

Accelerating the European energy transition with renewables

REPowering our EU - How to speed up the Shift to Renewable Energy in Europe

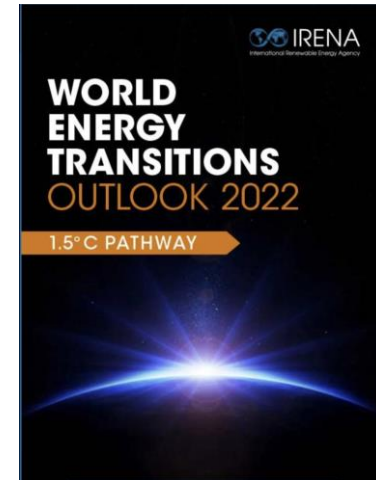
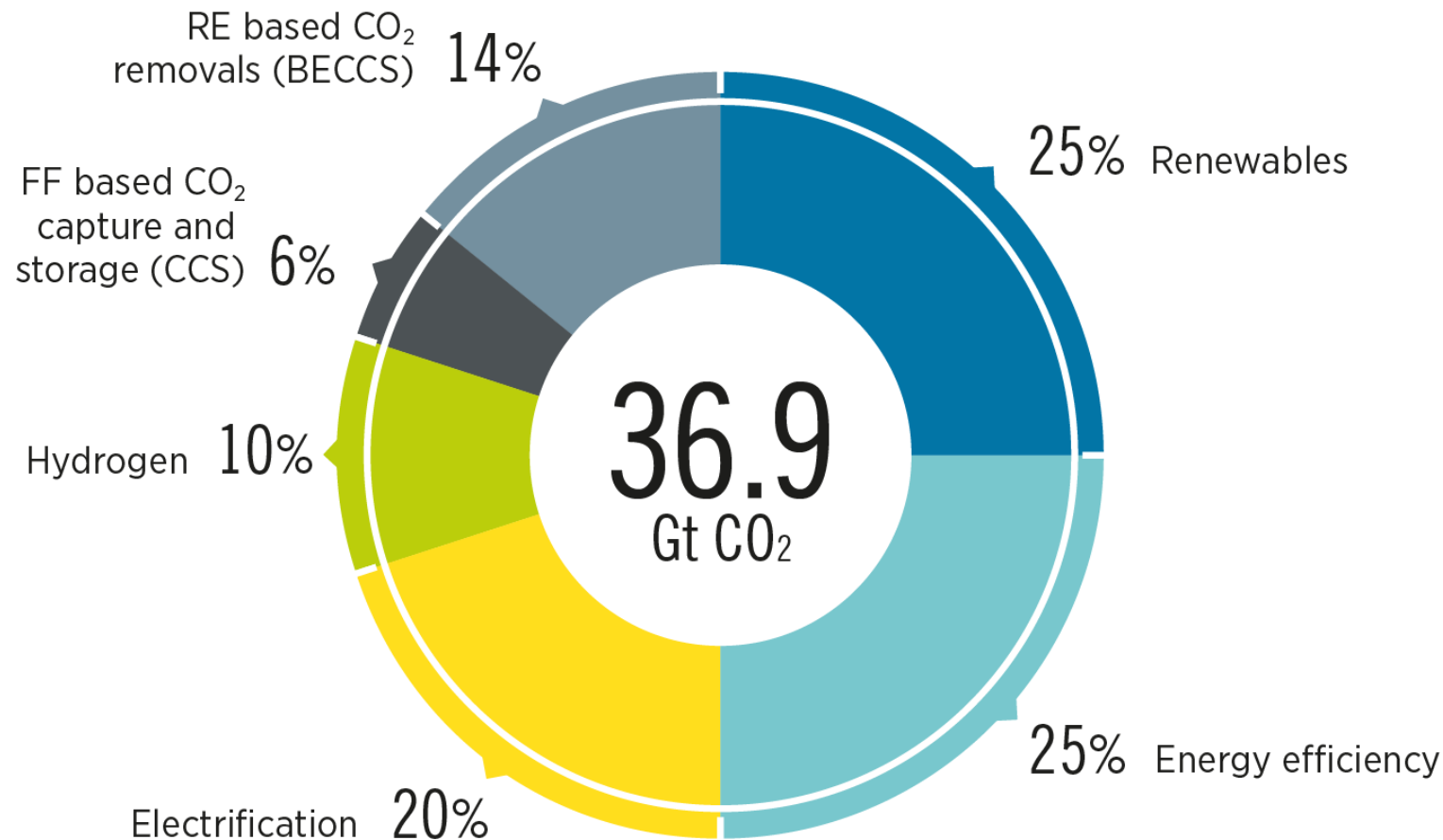
November 4, 2022

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Renewables, efficiency and electrification dominate energy transition

Reducing emissions by 2050 through six technological avenues



[Link](#)

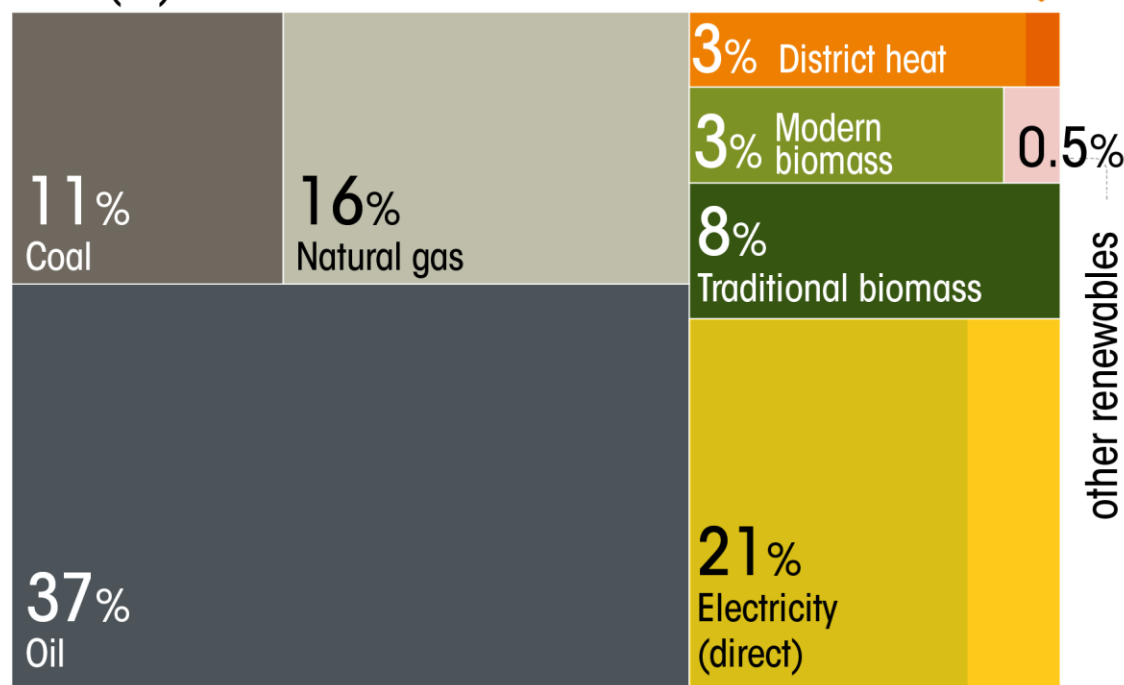
90% of all decarbonisation in 2050 will involve renewable energy through direct supply of low-cost power, efficiency, electrification, bioenergy with CCS and green hydrogen.

