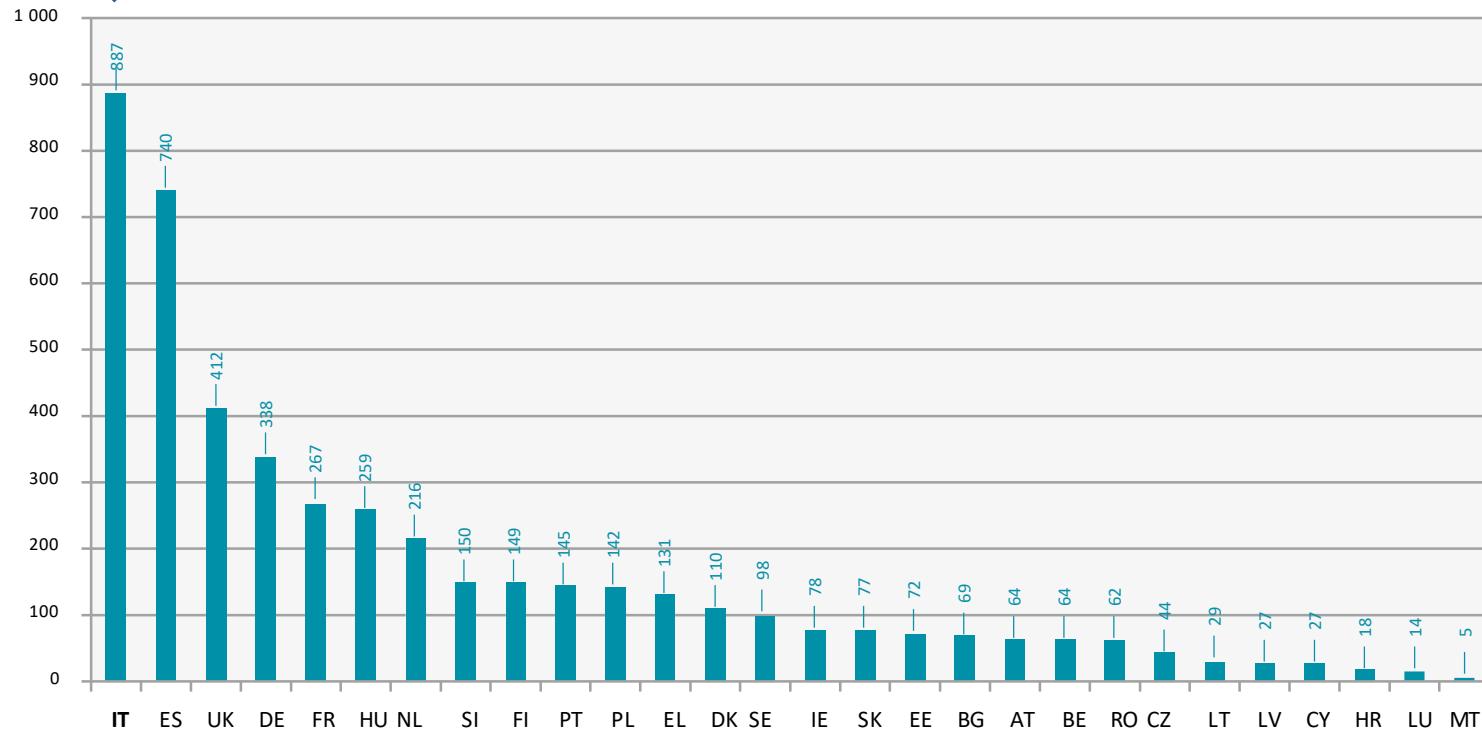
1. Business innovation grants (feasibility studies, lump sum of EUR 50,000 per project);
2. Business innovation grants for innovation development & demonstration purposes (between EUR 0.5 – 2.5 million / project)
3. Free-of-charge business coaching, access to a wide range of innovation support services and facilitated access to risk finance to facilitate the commercial exploitation of the innovation.

- ✓ 4 submission deadlines per year for phase 1 and 2
- ✓ Budget for the Energy SME topic (SMEInst-09-2016-2017):
 - ✓ 46 M€ in 2016
 - ✓ 50 M€ in 2017



What is the breakdown by country for the SME instrument?

Applications to the Horizon 2020 SME instrument per EU Member State



SMEs in EU Member States made 4 694 applications to the Horizon 2020 SME instrument. Most of the applications came from the five biggest Member States: Italy, Spain, the United Kingdom, Germany and France.



EUROPEAN COMMISSION
RTD - Energy
ENER - Renewables, R&I, Energy Efficiency
JRC – Institute for Energy and Transport
SET Plan Secretariat



SET-Plan ACTION n°6

DRAFT ISSUES PAPER

Continue efforts to make EU industry less energy intensive and more competitive

Drivers and means to improve EE in industry

- Sectoral technologies, tied to specific materials, processes or practices characterising a given sector (e.g. the steel or chemical industries)
- Cross-cutting technologies applicable to many sectors (e.g. heat recovery, energy efficient components, enhanced process control, industrial symbiosis, etc.)

Eight industrial sectors accounting for 98% of the industrial final energy consumption in EU28

Sector	Final energy consumption	EE Economic potential (payback <=5 year)	EE Technical Potential	Energy cost/ Value Added	No. of employed	Value added, gross
	Mtoe	Mtoe	Mtoe		Million	€ billion
Pulp and paper	34.3	1.4	7.2	16%	1.43	79.0
Iron and steel	50.8	3.1	16.3	36%	0.63	39.7
Non-metallic mineral	34.2	1.3	7.1	23%	1.29	63.9
Chemical and pharmaceutical	51.5	3.2	16.5	12%	1.72	229.8
Non-ferrous metal	9.4	0.5	1.9	23%	0.46	23.7
Petroleum refineries	44.7	1.9	10.6	44%	0.12	24.3
Food and beverage	28.4	1.7	6.8	10%	4.53	251.4
Machinery	19.3	1.3	5.3	3%	9.03	579.8
Total	272.5	14.4	71.7			

Examples of existing cross-cutting technologies with payback period longer than 5 years

End Use	Energy Efficiency Improvement Opportunity Description
Chillers & Compressors	Premium Efficiency Refrigeration Control System
Compressor for Pneumatic Systems	Compressor heat recovery
Compressor for Pneumatic Systems	Premium efficiency ASD compressor
Fans / Blowers	High/Premium Efficiency Motors (Fans)
Indirect Heating (Boilers)	Automated Blowdown Control
Indirect Heating (Boilers)	Condensate Return
Indirect Heating (Boilers)	Heat exchanger optimization
Indirect Heating (Boilers)	Minimize De-aerator Vent Losses
Machine Drive	High/Premium Efficiency Motors
Pumps	High/Premium Efficiency Motors (Pumps)
Pumps	Premium Efficiency Control with ASDs (Pumps)
System	Electricity demand management control system
System	Power Factor Correction



Examples of emerging cross-cutting technologies

End Use	Energy Efficiency Improvement Opportunity Description
Heat recovery	Organic Rankine Cycle, Supercritical Rankine Cycle
Heat recovery	More efficient low grade waste heat recovery Technologies, e.g. high temperature heat pump
Integrated Control Systems	Process integration for EE optimisation, including dynamic modelling to allow real-time process control and optimisation

The main cross-cutting technologies can be grouped as follows:

1. **High efficiency components:** motors, adjustable speed drives, pumps, fans, machines, compressors
2. **Heat or cold recovery technologies:** condensers, exchangers, carriers, storage, heat pumps
3. **Integrated control systems:** static modelling for process integration and energy efficiency optimisation at design stage, but also dynamic modelling to allow real-time process control and optimisation. It includes also: monitoring and sub-metering; demand response management; integration of renewables.



