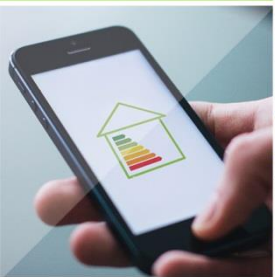
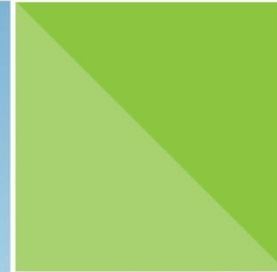




European  
Commission



# The EU vision for a climate neutral Europe by 2050

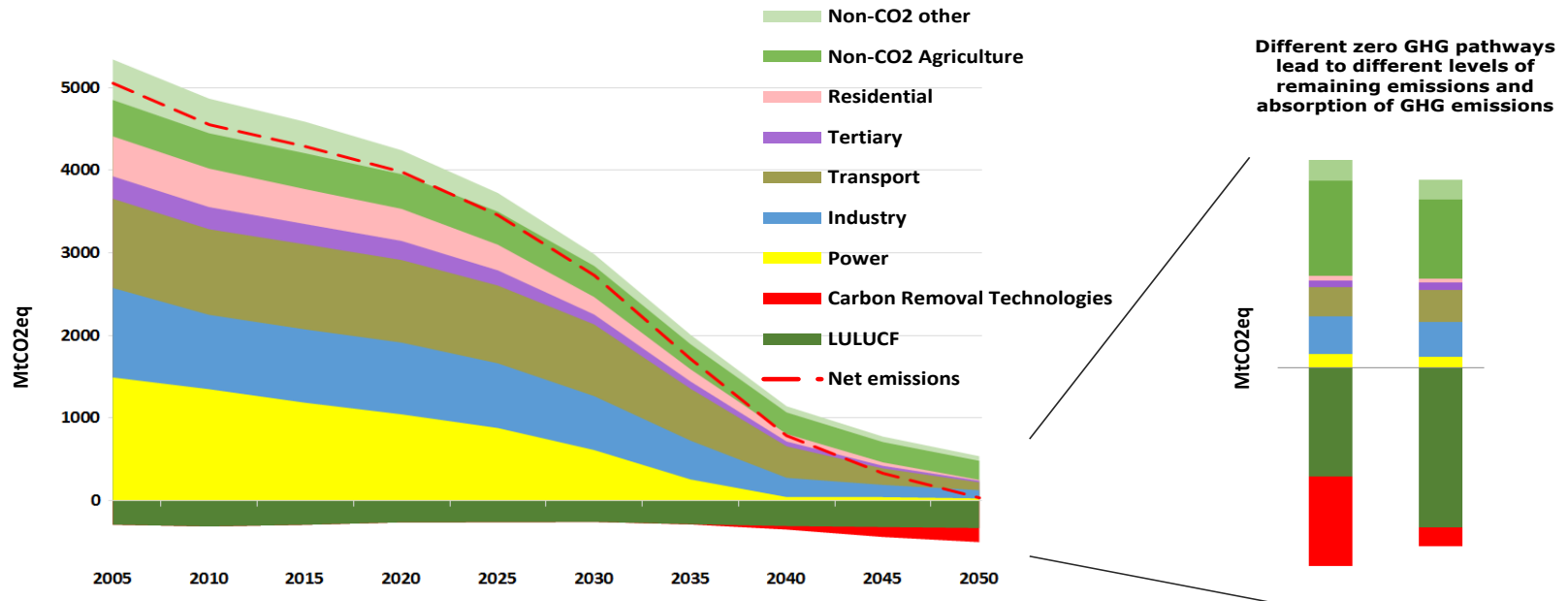
Joint event Heat Roadmap Europe 4 and  
ReUseHeat  
13 February 2019

Hans van Steen  
Acting Director ENER C  
European Commission – DG ENERGY



# Our Vision for a Clean Planet by 2050

- EU leads in clean energy transition and GHG emissions reduction. Ambitious 2030 targets. 60% reductions in 2050 with current policies – not in line with the Paris Agreement.
- Radical transformations necessary: central role of energy system, buildings, transport, industry, agriculture.
- There are a number of pathways for achieving a climate neutral EU, challenging but feasible from a technological, economic, environmental and social perspective.



