



# Powering a climate-neutral economy

## The Energy System Integration and Hydrogen Strategies

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# Towards a climate-neutral economy

2020 targets

2030 framework  
– Clean Energy  
Package

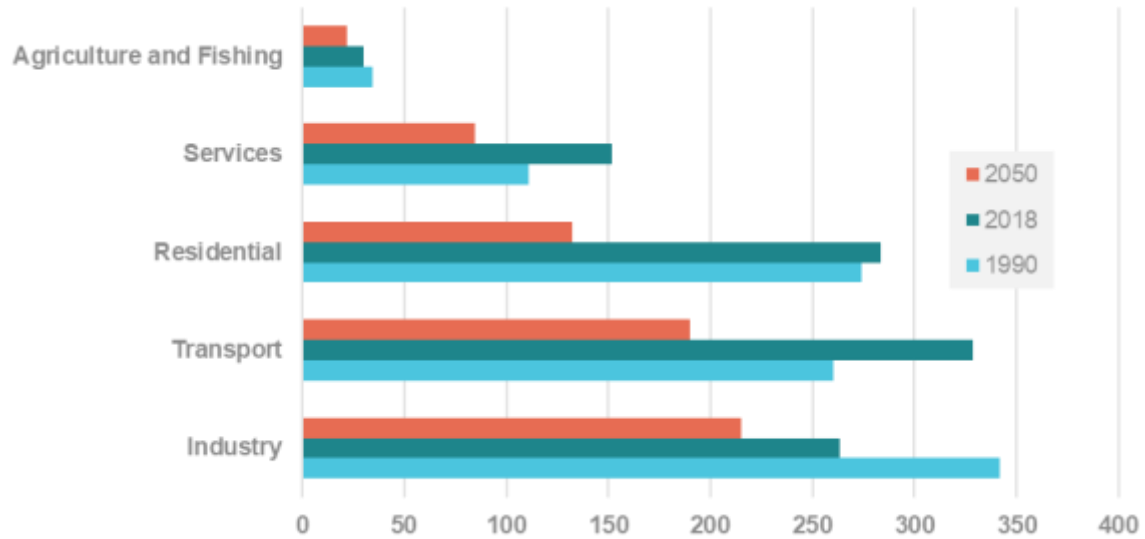
2050 Long Term  
Decarbonisation  
Strategy

The European  
Green Deal

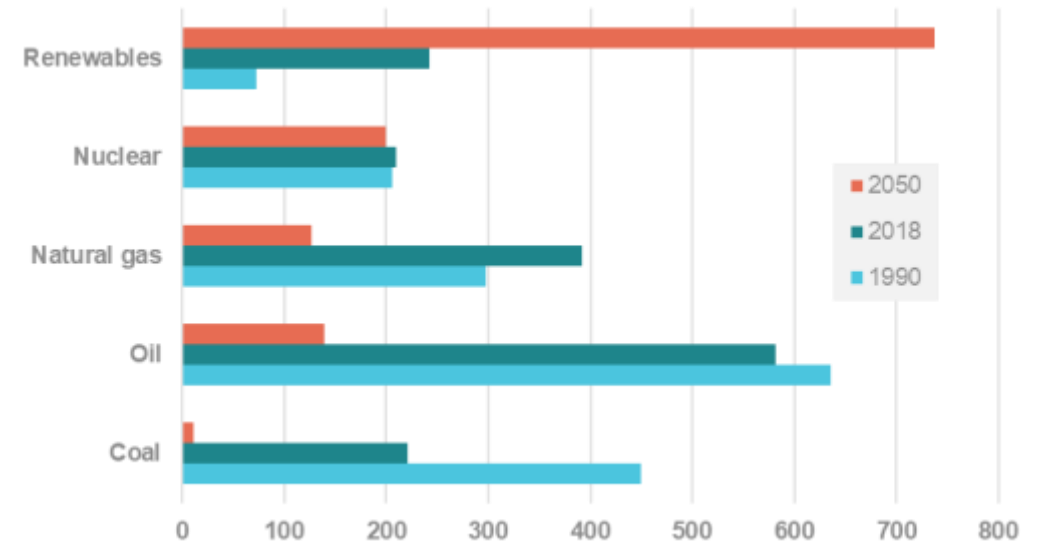
# A changing energy landscape towards 2050

