A Clean Planet for all

A European strategic long term vision for a prosperous, modern, competitive and climate neutral economy

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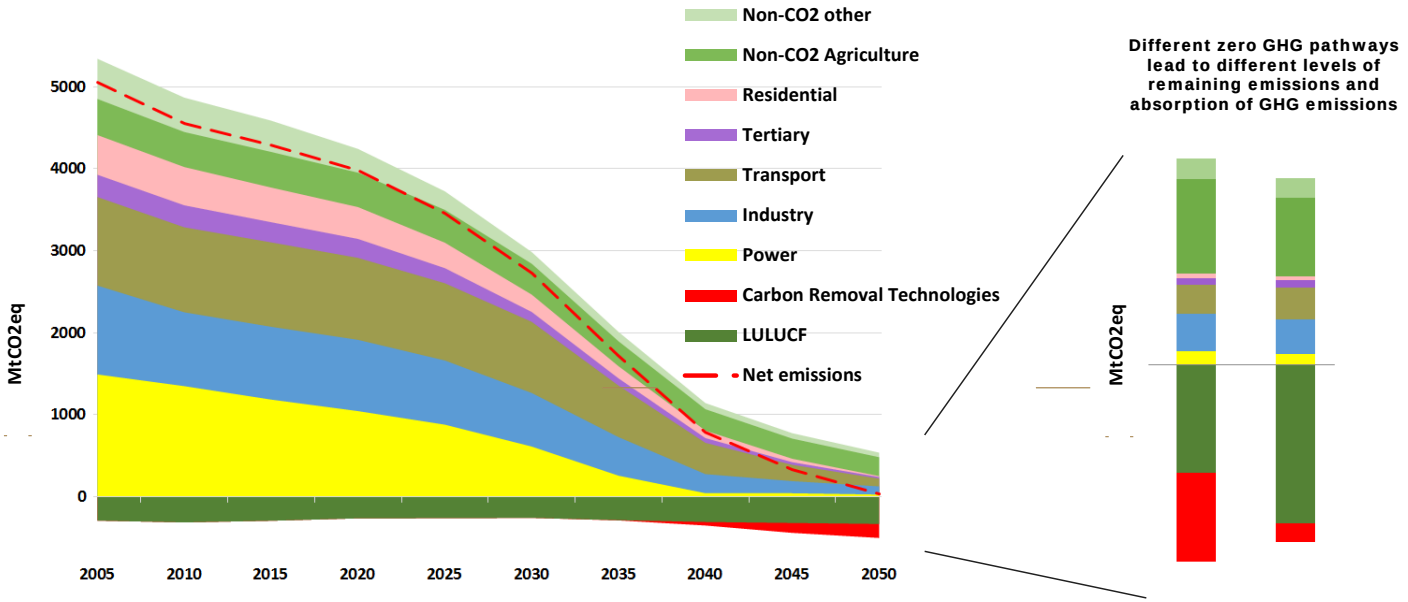
Vision: **EU climate neutrality by 2050**, in line with the PA

There are a number of pathways for this, challenging but **feasible** from a technological, economic, environmental and social perspective.