Best Available Techniques Reference Documents BREFs

<http://eippcb.jrc.ec.europa.eu/reference/>



JOINT RESEARCH CENTRE
Institute for Prospective Technological Studies (IPTS)

EUROPA > European Commission > JRC > IPTS > SPC > EIPPCB



Energy Efficiency

Code	Adopted/Published Document	Formal draft (*)	Meeting report	Estimated review start (**)
ENE	BREF (02.2009)			



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Dipartimento Energia

Italia 2020

Sono state identificate 7 priorità con obiettivi concreti e specifiche misure a supporto



Strategia Energetica Nazionale: per un'energia
più competitiva e sostenibile

Marzo 2013



<http://goo.gl/50EEc1>



1 Efficienza energetica



2 Sviluppo mercato competitivo e Hub del gas sud-europeo



3 Sviluppo sostenibile delle energie rinnovabili



Ricerca e sviluppo nel settore dell'energia



4 Sviluppo dell'infrastruttura e del mercato elettrico



5 Ristrutturazione della raffinazione e della rete di distribuzione dei carburanti



6 Produzione sostenibile di idrocarburi nazionali



7 Modernizzazione del sistema di governance

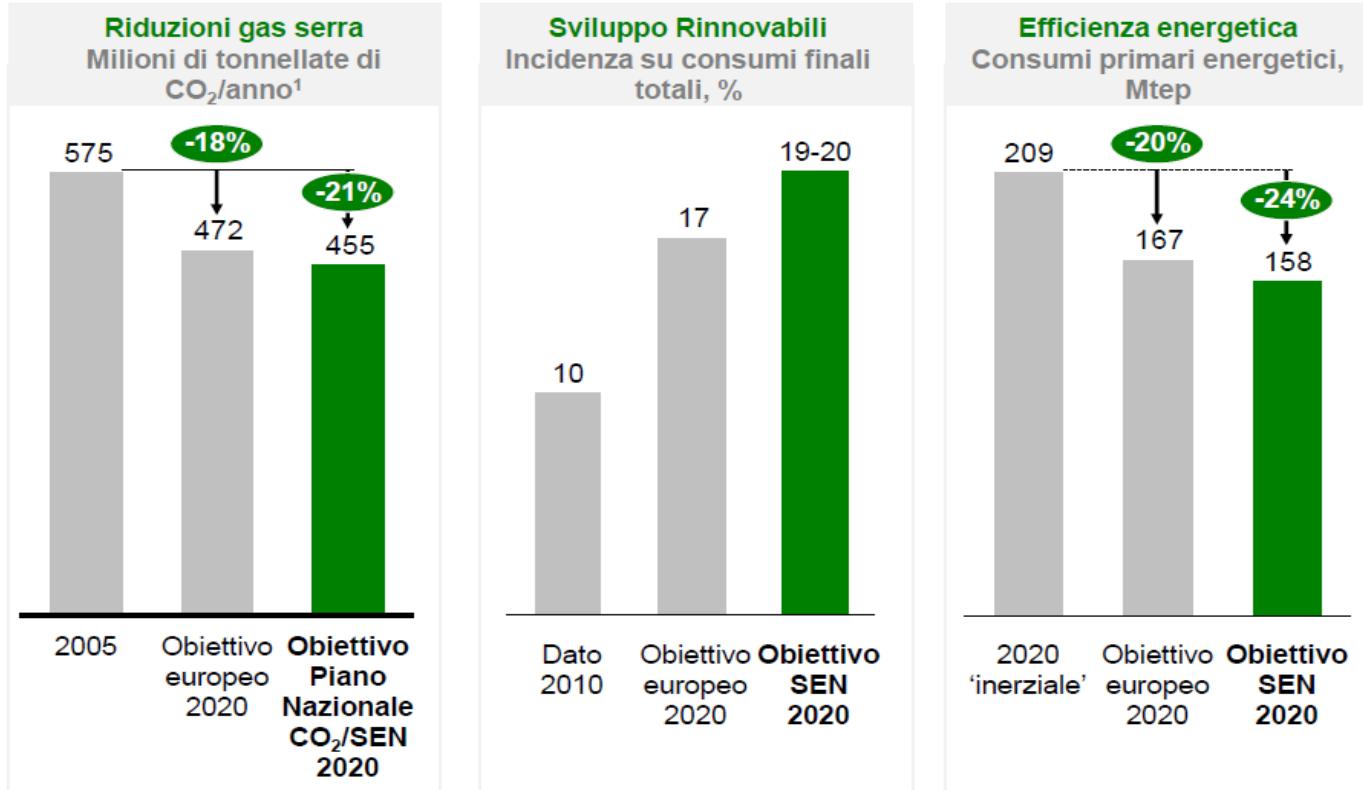
Italia 2020



Strategia Energetica Nazionale: per un'energia
più competitiva e sostenibile Marzo 2013

Marzo 2013

<http://goo.gl/5OEEc1>



Italia 2020

Si prevede, per la prima volta, la riduzione assoluta dei consumi primari grazie all'Efficienza Energetica - e la diminuzione della dipendenza da combustibili fossili a beneficio delle Rinnovabili

