

**PLAN.  
INNOVATE.  
ENGAGE.**



**ETIP SNET**

EUROPEAN  
TECHNOLOGY AND  
INNOVATION  
PLATFORM

SMART  
NETWORKS FOR  
ENERGY  
TRANSITION

# **ETIP SNET Vision 2050: transition and market implications**

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ENTSO-E R&I Lead  
IRED , Vienna**

18 October 2018

# Who are the stakeholders of ETIP SNET ?

entsoe

EDSO  
for smart grids

EASE  
European Association  
for Storage of Energy

EERA  
European Energy Research Alliance

eurelectric  
ELECTRICITY FOR EUROPE

Wind  
EUROPE

CEDEC

EUROBAT  
ASSOCIATION OF EUROPEAN AUTOMOTIVE AND INDUSTRIAL BATTERY MANUFACTURERS

EUREC

EUROPEAN  
TURBINE  
NETWORK

ETIP Wind  
EUROPEAN TECHNOLOGY & INNOVATION  
PLATFORM ON WIND ENERGY

GEODE

EHA  
European Hydrogen  
and Fuel Cell Association

ORGALIME

EUA-EPUE  
European Platform of Universities  
in Energy Research & Education

europacable  
Try life without us

SolarPower  
Europe

PhotoVoltaic  
EUROPEAN TECHNOLOGY  
& INNOVATION PLATFORM

EGEC  
GEOTHERMAL

EPSON  
Developing the Future

COGEN EUROPE  
The European Association  
for the Promotion of Cogeneration

ESMIG  
WE MAKE ENERGY SMART

smartEn  
Smart Energy Europe

IRHC Renewable  
Heating & Cooling  
European Technology and Innovation Platform

EUROHEAT  
& POWER

EU Turbines

eurogas

T&D europe  
The European Association of the Electricity Transmission  
and Distribution Equipment and Services Industry

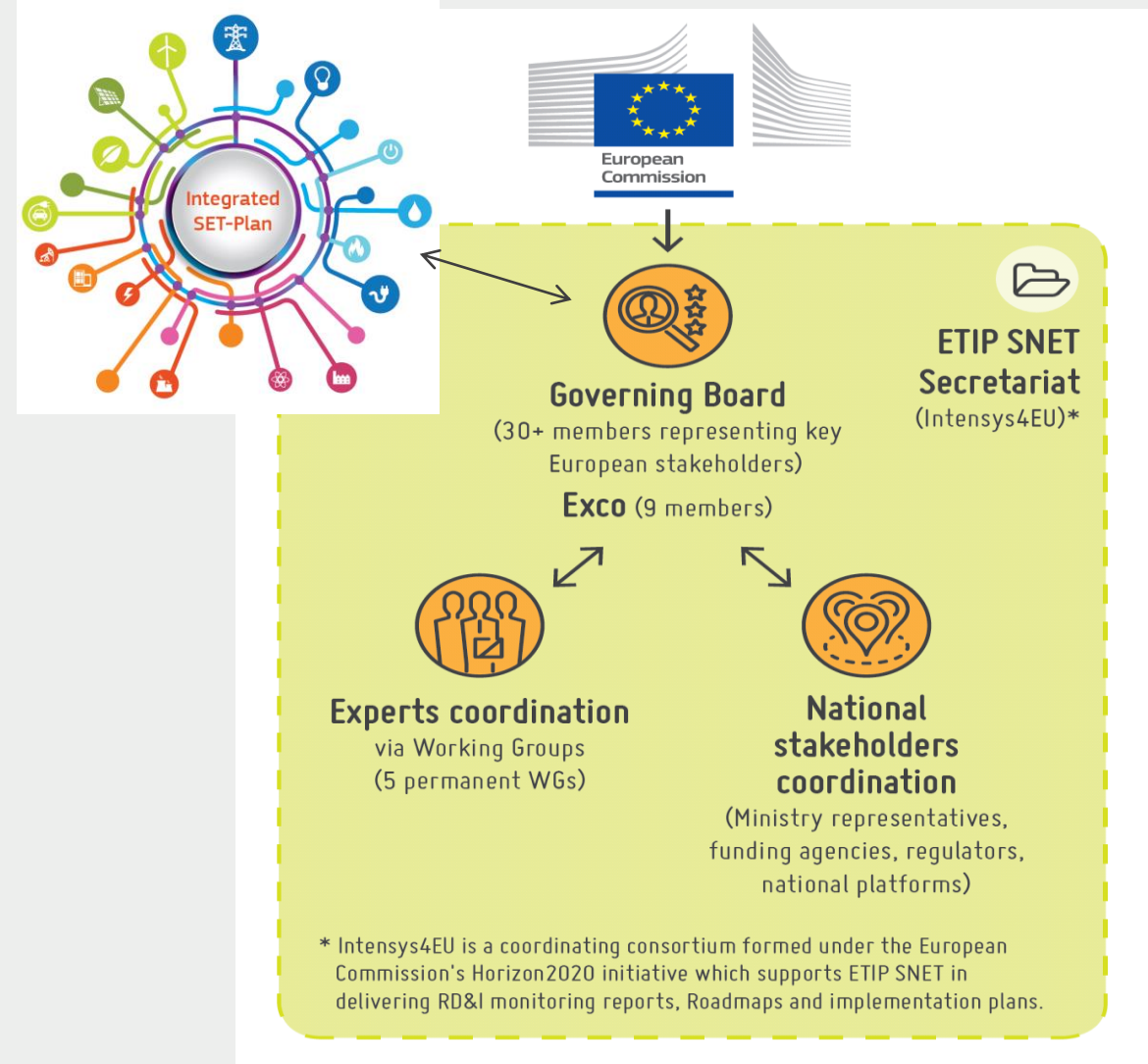
European  
Engine  
Power  
Plants  
Association  
ENGINE

