



3rd UNI-SET Energy Clustering Event

Research and Innovation for the future European energy system

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Bucharest, 22nd of November 2016

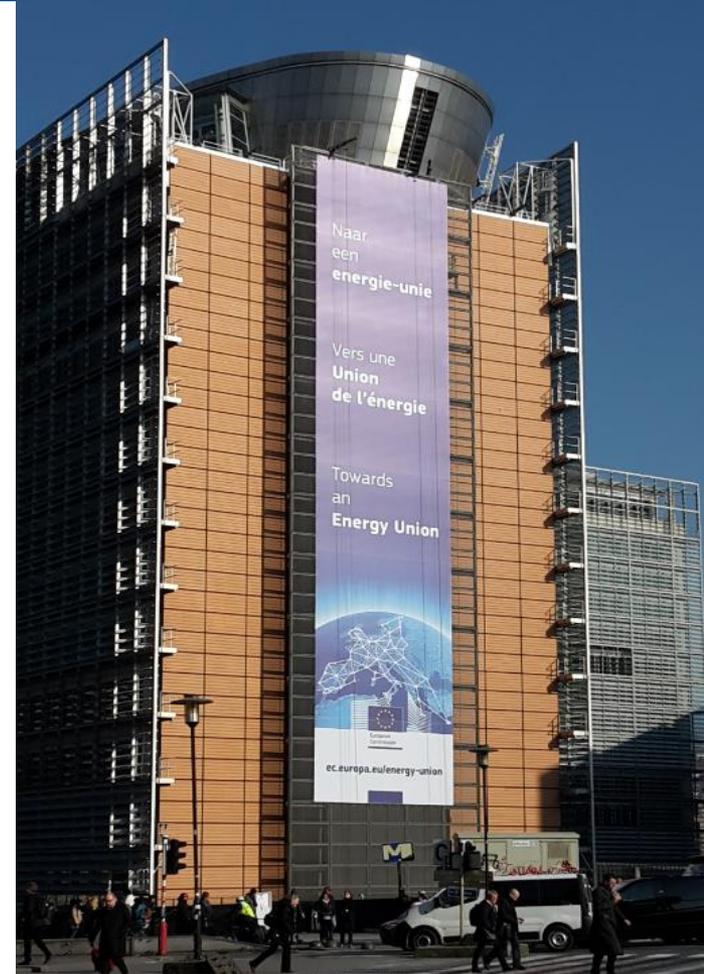




A comprehensive research strategy

Based on...

-  **Paris Agreement – COP 21**
-  **Energy Union Strategy**
-  **Integrated SET-Plan**



COP 21 Paris: Governments (incl. EU) agreed to:



Main messages:

- Keeping the increase in global average temperature **well below 2°C**
- Aiming at limiting the increase to **1.5°C**
- Strengthening societies' ability to deal with the impacts of climate change;
- Providing continued and enhanced international support for adaptation to developing countries
- Mission Innovation (doubling R&I budget for clean technologies in 5 years period)



2030 Framework for Climate and Energy

2020

-20% greenhouse
gase emissions

20% Renewable
Energy

20% Energy
savings

10%
Interconnections

2030

≥ -40% less
greenhouse gases

≥ 27% renewable
Energy

≥ 27% Energy
savings

15%
Interconnections

**Energy
Union**

5

GUIDING
DIMENSIONS

The Energy Union's 5 dimensions

1. Energy security, solidarity and trust,
2. A fully integrated internal energy market,
3. Energy Efficiency first,
4. Transition to a long-lasting low-carbon society,
5. An Energy Union for Research, Innovation and Competitiveness.

