Strategic Energy Technology (SET) Plan Initiation Workshop

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SET Plan workshop co-organised with INZEB
12th July 2018, Athens

A comprehensive clean energy research strategy

Based on…

- **Paris Agreement – COP 21**
- **Energy Union Strategy**
- **Integrated SET Plan (revamp 2015)**

⇩

overhaul of SET Plan

COP 21 Paris: Governments (+ EU) agreed to:

- Keep global average temperature well below 2°C
- Aim at limiting increase to 1.5°C
- Strengthen societies' ability to deal with the impacts of climate change;
- Provide continued and enhanced international support for adaptation to developing countries

The way towards the Energy Union

Where we want to go:

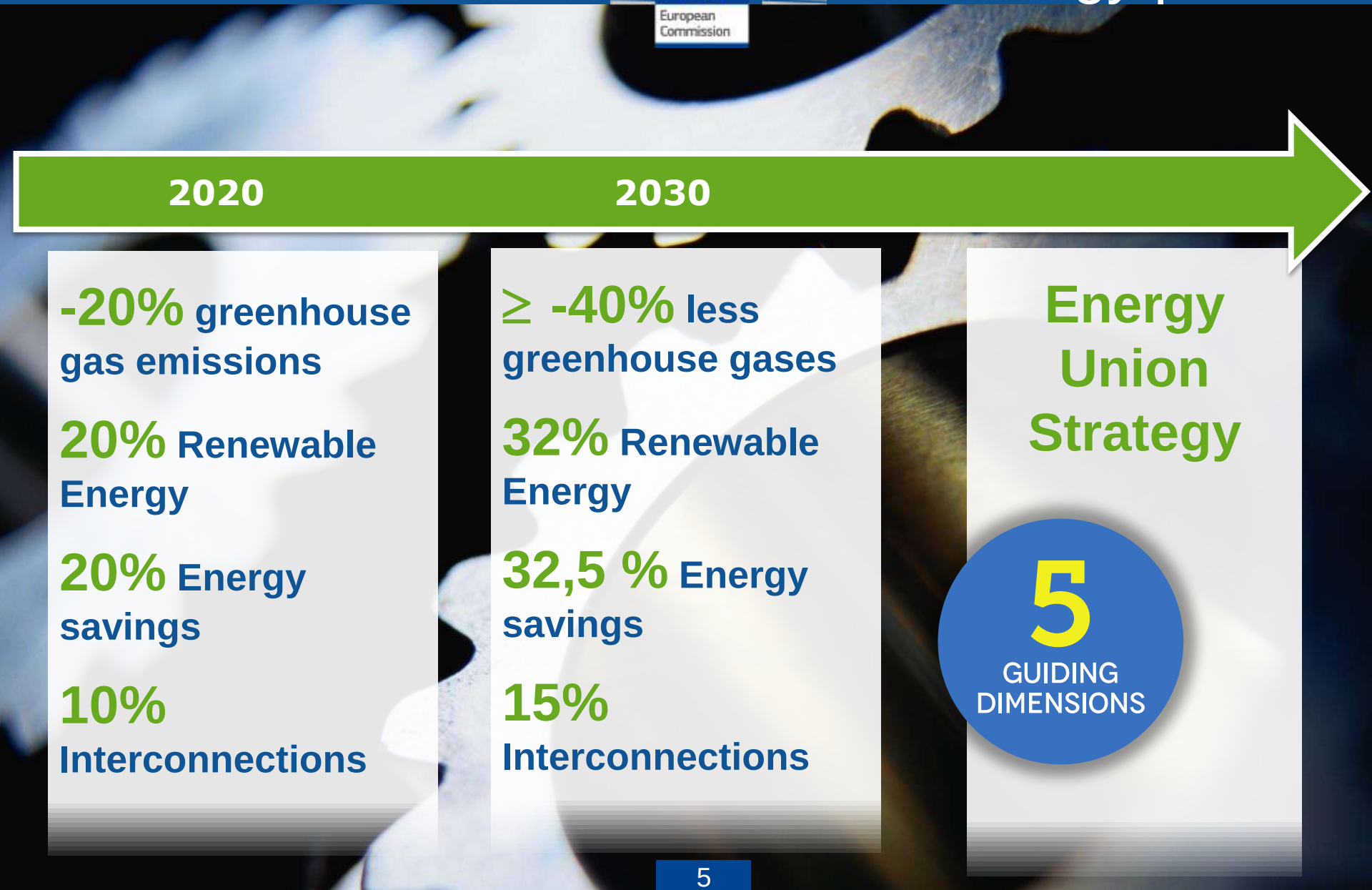
A secure, sustainable, competitive, affordable energy for every European