Federal Ministry  
for Economic Affairs  
and Energy



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# ETIP SNET's organisation



**WG1**

Reliable, economic and efficient smart grid system



**WG2**

Storage technologies and sector interfaces



**WG3**

Flexible Generation



**WG4**

Digitisation of the electricity system and customer participation



**WG5**

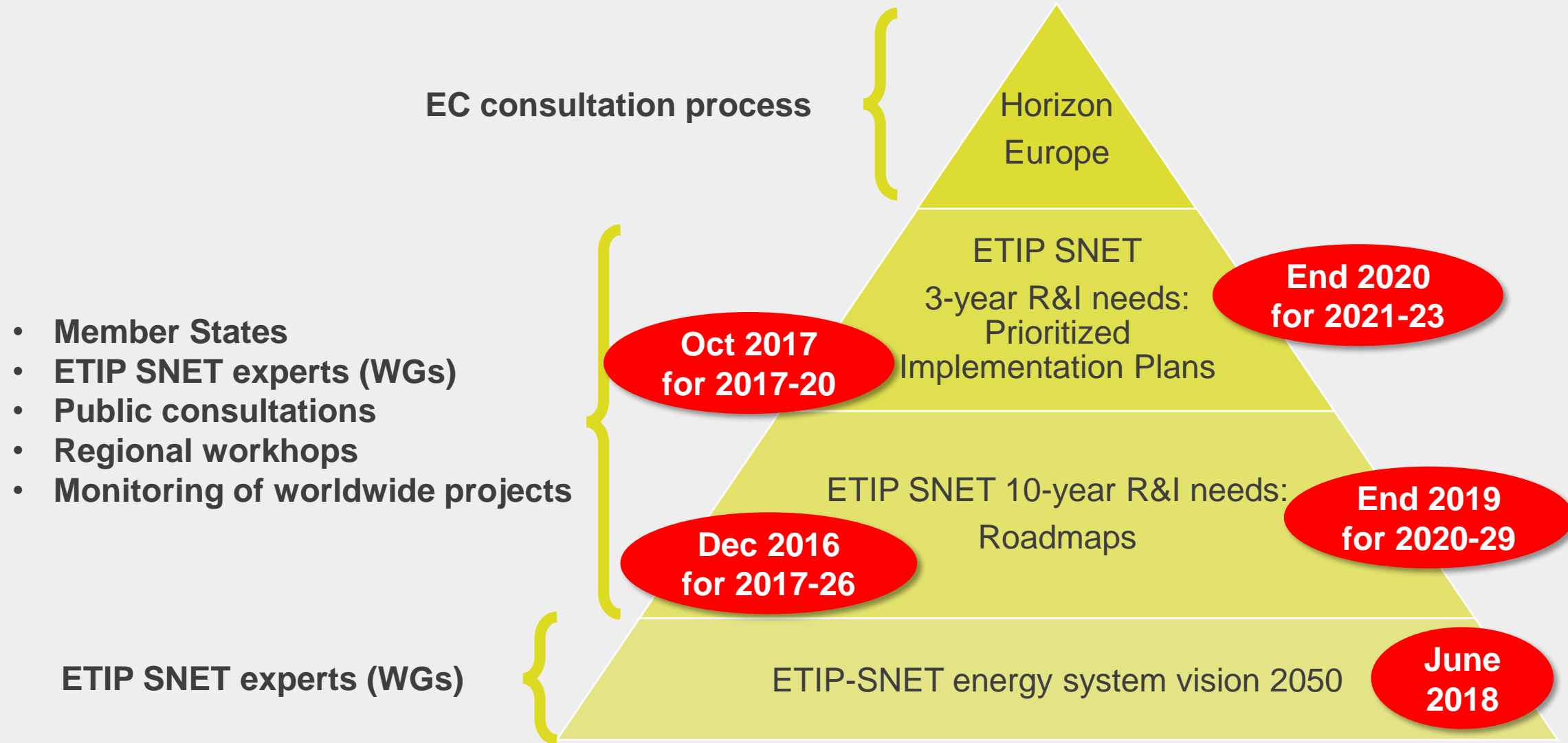
Innovation implementation in the business environment