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GUIDING
DIMENSIONS

The European Union Energy System

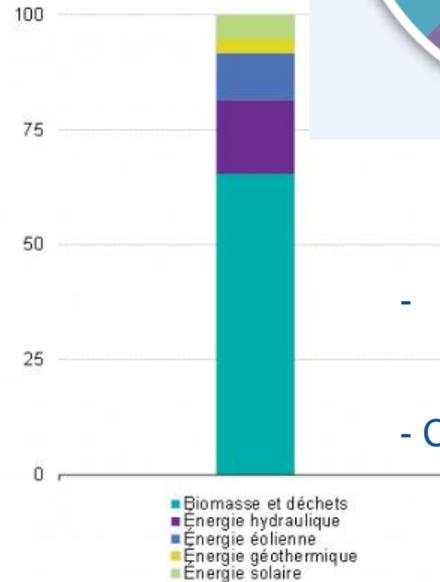
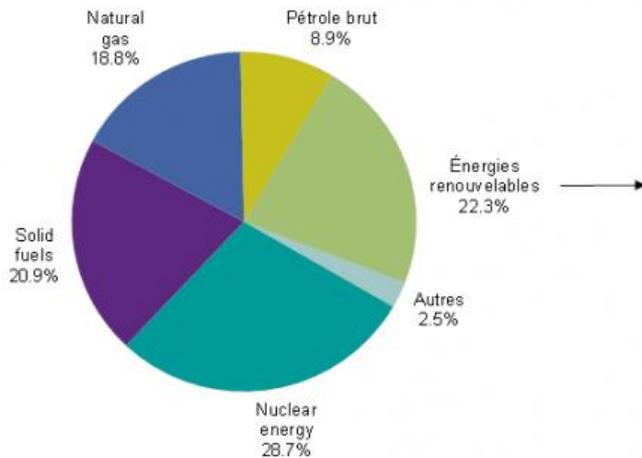


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Key figures

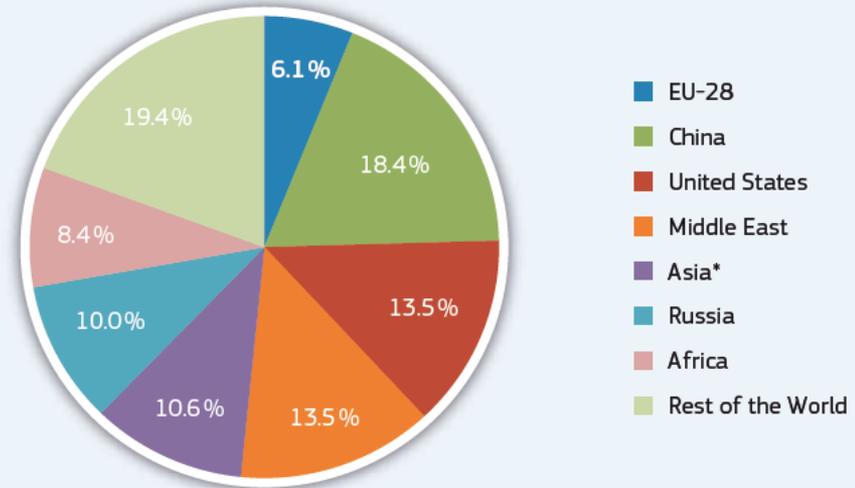


Production and imports (2014)



World Energy Production by Region (%)