What this means:

Energy security, solidarity and trust
A fully integrated internal energy market
"Energy efficiency first" (including the transport sector)
Transition to a long-lasting low-carbon society
An Energy Union for Research, Innovation and Competiveness

How we want to reach it:

Energy Union Strategy: a 2030 European framework for climate and energy policies



2020

- **-20%** greenhouse gas emissions
- **20%** Renewable Energy
- **20%** Energy savings
- **10%** Interconnections

2030

- ≥ **-40%** less greenhouse gases
- **32%** Renewable Energy
- **32,5 %** Energy savings
- **15%** Interconnections

Energy Union Strategy

5 GUIDING DIMENSIONS

Key among them: Clean Energy for All European Package

Main Goals:

LEADING THE ENERGY TRANSITION - CREATING VALUE FOR CITIZENS AND BUSINESSES

Putting energy efficiency first

Demonstrating global leadership in renewables

Delivering a fair deal for consumers

Elements of the Package

" In essence the new package is about tapping our green growth potential across the board"

Commissioner Miguel Arias Cañete (2016)

Energy Union Governance

Energy Efficiency
(Energy Efficiency Directive, European Performance of Buildings Directive)

Renewables
(Revised Renewable Energy Directive)

New Electricity Market Design
(including Risk Preparedness)

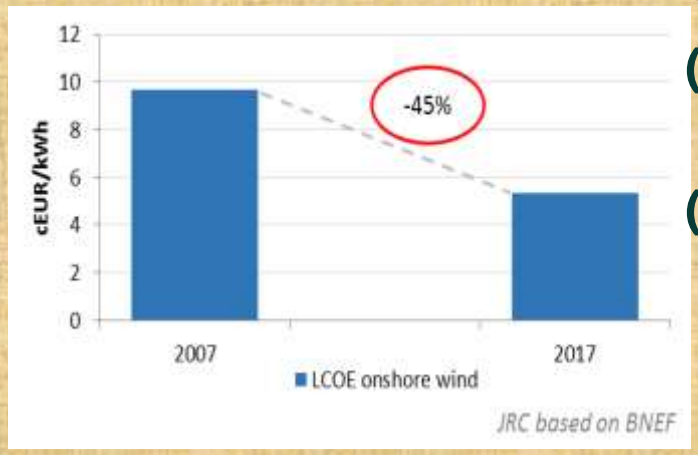
Energy prices and costs report

Strategic Energy Technology (SET) Plan:

An innovation and research guidance platform

TECHNOLOGICAL INNOVATION: IMPACTS ON COST & DEPLOYMENT

- Onshore wind energy **cost**:



(2007): 9.7 cEUR/kWh

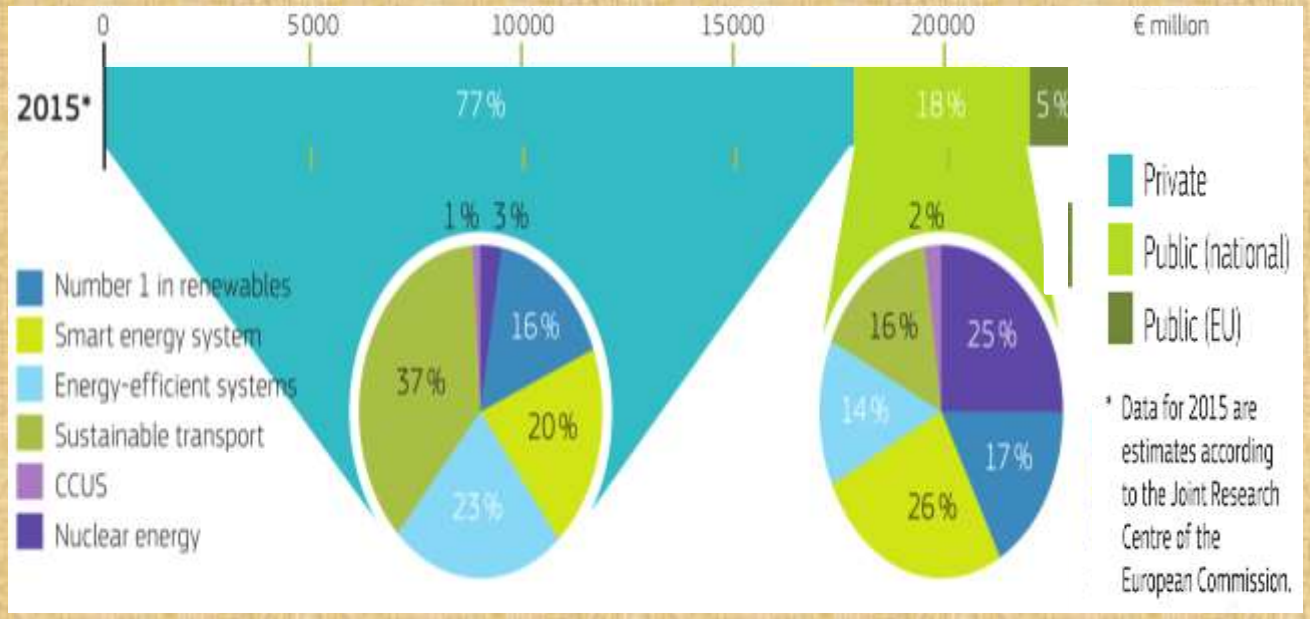
(2017): 5.5 cEUR/kWh

- Offshore wind energy **capacity**:

(2007): 1.1 GW

(2017): 15.8 GW

PUBLIC ENERGY R&D INVESTMENTS LEVERAGE LARGER PRIVATE CONTRIBUTIONS



Source: JRC

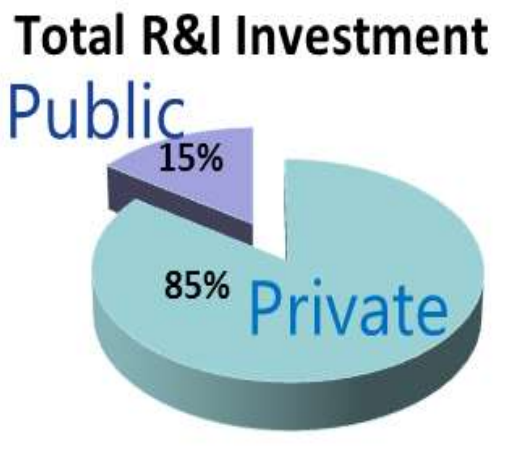
Year	Public (bn EUR)	Private (bn EUR)
2007	2.9	11.1
2010	4.7	16.8
2015	5.3	17.8

WHAT IS THE SET PLAN?

Key **implementing instrument of the research, innovation & competitiveness** dimension of the **Energy Union**.

A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy

Leveraging the impact of public support (European and national), by strengthening cooperation within Europe



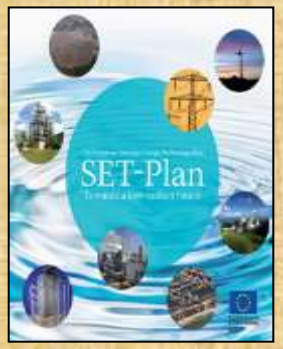
Coordination of national & European efforts is crucial

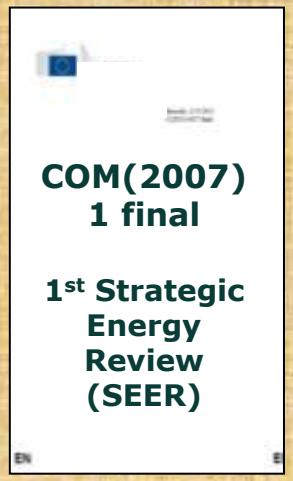
- **Created in 2007**
- **2015: Integrated approach tackling the energy system as a whole, beyond 'technology silos'**
- **Focus on the deployment of new technologies cost-effectiveness**
- **Accelerating energy transition through:**
  - **the implementation of joint actions**
  - **a better alignment of public & private R&I agendas**

New focus and a revised plan:

- coordinates low-carbon research and innovation activities in EU Member States and other participating countries (Iceland, Norway, Switzerland and Turkey).
- helps structure European and national research programmes and triggers substantial investments on common priorities in low-carbon technologies.