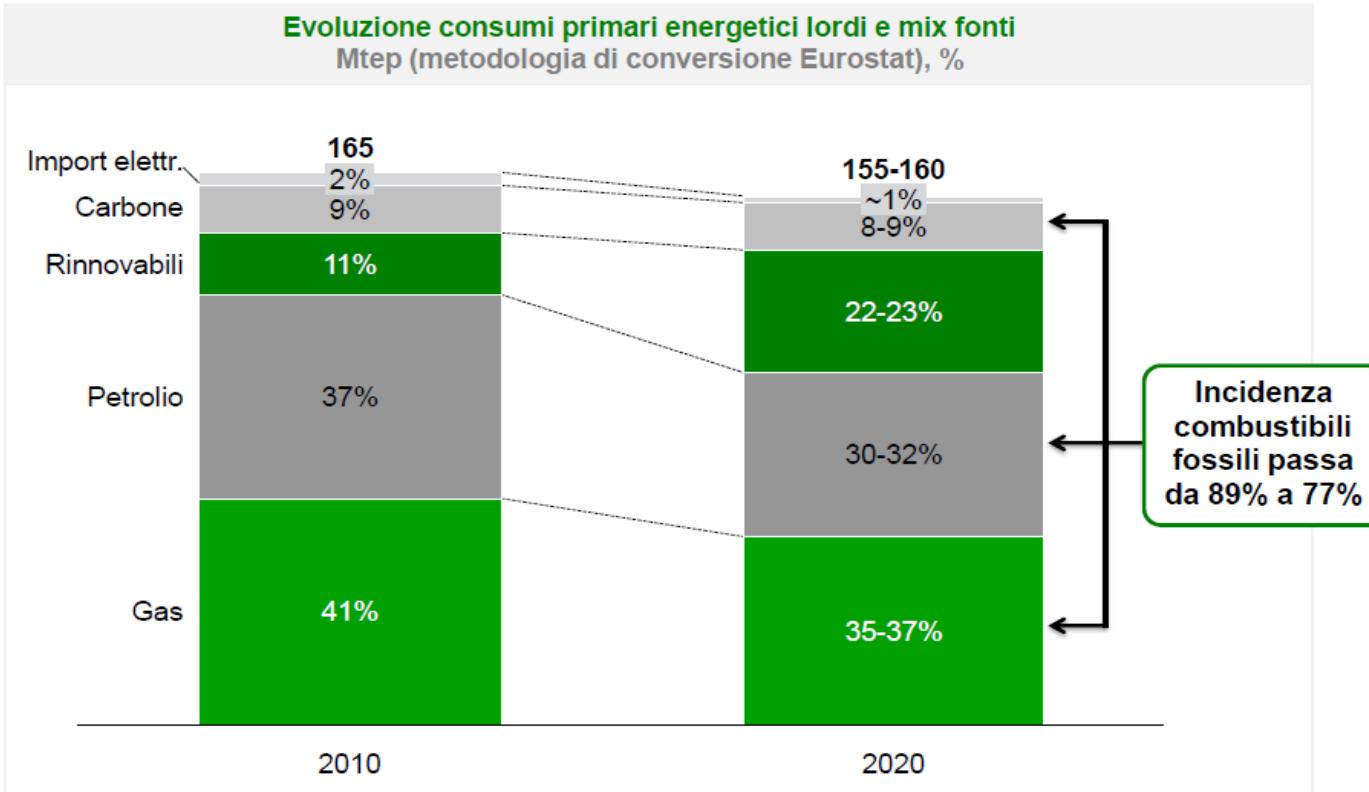


Strategia Energetica Nazionale: per un'energia più competitiva e sostenibile

Marzo 2013



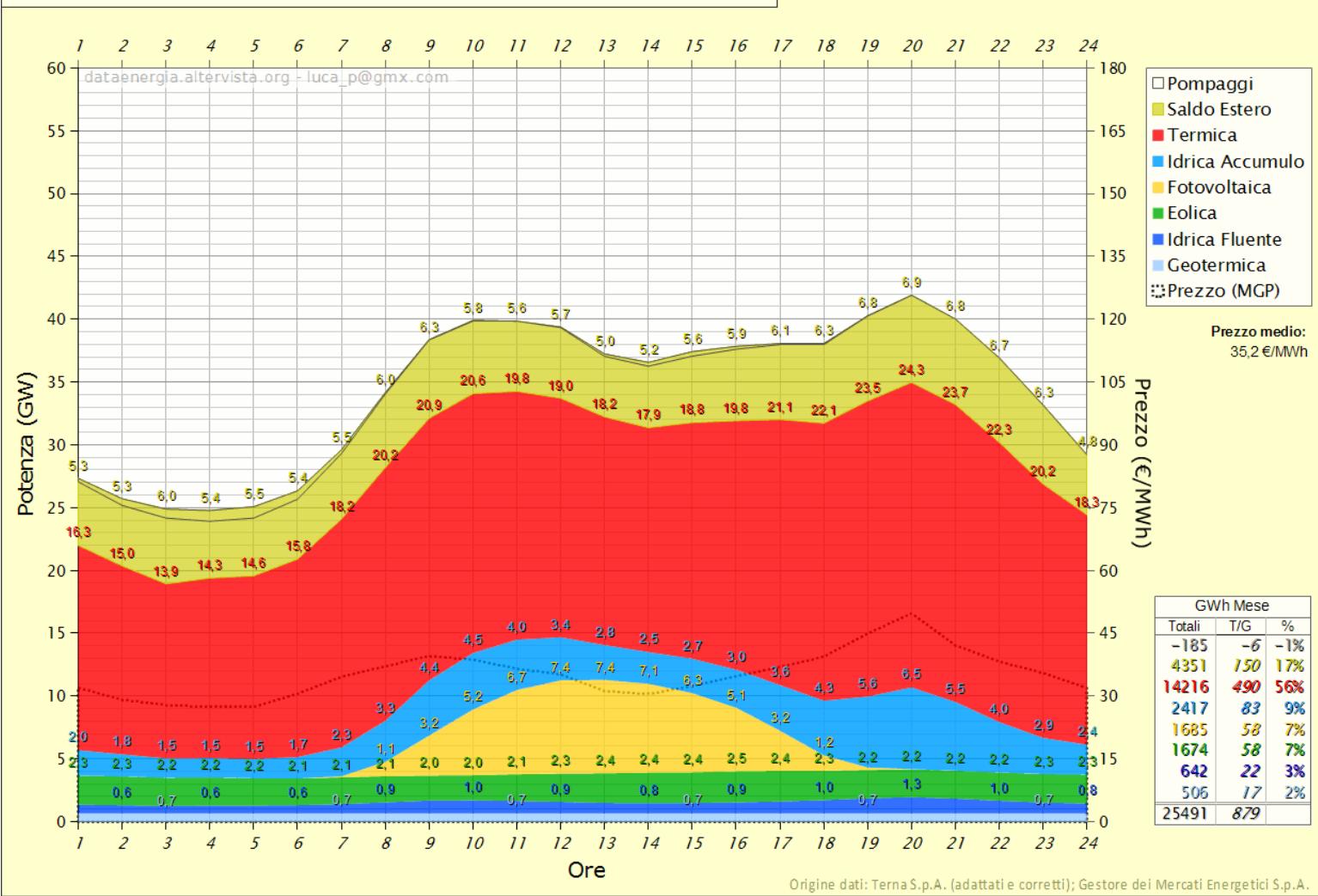
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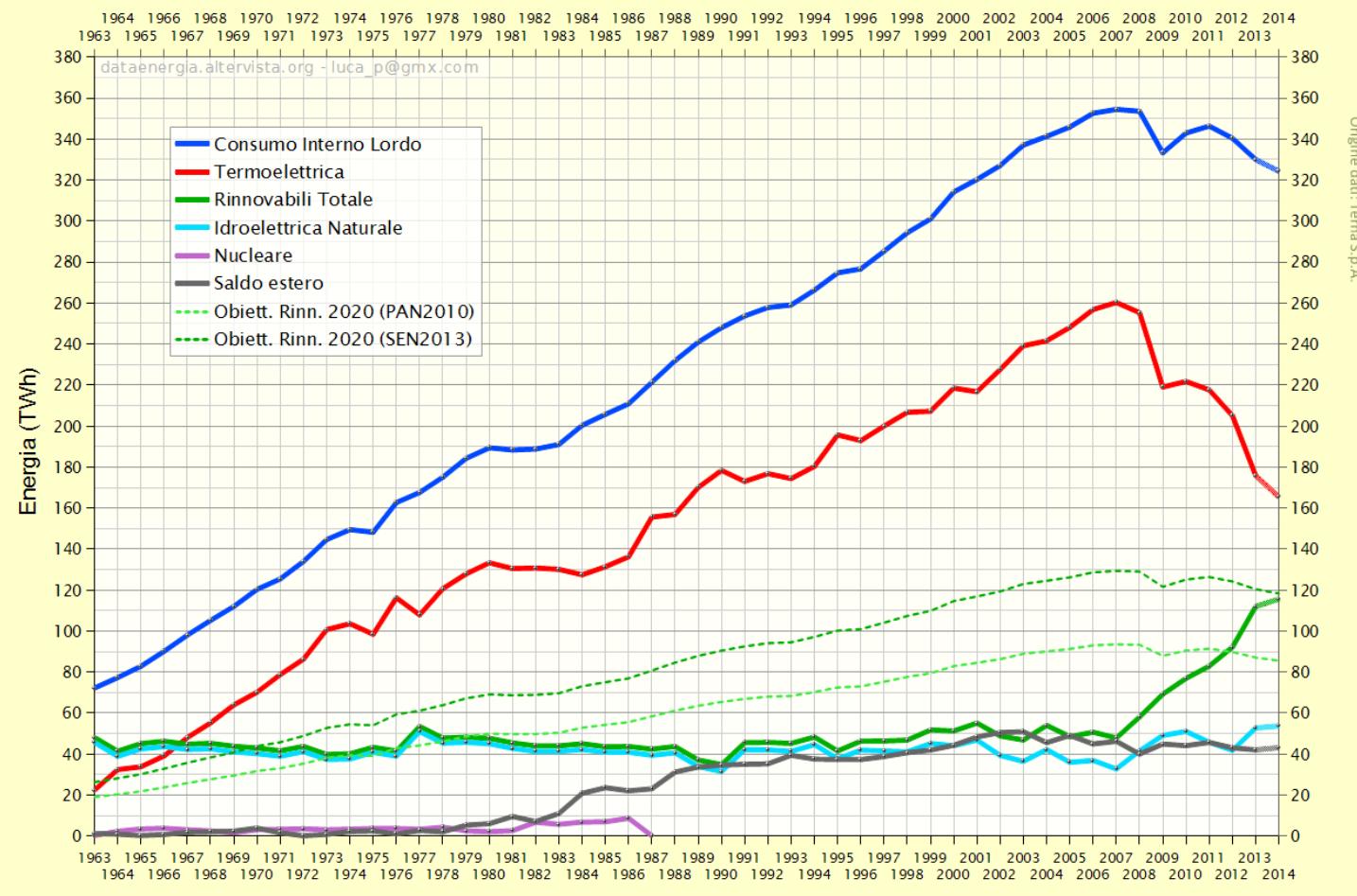
Dipartimento Energia