Total 2011 = 13 202 Mtoe



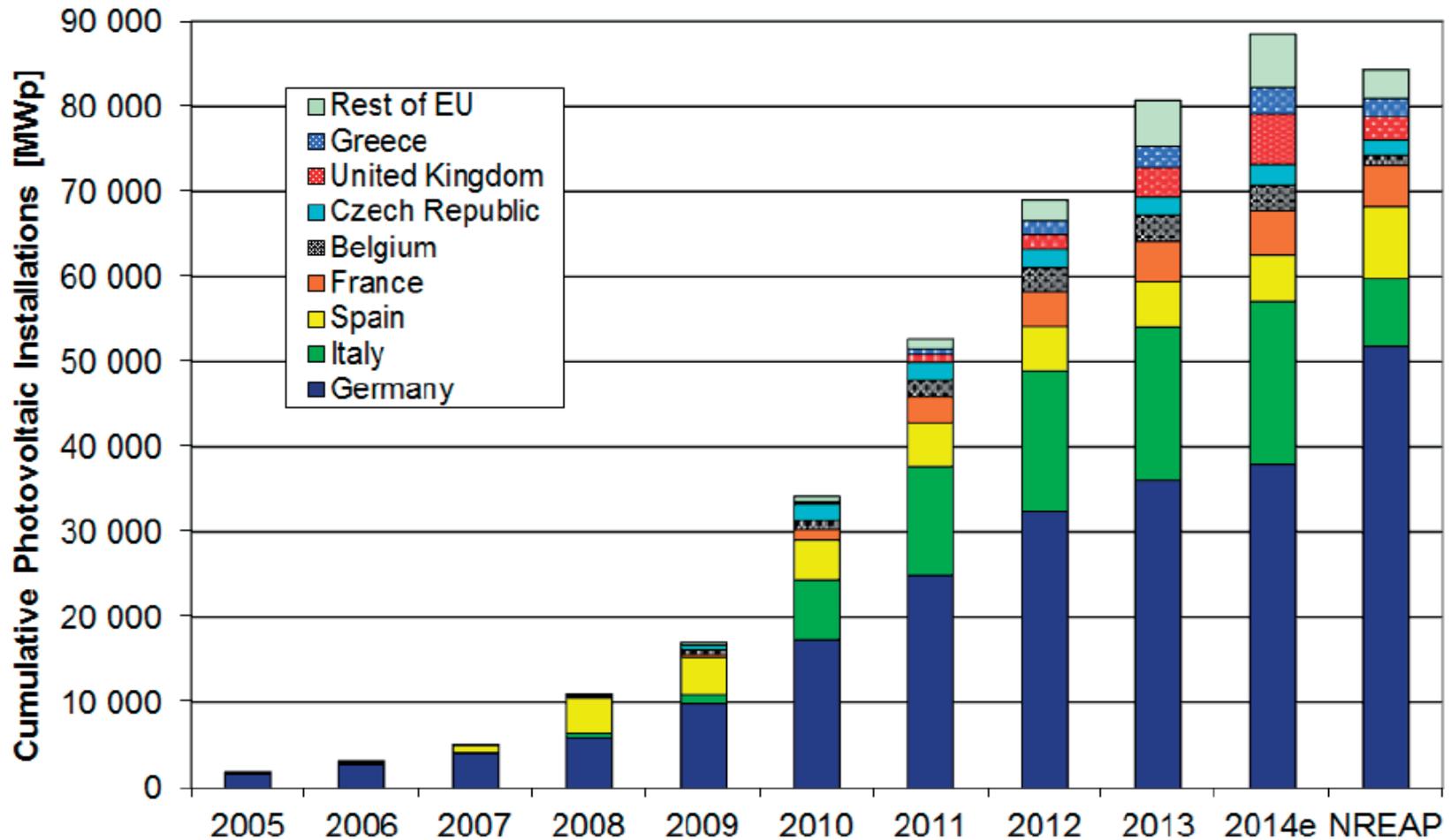
- Still a strong reliance on hydrocarbon