**NSCG**

National Stakeholders Coordination Group

# ETIP SNET RD&I prioritization process





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# The ETIP SNET Vision 2050

## Goal 2050

### Energy systems for European society

- Three pillars: environment, markets, security of supply

## The transition

### Towards integrated energy systems

- Today ... Tomorrow
- Challenges and opportunities
- Storage and conversion transition

## RD&I Needs

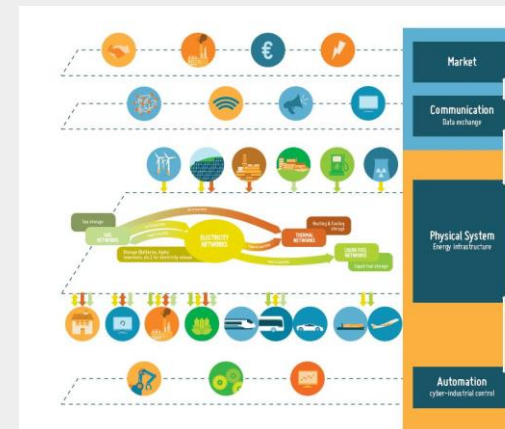
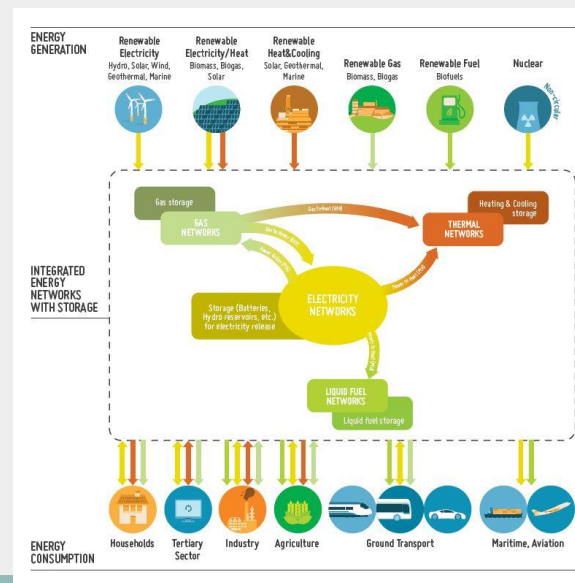
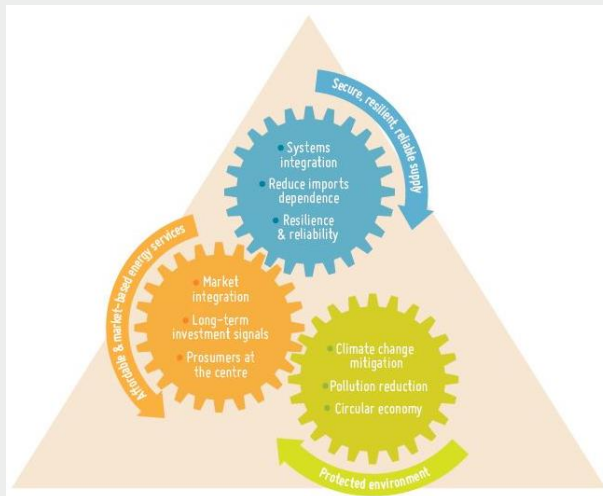
### Building Blocks