# Changing consumption and production patterns

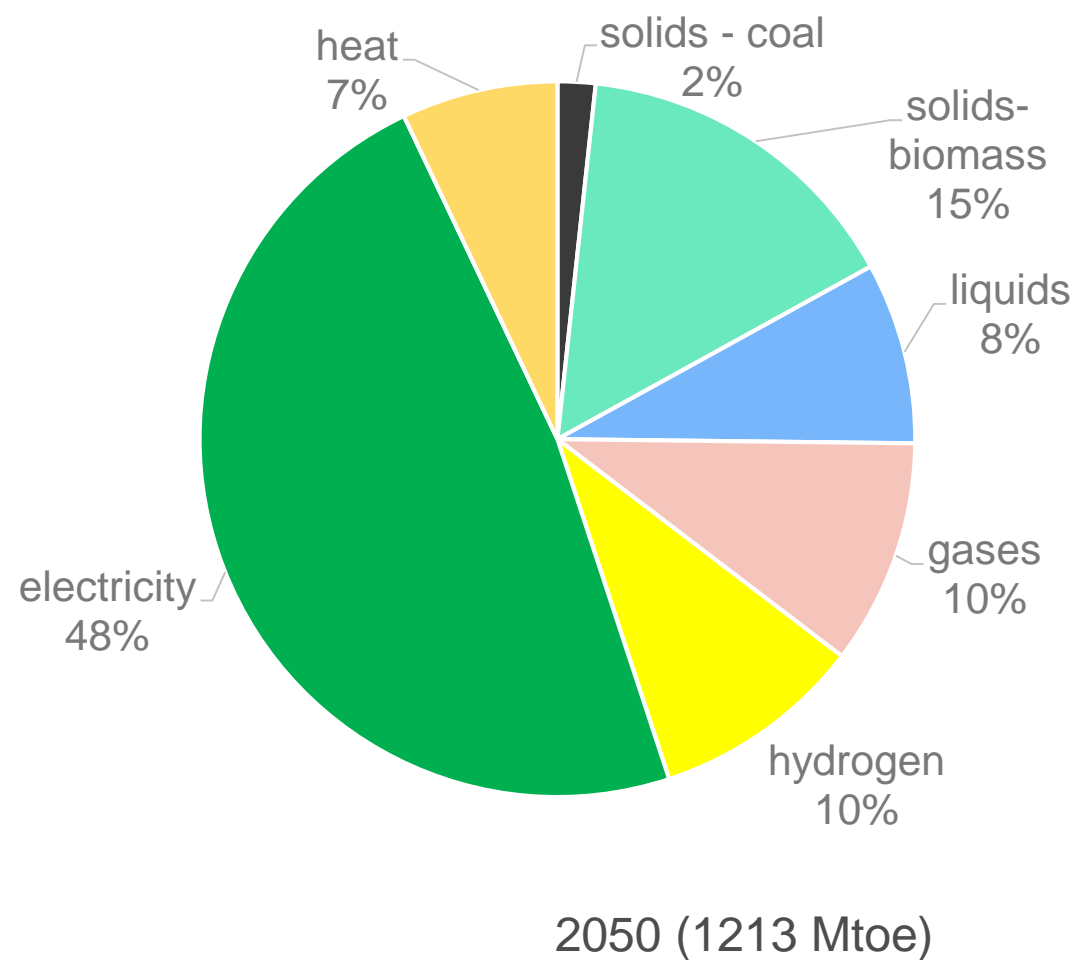