Produzione elettrica oraria per fonte in Italia - Marzo 2016 - Valori medi mensili



Fonte:
<http://dataenergia.altervista.org/>

Consumo Interno Lordo di energia elettrica per fonte in Italia



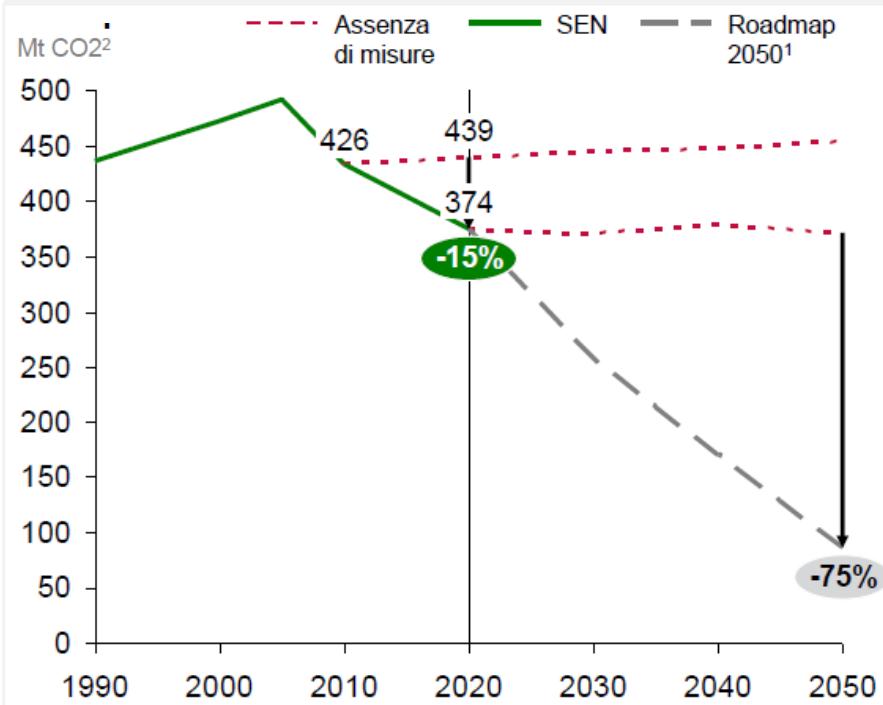
Fonte:
<http://dataenergia.altervista.org/>

Italia oltre il 2020

La Strategia energetica riduce sensibilmente le emissioni di CO₂ al 2020, ma il percorso di decarbonizzazione al 2050 sarà sfidante