- Continuously increasing share of RES



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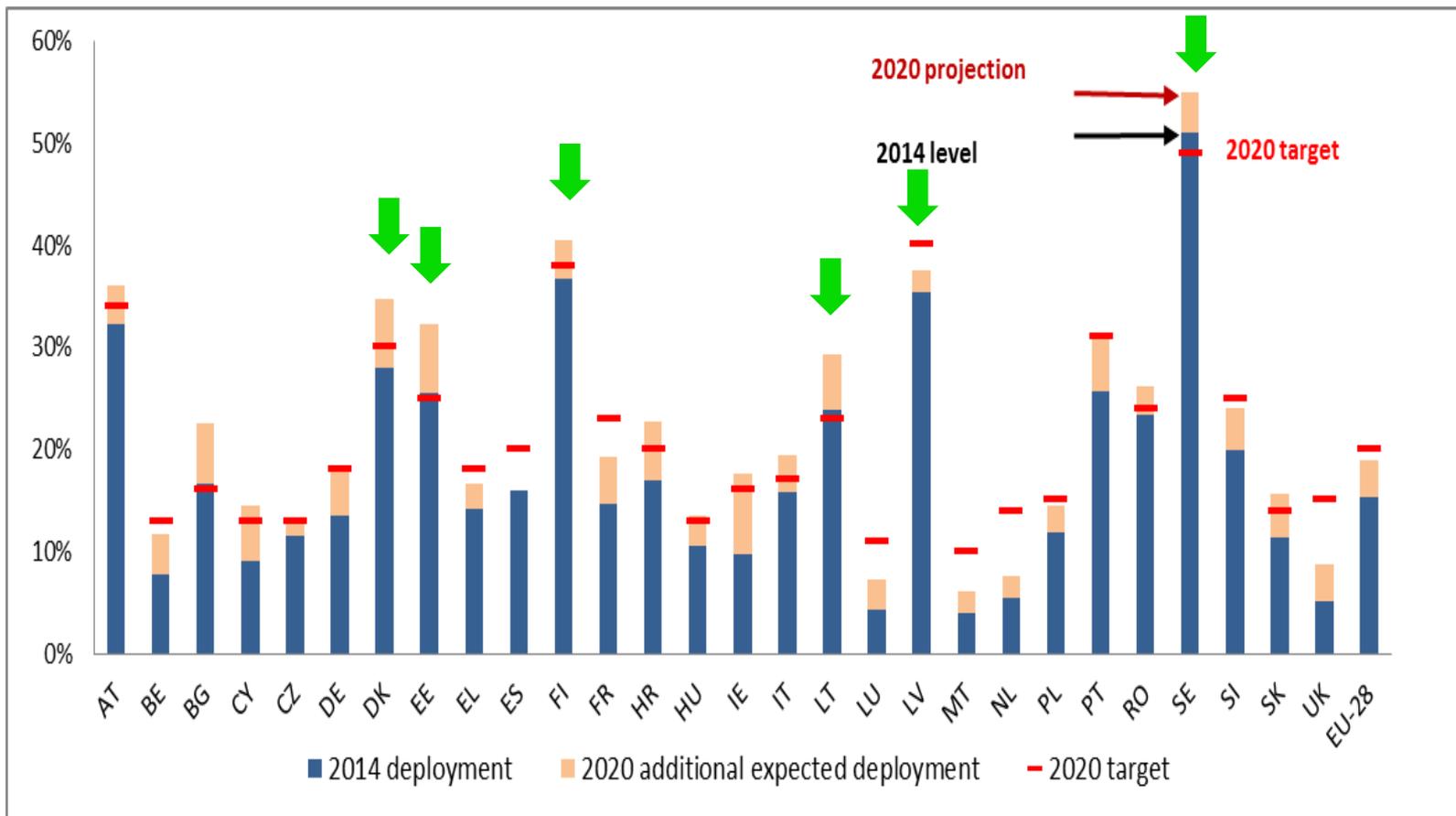
RES becoming mainstream (PV)