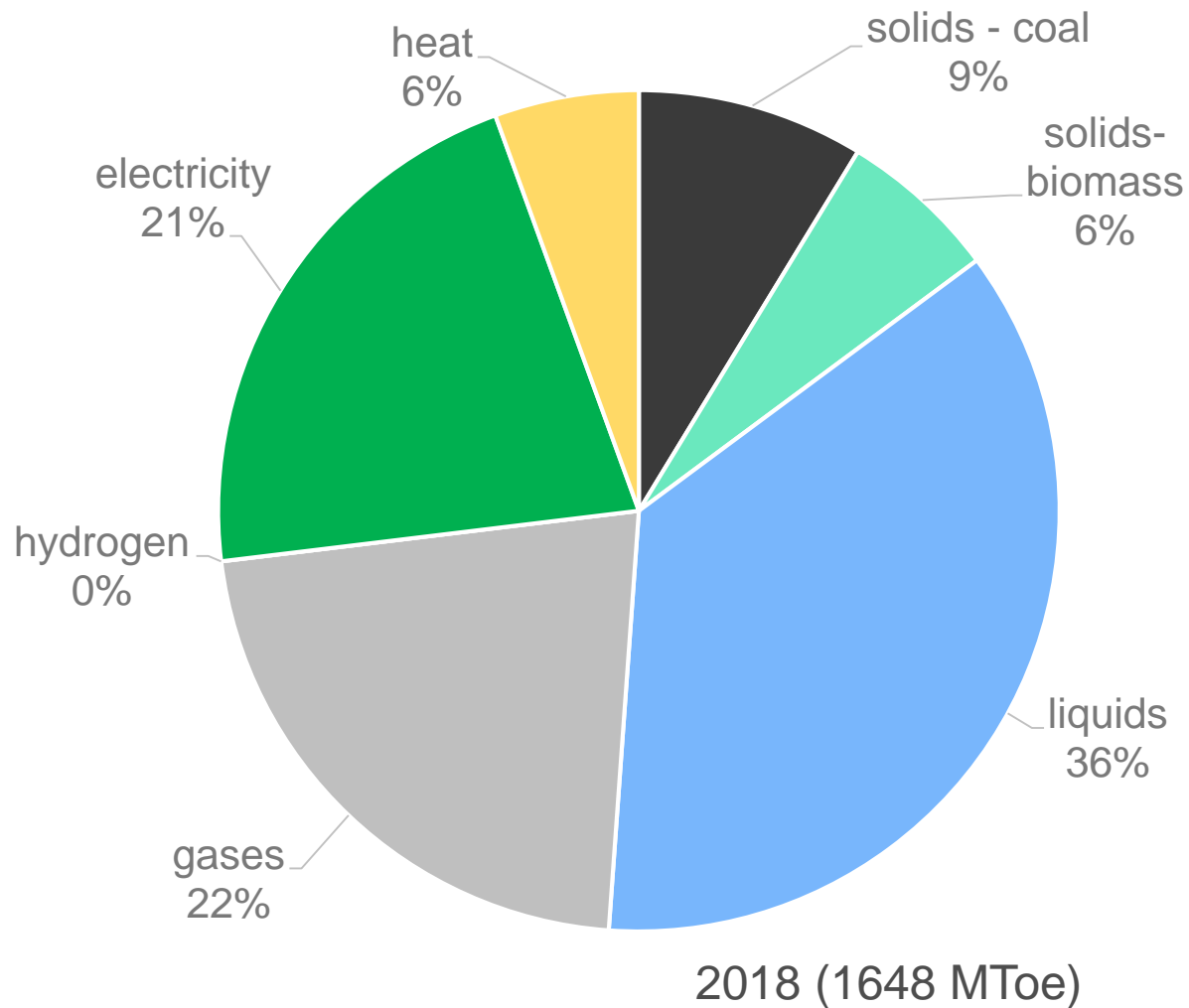
## Final energy demand per sector