Applicazione all'Italia degli scenari europei della Roadmap 2050

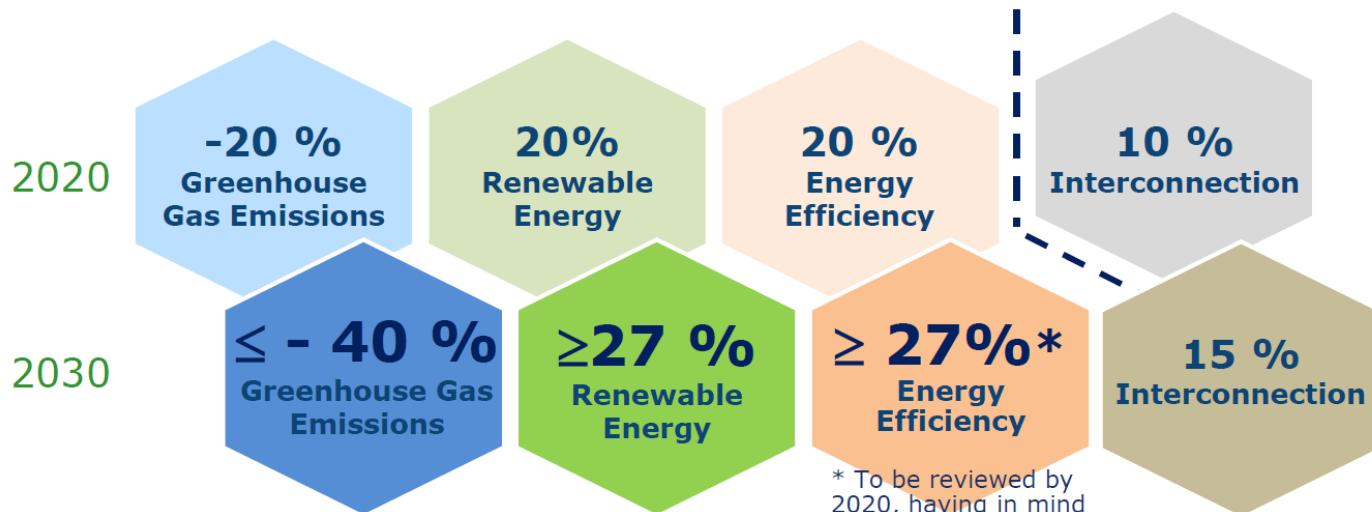


Implicazioni post 2020

- **Efficienza energetica:** necessità di moltiplicare gli sforzi (riduzione consumi di almeno 17-26% vs. 2010)
- **Rinnovabili:** fortissima penetrazione (almeno 60% dei consumi finali)
- Forte incremento del grado di **elettrificazione** (raddoppio quota consumi)
- **Gas:** ruolo chiave nella transizione (almeno fino al 2035)
- **R&D:** fondamentale per sviluppare tecnologie a basso livello di carbonio e competitive

Unione Europea Framework 2030

Agreed headline targets 2030 Framework for Climate and Energy



CLIMATE ACTION

framework

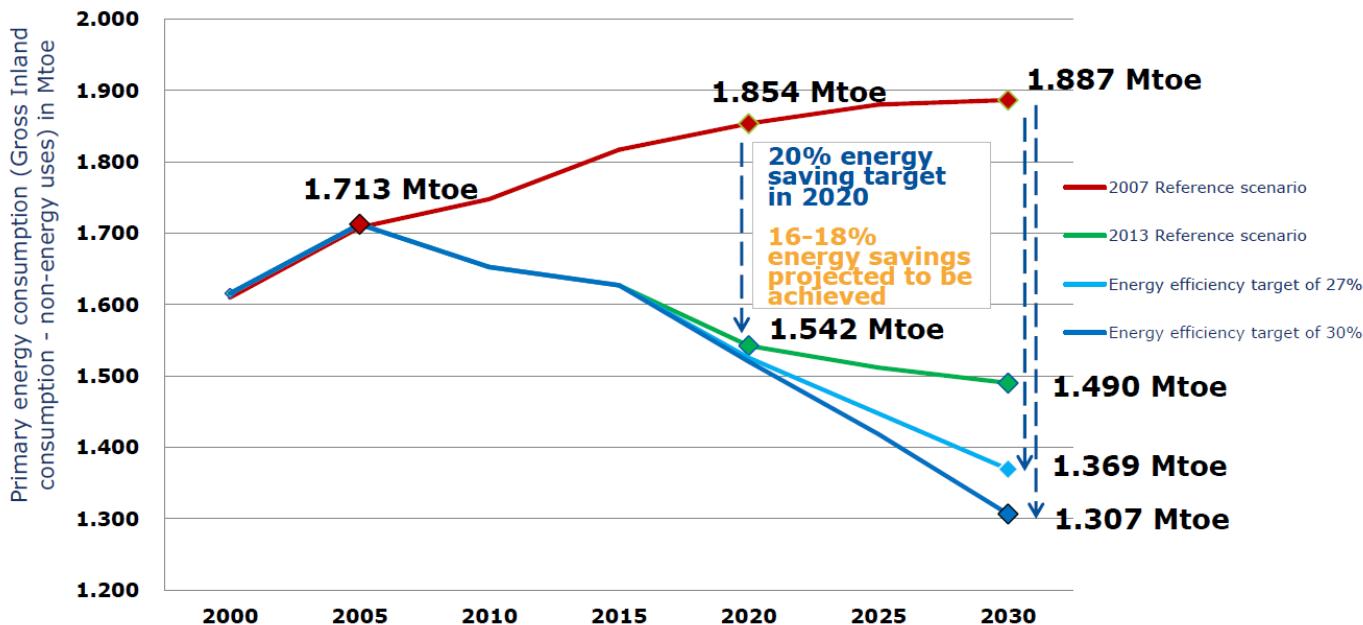
Unione Europea Framework 2030



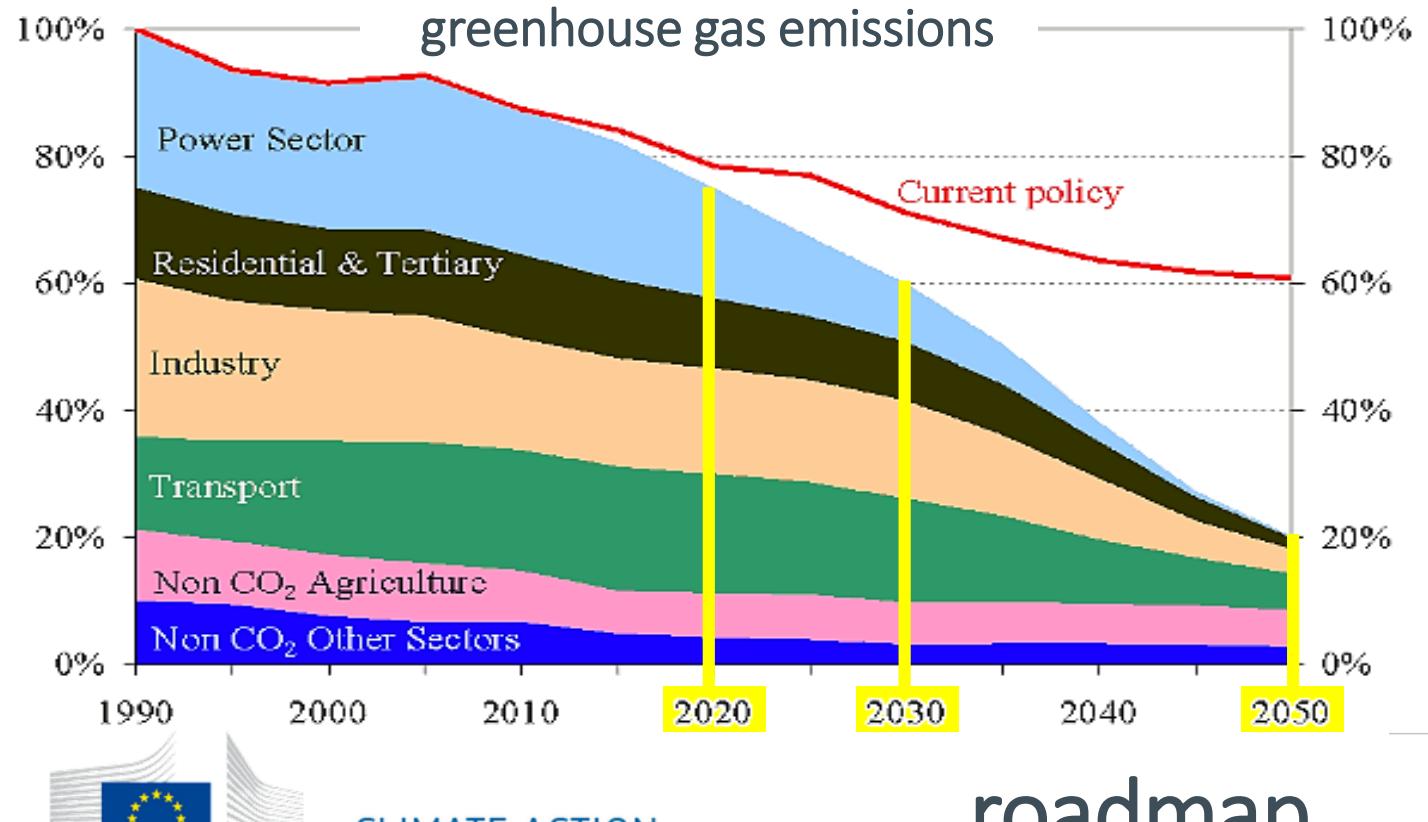
EU 2030 target:
at least 27% of
energy savings