- Services
- Markets
- Digitalization
- Technologies and integration

## RD&I Environment

### Framework

- European Industry
- Managing Economic Disruption
- Strategic Approach to RD&I





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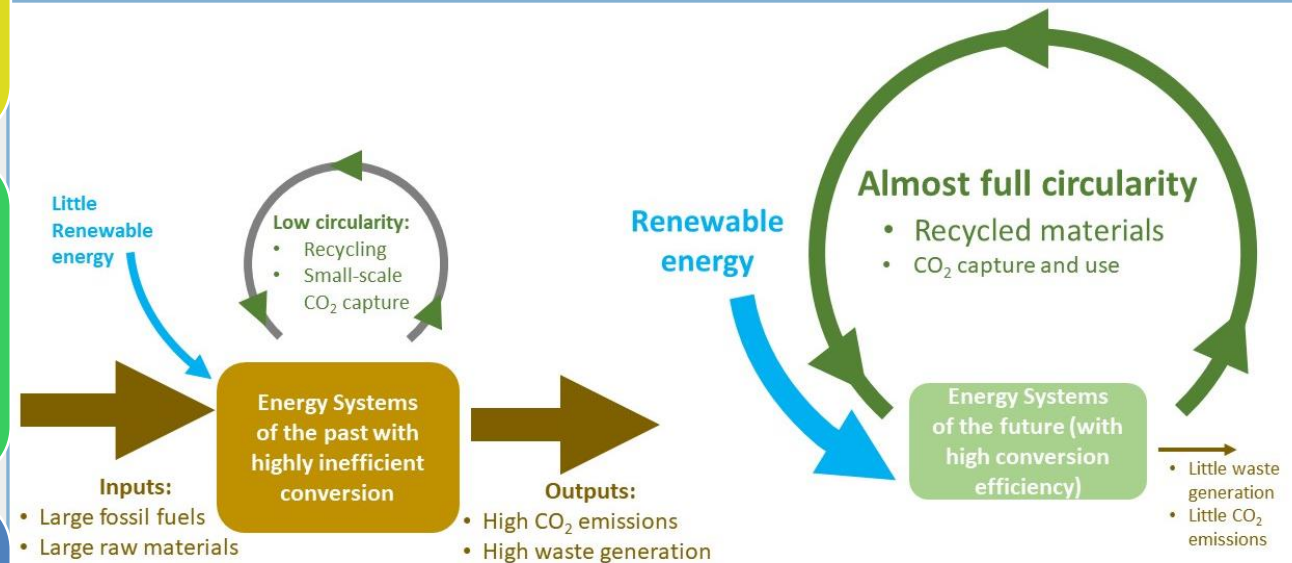
# 1. Goal 2050:

Integrating Smart Networks for the Energy Transition:  
Serving Society and Protecting the Environment

➤ A low-carbon, secure, reliable, resilient, accessible, cost-efficient, and market-based **pan-European integrated energy system**

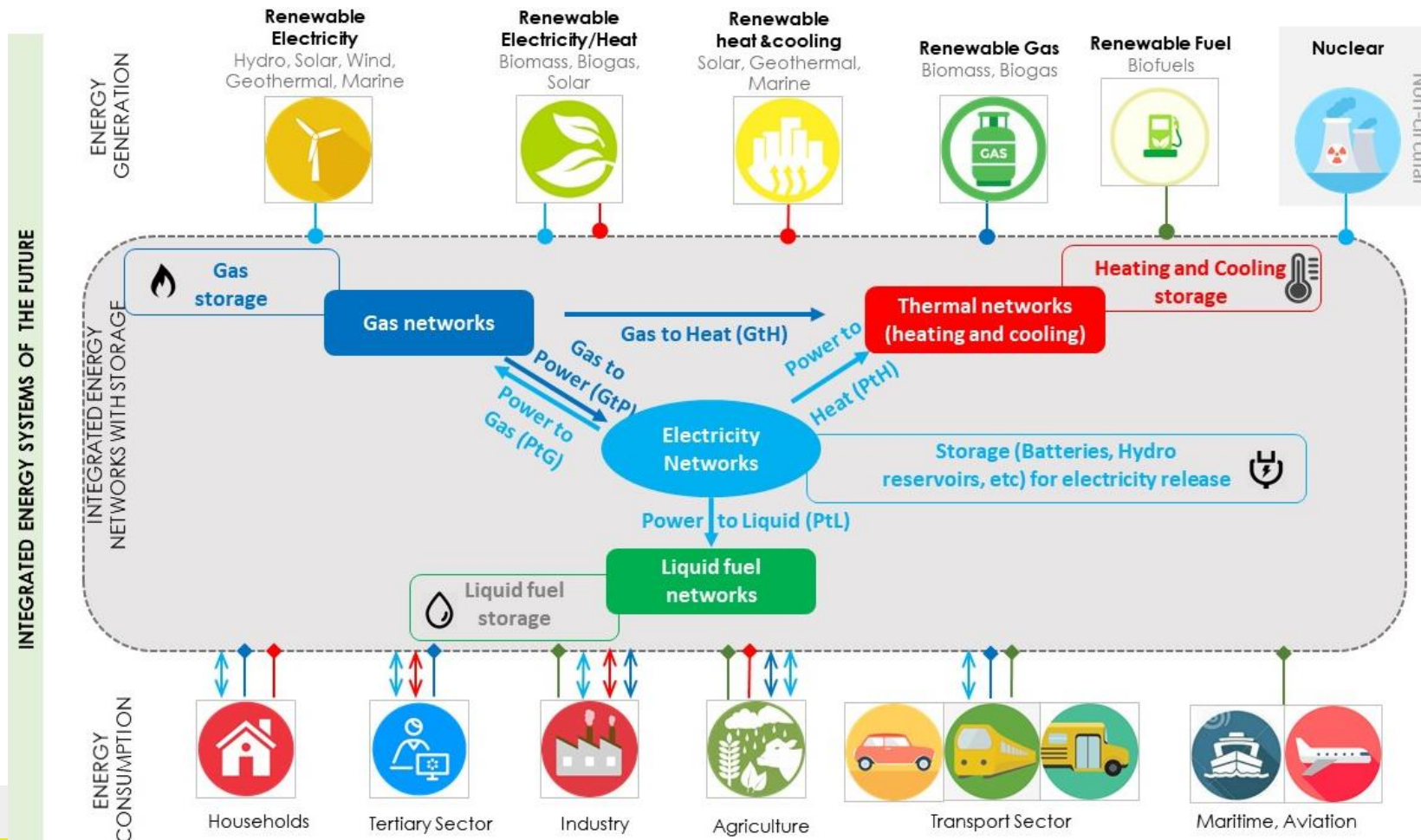
supplying the whole economy and paving the way for a **fully CO<sub>2</sub>-neutral and circular economy by the year 2050,**