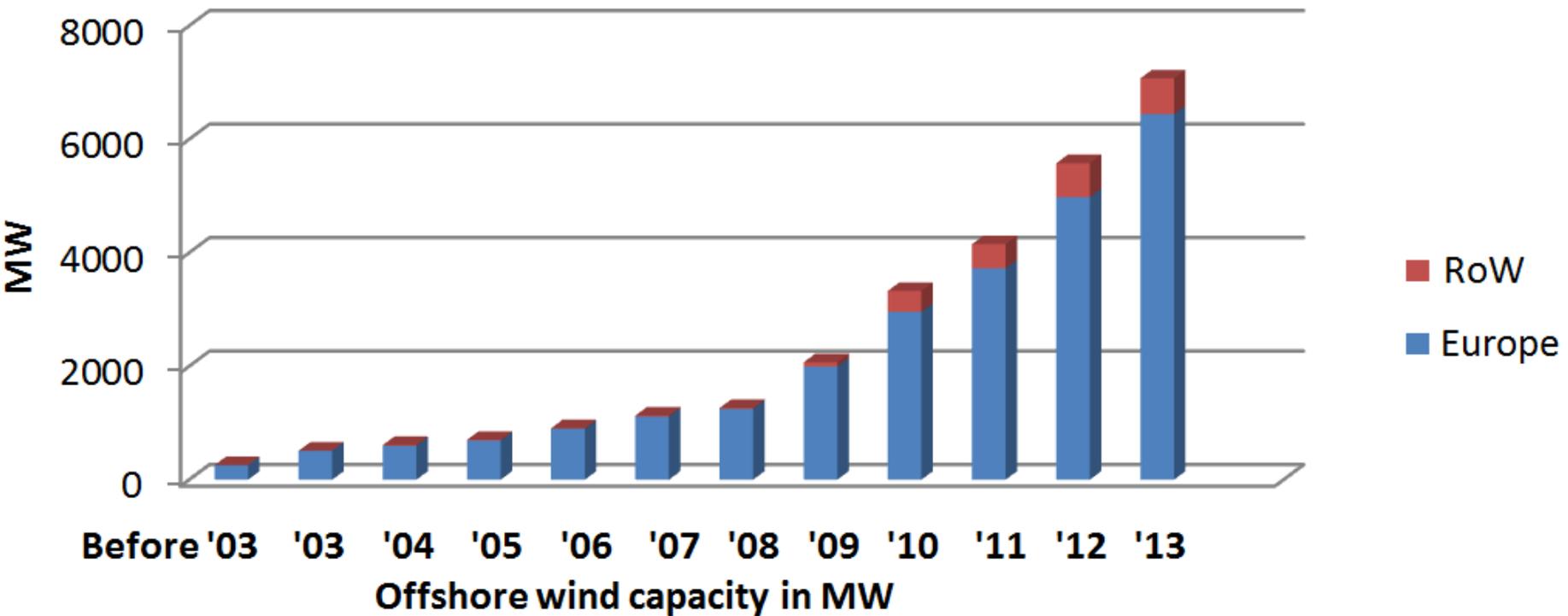
Cumulative installed grid connected PV capacity in EU + Candidate Countries compared with the NREAP target for 2020. Source: JRC PV 2014 report



National RES deployment (2014 and 2020 projections)



Offshore Wind developments led by Europe



On 30.11.2016 we will present a legislation package that will complete the Energy Union.

The package will influence the future European energy system and will be implemented in the post-2020 period



The Energy Union Winter legislation package: Main elements (1)



Legislation for Energy Efficiency including:

- the revision and update of the Energy Efficiency Directive (EED) and
- the Energy Performance of Buildings Directive (EPBD)

with the aim of updating the existing energy efficiency policy and legal framework to reflect the new energy efficiency target for 2030.

The Energy Union Winter legislation package (2)



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The Winter legislation package will also include:

- **Put in place a new electricity Market Design for a truly integrated EU electricity market;**
- **A revised Renewable Energy Directive and bioenergy sustainability policy for 2030, focusing on a cost-effective, sustainable and actual delivery of a RES share of at least 27% in the EU in 2030;**
- **Legislative proposal on the Governance of the Energy Union (preparing the ground for creating Integrated National Energy and Climate Plans for the period of 2021 to 2030).**



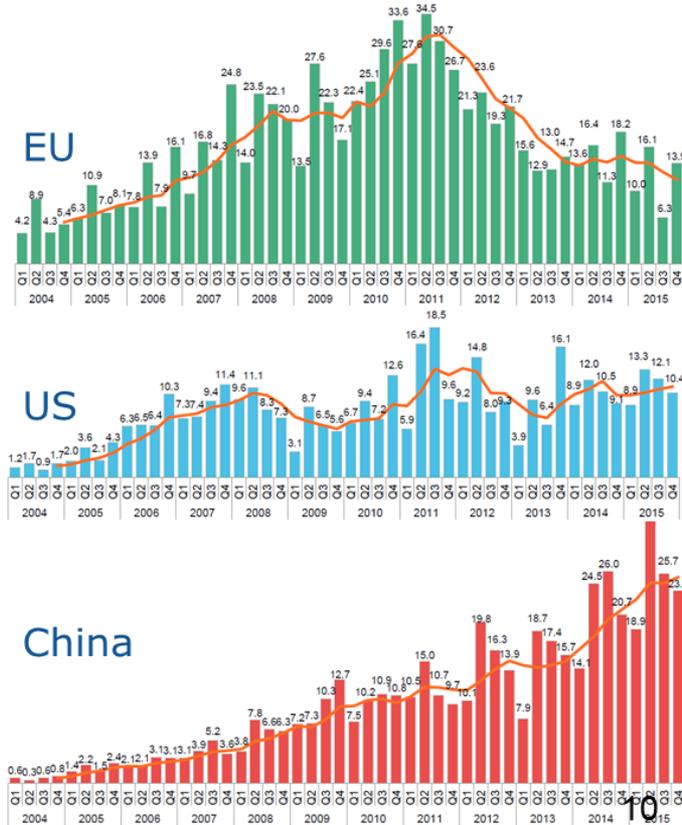
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The Energy Union 5th pillar (R, I & C)