## Consumption per energy supply source

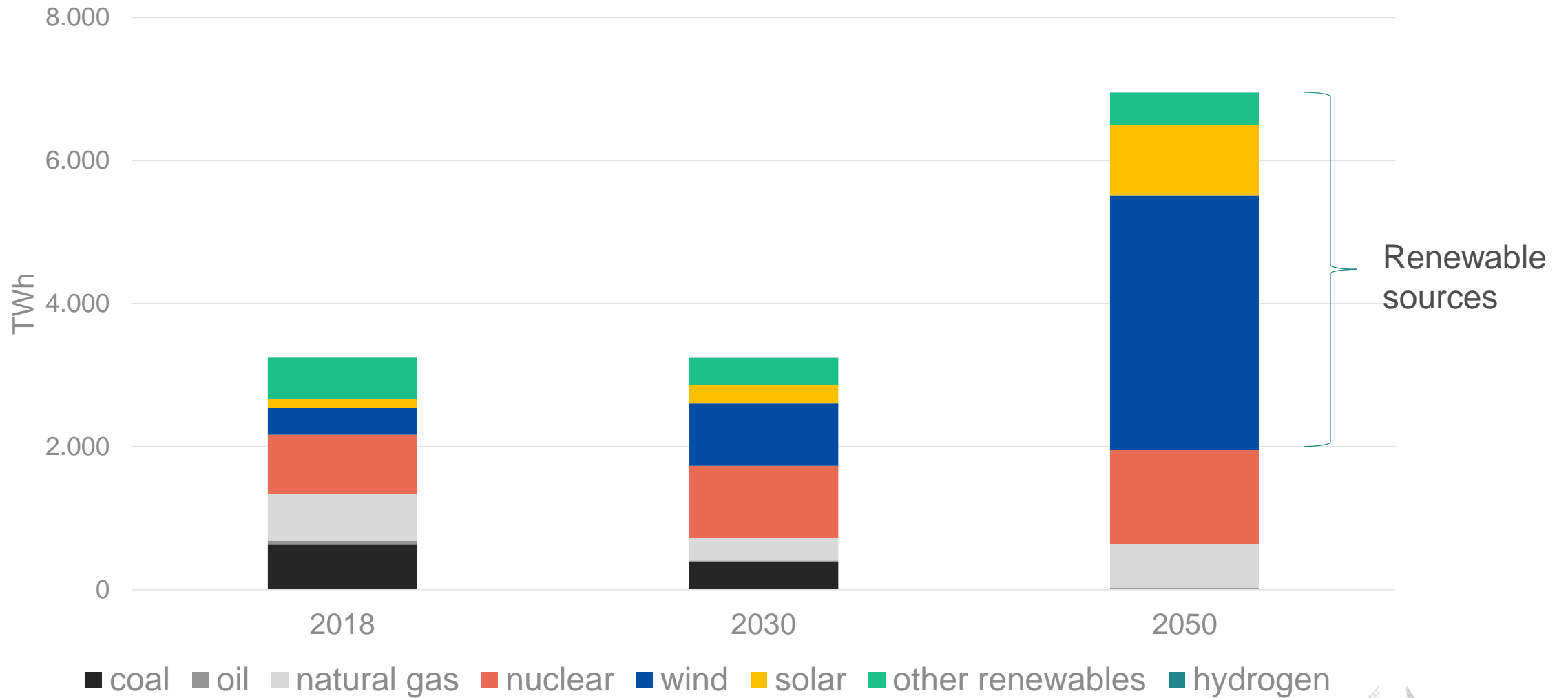


# Changing energy