From technology focus to an Energy Union systemic approach accounting for citizens

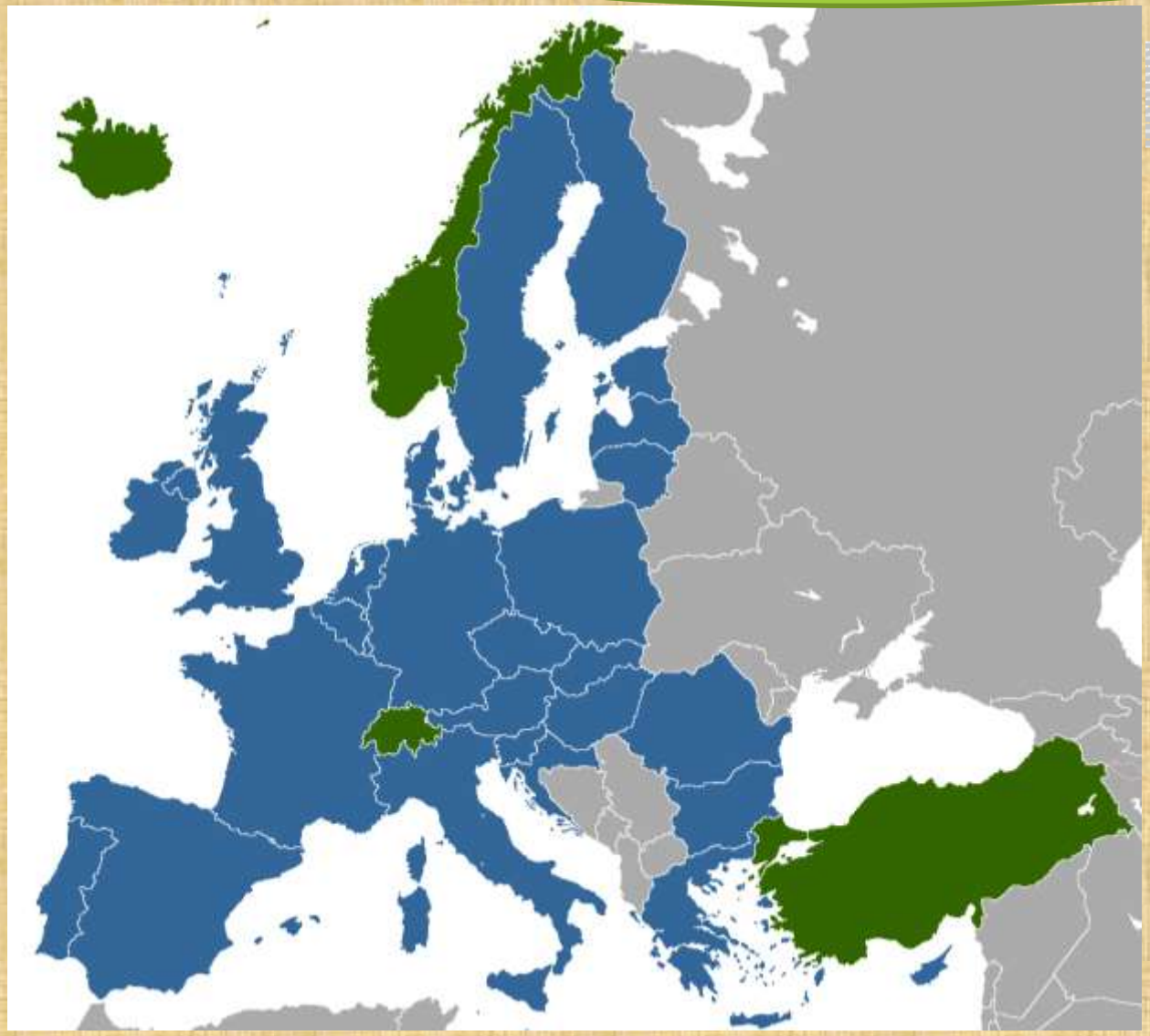




2007 → **2017**

- **Enables EU to meet energy policy objectives since 2007**
- **Exemplary cooperation model among 3 DGs (RTD, ENER, JRC)**
- **The key reference for collaboration, prioritisation and implementation of R&I in low-carbon energy technologies; the model for Transport policy and (recently) Mission Innovation**
- **Large-scale engagement of research and industry stakeholders**