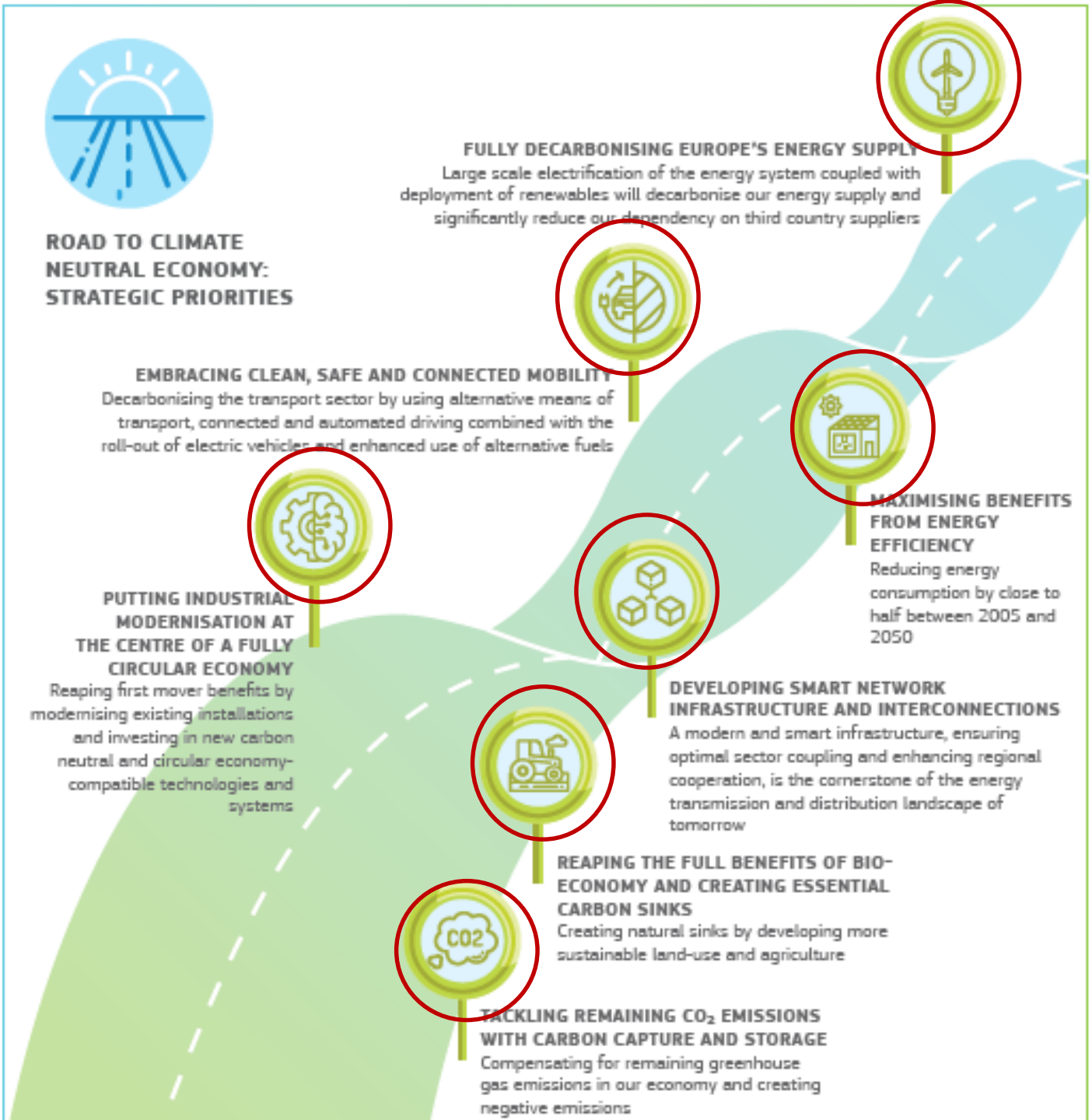


Radical transformation necessary: central role of energy system, buildings, transport, industry, agriculture.

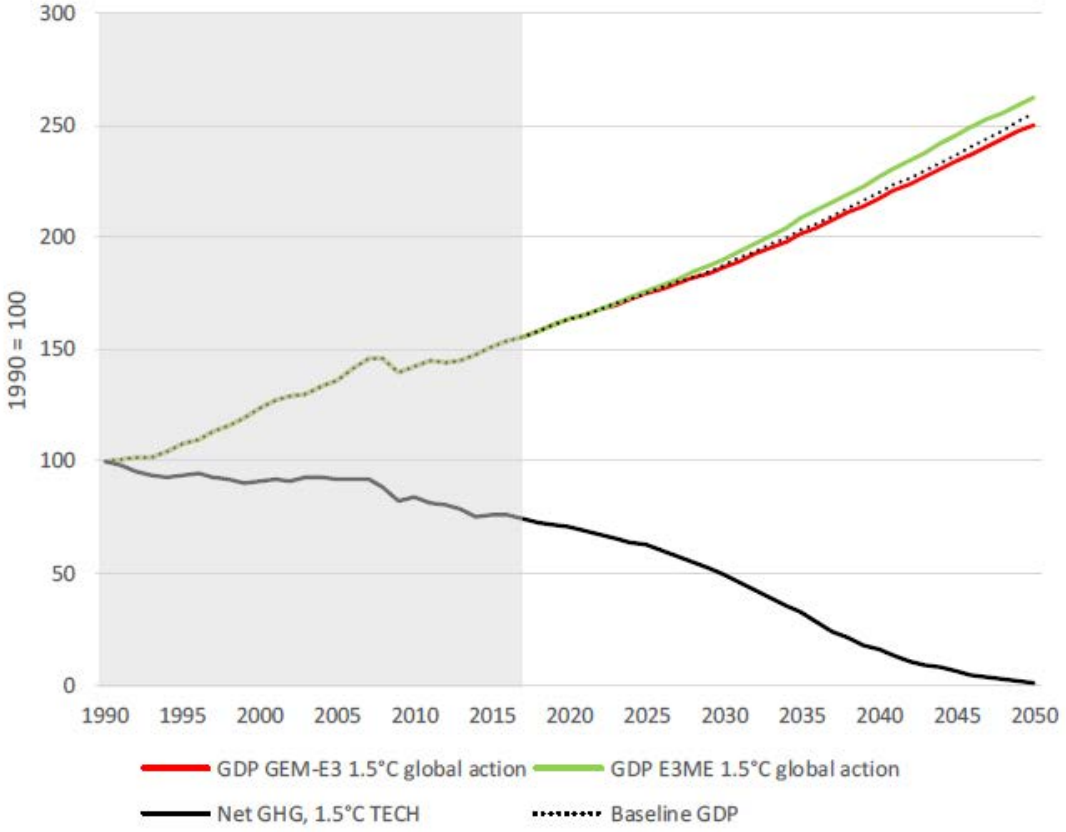
In-depth analysis supporting the proposal

