EU Climate Action

EU long term vision for a carbon neutral economy

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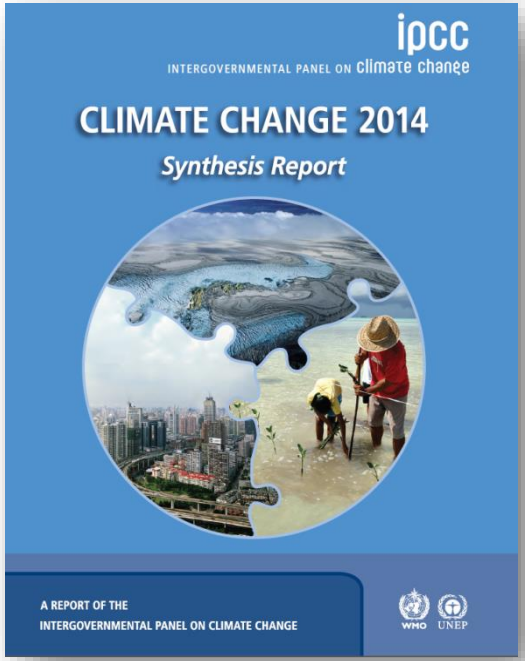
Overview

- ★ **The science behind climate action**
- ★ **EU climate targets & measures for 2020 & 2030**
- ★ **Long-term strategy**

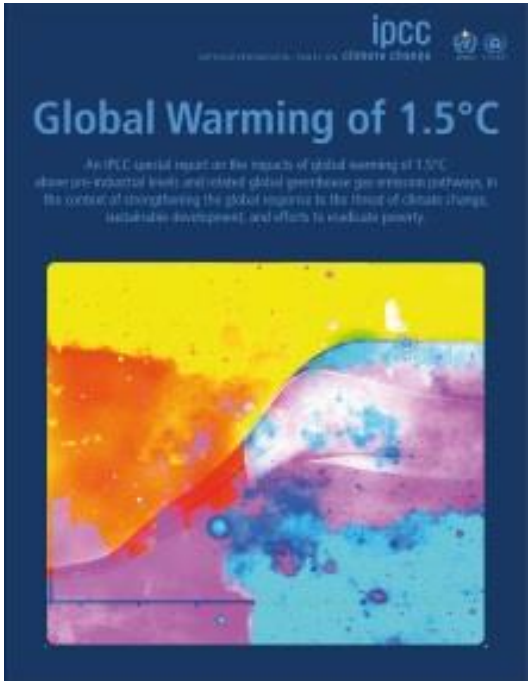
The latest climate science



IPCC 5th Assessment Report (2014):

- **Warming** of the climate system is unequivocal
- **Human influence** on the climate system is clear
- Each of the last three decades has been successively **warmer at the Earth's surface** than any preceding decade since 1850
- **Continued emissions of greenhouse gases** will cause further warming and changes in all components of the climate system
- Limiting climate change would require **substantial and sustained reductions in greenhouse gas emissions** which, together with **adaptation**, can limit climate change risks

The latest climate science



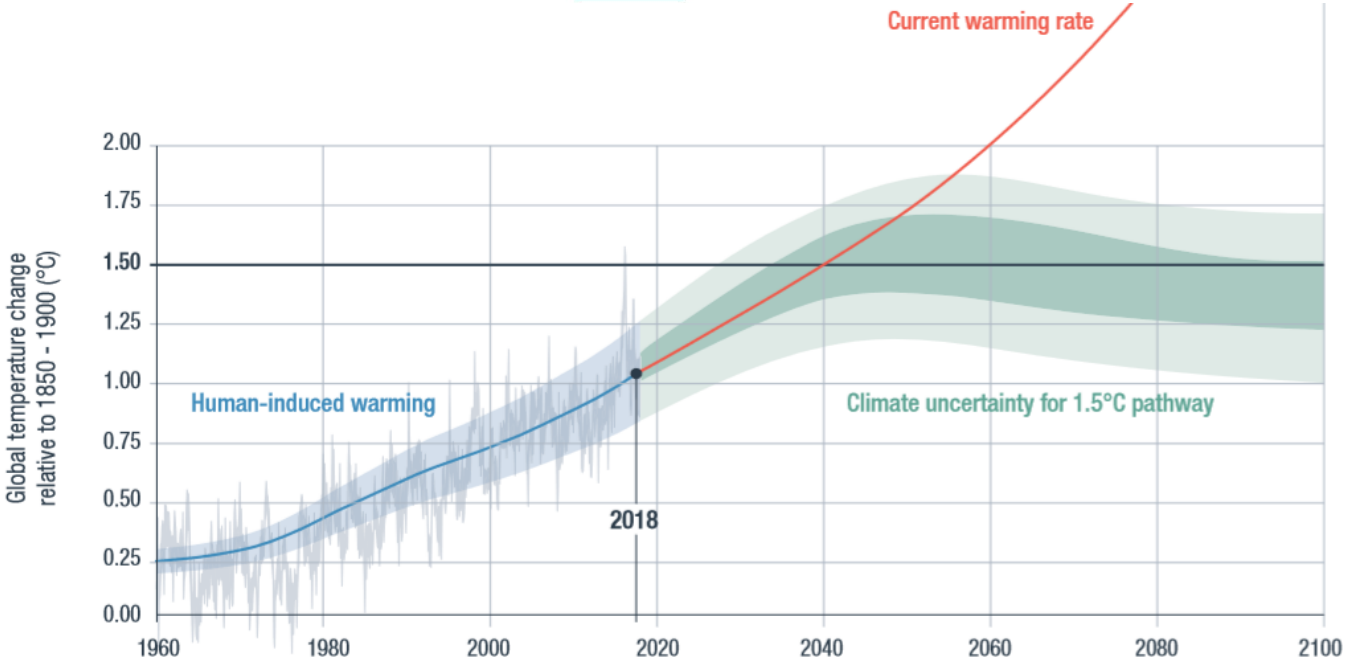
IPCC Special Report on Global Warming of 1.5°C (2018):

Warming

- Anthropogenic warming is now at ~**1°C**
- Warming is increasing at a rate of ~**0.2°C per decade**
- **1.5°C in 2030-2052** at current rate

Impacts

- Climate change is already transforming our environment (land and oceans)
- Changes in the frequency and intensity of extreme weather events observed



Human-induced warming reached approximately 1°C above pre-industrial levels in 2017.
At the present rate, global temperature would reach 1.5°C around 2040.