carriers



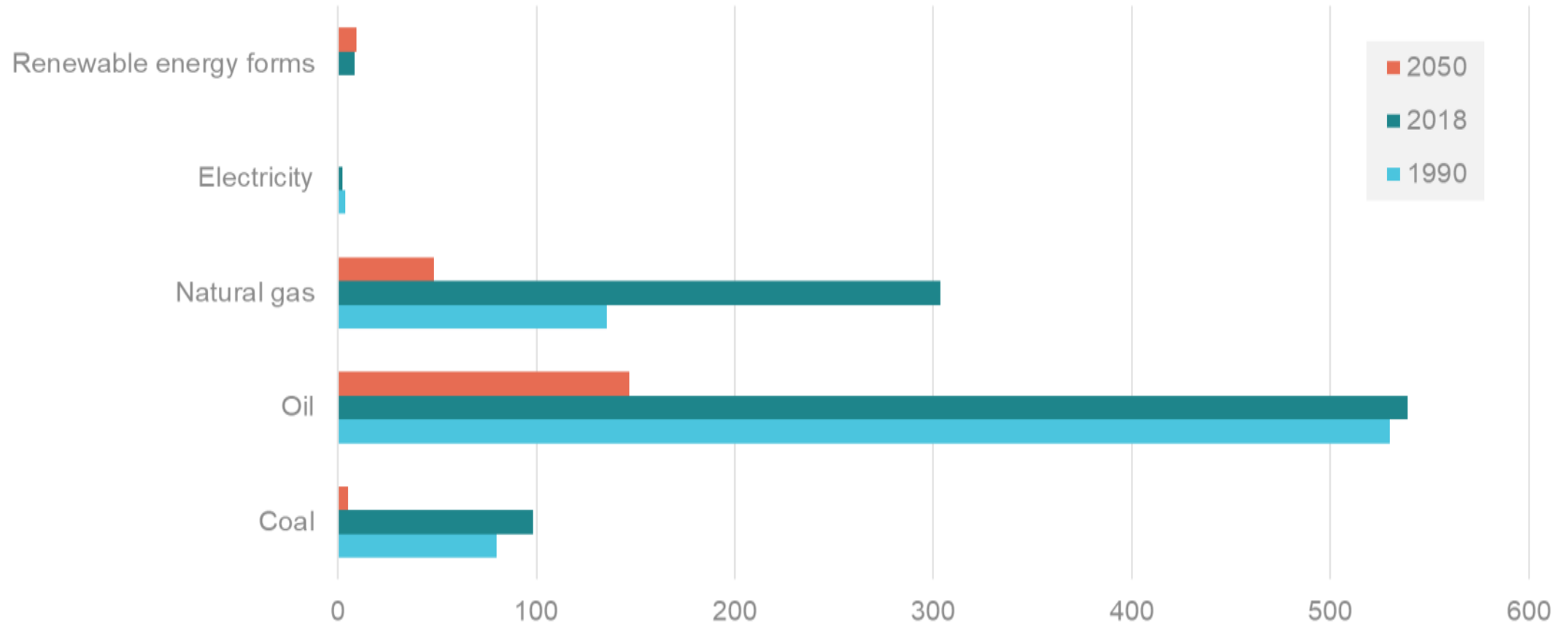
Source: Based on EU28 Eurostat/LTS 1.5LIFE/TECH scenarios