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


ROAD TO CLIMATE NEUTRAL ECONOMY: STRATEGIC PRIORITIES
FULLY DECARBONISING EUROPE'S ENERGY SUPPLY
Large scale electrification of the energy system coupled with deployment of renewables will decarbonise our energy supply and significantly reduce our dependency on third country suppliers
EMBRACING CLEAN, SAFE AND CONNECTED MOBILITY
Decarbonising the transport sector by using alternative means of transport, connected and automated driving combined with the roll-out of electric vehicles and enhanced use of alternative fuels
MAXIMISING BENEFITS FROM ENERGY EFFICIENCY
Reducing energy consumption by close to half between 2005 and 2050
PUTTING INDUSTRIAL MODERNISATION AT THE CENTRE OF A FULLY CIRCULAR ECONOMY
Reaping first mover benefits by modernising existing installations and investing in new carbon neutral and circular economy-compatible technologies and systems
DEVELOPING SMART NETWORK INFRASTRUCTURE AND INTERCONNECTIONS
A modern and smart infrastructure, ensuring optimal sector coupling and enhancing regional cooperation, is the cornerstone of the energy transmission and distribution landscape of tomorrow
REAPING THE FULL BENEFITS OF BIO-ECONOMY AND CREATING ESSENTIAL CARBON SINKS
Creating natural sinks by developing more sustainable land-use and agriculture
CO2
TACKLING REMAINING CO_2 EMISSIONS WITH CARBON CAPTURE AND STORAGE
Compensating for remaining greenhouse gas emissions in our economy and creating negative emissions

