USING ENERGY REGULATION TO SERVE CLIMATE OBLIGATIONS

Co-funded by the European Union

During the last 150 years, the global surface temperature has increased by almost 1.1°C mainly due to human activities, after being almost stable or with low variations for 2000 years.

One of the regions that will be witnessing an extreme change is the **Mediterranean region**, which will be **highly affected by global warming** both in terms of **lower precipitation and soil moisture**, leading to **water and agricultural problems.**

To **combat climate change** and adapt to its effects, **nations from around the world committed to undertake ambitious efforts**, at COP 21 on 12 December 2015, with the adoption of the **Paris Agreement.** The goal of this **legally binding international treaty** is to **limit global warming to well below 2,** preferably to 1.5 degrees Celsius, compared to pre-industrial levels.

To attain this goal, countries aim to achieve a **climate neutral world by mid-century**, and must **drastically reduce their CO2 emissions**, tackling the sectors which are the most carbon-intensive: **energy**, **transport**, **industry**, **agriculture** and **buildings**, among others.

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THE ENERGY TRANSITION IN THE EUROPEAN UNION

The European Commission committed to make Europe the first **climate neutral continent by 2050**, **reducing greenhouse gas emissions by 55% by 2030**, and working towards **affordable and sustainable energy supply** in all aspects of economic life such as **transport, building, and agriculture.**

To deliver these climate objectives, the EU adopted a set of legislative proposals which foresee **massive investments.**

December 2019

The European Green Deal

It aims to **transform the economy and societies** as a **third industrial revolution** to improve the well-being of citizens.

- make **transport more sustainable**
- **clean the energy system**
- **renovate buildings**
- **restore biodiversity**
- produce **healthy and affordable food**
- manufacture **longer lasting recyclable products**
- foster globally **competitive industry**
- provide **future-proof jobs for transition**
- **boost the global climate action**

July 2021

"Fit for 55" package

It includes propositions on

- **emission price formation and trading system***
- **electrification**
- **policy measures****

***energy/emission price formation level and targets/limits** on these various emissions and **how the emissions trading system** should develop.

****reinforcement of the policy measures on transport, taxation, and trade** as well as **revision of the directives on renewable energy and energy efficiency,** by 2030.

- **renewables and hydrogen**
- **decentralisation**
- **taxonomy** which establishes a list of environmentally sustainable economic activities

May 2022

REPowerEU

Adopted by the EC, sets some suggestions on

- **price containment**
- achieving **independence from Russian gas supplies**
- **joint gas purchase**
- **strategic storage**

Currently, the EU is too dependent on external parties for the power sector, be it for natural gas and other types of fuel, or for the photovoltaic panels which are mostly manufactured in China and other places outside of the EU. One of the ways to mitigate this dependence is to opt for **energy communities** which are autonomous and controlled by their members and shareholders.

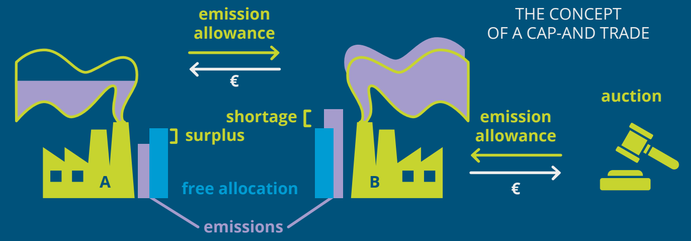
THE EU EMISSION TRADING SYSTEM

A POLICY TOOL TO DRIVE DECARBONISATION

The ETS consists of **pricing pollution to reduce it**

TRADE MECHANISMS AVAILABLE FOR INDUSTRIAL INSTALLATIONS THAT NEED EXTRA ALLOWANCES

Source of figure 1: Presentation from Helena Fabra Cadenas – DG CLIMA European Commission, 17 May 2022



THE CONCEPT OF A CAP-AND TRADE

The world's first major carbon market

STARTED IN **2005**

It is currently at around

80 EURO / TON OF CO2

It is also an important revenue for the member states as the auctioning of their allowances have reached around 30 billion euros in 2021.