Adapted from the Special Report on Global Warming of 1.5°C (IPCC)

Climate challenges

- Global warming already reached at 1°C
- 18 of the warmest years in the last 2 decades and extreme heat waves in EU for 4 of the last 5 years
- Real impact on EU economy & environment
- IPCC warns about global eco-systems in danger already at 2°C
- Climate change undermines security and prosperity in the broadest sense

Arctic region
Temperature rise much larger than global average
Decrease in Arctic sea ice coverage
Decrease in Greenland ice sheet
Decrease in permafrost areas
Increasing risk of biodiversity loss
Some new opportunities for the exploitation of natural resources and for sea transportation
Risks to the livelihoods of indigenous peoples

Atlantic region
Increase in heavy precipitation events
Increase in river flow
Increasing risk of river and coastal flooding
Increasing damage risk from winter storms
Decrease in energy demand for heating
Increase in multiple climatic hazards

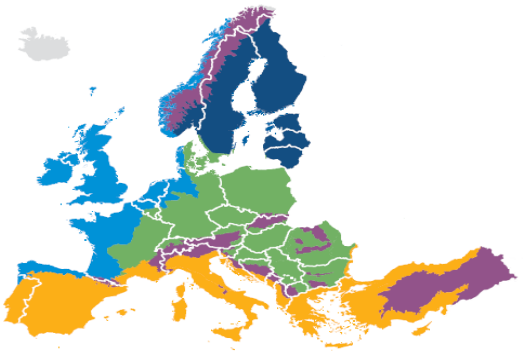
Mountain regions
Temperature rise larger than European average
Decrease in glacier extent and volume
Upward shift of plant and animal species
High risk of species extinctions
Increasing risk of forest pests
Increasing risk from rock falls and landslides
Changes in hydropower potential
Decrease in ski tourism

Coastal zones and regional seas
Sea level rise
Increase in sea surface temperatures
Increase in ocean acidity
Northward migration of marine species
Risks and some opportunities for fisheries
Changes in phytoplankton communities
Increasing number of marine dead zones
Increasing risk of water-borne diseases

Boreal region
Increase in heavy precipitation events
Decrease in snow, lake and river ice cover
Increase in precipitation and river flows
Increasing potential for forest growth and increasing risk of forest pests
Increasing damage risk from winter storms
Increase in crop yields
Decrease in energy demand for heating
Increase in hydropower potential
Increase in summer tourism

Continental region
Increase in heat extremes
Decrease in summer precipitation
Increasing risk of river floods
Increasing risk of forest fires
Decrease in economic value of forests
Increase in energy demand for cooling

Mediterranean region
Large increase in heat extremes
Decrease in precipitation and river flow
Increasing risk of droughts
Increasing risk of biodiversity loss
Increasing risk of forest fires
Increased competition between different water users
Increasing water demand for agriculture
Decrease in crop yields
Increasing risks for livestock production
Increase in mortality from heat waves
Expansion of habitats for southern disease vectors
Decreasing potential for energy production
Increase in energy demand for cooling
Decrease in summer tourism and potential increase in other seasons
Increase in multiple climatic hazards
Most economic sectors negatively affected
High vulnerability to spillover effects of climate change from outside Europe

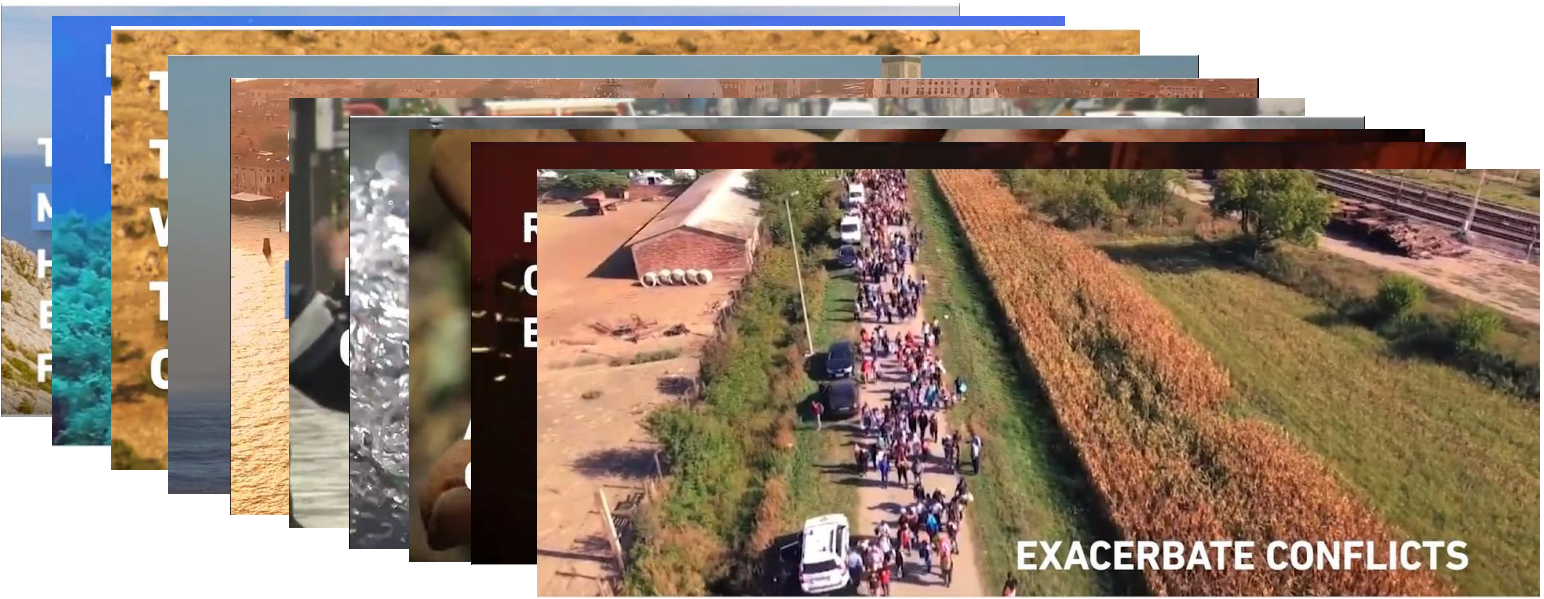


Dual challenge

1. We must sharply cut greenhouse gas emissions to prevent unmanageable impacts ('**mitigation**')

2. We must also adapt to climate change to increase society's resilience and manage unavoidable impacts ('**adaptation**')

Union for Mediterranean – first scientific report on the impact of climate change in the region



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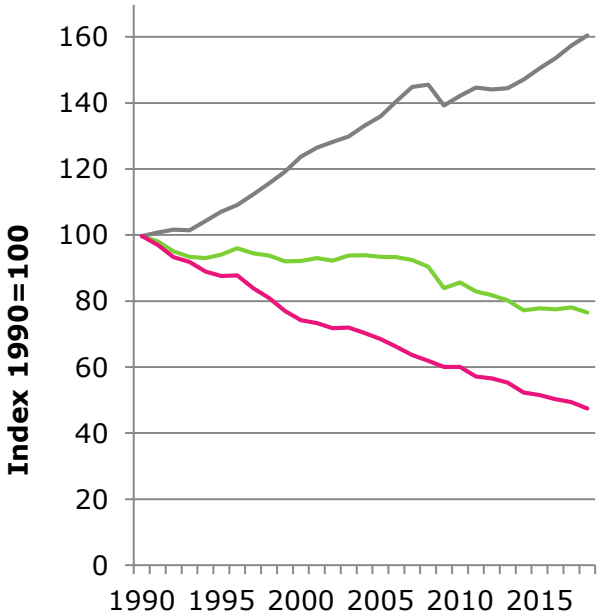
EU policies delivering