Research, Innovation and Competitiveness - How to maintain global leadership?

Investment in clean energy

Source: Bloomberg



Source: Bloomberg, European Commission (JRC)

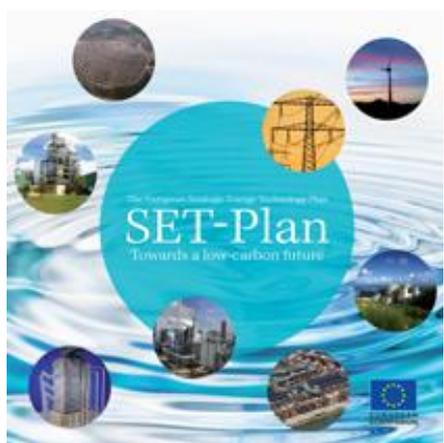
- Energy Union R&I focus areas:
 - Number 1 in RES
 - Consumer – smart grids, smart home appliances, smart cities
 - Efficient energy systems
 - More sustainable transport systems
- And two additional priorities:
 - A forward-looking approach to CCS and CCU for the power and industrial sectors
 - Nuclear energy – the use of the highest standards of safety, security, waste management and non-proliferation;

The SET Plan adopted in 2008



- **Focus on technologies with market impact up to 2020 - EIIIs:**

- Wind
- Solar
- Electricity grids
- CCS
- Bioenergy
- Nuclear
- Smart Cities and Communities
- Fuel cells and hydrogen

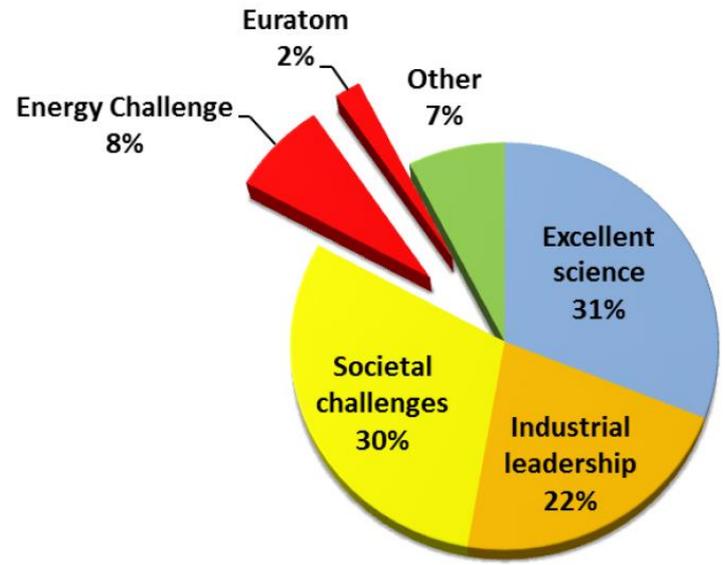


- **Focus on longer-term research actions beyond 2020 (set up of EERA)**

- **Financing**

Investments R&I accross EU
EUR 2.8bn (2007) → **EUR 7.1bn** (2011)

Horizon 2020



Integrated Roadmap 2014: Challenges and opportunities



- ***From a technology-specific focus to an integrated approach***
- ***Start from the energy needs and services to the consumers***
- ***Accelerate the transformation of the energy system in a cost-effective way***
- ***Reinforce the EU's technological leadership and translate it into growth and jobs***
- ***Enhance investments and promote European cooperation***