Electricity becomes the main energy carrier in 2050

2018

378EJ

Total Final Energy Consumption
TFEC (%)



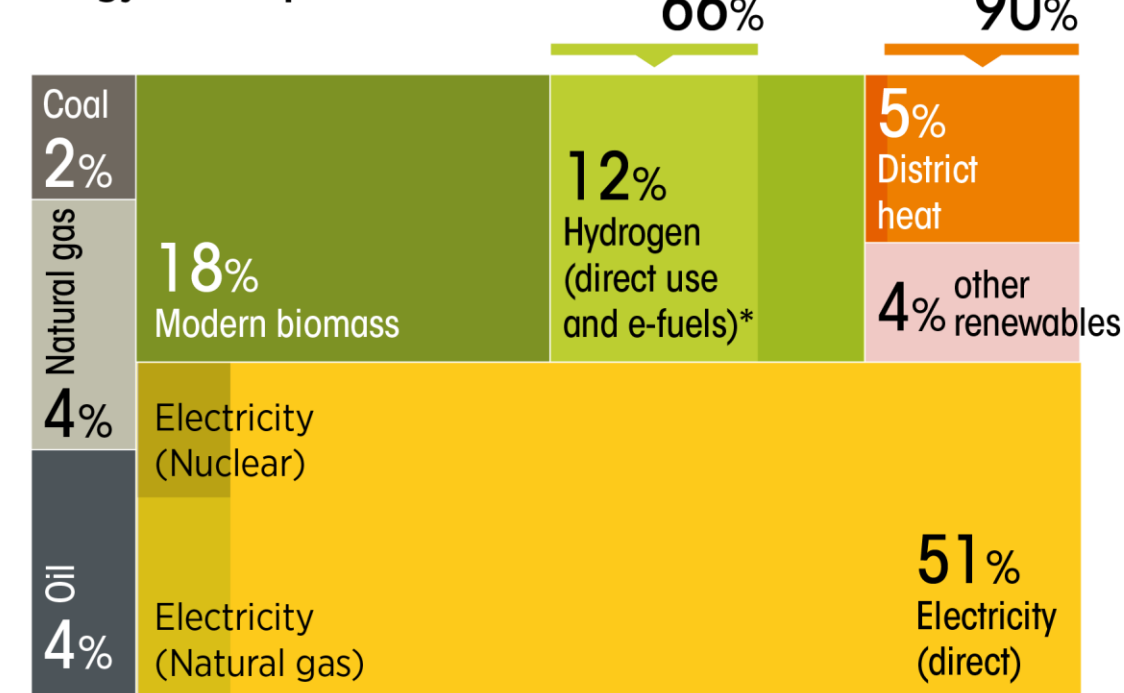
Renewable share
in district heat: **9%**

Renewable share in electricity: **25%**

2050 - Where we need to be (1.5-S)

348EJ

Total Final Energy Consumption



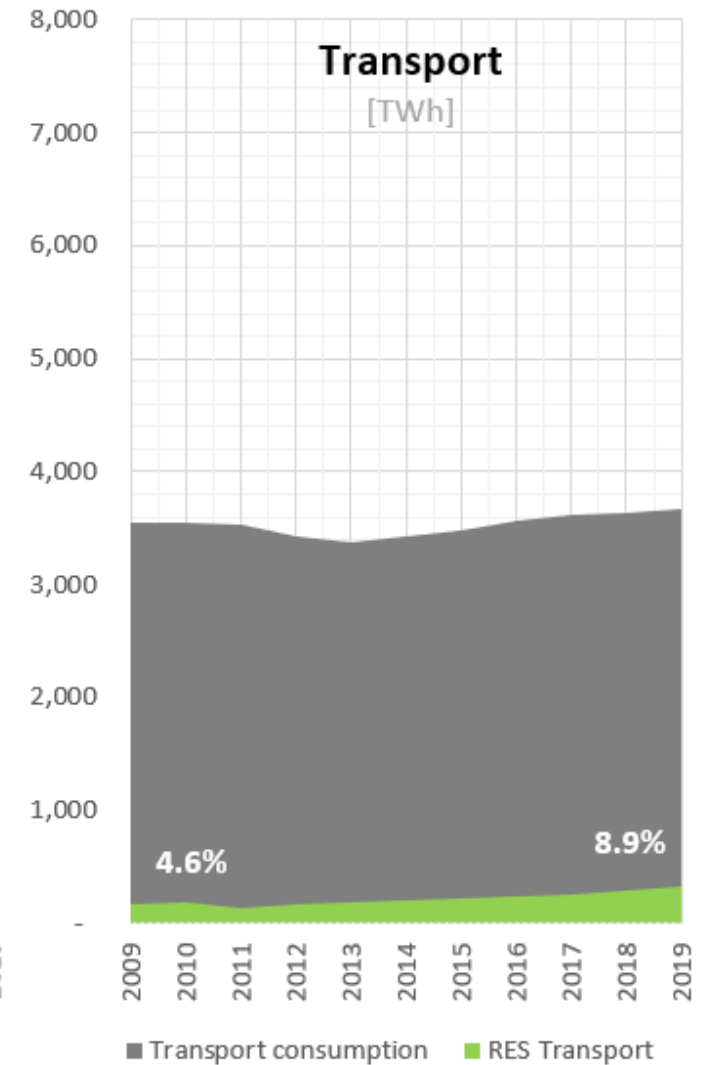
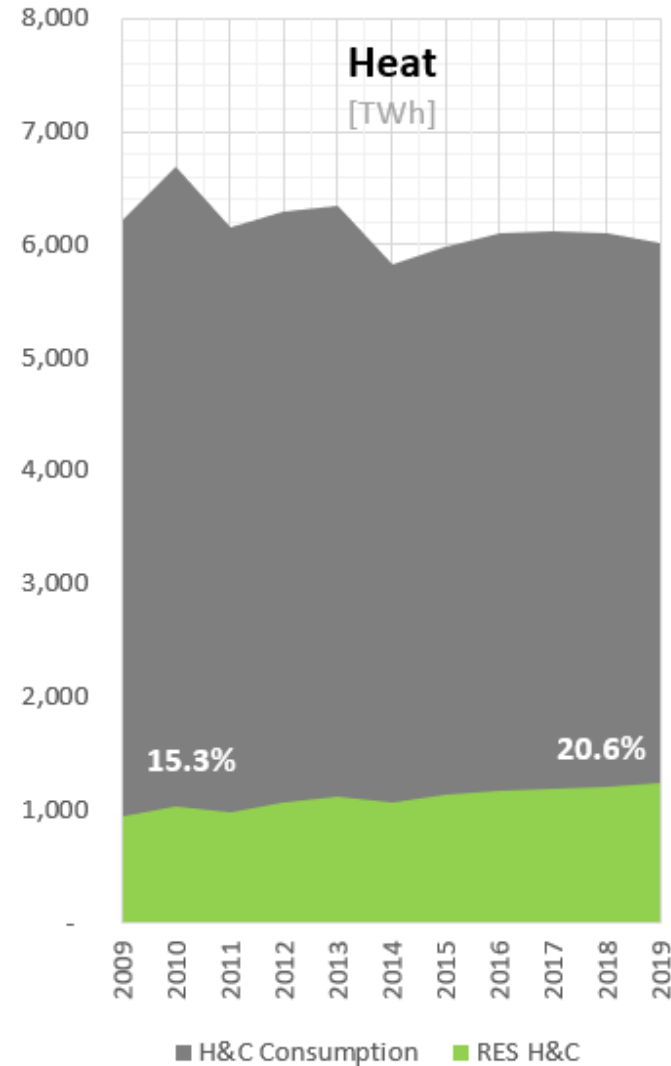
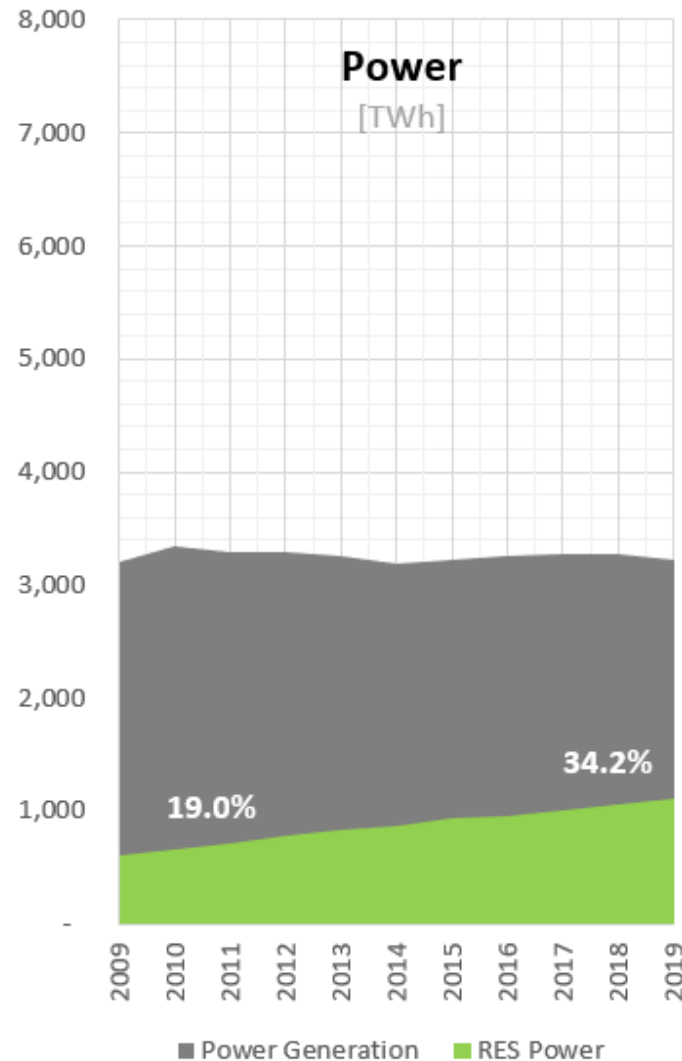
Renewable share
in hydrogen: **66%**