# Power system is most rapid to decarbonise



Source: Based on EU28 Eurostat/LTS 1.5LIFE/TECH scenarios

# Net energy imports



Source: Mtoe, based on EU28 Eurostat/LTS 1.5LIFE/TECH scenarios

# The rationale behind the Energy System Integration and Hydrogen Strategies

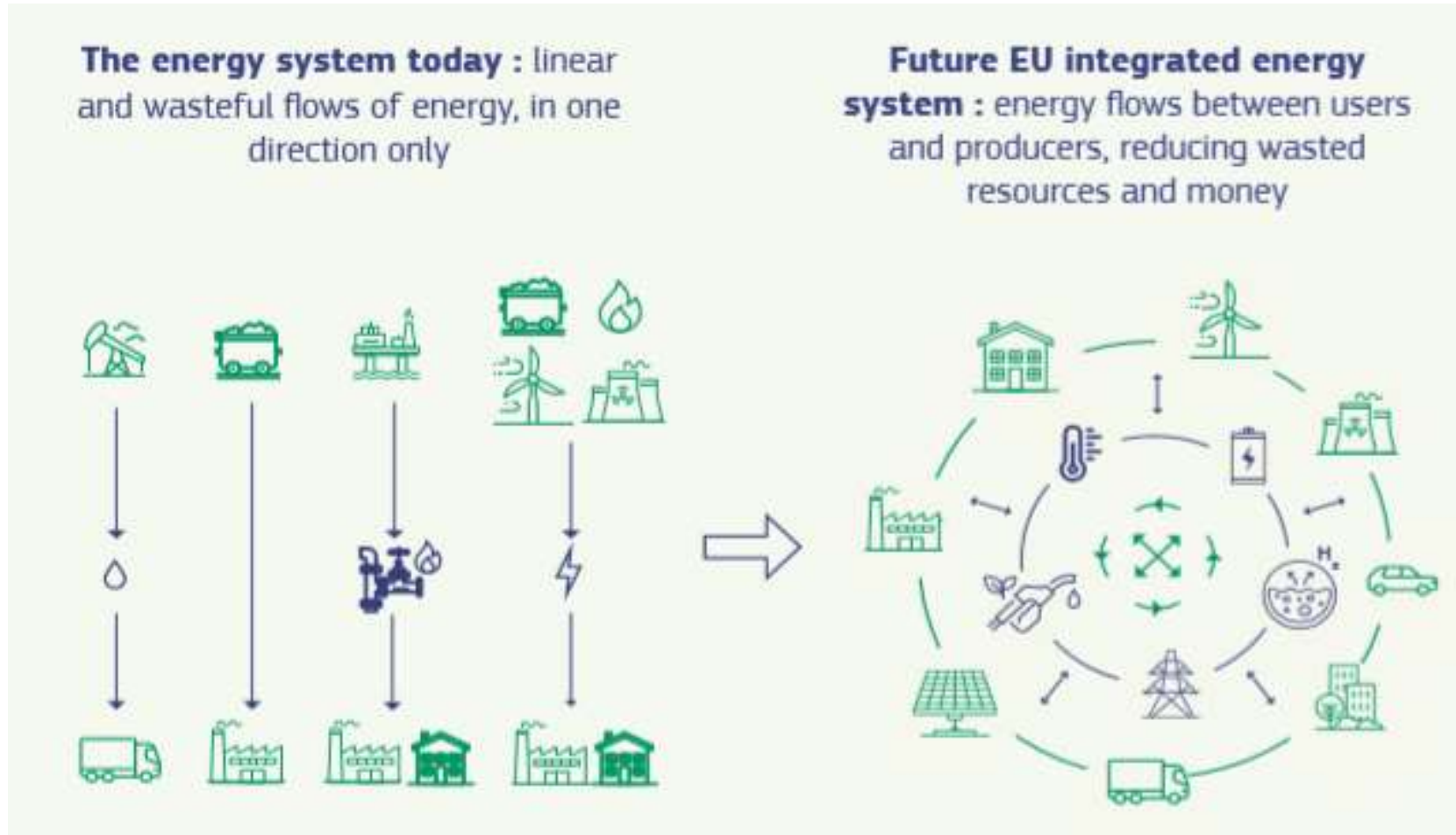


# Why a Strategy for Energy System Integration? Why now?

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# What is energy system integration?



**Energy System Integration (ESI)** is the integrated planning and operation of the energy system 'as a whole', across multiple carriers, infrastructures and consumption sectors



# Laying the foundation for a climate-neutral energy system

## Energy System Integration Strategy

A more **circular and energy efficient** energy system

1

A **deep electrification** of consumption, based on **renewable electricity**

2

The use of **renewable and low carbon fuels (incl. hydrogen)** in hard-to-abate sectors