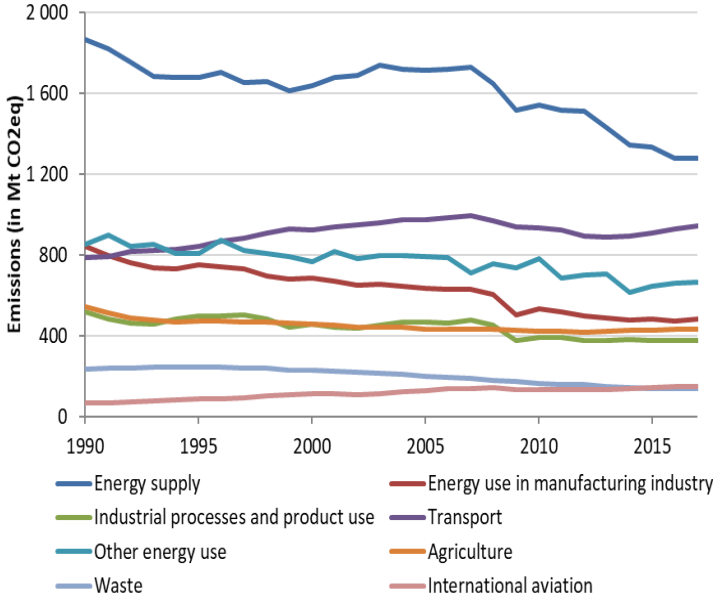
GDP +61%

GHG emissions

GDP

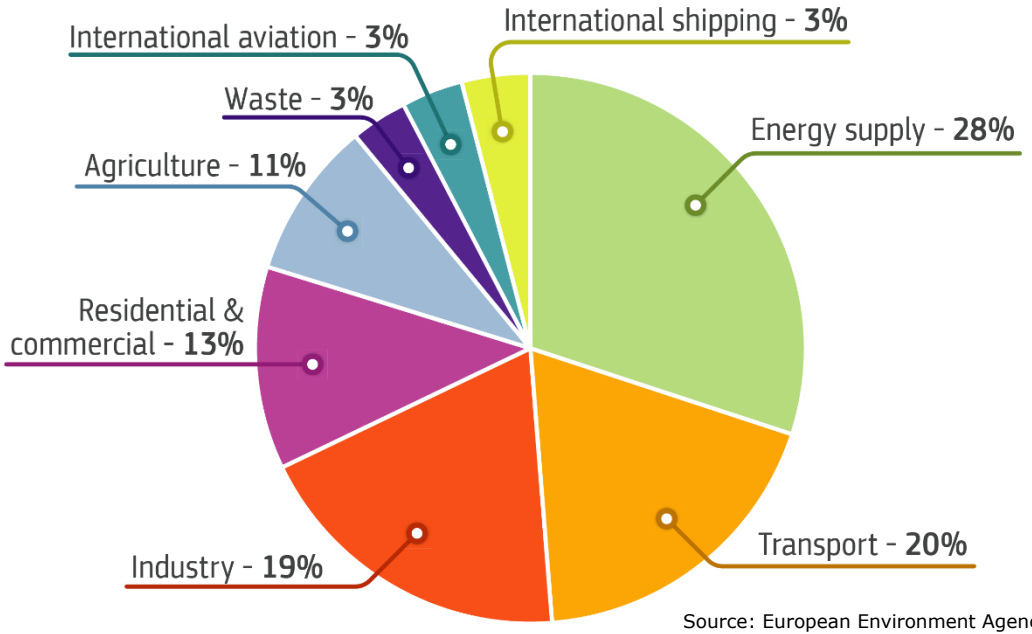
GHG intensity

GHG emissions –23%



Source: Preparing the ground for raising long-term ambition – EU climate action progress report, 31.10.2019, COMM(2019) 559, European Commission

Sources of EU greenhouse gas emissions



Source: European Environment Agency, GHG emissions by sector in the EU-28, 1990-2016. Excludes carbon dioxide from biomass and LULUCF (land use, land-use change and forestry)

EU climate and energy targets

2020

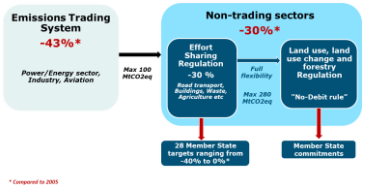
- **-20%** Greenhouse Gas Emissions
- **20%** Renewable Energy
- **20%** Energy Efficiency
- **10%** Interconnection
- **20%** Climate in funding programmes *2014-2020*

2030

- **≤ -40%** Greenhouse Gas Emissions
- **≥ 32%** Renewable Energy
- **≥ 32.5%** Energy Efficiency
- **15%** Interconnection
- **25%** Climate in funding programmes *2021-2027*
- **-37.5%** CO_2 from cars *Vans: -31%* *Lorries: -30%*