If the carbon price is low, the companies covered by the ETS might opt for paying the allowance but if it is high, they might decide to **produce in a cleaner way** to avoid paying pricy emissions.

DECARBONISATION TOOLS THE ROLE OF RENEWABLES AND ENERGY EFFICIENCY

DECARBONISATION

IS BASED ON 4 MAIN PILLARS CONSISTING OF

Decarbonisation of the electricity generation

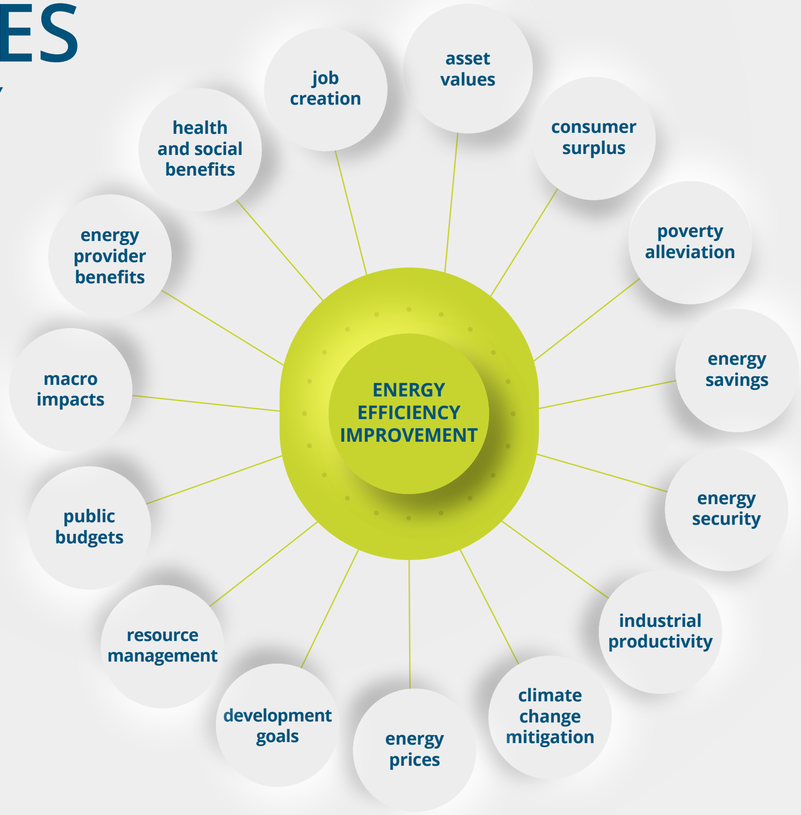
Efficiency in all sectors including building, transport, and agriculture

Fuel shifting in transport, heating, and industries

The preservation and increase of **natural carbon sinks**

ENERGY EFFICIENCY MEASURES DO NOT HAVE A HIGH VISIBILITY BUT CAN HAVE A HUGE EFFECT IN CUTTING THE EMISSIONS

Source of figure 2: M-Benefits - Valuing and Communicating Multiple Benefits of Energy-Efficiency Measures, Instituto de Sistemas e Robótica - Polo de Coimbra



In power generation

by ameliorating the operating conditions of the plants, or by opting for more efficient means of generation such as the hydropower plants

In the transmission system

it is normal to lose roughly 2% of the energy under the form of heat

HOW TO ENHANCE ENERGY EFFICIENCY?

In the distribution system

in an efficient grid, 3-4% could be lost due to the lower voltage nature of the system which incurs higher losses

For the end-users

by conducting energy audits identifying possible solutions and applying the most cost-effective ones

BUYER POWER IN THE EU

HOW TO SUPPORT ENERGY TRANSITION AND REDUCE ENERGY POVERTY

BUYER POWER

is a concept that expresses the ability of a buyer to reduce the price he pays for a service.