Strategic Energy Technology (SET) Plan

Towards an Integrated Roadmap:
Research & Innovation Challenges and Needs
of the EU Energy System





The new elements:

- *Identify Strengths and Weaknesses in the global competition*
- *New governance*
- *Widening to new actors*
- *More joint actions*
- *Transparency, participatory process, Knowledge sharing*
- *Monitoring and reporting*
- *10 actions*





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Bringing the pieces together: From Integrated Roadmap to the Energy Union and SET Plan

SET Plan Integrated Roadmap December 2014

- Accelerating the development of renewables
- System flexibility and security
- Engaging consumers
- Smart technologies and services for consumers
- Smart cities and communities
- Modernising the electricity grid; synergies with other energy networks
- Energy storage
- System flexibility and security
- Energy efficiency in buildings
- Energy efficiency in heating & cooling
- Energy efficiency in industry & services
- Energy storage
- Sustainable biofuels, fuels cells & hydrogen, and alternative fuels
- Carbon Capture Storage/Use
- Nuclear Energy

ENERGY UNION R&I & Competitiveness priorities February 2015

- N°1 in Renewables
- Smart EU Energy System with consumers at the centre
- Efficient Energy Systems
- Sustainable Transport
- Carbon Capture Storage/Use
- Nuclear Safety

SET Plan (Key Actions) September 2015

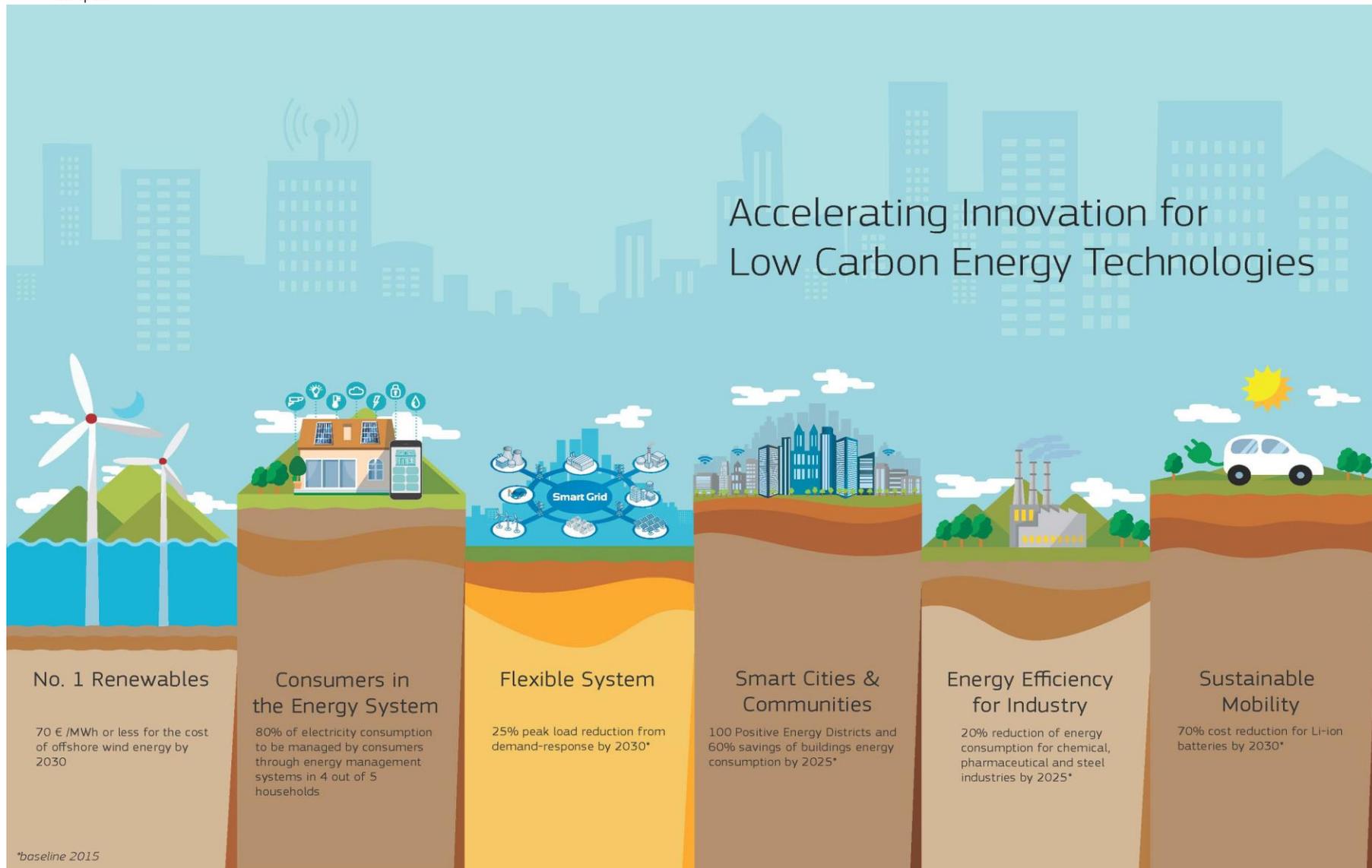
- Performant and low-cost renewables
- Smart solutions for energy consumers
- Integrated and flexible energy systems
- Efficiency in buildings and in energy intensive industries
- Batteries for e-mobility and stationary storage
- Renewable fuels and bioenergy
- Carbon Capture Storage/Use
- Nuclear safety