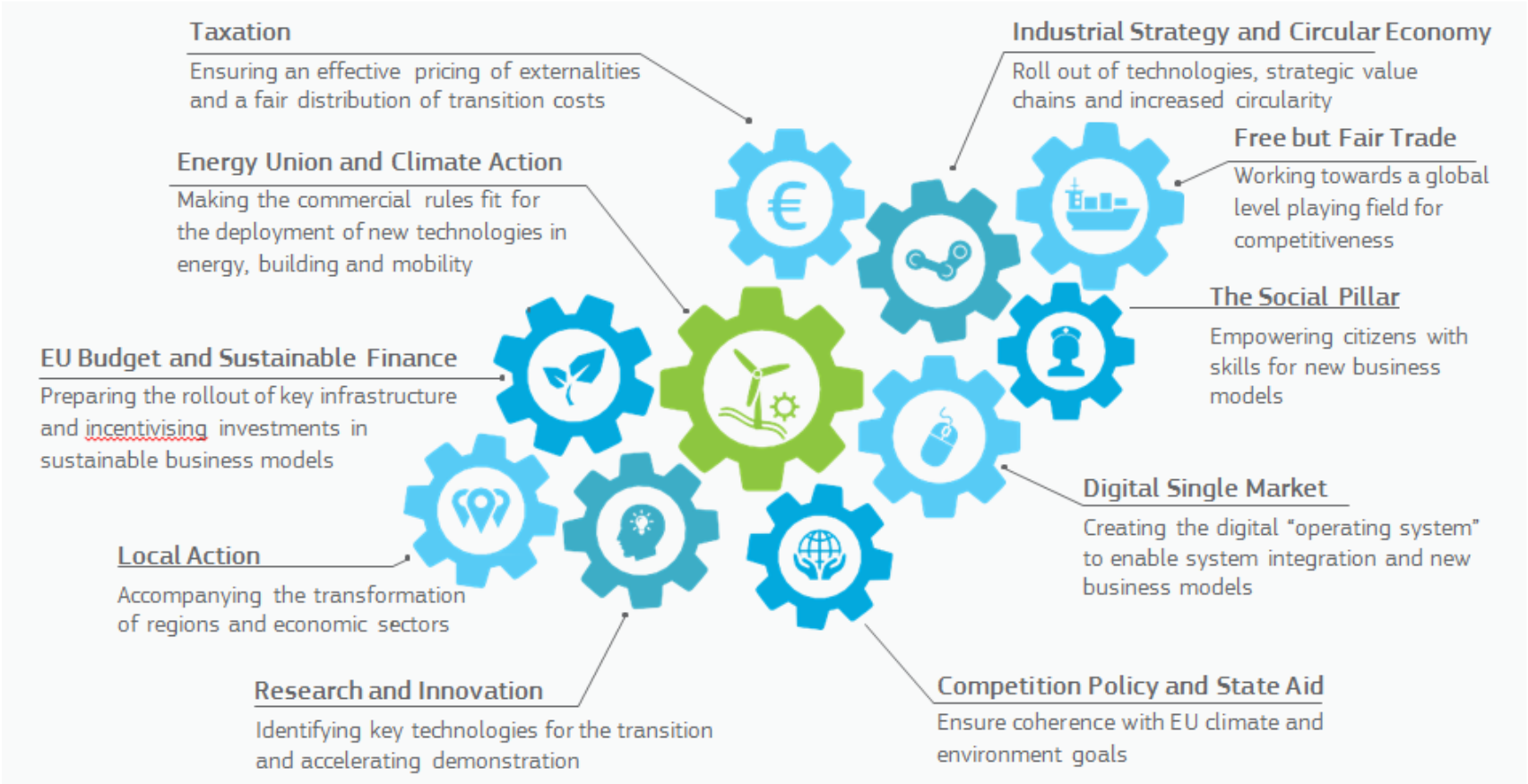
Full decoupling of EU GDP growth and emissions by 2050



Sources: PRIMES, ESTAT, JRC-GEM-E3 and E3ME.

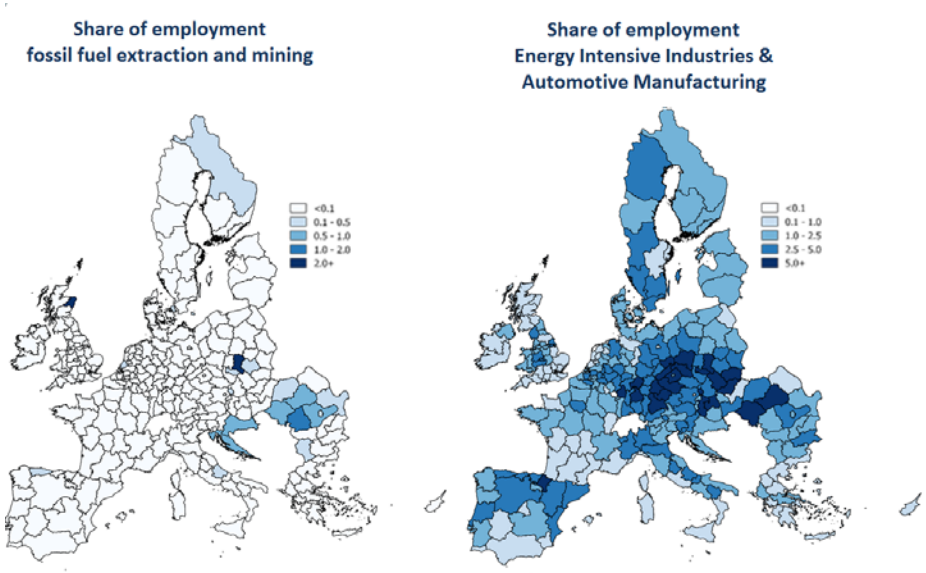
- **Positive for growth and jobs**, with GDP impact up to +2%
- **Co-benefits**: energy imports down, public health, etc.
- **Significant additional investments:** from 2% of EU GDP invested in the energy system today to **2.8%** (up to € 575 bn per annum) to achieve a net-zero greenhouse gas emissions 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 this will affect negatively some sectors and regions often in lower income MS, more than others
- **Modernisation process has to be managed with no-one left behind**, relevant policies must be deployed to the fullest.