ENERGY POVERTY

can be showcased under several forms such as:

- **energy fuel poverty**
- **energy polluting poverty**
- **energy efficiency poverty**
- **energy access poverty**

Through REPowerEU, the EU is opting for a **JOINT PURCHASING** strategy to

- **diversify the energy supply** and thus **increase the security of supply,** with the aim to become independent from Russian gas by 2030
- benefit from the collective political and market weight of the EU for **reduced prices**
- this joint purchasing strategy is not a mandatory or centralised initiative.

CITIZEN ENERGY COMMUNITIES

are entities based on voluntary participation that is controlled by natural persons, municipalities, or small enterprises. They provide environmental, economic, and social benefits to its members and can participate in activities such as power generation, supply, consumption, aggregation, energy storage, energy efficiency services or charging services for electric vehicles.

THE AGGREGATION MODEL

is also interesting to be tackled as aggregators are third parties that combine the flexibility of electricity users and sells it back to the market.

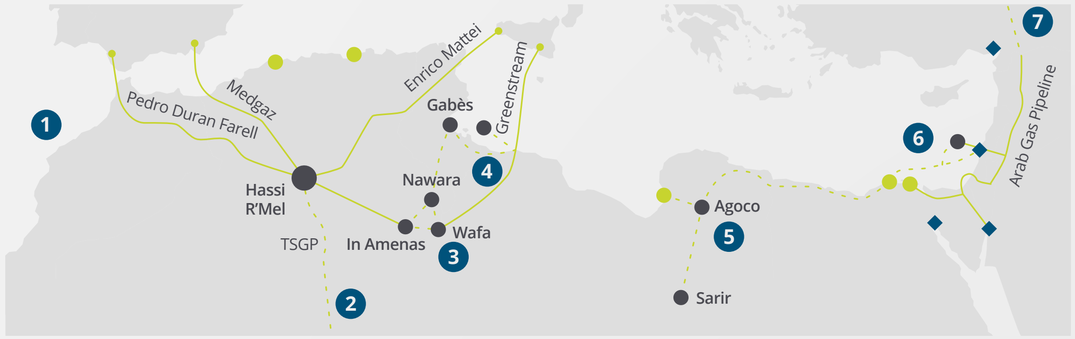
NATURAL GAS

A BRIDGE BETWEEN CONVENTIONAL ENERGY AND RENEWABLE ENERGY

NATURAL GAS HAS HELPED ENHANCE THE STRATEGIES OF COUNTRIES BY

- **cleaning the electricity production process**
- **increasing the share of RES by providing more flexibility**
- **decarbonising the transport sector**
- **phasing out coal**

GAS INFRASTRUCTURE IN THE SOUTHERN SHORE



Source of figure 3: UFM Gas Platform

TRANS ADRIATIC AND IONIAN ADRIATIC PIPELINES

Source of figure 4: IONIAN ADRIATIC PIPELINE – IAP Vienna, 24 May 2018 Western Balkans Gas Infrastructure Workshop, Energy Community AND tap-ag.it

OPERATIONAL SINCE **2020**

SPANNING A DISTANCE OF **878KM**

CAPACITY OF **20 BCM/YEAR**

THE TRANS ADRIATIC PIPELINE (TAP)

IT PASSES THROUGH

Greece **Albania** **Italy**

THE POTENTIAL IONIAN ADRIATIC PIPELINE (IAP)

SPANNING OVER **511KM**

CAPACITY OF **5 BCM/YEAR**

IS PLANNED TO PASS THROUGH

Albania **Montenegro** **Bosnia and Herzegovina** **Croatia**

GAS RESERVES

in the region are abundant but concentrated in specific geographic places. The **lack of a suitable infrastructure** in the region is a main **cause for the limited gas trade in the area.**

THE INFRASTRUCTURE

for natural gas is one and shared among users and has **physical limits.**

The accessibility to gas resources should be **geographically widespread**, and EU countries should cooperate fully in a supply emergency.

The northern and southern shores of the Mediterranean **should increase their cooperation** to develop and orient the future of the gas sector.

The gas infrastructure is a monopoly and **needs to be regulated by an independent entity** and through a sound regulatory framework.