Setting targets for research and innovation within the Integrated SET Plan



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Accelerating Innovation for Low Carbon Energy Technologies



*baseline 2015

Energy Union's 5th dimension: From the 4+2 R&I priorities to the 10 SET Plan Actions

1. World leader in developing the next generation of renewables energy technologies



SET Plan Actions

- 1) Technology leadership by developing highly performant renewables technologies and their integration in the system
- 2) Cost efficient key technologies

Targets for 5 key RES technologies:

Offshore Wind, CSP, Solar, Ocean, Geothermal

2. Participation of consumers in the energy transition through a smart system

SET Plan Actions

3) Energy consumers, Smart cities & communities

4) Resilience, security and smartness of the energy system



Energy Union's 5th dimension: From the 4+2 R&I priorities to the 10 SET Plan Actions

3. Efficient energy systems, making the building stock energy neutral

SET Plan Actions

5) New materials and technologies for energy efficiency solutions for buildings

6) Continue efforts to make EU industry less energy intensive and more competitive



4. Sustainable transport Systems

SET Plan Actions

7) Become competitive in the global battery sector

8) Renewable fuels needed for sustainable transport solutions



Energy Union's 5th dimension: From the 4+2 R&I priorities to the 10 SET Plan Actions

The 2 additional Energy Union priorities for interested MSs

SET Plan Action 9

A forward-looking approach to carbon capture and storage (CCS) and carbon capture and use (CCU)

SET Plan Action 10

Ensure the highest standards of safety, security, and waste management and maintain technological leadership in nuclear



Setting targets and implementing the SET Plan



- The research stakeholders well represented in the consultations by European Energy Research Alliance (EERA) and the university association (EUA-EPUA)
- Input has been provided for the Declarations of Intent of the SET Plan actions by EUA-EPUA. Thank you!
- We are looking forward to maintain this strong collaboration in the implementation of the SET Plan actions





SET-Plan 2016 - CEE Conference

✓ 30/11- 02/12/2016, Bratislava
(Slovakia's EU Council Presidency)



- ✓ **We will present one year Progress of the SET Plan**
- ✓ **We will present a strategy to Accelerate Clean Energy Innovation**
- ✓ Confirm that SET Plan is a unique platform to discuss synergic action of EU energy policy and research and innovation policy to transform the energy system

From setting targets to Implementation:

- form Temporary Working Groups for the implementation of the targets in all SET Plan actions**
- identify the actors to participate (interested Member states and research & industrial stakeholders)**





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**Thank you
for your attention !**

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Energy