Renewable share
in district heat: **90%**

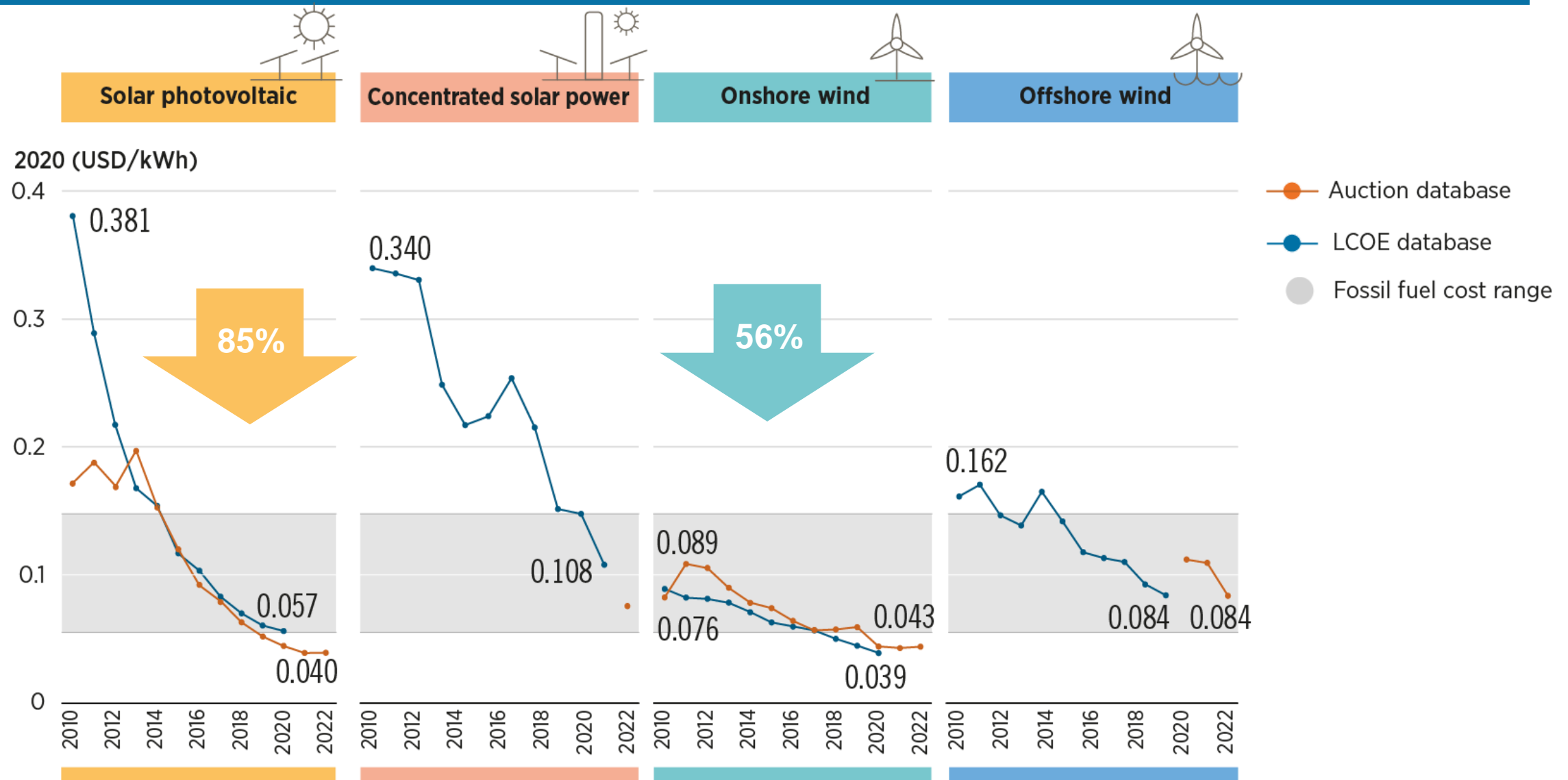
Renewable share in electricity: **90%**

90% of total electricity needs will be supplied by renewables by 2050

Today, renewables account for just 1/5 of Europe's energy consumption

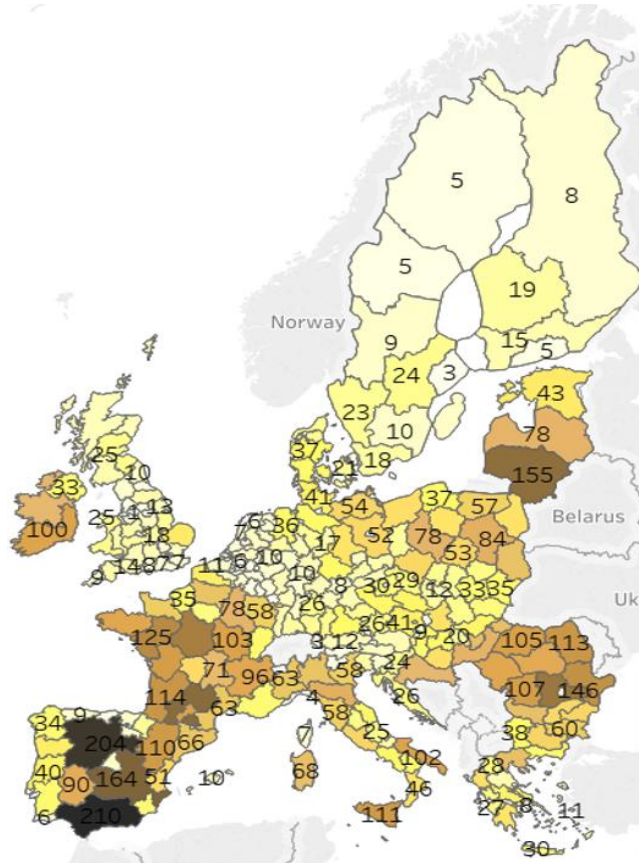


We are moving towards a world of abundant, cheap renewable energy

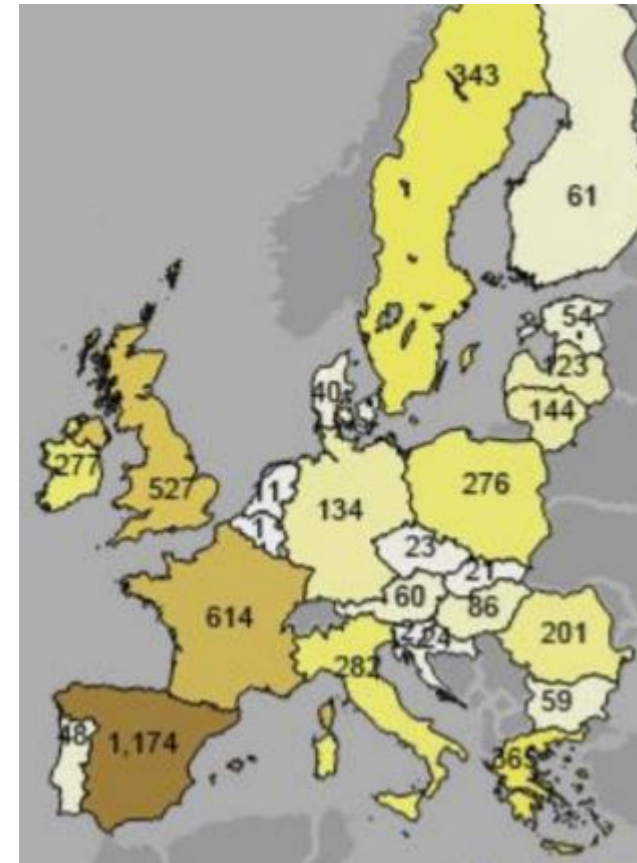


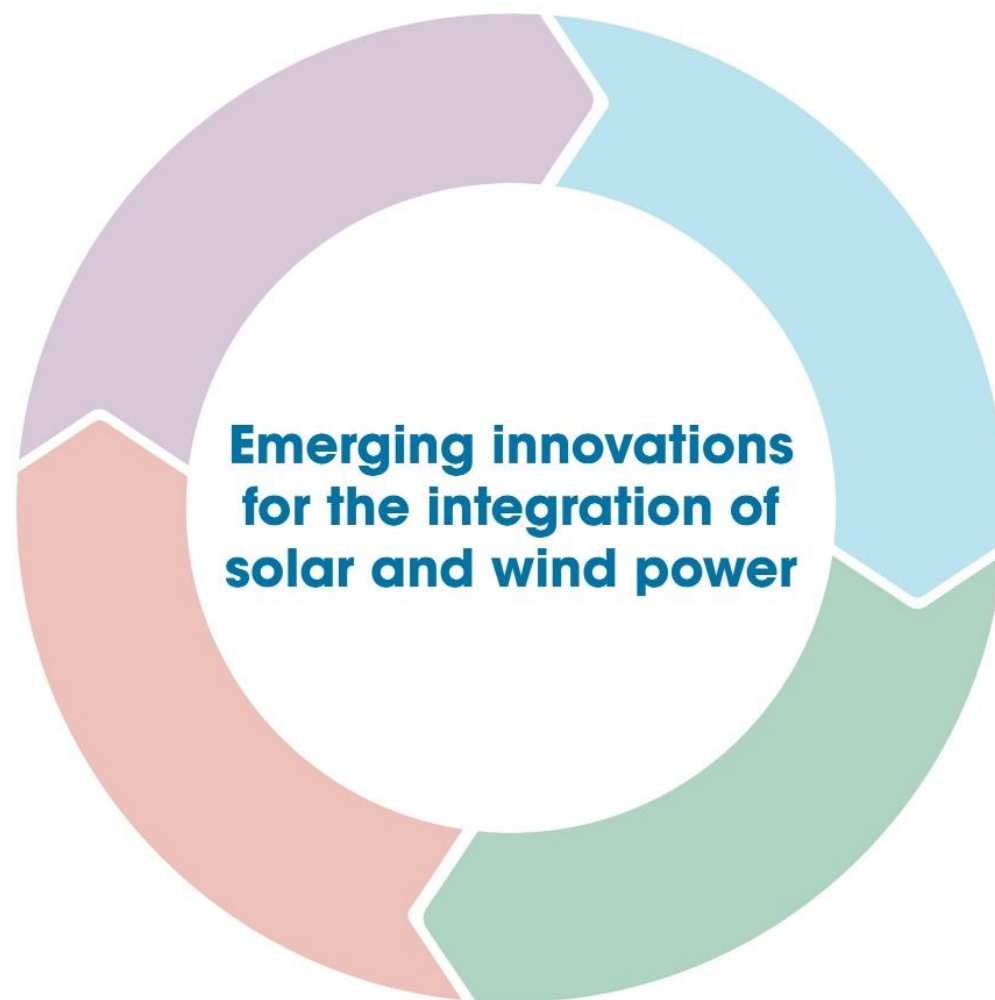
Renewable power can supply the bulk of Europe's energy demand