THE ROLE OF HYDROGEN IN THE MEDITERRANEAN ENERGY TRANSITION

HYDROGEN

has a **high energy content** per unit of weight, triple as much as gasoline.

GREAT POTENTIAL TO BE USED IN

- power generation
- transportation
- heating
- synthetic fuels
- ammonia and fertilizers
- metal refining

FUTURE INTEGRATED ENERGY SYSTEMS

will have a **circular energy flow** encouraging energy transfer between the stakeholders of the system and reducing the wasted resources.

THEY CONSIST OF

- energy efficient system
- deep electrification of consumption
- use of renewables
- low carbon fuels in hard-to-abate sectors.

Hydrogen can be

INTEGRATED IN THE ENERGY SYSTEM IN MULTIPLE STEPS

- production of energy
- storage of energy
- industrial and heat production
- refuelling and transportation

+ OTHER OPPORTUNITIES

In the Mediterranean region, there is a huge

POTENTIAL FOR COLLABORATION BETWEEN SOUTHERN AND NORTHERN SHORE COUNTRIES

SOUTHERN COUNTRIES — have abundant resources to produce green hydrogen

NORTHERN COUNTRIES — are willing to import this produced gas

UPGRADING THE POWER SYSTEMS FOR A SMOOTH ENERGY TRANSITION

Although

ELECTRIFICATION
is an important factor to reach carbon-neutrality, alone, it will not be able to cater for all the sectors.

Hence,

POWER-TO-GAS
can potentially complement the efforts of electrification.

Depending on their size *

ENERGY STORAGE SYSTEMS
can be used for multiple services

- synthetic inertia
- frequency regulation
- load shifting
- virtual lines

TRANSMISSION SYSTEM OPERATORS
should adapt

to this new context especially with the growth of renewable energy sources and the

need for more
SYSTEM FLEXIBILITY

This will pose

new challenges to the TSOs

as the power sector is witnessing

a shift from monodirectional to a
FRAGMENTED AND BIDIRECTIONAL SYSTEM

TSOs are enablers of the energy transition

They are managing an increasingly complex energy system in which the

consumers are gradually turning into
PROSUMERS

* ENERGY STORAGE SYSTEMS' SIZES

LARGE-SCALE
GW

MEDIUM SCALE
MW

MICROSYSTEMS
KW

TECHNOLOGY INNOVATIONS
SMART CITIES AND ELECTRIC MOBILITY

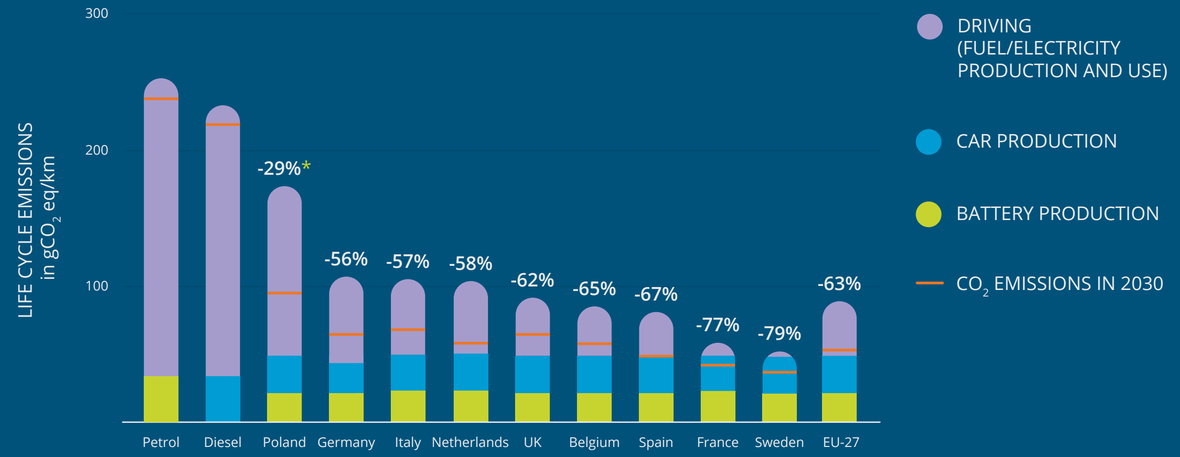
SMART CITY

is a city **based on Information and Communication Technology (ICT)**, aiming to develop, deploy, and promote **sustainable development practices** to address growing urbanisation challenges.