3

## Hydrogen Strategy

A full value chain approach to upscale hydrogen

+

**Clean Hydrogen Alliance**

# Making it happen – an action plan for Energy System Integration

Pillar	Actions oriented towards	Main tools involved (*)
<b>A more circular and energy efficient energy system</b>	<ul style="list-style-type: none"> <li>Better apply EEF principle &amp; PEF</li> <li>Build a more circular system</li> </ul>	RED, EED, TEN-E
<b>A deep electrification of consumption, based on renewable electricity</b>	<ul style="list-style-type: none"> <li>Increased supply RES-E</li> <li>Faster electrification end-use sectors</li> <li>Roll out EV infrastructure &amp; new loads integration</li> </ul>	RED, IED, AFID, TEN-E, TEN-T, CO2 emissions for cars, EU funding, offshore RES, Renovation wave, NC Flexibility
<b>RES &amp; low carbon fuels for hard-to-abate sectors (incl. hydrogen)</b>	<ul style="list-style-type: none"> <li>Promoting RES fuels from biomass</li> <li>Promoting RES hydrogen</li> <li>Enabling CCUS incl. for synthetic fuels</li> </ul>	RED, Aviation/Maritime initiatives, EU funding + Hydrogen Strategy Follow-up
<b>Energy markets fit for decarbonisation &amp; distributed resources</b>	<ul style="list-style-type: none"> <li>Creating a level playing field across carriers</li> <li>Review gas regulatory framework</li> <li>Improve customer information</li> </ul>	ETD, ETS, State Aid, gas legislation, guidance on non price components
<b>A more integrated energy infrastructure</b>	<ul style="list-style-type: none"> <li>More integrated planning at gas, electricity, heat and hydrogen</li> <li>Better governance</li> </ul>	TEN-E, TEN-T, RED, EED, TYNDP
<b>A digitalised energy system &amp; supportive innovation framework</b>	<ul style="list-style-type: none"> <li>Ensure digitalisation support energy system integration</li> <li>Research and innovation as a key enabler</li> </ul>	Energy Digitalisation Action Plan, NC cybersecurity, impact oriented research outlook

(\*) *Non-exhaustive list*

# Hydrogen – What and Why?

## Hydrogen:

- Feedstock, fuel, energy carrier / storage, many applications
- Does not emit CO<sub>2</sub>, no air pollution
- Essential to reach our climate ambition (hard-to-abate sectors)
- Europe is highly competitive in clean hydrogen technologies manufacturing

## Which hydrogen:

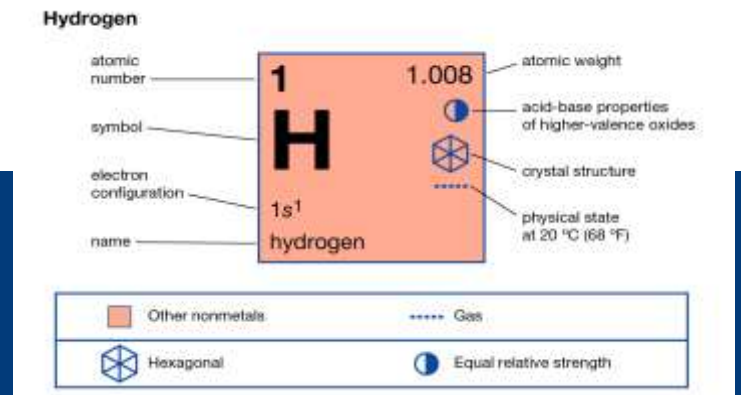
Currently: **fossil-based hydrogen**

Our vision: **Renewable (clean)**, and in a transitional period **low-carbon hydrogen** (fossil-based hydrogen with carbon capture and electricity based) for:

- Replacing existing hydrogen production
- **Industry** (fertilisers and green steel) and transport  
(Local buses, parts of rail, heavy duty road vehicles; in the longer term: maritime and aviation)

## Issues:

- **Cost-competitiveness**
- **Technological maturity (cost-effective electrolyzers)**
- **Renewable energy & scale**



# The Hydrogen Strategy – a roadmap to 2050

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**2024**

- 6 **GW** of renewable hydrogen electrolyzers
- Replace **existing hydrogen production**
- Regulation for liquid hydrogen markets
- Start planning of hydrogen infrastructure

**2030**

- **40 GW** of renewable hydrogen electrolyzers
- New applications in **steel and transport**
- Hydrogen for electricity balancing purposes
- Creation of “Hydrogen Valleys”
- Cross-border logistical infrastructure

**2050**

- Scale-up to **all hard-to-decarbonise sectors**
- Expansion of hydrogen-derived **synthetic fuels**
- EU-wide infrastructure network
- An open international market with € as benchmark

The background is a collage of images related to renewable energy. It features a large green circular shape on the left, a field of solar panels in the foreground, a white electrical cabinet on the right, and a landscape with power lines and wind turbines in the background under a blue sky with clouds.

**Thank you for your attention!**

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