Energy efficiency

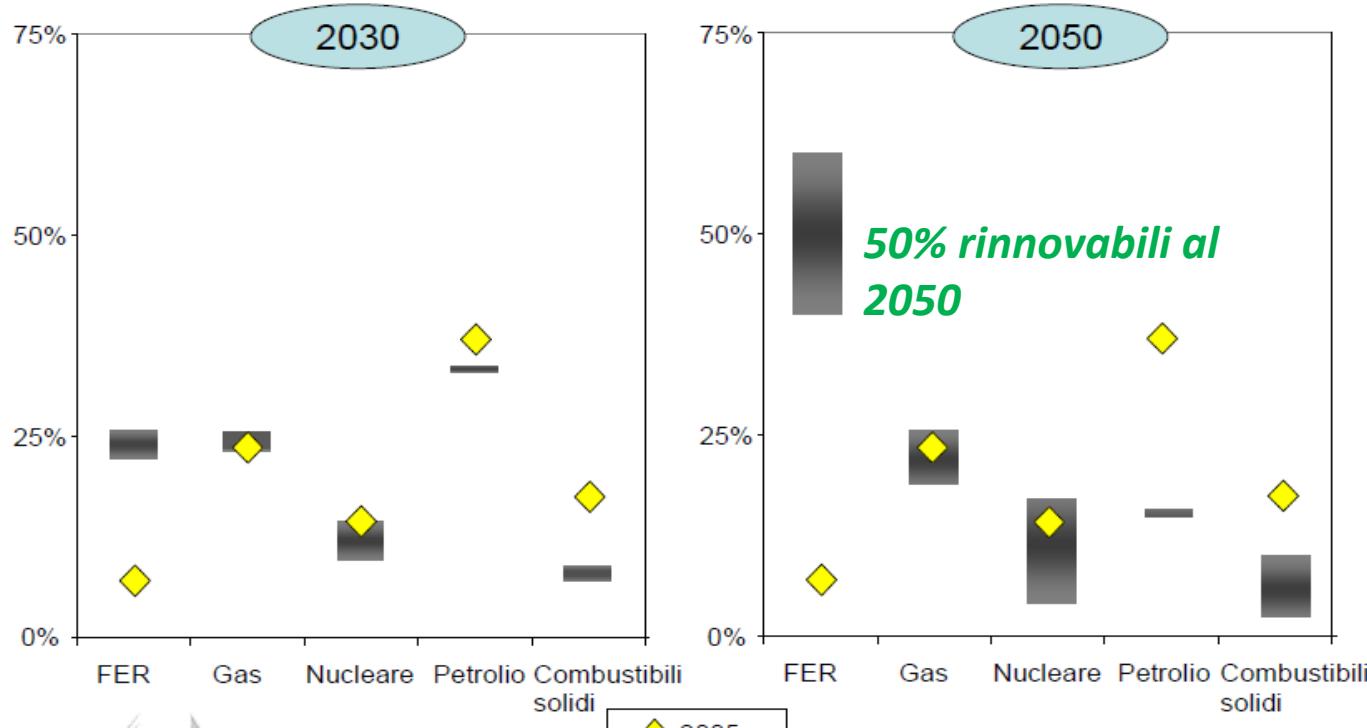
2020 and 2030 energy savings targets



Unione Europea Roadmap 2050



Unione Europea Roadmap 2050



roadmap



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Danimarca 2050



Danish Ministry
of Energy, Utilities
and Climate

<http://www.efkm.dk/en>

Energy, utilities and climate policy | Facts | News and Press | The Minister | The Ministry

IN 2050 ALL OUR ENERGY WILL BE FROM RENEWABLE ENERGY SOURCES

[read more](#)



NEWS

The Energy Commission must come up with the next intelligent steps forward in Denmark's green transition

Energy, Utilities and Climate Minister Lars Christian Lilleholt today unveils the government's Energy Commission which will analyze the new...

Danish Minister and the French Ambassador to brief 50 ambassadors on COP21 in the House of Industry

The Danish Minister for Energy, Utilities and Climate, Lars Chr. Lilleholt, and the Ambassador of France to Denmark, Francois Zimeray, will today be...



DANISH MINISTER FOR ENERGY, UTILITIES AND CLIMATE

Lars Chr. Lilleholt

[Read the minister's CV](#)

SHORTCUTS

- [Smart Grid](#)
- [Energy Agreements](#)
- [Climate Negotiations in the UN](#)
- [Green Growth and Business](#)
- [Climate Negotiations in the EU](#)



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Danimarca 2050

The government's energy policy milestones up to 2050

In order to secure 100 pct. renewable energy in 2050 the government has several energy policy milestones in the years 2020, 2030 and 2035. These milestones are each a step in the right direction, securing progress towards 2050.

2020	2030	2035	2050
Half of the traditional consumptions of electricity is covered by wind power	Coal is phased out from Danish power plants Oil burners phased out	The electricity and heat supply covered by renewable energy	All energy supply - electricity, heat, industry and transport - is covered by renewable energy

The initiatives up to 2020 will result in a greenhouse gas reduction by 35 pct. in relation to 1990.