ELECTRIC VEHICLES

are far more efficient than other options such as hydrogen vehicles which in turn are more efficient than power to liquid vehicles. **Petrol and diesel cars emit almost 3 times more CO2 than the average electric car in the EU.** However, the emissions of the EVs depend on the emissions of electricity used to recharge, but in all cases, they emit less than a car powered with diesel or gasoline.

DIFFERENCE IN EMISSIONS BETWEEN PETROL AND DIESEL CARS, AND ELECTRIC VEHICLES IN DIFFERENT COUNTRIES



Scenario where average EU electricity is used to produce the batteries and the cars

** CO2 savings compared to the average of both diesel and petrol emissions*

Source of figure 5: Transport & Environment's (T&E)

AVIATION AND SHIPPING

ARE RESPONSIBLE FOR AROUND **5%** OF THE YEARLY GLOBAL EMISSIONS

SUSTAINABLE ADVANCED FUEL (ASF)
should be under focus to replace Kerosene
IN THE AVIATION APPLICATIONS.

GREEN HYDROGEN AND AMMONIA
seem to be
SUITABLE REPLACEMENT FOR FUEL IN SHIPPING APPLICATIONS.

In summary, like other sources of pollution, the optimal way to **reduce transport pollution** is to **avoid unnecessary travel** and **use travel modes that are less pollutant** than the ones currently in use.

MEDREG'S

POSITION

- **Regulators should and will be a key part of the actions** having the potential **to reduce the environmental damage.**

- **Regulations and policies can act as accelerators or inhibitors for RES integration.**

- While the **region is environmentally interconnected**, each **Mediterranean country displays a unique economic and financial reality**, which makes it important to **devise sectoral targets** that are **commonly agreed**, but **specific to each country's needs.**

- National regulatory authorities **must adjust and upgrade the current regulations** and policies **to foster the energy transition, distribution innovation and evolution of the power system.**

MEDREG'S

ACTIONS

Since 2014, MEDREG has **stepped up its efforts** by conducting **research and analysis** to better understand effective mechanisms and tools for promoting renewable energy in the Mediterranean on:

- Net metering systems
- Certification systems of origin for electricity generated by RES and CHP
- Smart grids
- Auction mechanisms to promote RES
- New regulatory options for RES integration
- Energy efficiency and e-mobility.

MEDREG also supports its members in the transition to a decarbonised energy system with specific **workshops and trainings** meant to **enhance their skills and knowledge** on digitalisation tools, cyber-security, and new technologies to cope with the emerging challenges they are confronted with.

MEDREG members will **continue to work together and share information** on these critical issues, as well as **pursue discussions** about future policies and actions that will lead to a successful energy transition while **minimising the impact on energy costs and consumer costs.**

FOR MORE INFORMATION ON THE TOPIC

Consult our Technical Report based on our Training "Climate Obligations, Environmental Standards, and Regulations" *of October 2022*, with the contributions of the following speakers:

- **Helena Fabra Cadenas,** Policy Officer, DG CLIMA
- **Vincenzo Cioffo,** Head of Technical Secretariat in the Environment Division, ARERA
- **Prof. Francisco Ferreira,** Universidade Nova de Lisboa
- **Ignacio Herrera,** Associate Professor, University of Bergen
- **Bardhi Hoxha,** Deputy Director of MEDREG
- **Sorina Mortada,** Technical Consultant, LCEC
- **Hasan Ozkoc,** Director of MEDREG
- **Stephen Ressl,** Consultant
- **Luca Ruffino,** Program Officer, Med-TSO