SET Plan Governance



- SET Plan Countries
- European Commission
- Research and Industry stakeholders

SET Plan Governance

Actors directly involved in the target setting process.

- **A widely participatory process**
  - **32 National Governments: EU28, IS, NO, CH, TK**
  - **Industry and research actors: 154 umbrella organisations representing 16 700 entities**
- **Steering Group: The SET Plan decision-making body, increases alignment between national and EU R&I programmes and enhance cooperation between countries.**
- **ETIPs: Streamlined industry-led stakeholders' structures.**
- **EERA: Strategic partnership with the research community, promotes coordination among research and technology transfer actors.**

SET Plan actions under the Energy Union

Energy Union

Research, Innovation and Competitiveness Priorities

SET-Plan 10 Key Actions

No1 in Renewables		1 *Performant renewable technologies integrated in the system* 2 *Reduce costs of technologies*	Sustainable Transport		7 *Competitive in global battery sector and e-mobility* 8 *Renewable fuels and bioenergy*
Consumers in the Energy System		3 *New technologies & services for consumers* 4 *Resilience & security of energy system*	Carbon Capture Utilisation and Storage		9 *Carbon Capture Storage / Use*
Efficient Energy Systems		5 *New materials & technologies for buildings* 6 *Energy efficiency for industry*	Nuclear Safety		10 *Nuclear safety*


European Commission
SET-PLAN
10 RESEARCH AND INNOVATION ACTIONS ALIGNED TO THE ENERGY UNION OBJECTIVES
STRATEGIC ENERGY TECHNOLOGY PLAN
An integrated plan to accelerate the EU energy system transformation
GLOBAL LEADER IN RENEWABLES
Develop highly performant renewable technologies integrated in the energy system
Reduce cost of key renewable technologies
SMART EU ENERGY
Create new technologies and services for consumers
Increase the integration, security and flexibility of the energy system
NUCLEAR SAFETY*
Increase safety
ENERGY EFFICIENCY FIRST
Increase energy efficiency in buildings
Improve energy efficiency in industry
SUSTAINABLE TRANSPORT
Become competitive in the battery sector for e-mobility and stationary storage applications
Strengthen market take-up of renewable fuels
CARBON CAPTURE, STORAGE AND USE
Step-up R&I activities and commercial viability
ENERGY UNION
Ensure that Europe has secure, sustainable, competitive and affordable energy.
The European Commission adopted a revised SET-Plan in 2015. It aims at:
More integrated approach for research and innovation in the field of low-carbon energy,
Stronger cooperation among the European Commission, EU countries & Iceland, Norway, Switzerland and Turkey, and stakeholders.
FIND OUT MORE
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European Commission