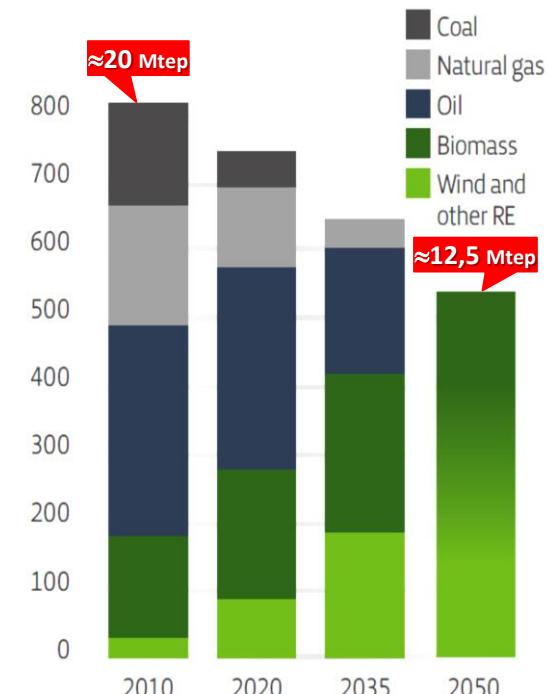
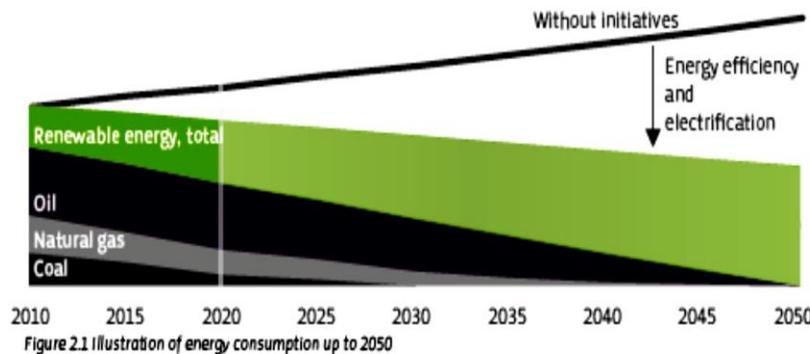


Figure 3.8 Consumption of fossil fuels and renewable energy (PJ)