**while maintaining and extending global European industrial leadership in energy systems during the energy transition.**



## 2. The Transition: Pathway towards the Vision

### Towards integrated energy systems





### 3. R&D Needs: Building Blocks

## Energy System: Integration of Market, Communication, Physical system, and Automation Layers

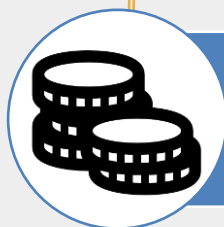




European Leadership in World Economy



Managing economic disruption and job creation



Strategy for RD&I on Governance, Funding, Financing



**Act today:** Bring stakeholders together, guide paths, link platforms and stakeholders, communicate societal benefits



# Transition and market implications



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# ETIP SNET Vision: innovative markets, systems, services

## User-friendly services – the active customer in the center

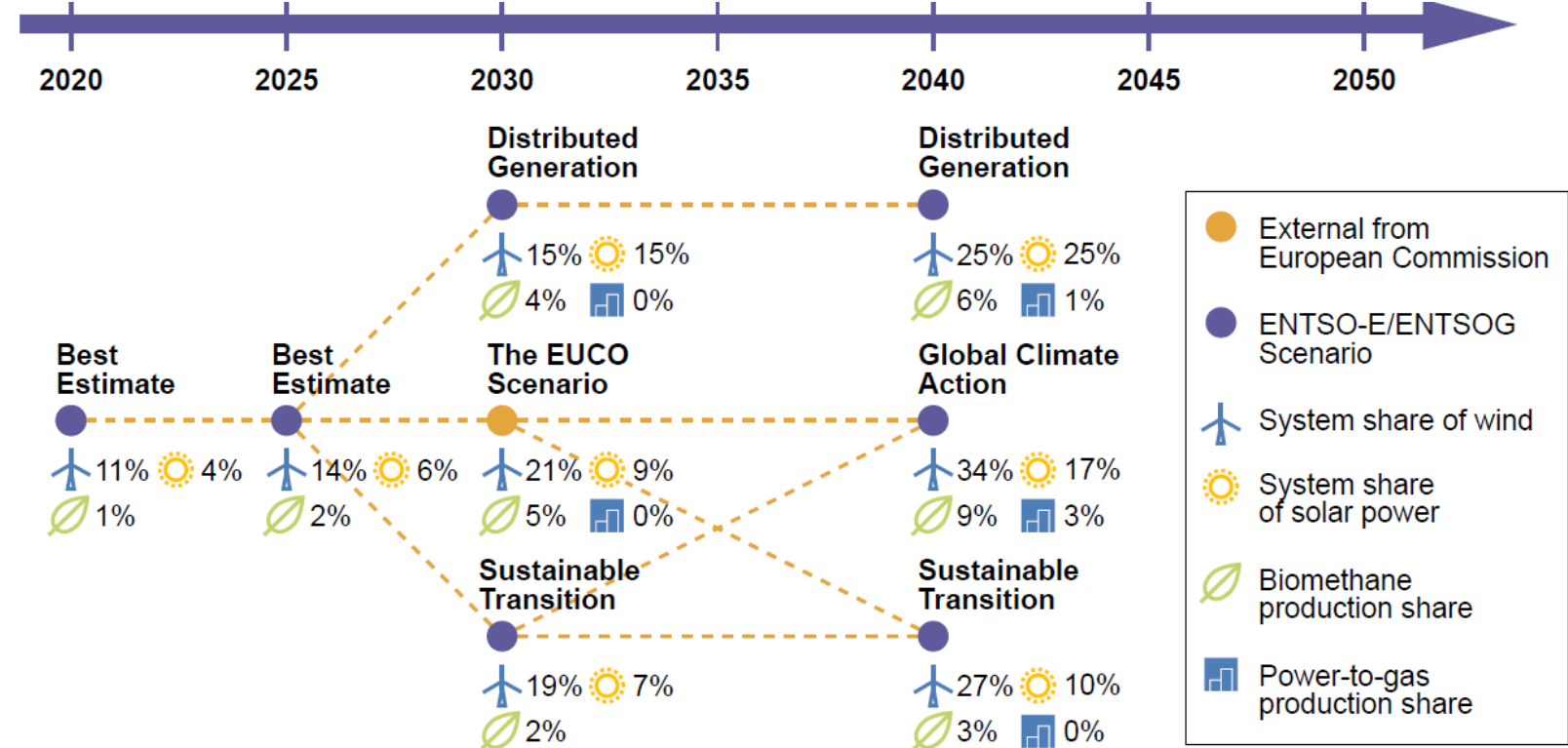
- **Shared platforms:** for data exchange and integrated decision making
- **Aggregation:** smartness for EV, Batteries, heat pumps, Power to Gas
- **Optimised and interconnected services:** real-time information to all users for contributions to system balancing and resilience
- **Decentralised, peer to peer control:** for local energy communities
- **Automated demand response:** Electricity, heating and cooling for households, industry and commerce
- **Data Privacy and Ownership:** Smart Meters, consider citizen's rights versus grid operator needs, interoperability, system security needs
- **Cyber Security:** for energy system state monitoring and control, for ICT networks, considering critical system operation and market process needs, from transmission to local levels