# 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)
<b>Main Drivers</b>	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
<b>GHG target in 2050</b>	-80% GHG (excluding sinks) ["well below 2°C" ambition]					-90% GHG (incl. sinks)	-100% GHG (incl. sinks) ["1.5°C" ambition]	
<b>Major Common Assumptions</b>	<ul style="list-style-type: none"> <li>Higher energy efficiency post 2030</li> <li>Deployment of sustainable, advanced biofuels</li> <li>Moderate circular economy measures</li> <li>Digitilisation</li> </ul>				<ul style="list-style-type: none"> <li>Market coordination for infrastructure deployment</li> <li>BECCS present only post-2050 in 2°C scenarios</li> <li>Significant learning by doing for low carbon technologies</li> <li>Significant improvements in the efficiency of the transport system.</li> </ul>			
<b>Power sector</b>	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.							
<b>Industry</b>	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
<b>Buildings</b>	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
<b>Transport sector</b>	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			<ul style="list-style-type: none"> <li>CIRC+COMBO but stronger</li> <li>Alternatives to air travel</li> </ul>
<b>Other Drivers</b>		H2 in gas distribution grid	E-gas in gas distribution grid					Limited enhancement natural sink

## 7 Building Blocks

1. Energy efficiency
2. Deployments of renewables
3. Infrastructure and inter-connections
4. Clean, safe & connected mobility
5. Competitive industry and circular economy
6. Bio-economy and natural carbon sinks
7. Tackle remaining emissions with carbon capture and storage

## Building Block 1 Energy efficiency

Central role, energy consumption reduced by as much as half in 2050 compared to 2005

Buildings key, most of the housing stock of 2050 existing already today, higher renovation rates, fuel switching

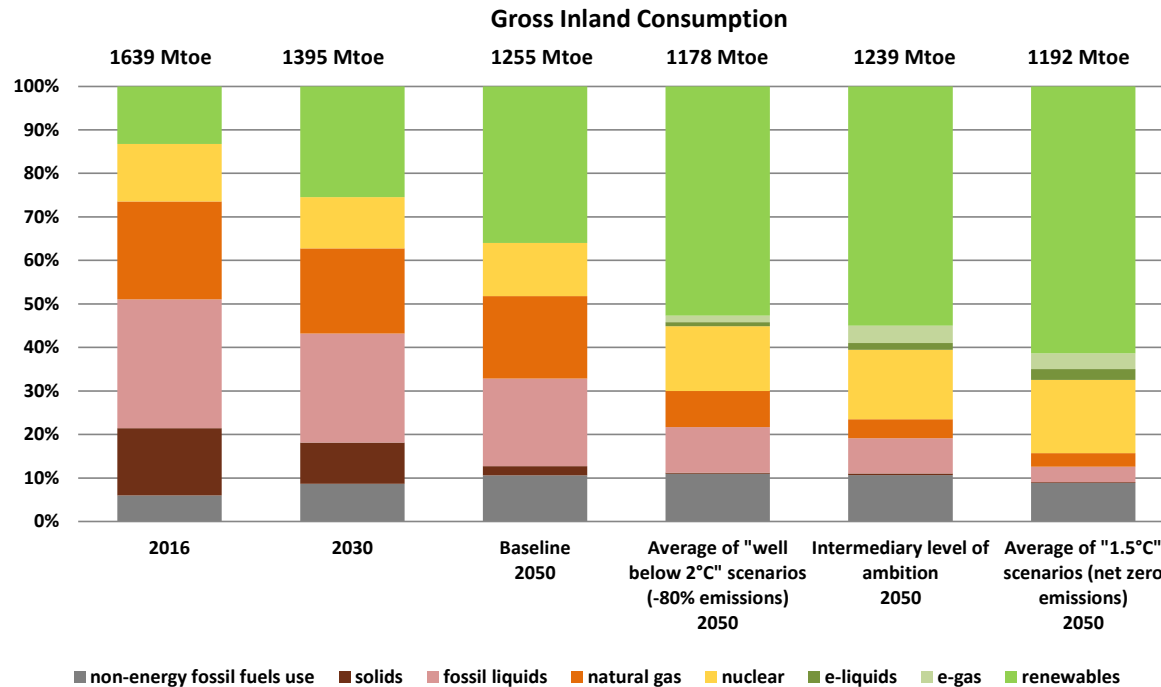
Requires adequate financial instruments and skilled workforce, integrated policy approach and consumer engagement to sustain higher renovation rates