Upwards revision clause by 2023

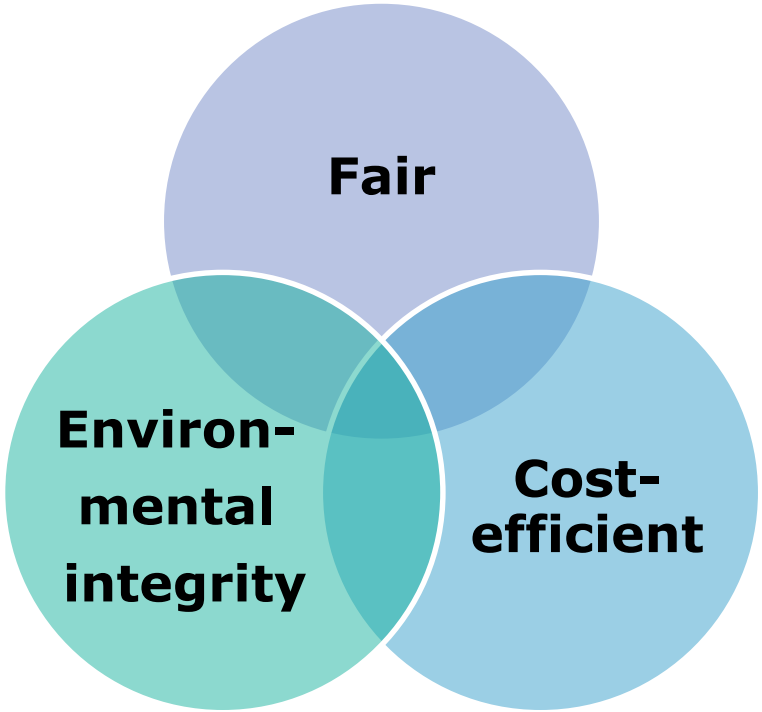
Compared to 1990

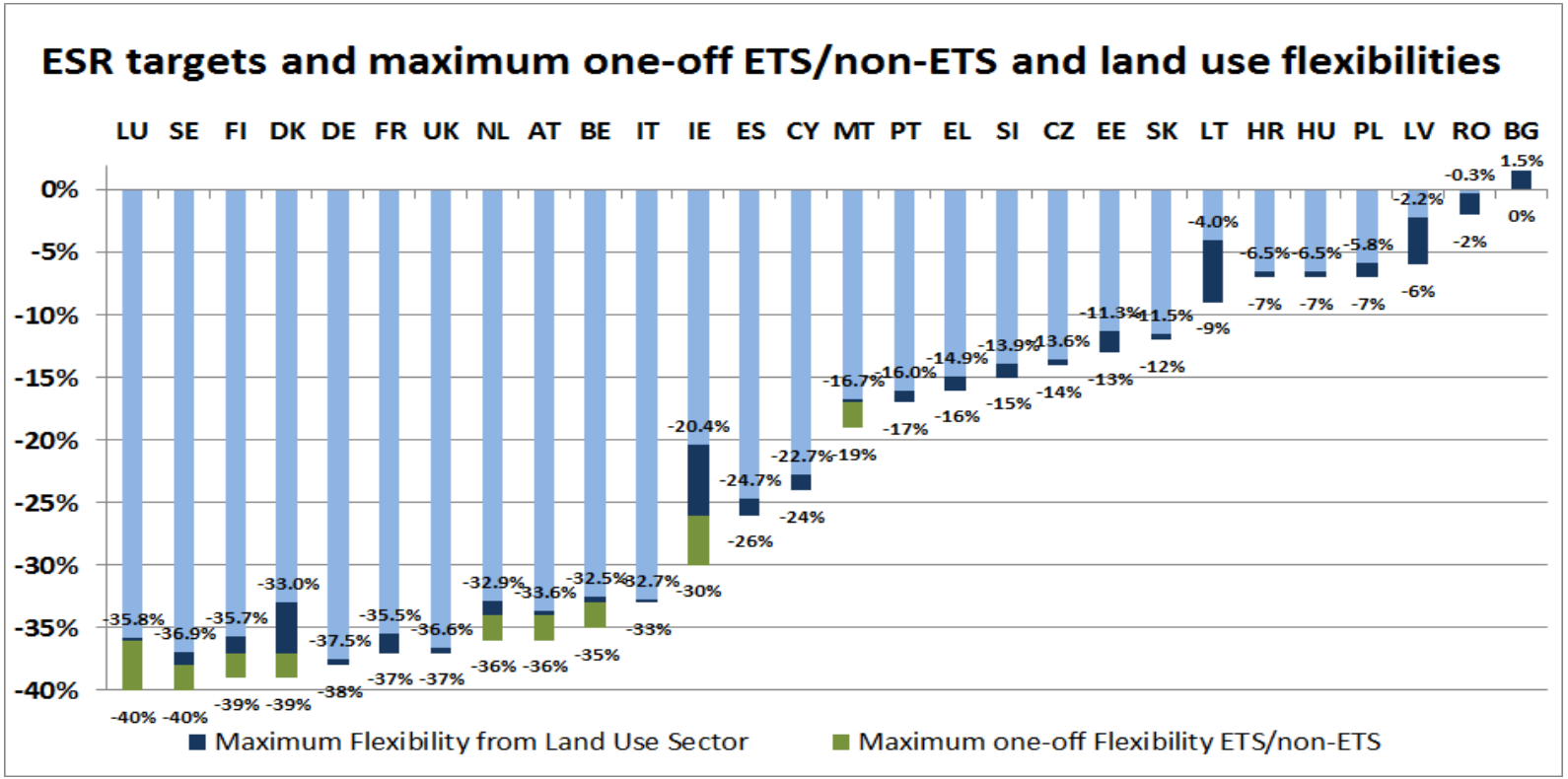


- **EE Directive**
- **Buildings**
- **Ecodesign**

EU ‘Effort Sharing’ Regulation

- Covers **almost 60%** of EU greenhouse gas emissions
- Includes **buildings**, **transport**, **agriculture** (non-CO_2), **waste**, **F-gases**, other smaller sectors outside ETS
- Breaks down **the EU target for non-ETS sector of -30% by 2030 into Member States targets**





* Compared to 2005

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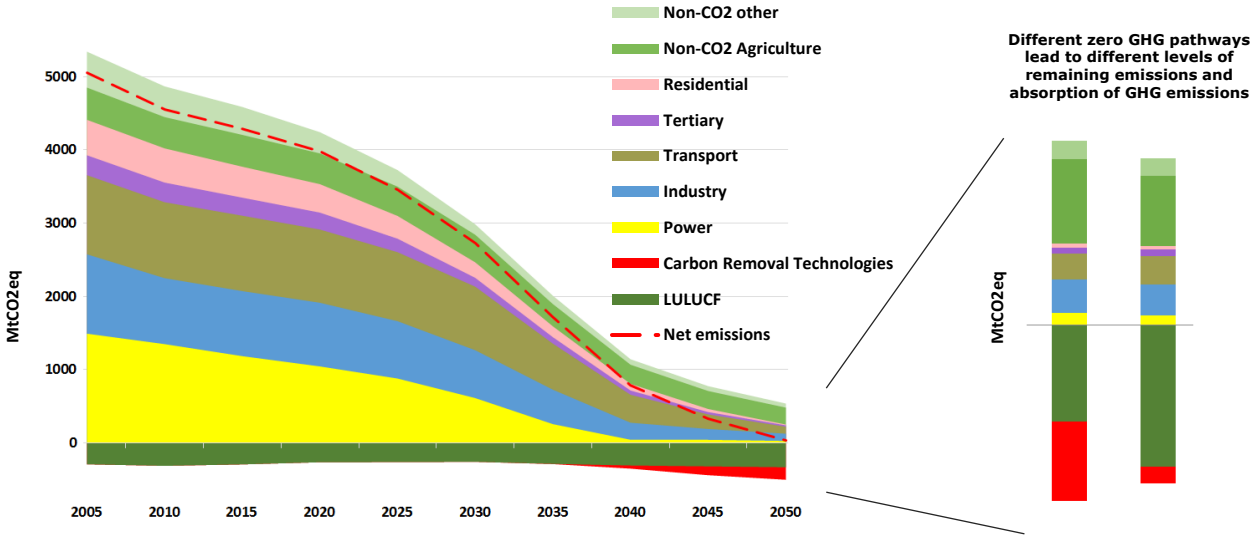
Vision for a Clean Planet by 2050

There are a number of pathways for achieving a climate neutral EU, challenging but feasible from a technological, economic, environmental and social perspectives.