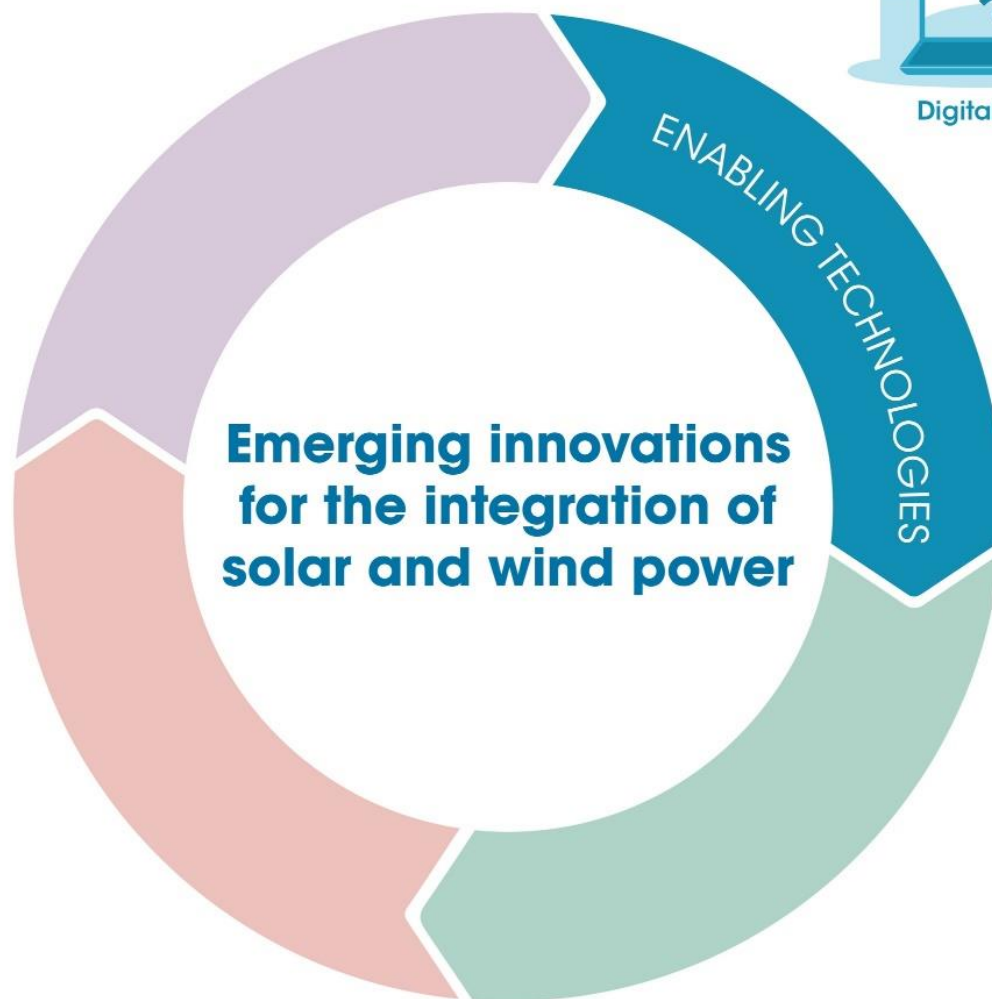
Solar PV (Ground mounted) > 10,000 TWh

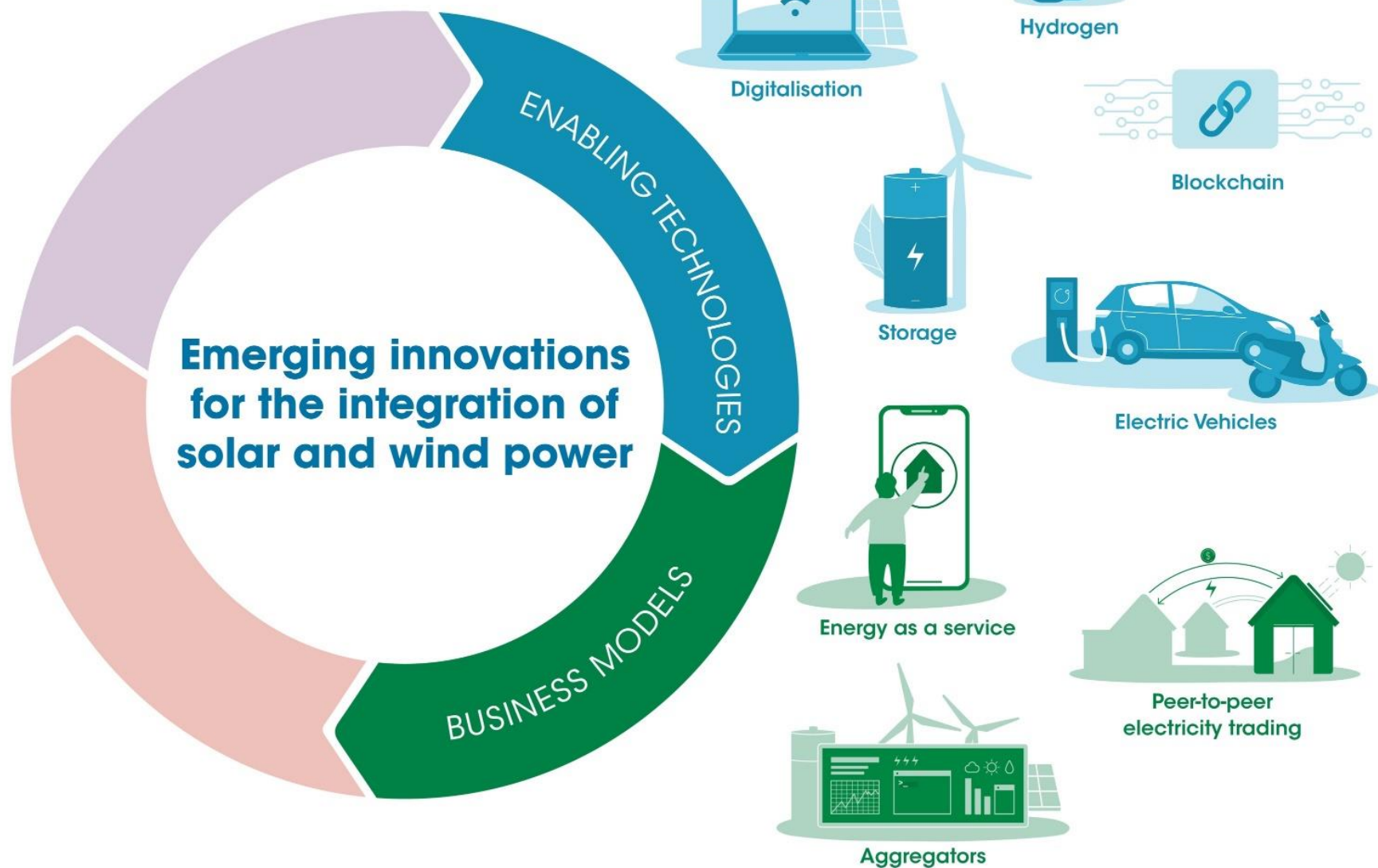


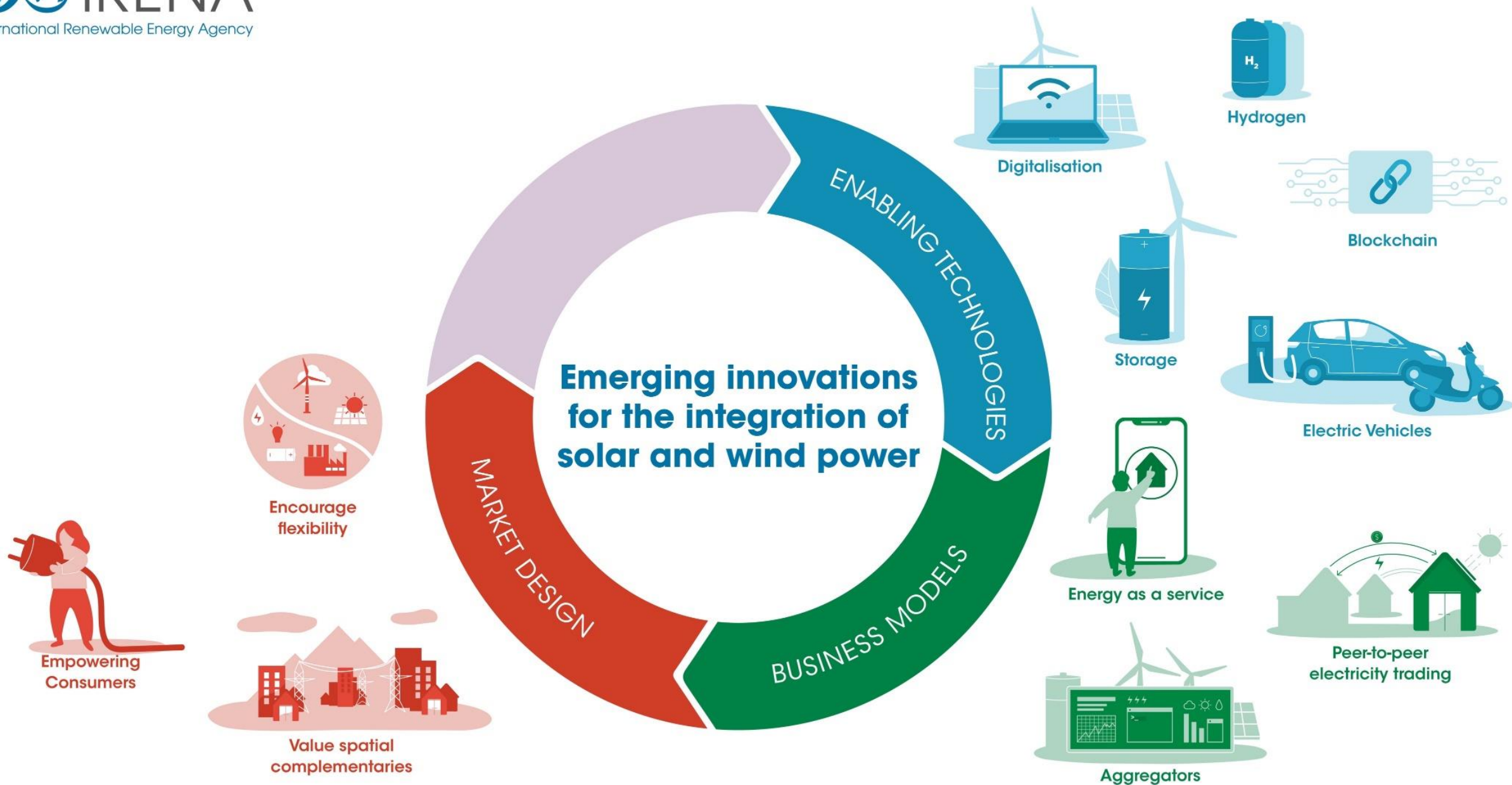
Onshore wind > 5,700 TWh

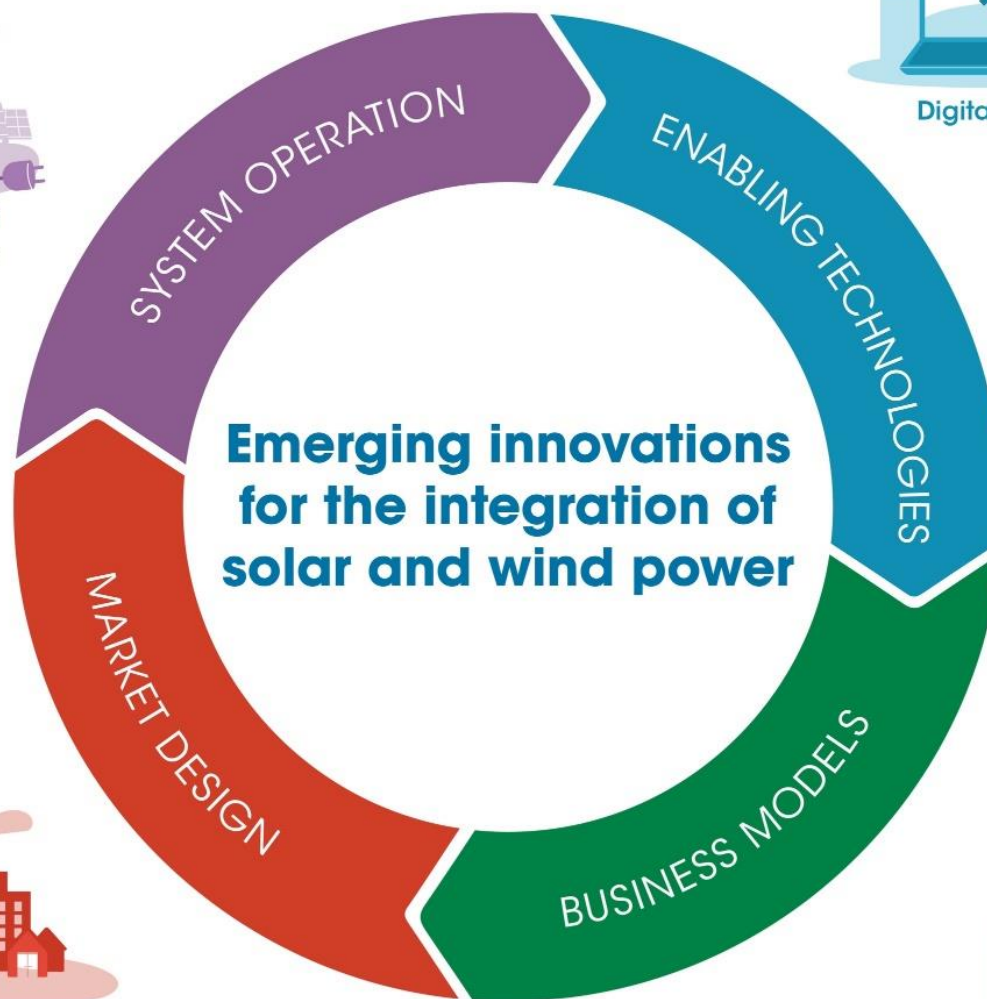