The goal of **efficient markets** is met by means of:

- Informed prosumer choices
- Tailored info services
- Procurement of any energy-related needs anytime
- Automatic, market-based balancing of unplanned deviations in real-time
- Integrated infrastructure for all energy vectors with electricity system as backbone

# Three paths for the future 2040 - just before 2050



ENTSO-E TYNDP 2018

While coping with “4D”

New Challenge moving forward : the ‘4D’

Decarbonisation

Digitisation

Decentralisation

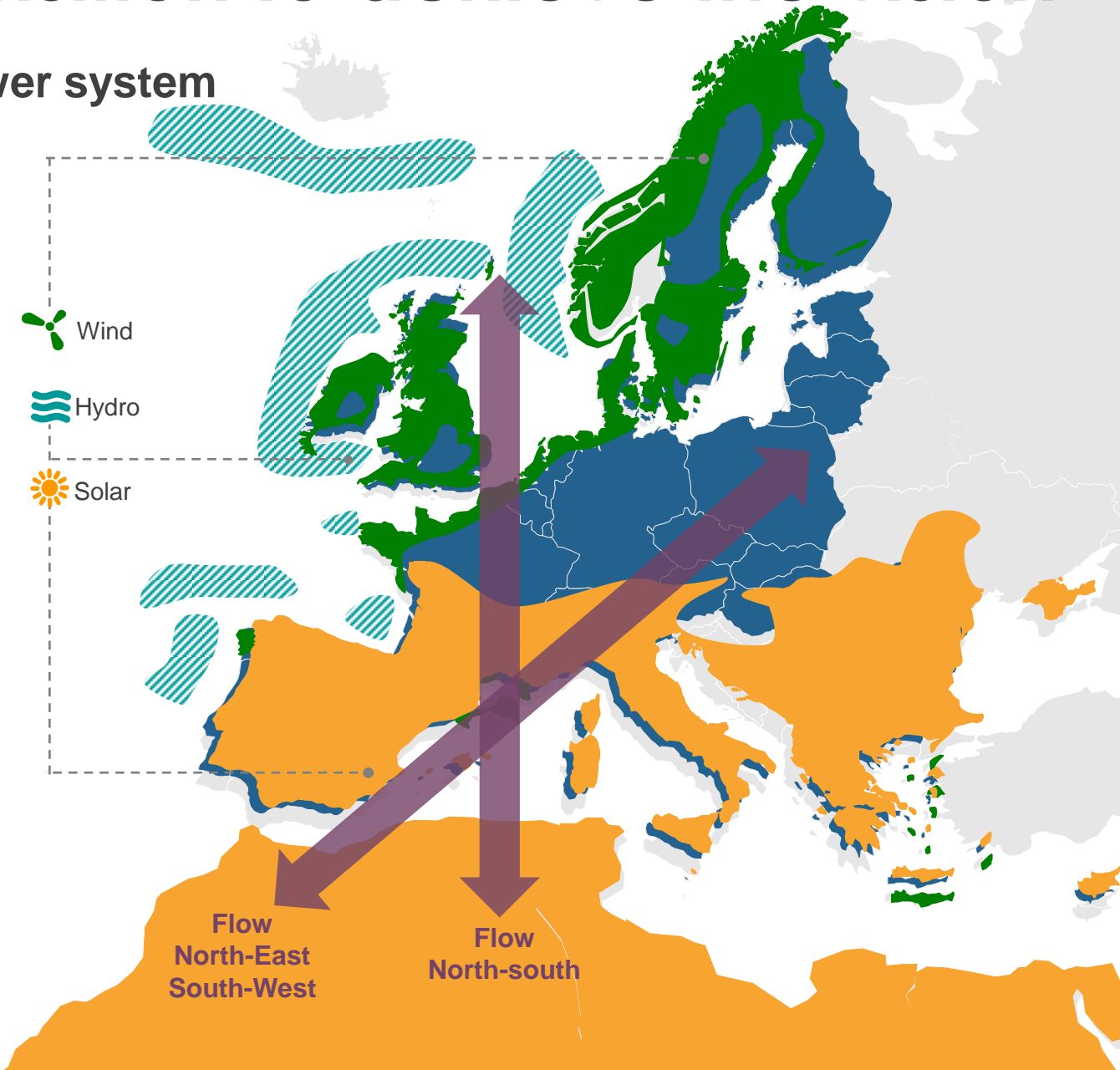