## Changes in final energy consumption (2050 compared to 2005)



# Building Block 2 Deployment of renewables

Primary energy in 2050 largely coming from renewable sources



## 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.

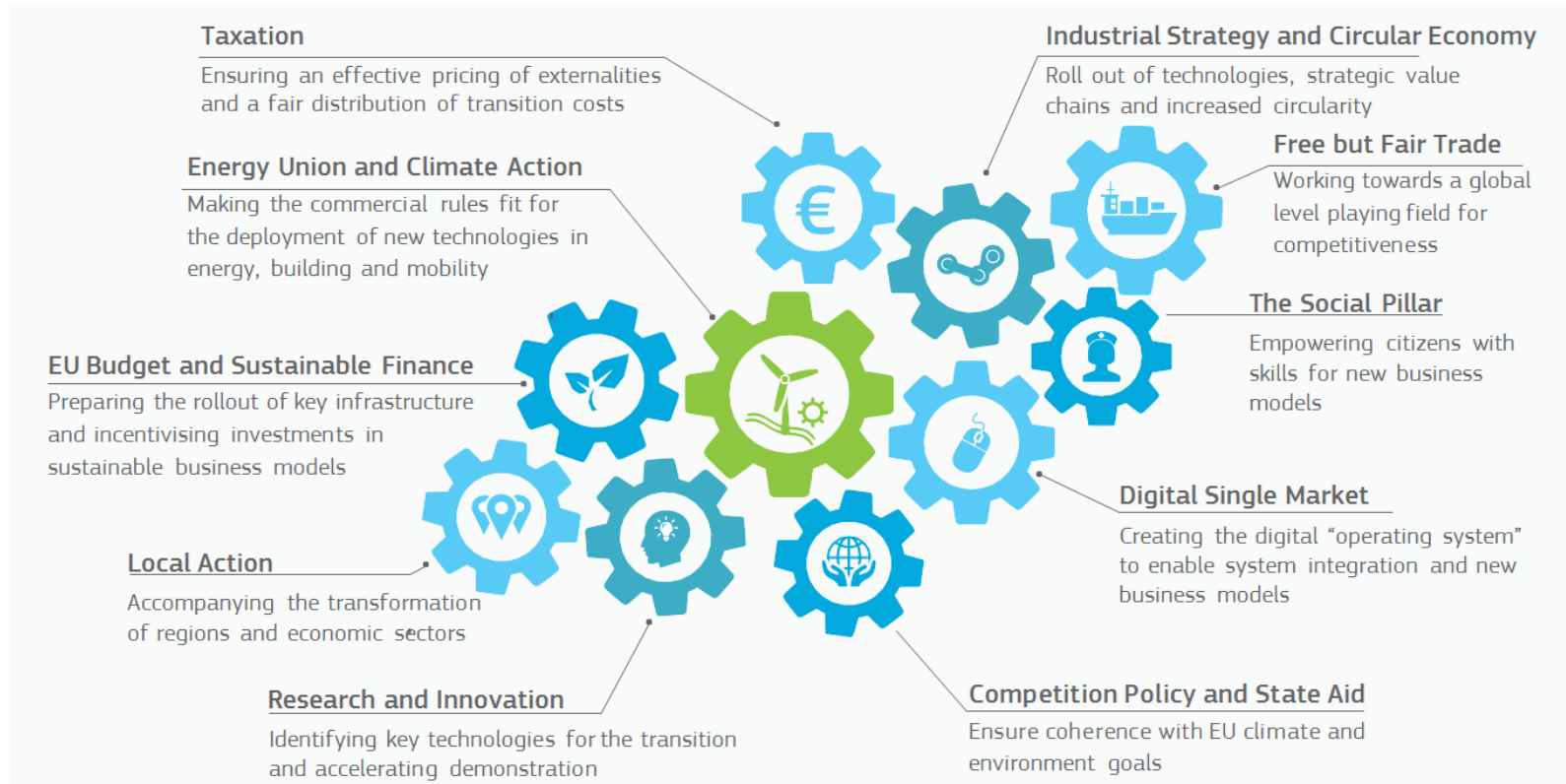
Renewable electricity allows production and deployment of carbon-free energy carriers such as hydrogen and e-fuels to decarbonize heating, transport and industry.