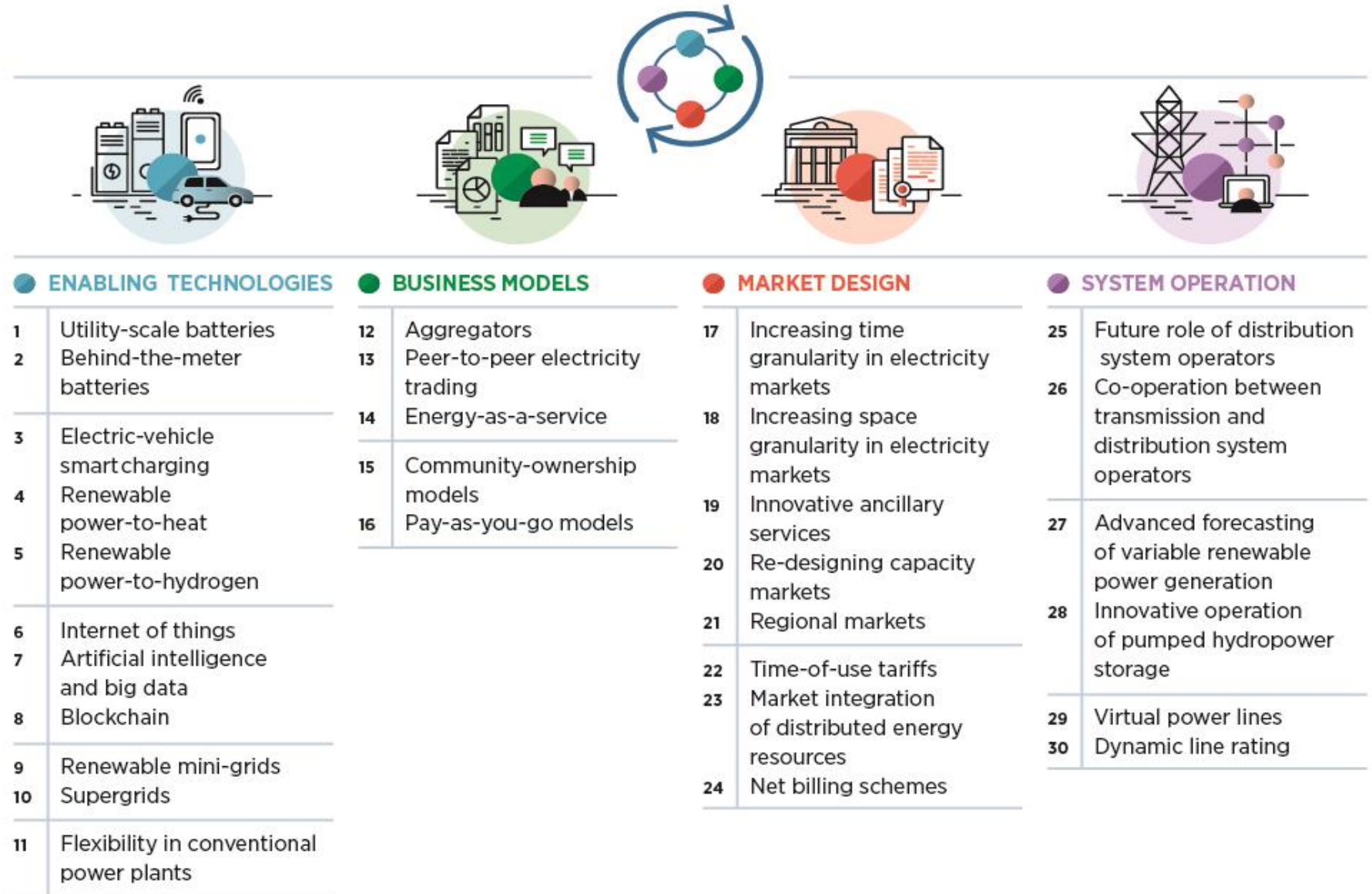




30 key innovations for wind and solar PV integration

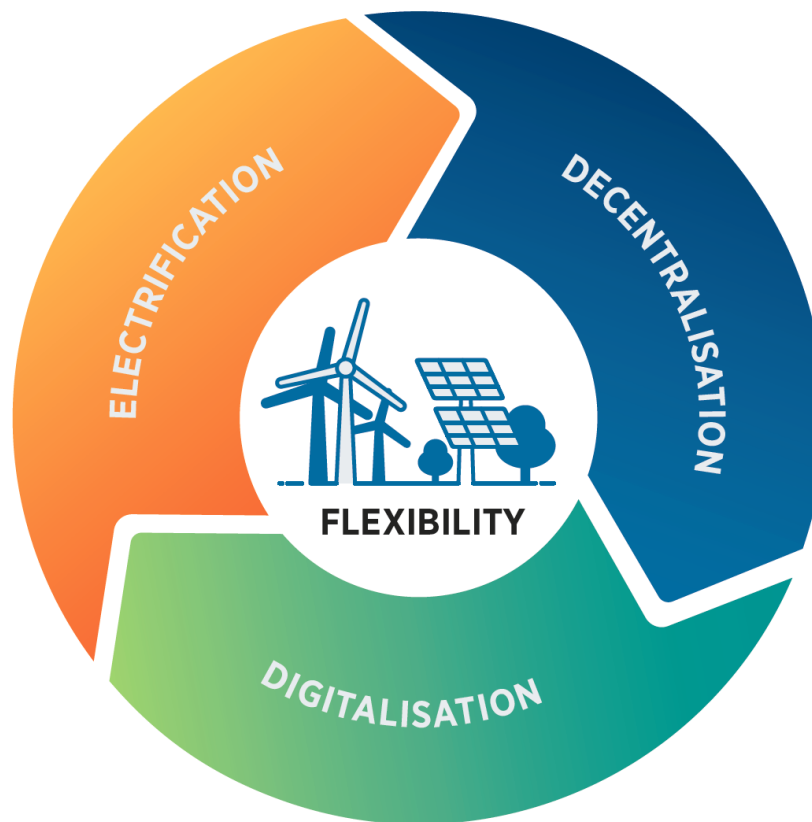


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Three innovation trends

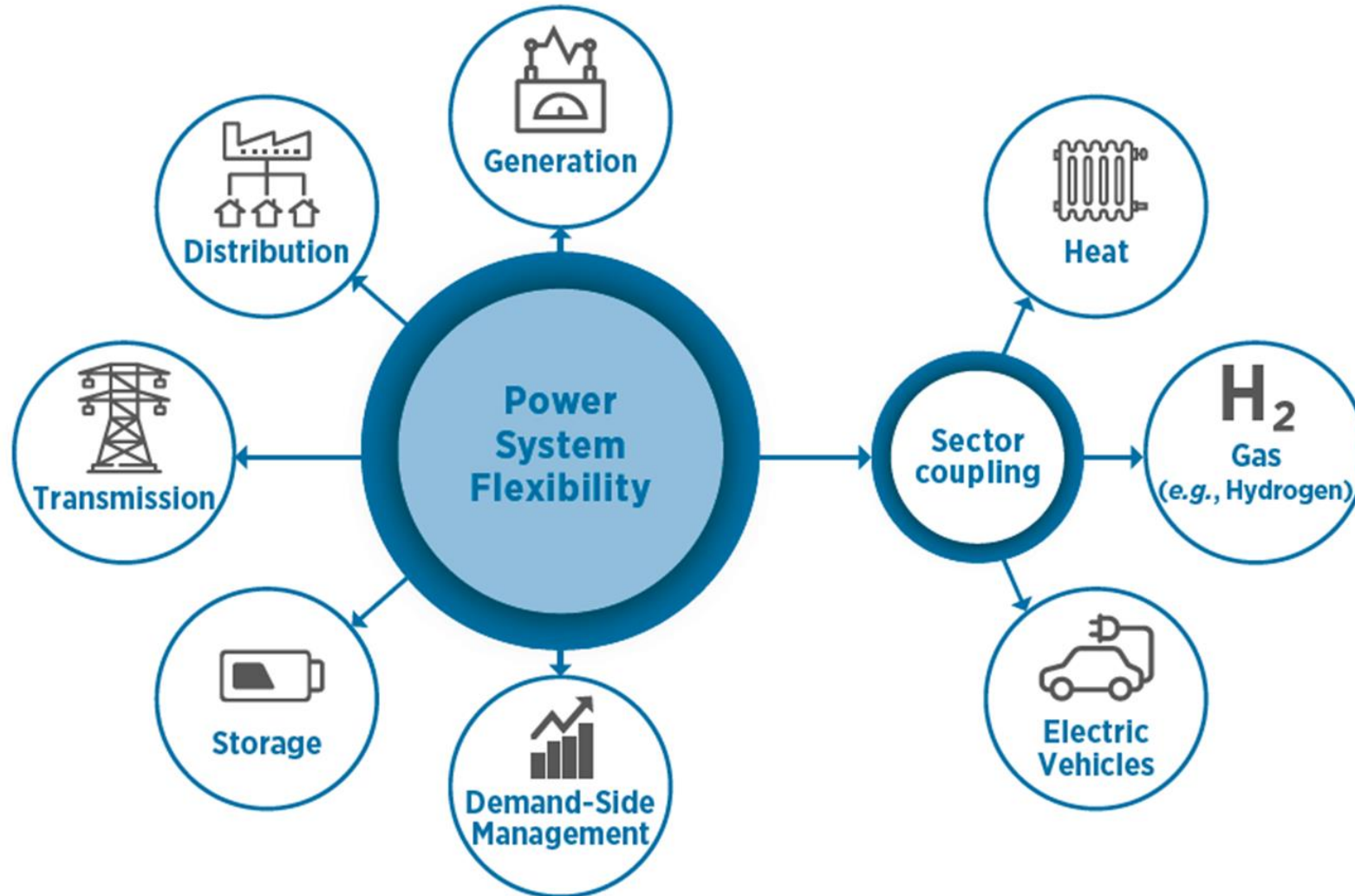