Climate neutral economy by 2050 is **feasible** and moreover - **desireable**, but requires **deep societal and economic transformations within a generation.**

It requires **commitment, ownership** and above all - **action** - by all Europeans.

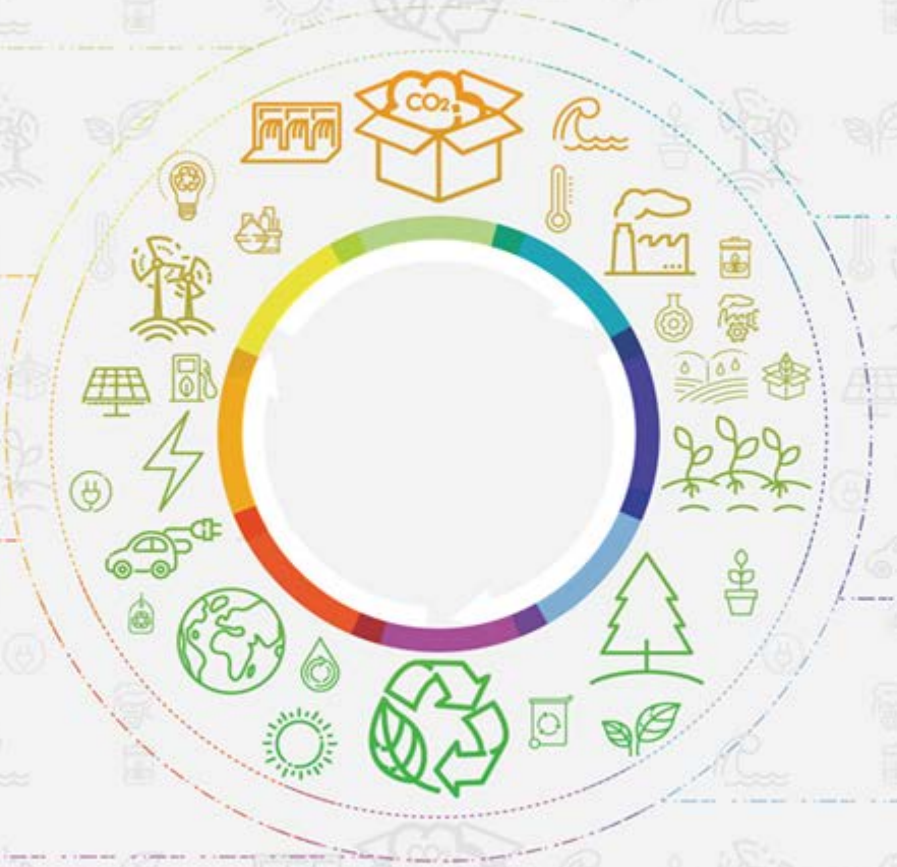
Stakeholder engagement prior to publication of the EU LTS

- Two day **stakeholder conference**, 10-11 July 2018
- **Online questionnaire** with 74 questions (July-October 2018)
  - over 2800 responses and 173 position papers received, from individuals (74%) and organised stakeholders (26%)
- **Broad literature review** throughout the LTS in-depth analysis:
  - IPCC Special Report on 1.5°C
  - Results of (scientific) studies and modelling exercises
  - Inputs from a variety of stakeholders such as industry roadmaps, position papers, studies

Ongoing political and social debate

- The EU LTS has been thoroughly discussed by EU institutions and all relevant ministers. **Heads of state have promised to finalise their guidance before the end of the year.**
- **Inclusive societal debate in 2019 is key!** In an open and inclusive manner with National Parliaments, business, non-governmental organisations, trade unions, cities and communities, as well as citizens and the youth.
- **The Commission outreach tour** to European capitals to engage with governments, parliaments, businesses, NGOs, cities, communities and citizens
- EU to adopt and submit an ambitious strategy by **early 2020** to the UNFCCC as requested under the Paris Agreement.
- Show leadership and work with other parties to do the same.

#EU2050



https://ec.europa.eu/clima/news/commission-calls-climate-neutral-Europe-2050.en