Democratisation

# Accelerating energy transition to achieve the vision

32% renewables by 2030 = +/- 55% for the power system

## CHALLENGES

- System stability & inertia
- New connections
- Changing power flows & congestions
- Unlocking flexibility together with DSOs
- New Digital Orchestration




# Energy Transition: the flexibility challenge is real

**50%** Of the **generating capacity** from **variable RES** by 2030

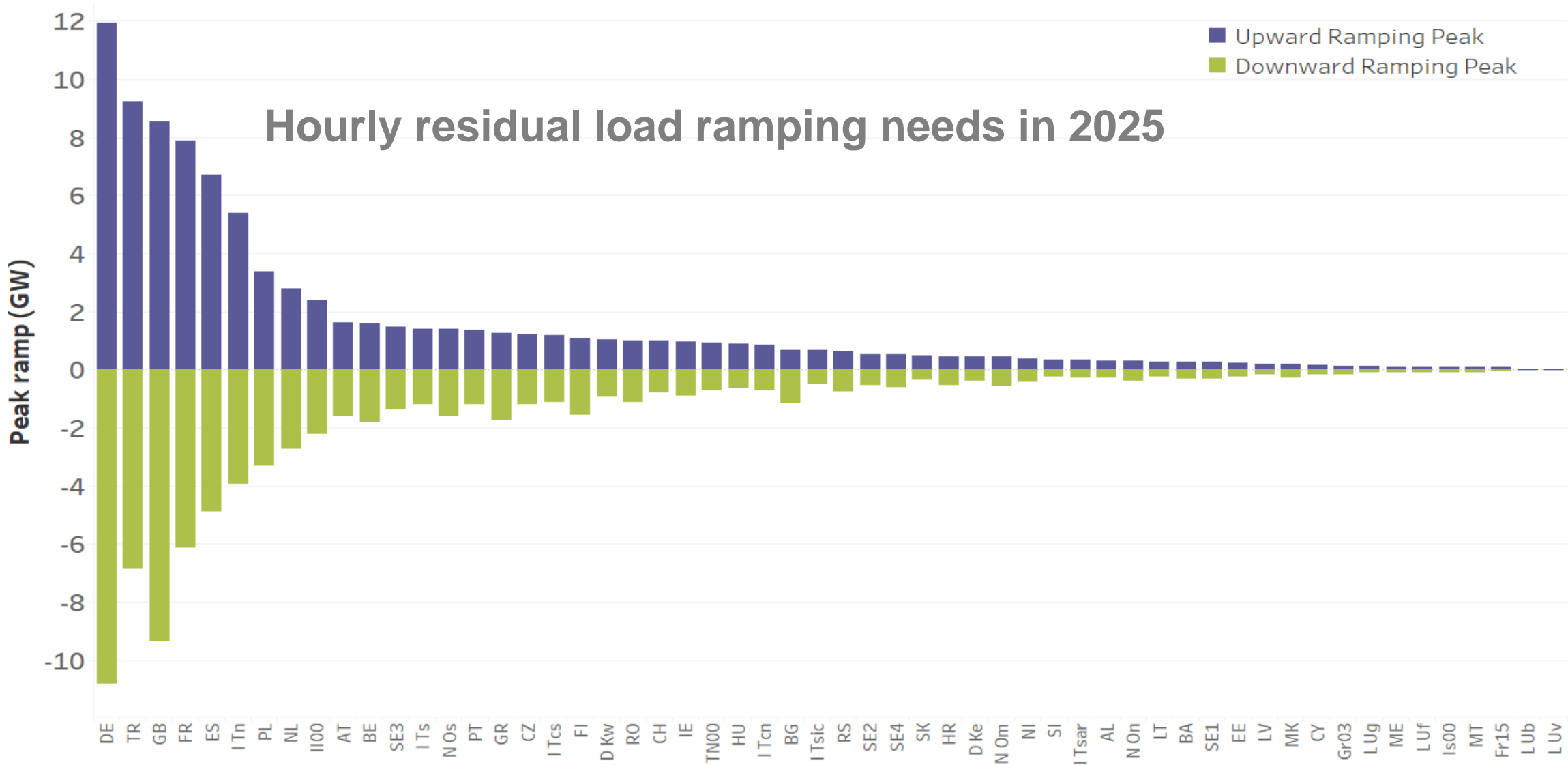
**350** **Additional GW of wind and PV** to be connected by 2030