- Electrification of end-use sectors is an emerging solution to **maintain value and avoid curtailment of VRE**, and help decarbonize other sectors



- The increasing deployment of Distributed Energy Resources (DERs) turns the consumer into an active participant, **fostering demand-side management.**

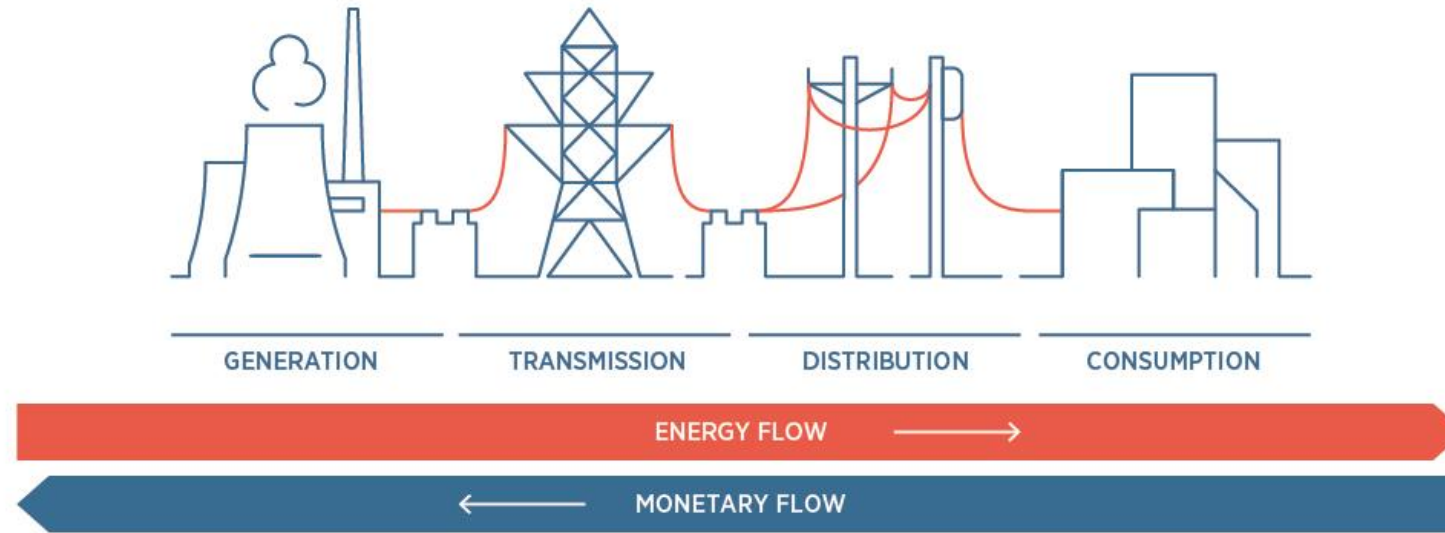
- Digital technologies enable **faster response, better management of assets** by **connecting devices, collecting data, monitor and control**