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.

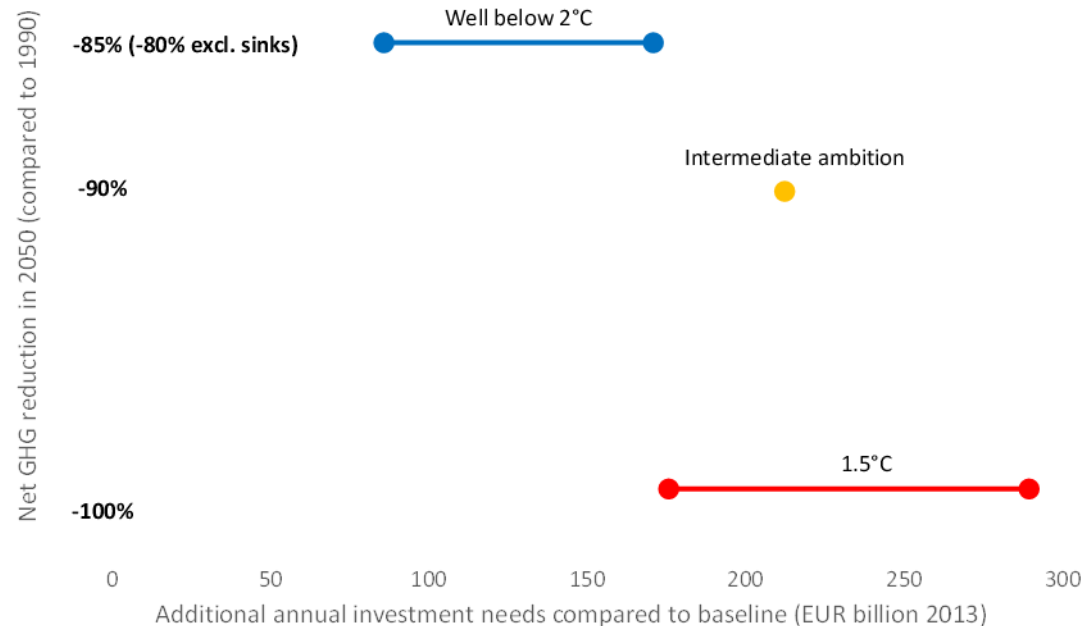


# Enabling framework crucial to deliver transformation



## Increased Investment in 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
- Positive for growth and jobs, with GDP higher by up to 2% in 2050
- Co-benefits: energy imports down, public health, etc.





## Next steps (1)

- Invitation to all the EU institutions to consider the EU vision.
- EU leaders to reflect on this in Sibiu summit, all relevant Council formations should hold policy debates in preparation.
- 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.
- 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.