Supported by a sectoral as well as economy wide in depth analysis:

- Overview of available technologies/actions
- Modelling suite to look at sectoral transformation, interaction and macro-economic implications
- References to extensive range of studies and analyses from other academics, institutions, stakeholders on all aspects described.
- Also focus on enabling framework conditions

Detailed assessment supported by scenario analysis

Long Term Strategy Options

	Electrification (ELEC)	Hydrogen (H2)	Power-to-X (P2X)	Energy Efficiency (EE)	Circular Economy (CIRC)	Combination (COMBO)	1.5°C Technical (1.5TECH)	1.5°C Sustainable Lifestyles (1.5LIFE)
Main Drivers	Electrification in all sectors	Hydrogen in industry, transport and buildings	E-fuels in industry, transport and buildings	Pursuing deep energy efficiency in all sectors	Increased resource and material efficiency	Cost-efficient combination of options from 2°C scenarios	Based on COMBO with more BECCS, CCS	Based on COMBO and CIRC with lifestyle changes
GHG target in 2050	-80% GHG (excluding sinks) ["well below 2°C" ambition]					-90% GHG (incl. sinks)	-100% GHG (incl. sinks) ["1.5°C" ambition]	
Major Common Assumptions	• Higher energy efficiency post 2030 • Deployment of sustainable, advanced biofuels • Moderate circular economy measures • Digitilisation					• Market coordination for infrastructure deployment • BECCS present only post-2050 in 2°C scenarios • Significant learning by doing for low carbon technologies • Significant improvements in the efficiency of the transport system.		
Power sector	Power is nearly decarbonised by 2050. Strong penetration of RES facilitated by system optimization (demand-side response, storage, interconnections, role of prosumers). Nuclear still plays a role in the power sector and CCS deployment faces limitations.							
Industry	Electrification of processes	Use of H2 in targeted applications	Use of e-gas in targeted applications	Reducing energy demand via Energy Efficiency	Higher recycling rates, material substitution, circular measures	Combination of most Cost-efficient options from "well below 2°C" scenarios with targeted application (excluding CIRC)	COMBO but stronger	CIRC+COMBO but stronger
Buildings	Increased deployment of heat pumps	Deployment of H2 for heating	Deployment of e-gas for heating	Increased renovation rates and depth	Sustainable buildings			CIRC+COMBO but stronger
Transport sector	Faster electrification for all transport modes	H2 deployment for HDVs and some for LDVs	E-fuels deployment for all modes	Increased modal shift	Mobility as a service			• CIRC+COMBO but stronger • Alternatives to air travel
Other Drivers		H2 in gas distribution grid	E-gas in gas distribution grid				Limited enhancement natural sink	• Dietary changes • Enhancement natural sink

7 Building Blocks

Energy efficiency

Deployments of renewables

Clean, safe & connected mobility

Competitive industry and circular economy

Infrastructure and inter-connections

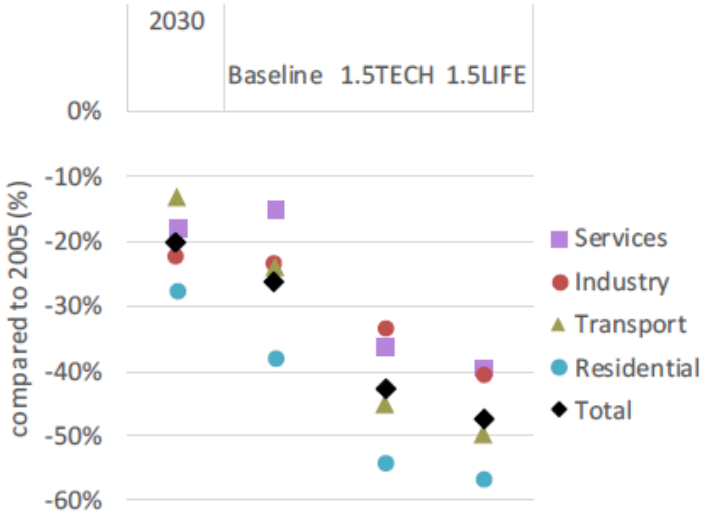
Bio-economy and natural carbon sinks

Tackle remaining emissions with carbon capture and storage

Building Block 1 - Energy efficiency

- Will play a central role
- Energy consumption to be reduced by as much as half in 2050 compared to 2005
- Buildings key, most of the housing stock of 2050 exists already today
- Requires adequate financial instruments and skilled workforce to sustain significantly higher renovation rates

Changes in sectoral final energy consumption (% change vs 2005)

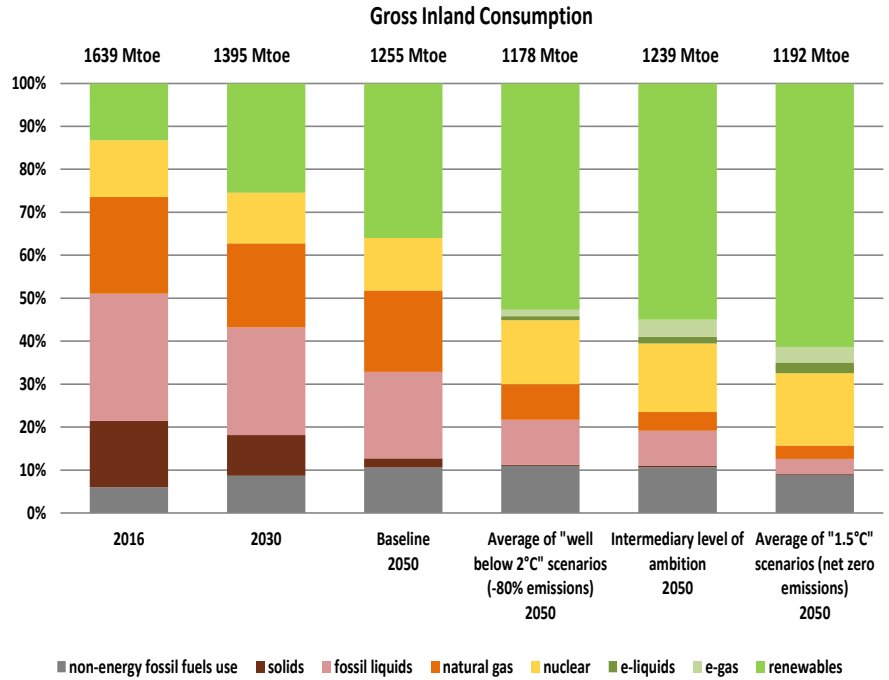


Note: "Services" includes here the agriculture sector.

Source: Eurostat (2005), PRIMES.