A holistic perspective of the energy system will be required



Ongoing Energy Transformation: Flexibility

TRADITIONAL ELECTRICITY SUPPLY CHAIN

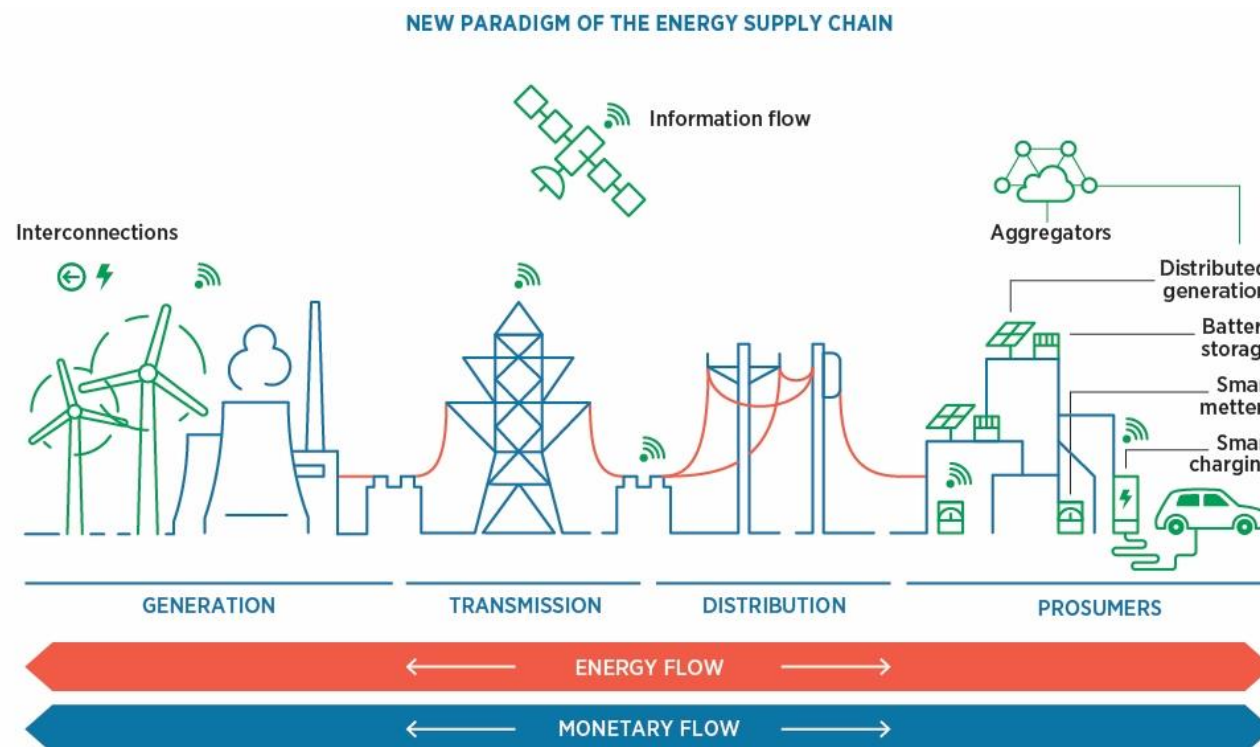


**Flexibility
providers in the
current system:**

Flexible generation



Ongoing Energy Transformation: Flexibility

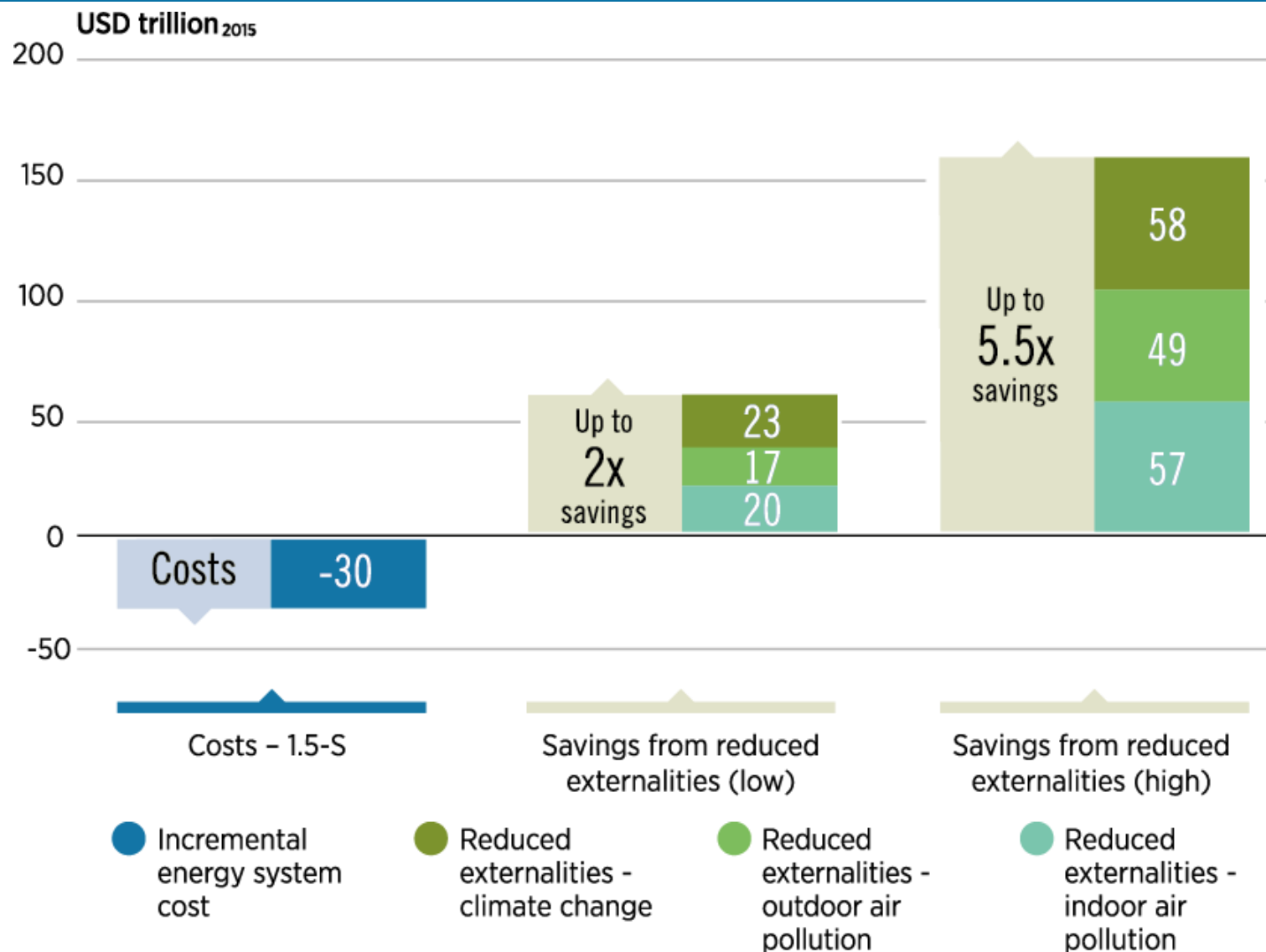


Flexibility providers in tomorrow's system:

Flexible generation,
Regional markets,
Demand response,
Storage, Power-to-X.



The energy transition makes economic sense



- In its World Energy Transition outlook, IRENA estimates that in the 1.5°C Scenario every USD 1 spent on the energy transition would yield benefits valued at between USD 2 and USD 5.5.
- In cumulative terms, the 1.5°C Scenario would have an additional energy-system cost (net effect of increased investment and reduced operation costs) of USD 30 trillion over the period to 2050 but would result in a payback through reduced externalities on human health and the environment of between USD 61 trillion and USD 164 trillion.

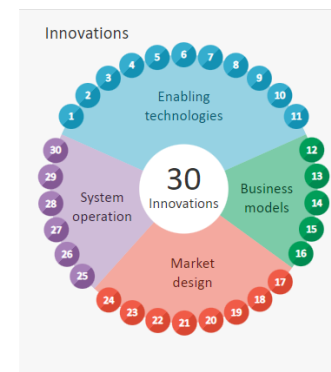
IRENA Innovation Landscape



<https://www.irena.org/publications/2019/Feb/Innovation-landscape-for-a-renewable-powered-future>

<https://www.irena.org/innovation/Toolbox>

Innovation Toolbox



Rapidly integrating solar and wind power to cut emissions and meet key climate goals poses technical and economic challenges.

Innovation Toolbox offers **30 innovations** emerging across four key dimensions: enabling technologies, business models, market design and system operation.

These innovations can be mixed and matched as needed to create solutions. While the combinations could be endless, the Toolbox outlines **11 solutions** as examples of how to achieve system-wide synergies.

Explore the **Innovation Toolbox** based on your own technical, economic or societal requirements:

- ◀ Select from the 30 innovations on the left to discover each in more detail.
- ◀ Select a solution to see how different innovations can work together.

▶ Access tutorial to learn how to use the Toolbox.