**14** Countries with wind and solar outputs likely **higher than 80% demand** already in 2025

**20%** **Reduction of dispatchable capacity margin** over peak load

- 
- 1** Distributed generation impacts the whole grid and power system
  - 2** Enhancing and valuing the flexibility potential is fundamental
  - 3** Cross-border flows take advantage of the variety of generation mix and patterns
  - 4** Active consumers are needed for the whole system
  - 5** TSO-DSO Coordination is key

# Ramping will require high hourly flexibility



Source: ENTSO-E – Mid Term Adequacy Forecast 2018

# How to meet the flexibility challenge?

## Improve price signals

- Enable scarcity pricing in all timeframes
- Integrate RES into the market by removing priority dispatch & make them balance responsible
- Complete integration of ID and balancing markets to increase liquidity

## Enhance Demand Response

- Open participation to all markets directly, via supplier or via aggregator
- Dynamic pricing and hedging opportunities
- Easy to switch suppliers
- Data management, smart meters and hubs

## Stronger cooperation

- Regional TSO cooperation
- Stronger NRAs' and MSs' cooperation
- Policy regions
- DSO-TSO coordinated use of distributed flexibilities
- "EU Framework" for CRM
  - Adequacy-based
  - Cross border participation

**Stronger and more interconnected European grid - TYNDP**

# Market design



# Regulation for Innovation (1)

## New Regulatory needs

- Need to adapt current regulation
- **Shift to forward looking incentive regulation**

## New regulation objectives

- Both **CAPEX and OPEX - driven innovations** should be covered through tariffs when more efficient and/or better for society at large.
- **Should not only take into account TSO cost-efficiency** but also :
  - *Market Stakeholder benefits*
  - *Cross-border pan European benefits*
  - *European and regional dimension*
- Investments should be made according to **a reference architecture & sets of interoperability standards** for reduced Total Cost of Ownership



# THE REGULATORY perspective

Allow the coordinated use of flexibility for the most valuable purpose

Create a clear framework for Distributed Resource

Incentivise innovation in regulated business

Bring RES to the market

Strike for the right balance between OPEX and CAPEX

Set a framework for data management



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**Thank you for your attention!**

[www.entsoe.eu](http://www.entsoe.eu)  
[www.etip-snet.eu](http://www.etip-snet.eu)

**All energy sectors  
together towards**

**VISION 2050**



# PRICES SIGNAL REFLECTING REAL COST OF ELECTRICITY



Prices should **drive power usage**, dispatch and investments  
Prices should thus **reflect the actual situation** of the system

Allow scarcity  
prices

Imbalance prices  
fully cost-  
reflective

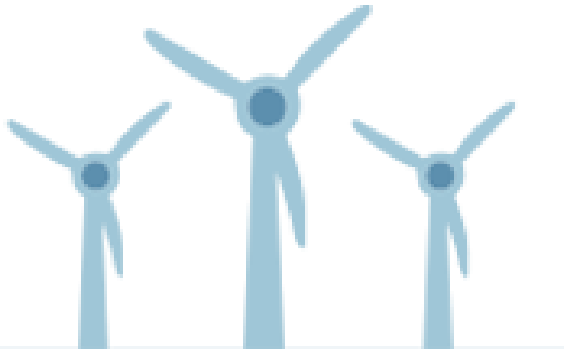
Market-based  
price for RES

Introduce  
dynamic pricing  
at retail level

Allow  
development of  
risk-hedging  
products to  
protect oneself  
against volatility  
of prices

# What steps forward to improve RES integration into the market?

- 1** Phase out of the priority dispatch for RES unless it does not increase (re)dispatching costs
- 2** All RES need to have balancing responsibilities
- 3** RES support level to be determined competitively
- 4** Create conditions for **regional** (and eventually European) framework for RES support



# Regulation for Innovation (2)

## New regulation objectives

- Both **CAPEX and OPEX - driven innovations** should be covered through tariffs when more efficient and/or better for society at large.
  - **Should not only take into account TSO cost-efficiency** but also :
    - *Market Stakeholder benefits*
    - *Cross-border pan European benefits*
    - *European and regional dimension*
  - Investments should be made according to **a reference architecture & sets of interoperability standards** for reduced Total Cost of Ownership
- **Financing innovation:**
    - **R&I spending** should be facilitated and covered in **tariffs**.
    - R&I costs should be evaluated as a separate budget, with an **R&I plan** proposed by TSO and evaluated by relevant stakeholders
    - Foster current **EU funding schemes**, focusing on **power system and its integration with digital network** as a strategic enabler for the energy transition.
    - Set up pilot projects with ad-hoc funding for large integration projects of Digital into TSO Core businesses, **first-of-a-kind projects**
  - **Costs** from innovation actions coming from **new European regulation** (e.g. **Risk preparedness regulation**) should be covered through tariffs