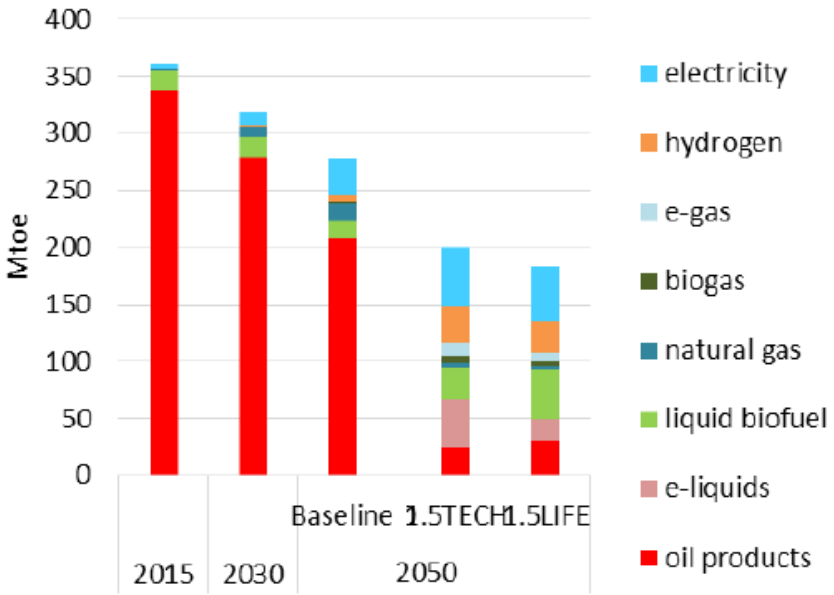
Building Block 2 - Deployment of renewables

- The share of electricity in final energy demand will at least double, more than 80% of it will be renewable.
- Renewable electricity allows production and deployment of carbon-free energy carriers such as hydrogen and e-fuels to decarbonize heating, transport and industry.
- Decentralized, smart and flexible power system.
- Reduction of energy import dependence, cumulative savings from reduced import bill of € 2-3 trillion over the period 2031-2050.



Building Block 3 - Clean, safe & connected mobility

Fuels consumed in the transport sector in 2050

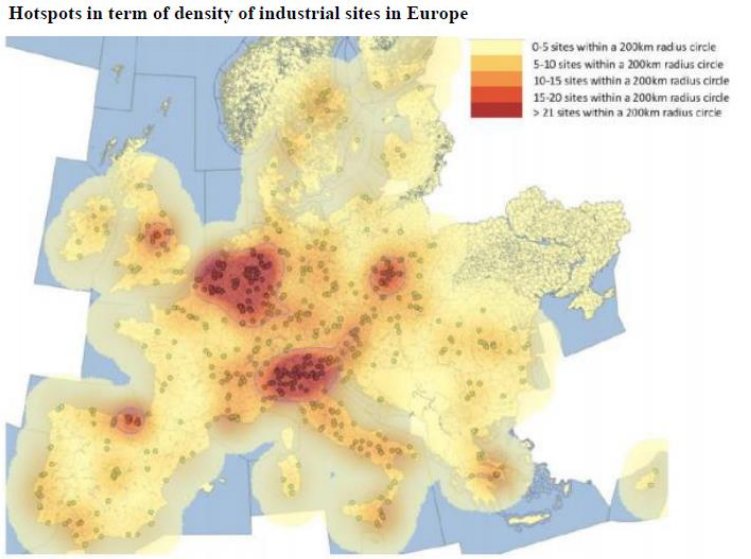


Source: PRIMES.

- Cheaper and efficient batteries, highly efficient electric powertrains, connectivity and autonomous driving offers prospects to decarbonise road transport.
- No single silver bullet for all transport modes with alternative fuels having a role in heavy duty or long distance transport modes (advanced biofuels, carbon-free e-fuels, hydrogen).
- Digitalisation, data sharing and interoperable standards leading to a more efficient mobility system.
- Innovative mobility for urban areas and smart cities, underpinned by changing behaviour, leading to improvement of quality of life.

Building Block 4 - Competitive industry

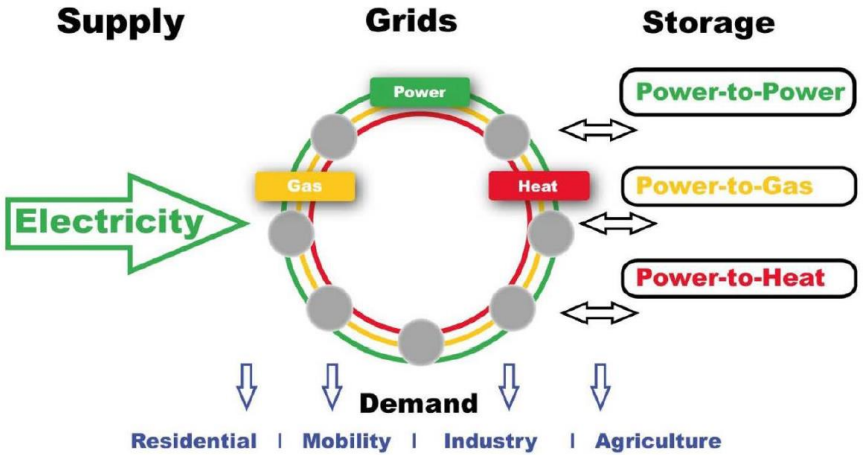
- Competitive resource-efficient industry and circular economy, increased recovery and recycling of raw materials (including critical materials), new materials and business concepts.
- Electrification, energy efficiency, hydrogen, biomass and renewable synthetic gas to reduce energy emissions in the production of industrial goods.
- Process-related reductions more difficult. Biomass and hydrogen can reduce certain emissions (steel production, some chemicals), others will require CO2 to be captured and stored or used.
- In the next 10 to 15 years, technologies that are already known will need to demonstrate that they can work at scale.



Source: EPOS SPIRE Project.

Building Block 5 - Network infrastructure

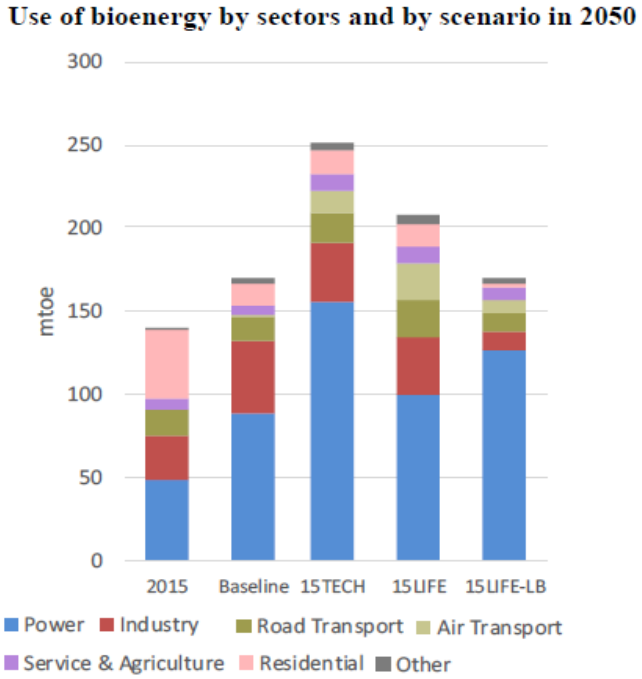
- Integrated and interconnected smart infrastructure.
- Completion of the Trans-European Transport and Energy Networks.
- Smart electricity and data/information grids, hydrogen pipelines, further sector integration.