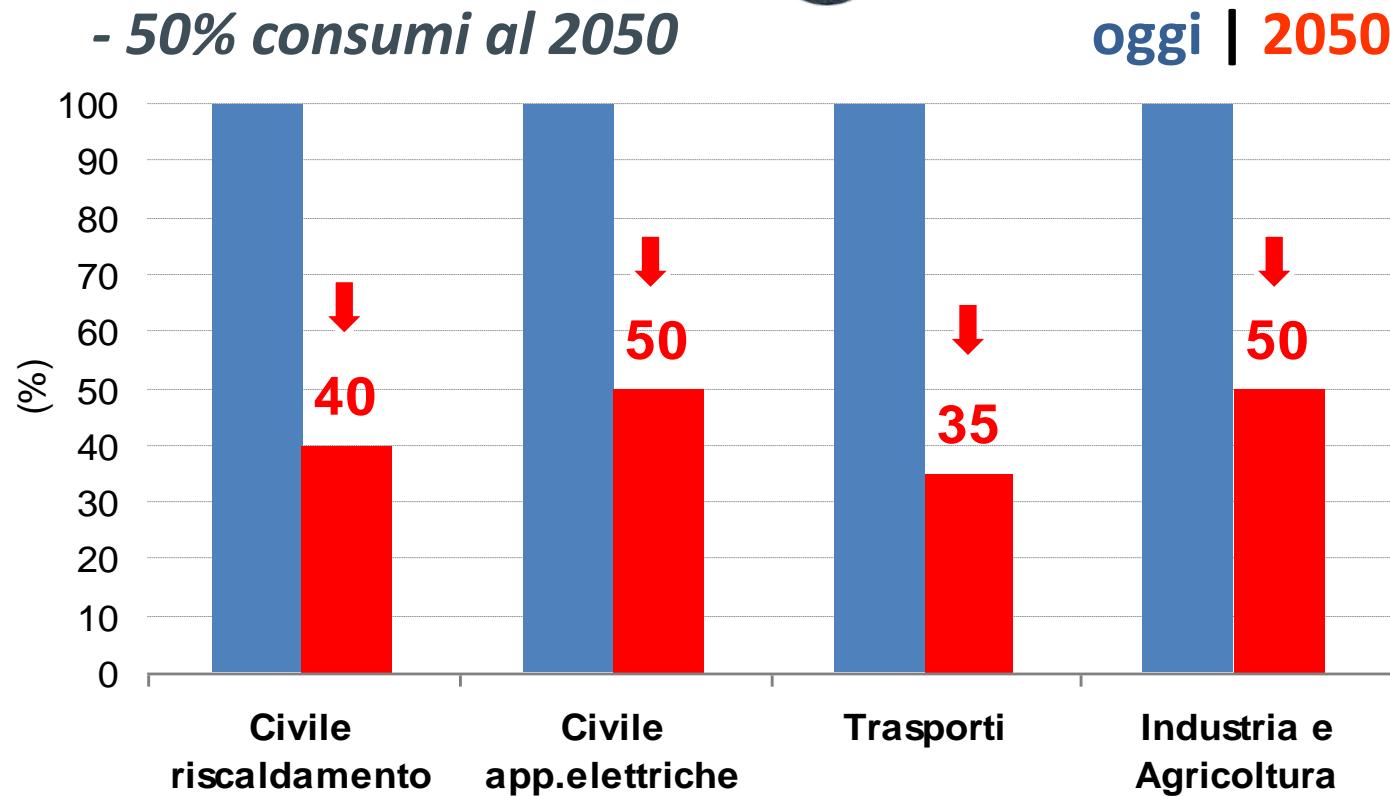
Danimarca 2050

Green energy



KLIMAKOMMISSIONEN
DANISH COMMISSION ON CLIMATE CHANGE POLICY

<http://goo.gl/VSAHhq>

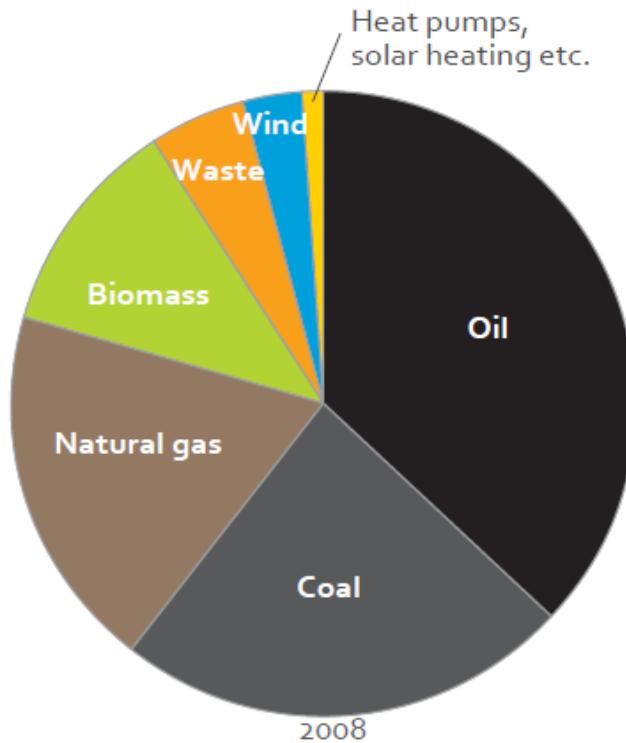


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Danimarca 2050

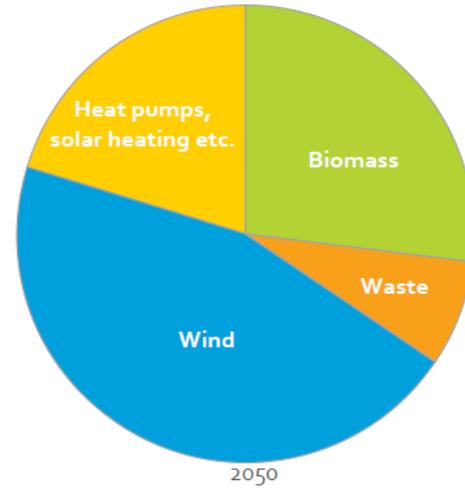
Green energy



KLIMAKOMMISSIONEN
DANISH COMMISSION ON CLIMATE CHANGE POLICY

<http://goo.gl/VSAHhq>

100% rinnovabili al 2050



2008 |
2050



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Svezia fossil-free



Government Offices of Sweden



Photo: Folio Bildbyrå

<http://goo.gl/sK8neH>

Fossil Free Sweden

Sweden will be one of the world's first fossil-free welfare countries. To this end, the Government has launched the Fossil Free Sweden initiative, where Swedish actors are given the opportunity to call attention to how they are contributing to climate change work. The initiative brings together actors from the business sector, municipalities, regions and organisations from across the country.

Responsible ministers

> Åsa Romson

Responsible ministries

> Ministry of the Environment and Energy



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Tirol 2050 energieautonom

The screenshot shows the homepage of the Tirol 2050 energieautonom website. The top navigation bar includes links for MENÜ, DIE VISION, Energie Enquete, Ideenkanal, DOWNLOAD, KONTAKT, and TEILEN. The main banner features a forest scene with a circular logo containing the text "TIROL 2050 energieautonom". Below the banner, a URL "http://goo.gl/dvC1Rs" is displayed. The central content area has a yellow background and features the word "VISION" in large green letters above a URL "http://goo.gl/sK8neH". A subtext reads: "Eine Zukunft frei von fossilen Energieträgern und damit eine lebenswerte Zukunft für die nächsten Generationen – das ist das Ziel von TIROL 2050 energieautonom." To the left is a green illustration of a forest with a water cycle diagram. In the center is a graphic showing a blue triangle for energy consumption reduction and a green triangle for renewable energy increase. To the right is a photo of a group of people outdoors with the caption "Tirol – Alle ins Boot holen" and a detailed text about the program's goals.

http://goo.gl/dvC1Rs

VISION
http://goo.gl/sK8neH

Eine Zukunft frei von fossilen Energieträgern und damit eine lebenswerte Zukunft für die nächsten Generationen – das ist das Ziel von TIROL 2050 energieautonom.

Die Energieautonomie

Bis zum Jahr 2050 soll der Energieverbrauch in Tirol halbiert und der Anteil an erneuerbaren Energieträgern um 30 % erhöht werden. Dabei werden nicht nur neue Technologien, wie Wasserstoffautos oder "Intelligente Gebäude" eine Rolle spielen. Der Wandel zu einer zukunftsfitigen Gesellschaft gelingt am besten über viele einzelne Schritte und die Vielfalt von Ideen der Menschen in Tirol. Mit dem gemeinsamen Einsatz für die Energieautonomie Tirols schreiten wir in eine entkoppelte Zukunft.

Energieverbrauch - 50%

Erneuerbare Energie + 30%

Tirol – Alle ins Boot holen

Mit dem Programm für ein energieautonomes Tirol 2050 bündelt das Land alle Kräfte. Die Energieautonomie hat für das Land Tirol einen hohen energie-, wirtschafts- und gesellschaftspolitischen Stellenwert. Deshalb sollen von der Bevölkerung über die Unternehmen bis hin zum Land und den Gemeinden alle ins Boot geholt werden. Jede und jeder kann durch Ideen und Handeln einen Teil dazu beitragen, dass Tirol langfristig und nachhaltig energieautonom wird. Bei Tirol 2050 dürfen alle mitreden und mitmachen. Die Politik will laufend die Rahmenbedingungen schaffen, um einen gesellschaftlichen Wandel im Sinne der Energieautonomie zu ermöglichen.



Zurigo 2000-Watt Society

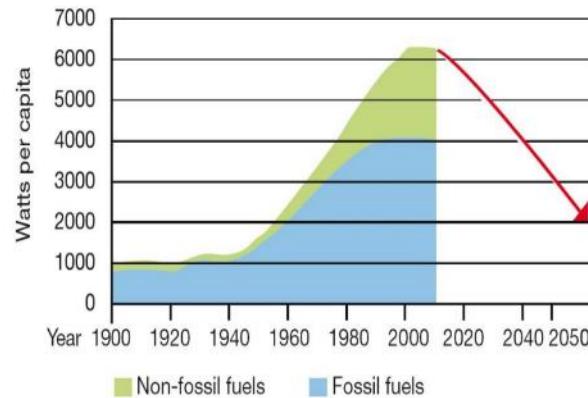
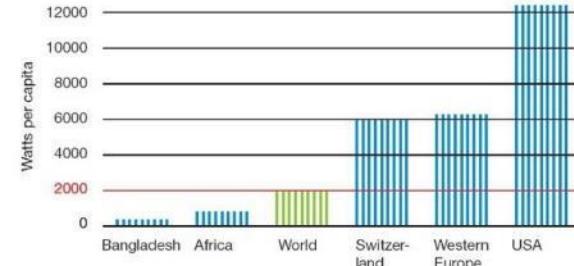


2000-Watt Society

www.stadt-zuerich.ch/2000-watt-society

Ten years ago, the vision of a "2000-Watt Society" was developed at the Swiss Federal Institute of Technology (ETH) in Zürich. It is a model for energy policy which demonstrates how it is possible to consume only as much energy as worldwide energy reserves permit and which is justifiable in terms of the impact on the environment. It is possible when every person in every society limits their energy consumption to a maximum of 2000 watts.

Furthermore, at least 75% of energy needs need to be met using renewable energy sources, meaning that on an annual basis only one tonne of greenhouse gas is given off per person per year. The 2000-Watt Society is Zürich's approach to tackling climate change and the future conflict of resources.



<https://goo.gl/05WfRN>

Fonti

- <http://dataenergia.altervista.org/portale/>
- <http://www.fonti-rinnovabili.it/>
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Grazie per l'attenzione!

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