- Smart charging or refuelling stations for transport. Increased synergy between transport and energy systems.
- Retrofitting existing infrastructure and assets and timely replacement of ageing infrastructure compatible with the deep decarbonisation objective.

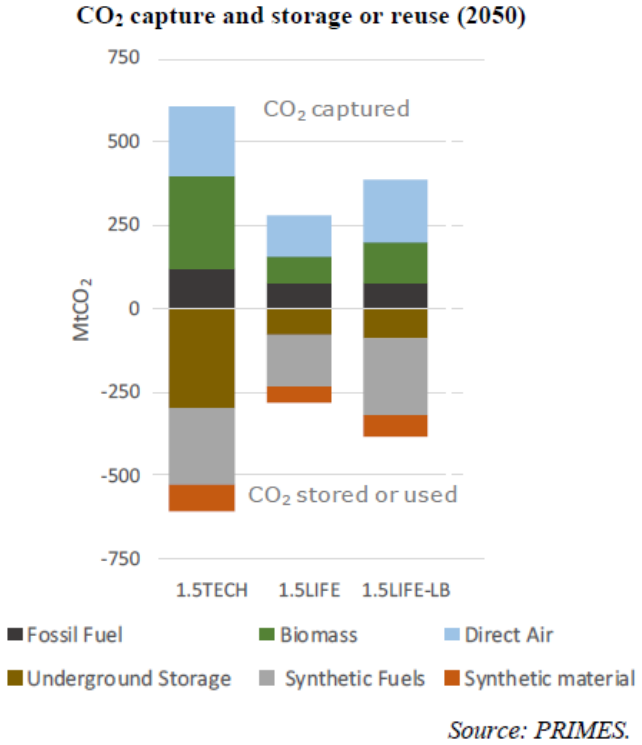
Building Block 6 - Bio-economy

- Agriculture to provide sufficient food, feed and fibre. Agricultural non-CO2 emissions can be reduced (but not to zero) and soil carbon can be increased through improved farming techniques.
- Biomass is multipurpose: supply direct heat, biogas, biofuels, alternative to carbon intensive materials and generate negative emissions when coupled with carbon capture and storage; therefore increased demand (up to 80%).
- Key role of energy crops to avoid unsustainable use of forests, maintain the natural carbon sink while preserving ecosystems.
- Natural carbon sink can be enhanced through afforestation and restoration of degraded forest lands and other ecosystems (benefiting biodiversity, soils and water resources and increase biomass availability over time).



Source: PRIMES.

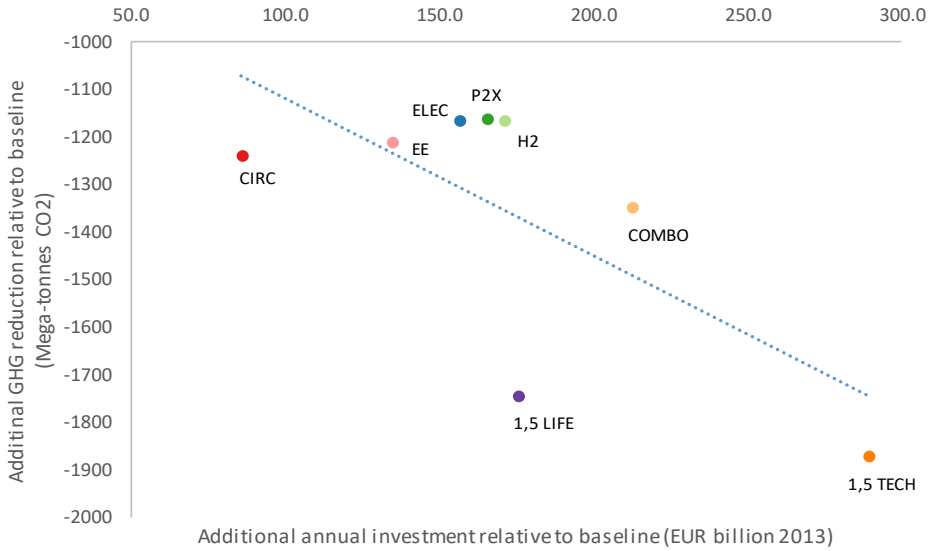
Building Block 7 - Carbon Capture and Storage



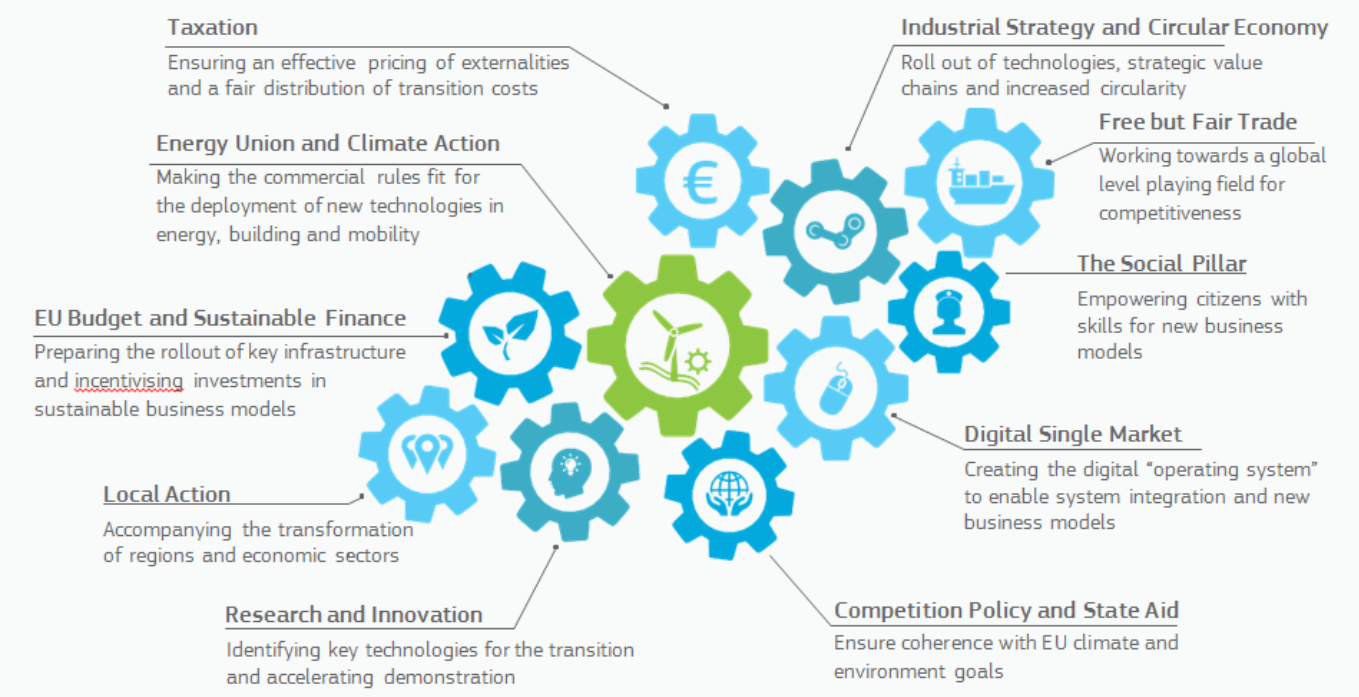
- Rapid deployment of renewable energy and new options to decarbonize industry reduced the need for CCS.
- But to achieve net-zero greenhouse gas emissions, CCS still required for certain energy-intensive industries and eventually to generate negative emissions.
- CCS today is facing barriers: lack of demonstration plant and proof of economic viability, regulatory barriers in some MS, public acceptance.
- An enabling framework is needed to spur research and innovation, scale up private investments, provide the right signals to the markets and reassure public opinion.

Stimulating clean investment into the EU economy

- Modernising and decarbonising the EU's economy will stimulate significant additional investment
- From 2% of EU GDP invested in the energy system today to 2.8% (up to € 575 bn per annum) to achieve a net-zero greenhouse gas emissions economy

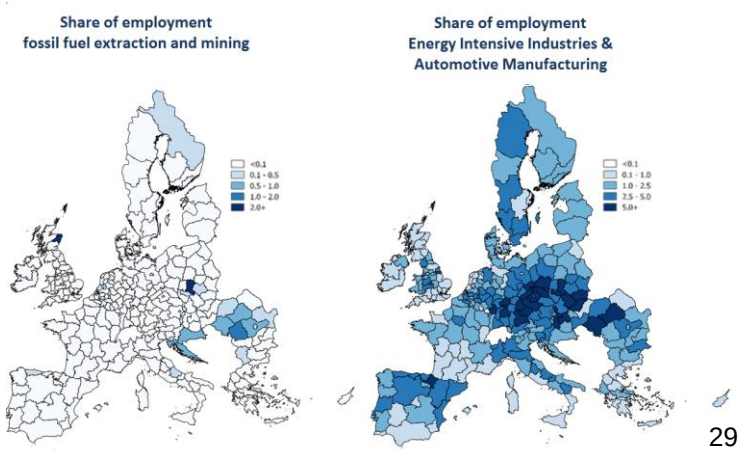


Enabling framework crucial to deliver transformation



Just transition

- Overall economic impacts of the deep transformation are positive
- The transition will spur growth in new sectors. 'Green jobs' already represent 4 million jobs in the EU
- But some sectors will face challenges (e.g. coal mining and fuel extraction) and others will transform (e.g. energy-intensive industries and automotive sector)
- This will affect some regions more than others
- Modernisation process has to be managed, no-one left behind, EU budget, employment and cohesion policies have a role
- Skill training is key



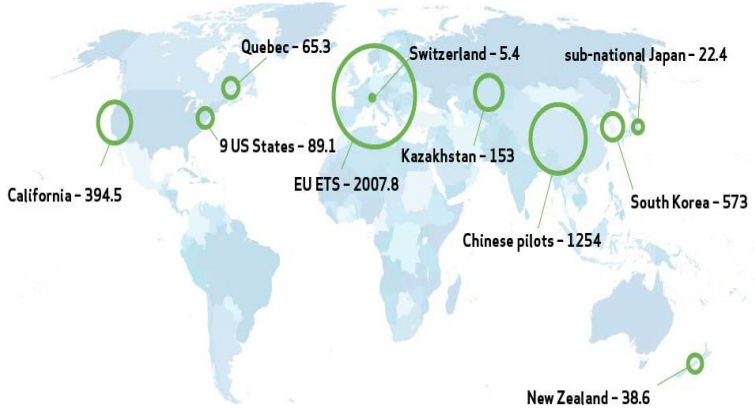
Role of citizens and local authorities

- Moving towards a net-zero greenhouse gas economy can only be successful with citizens that embrace change, get engaged and experience it as beneficial for their lives and that of their children.
- Increasing willingness of consumers to engage in sustainable activities. Personal lifestyle choices can make a real difference, while improving quality of life.
- Cities are already the laboratories for transformative and sustainable solutions with 75% of our population living in urban areas. City refurbishment and better spatial planning are drivers to renovate houses, improving living conditions, reducing travel time.
- Improved planning and public infrastructure to withstand more extreme weather events will be imperative.
- The EU should capitalise on and expand the role of regions, cities and towns.

The role of people

Global dimension

- Open markets, a globalised world and multilateralism are a precondition to benefit from this transition domestically and globally
- The EU's long-term strategy cannot be pursued in isolation. Role of energy and climate diplomacy and other political dialogues, security and development cooperation
- EU to prepare for geopolitical and geo-economic shifts with new and changed dependencies



Emissions trading schemes under development worldwide

- Trade policy to promote uptake of new technologies while defending the right to fair access to markets and critical raw materials.
- EU must take all necessary measures to safeguard and boost its own prospects for economic and social development.
- As the world's largest single market, EU standards on products affect global markets

Next steps

- National Climate and Energy Plans under development. On 31 Dec 2019 the final plans will be submitted to Commission. They will provide an overview of how close we are to reach our 2030 targets.
- Commission has been very active, discussing with governments, National Parliaments, business, non-governmental organisations and trade unions throughout 2019.
- EU to adopt and submit an ambitious strategy by early 2020 to the UNFCCC as requested under the Paris Agreement.
- This will be done in light of President-elect's guidelines. She will propose a European Green Deal in the first 100 days that will include the first European Climate Law to enshrine the 2050 climate – neutrality target in law. By 2021, a comprehensive plan to increase the EU's target for 2030 to 50% / 55% emissions reduction will have been put forward.

European Commission

FIGHTING CLIMATE CHANGE TOGETHER

#United4Climate

EU CLIMATE ACTION

EU climate & energy goals for 2020

REACHED ALREADY

EU climate & energy goals for 2030

ALL KEY EU LAWS FINALISED

Paris Agreement & international cooperation

REAPING THE OPPORTUNITIES & FIGHTING CLIMATE CHANGE TOGETHER

Long-term strategy for a climate-neutral EU in 2050

EVERYONE TO CONTRIBUTE!

You!

We need everyone on board!

#EU2050

Thank you for your attention