1. World leader in developing the next generation of renewable 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

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

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

European Commission

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

European Commission

The 2 additional Energy Union priorities for interested MSs

SET Plan Action 9

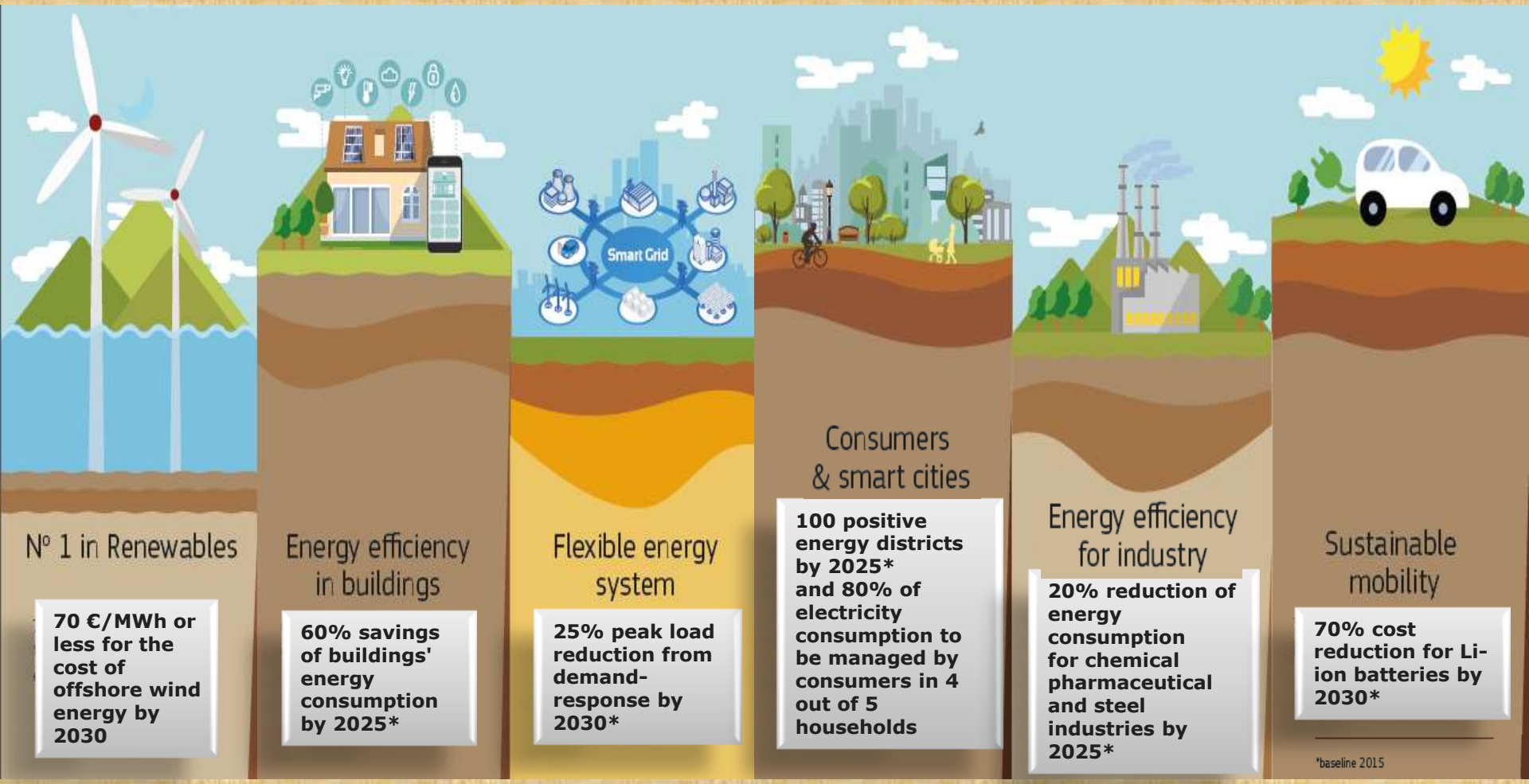
A forward-looking approach to carbon capture and storage (CCS) and carbon capture and use (CCU)

SET Plan Action 10

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

The SET Plan implementation

Setting targets for low carbon technologies – [done in 2016]



SET Plan Implementation Plans: progress of the Working Groups

SET Plan Action	Working Group	IP Expected endorsement	IP Status
1 & 2	Concentrating Solar Power/Solar thermal electricity	14 June 2017	**Endorsed**
1 & 2	Photovoltaic	14 Nov 2017	**Endorsed**
1 & 2	Deep geothermal systems	24 Jan 2018	**Endorsed**
1 & 2	Offshore wind	13 June 2018	**Endorsed**
1 & 2	Ocean energy	21 March 2018	**Endorsed**
3.1	Smart solutions for energy consumers	2018	In progress
3.2	Smart cities and communities	12 June 2018	**Endorsed**
4	Energy Systems	24 Jan 2018	**Endorsed**
5	EE for buildings / Renewable heating and cooling	2018	In progress
6	EE for industry	27 Sept 2017	**Endorsed**
7	Batteries for e-mobility & stationary storage	14 Nov 2017	**Endorsed**
8	Renewable fuels & bioenergy	13 June 2018	**Endorsed**
9	Carbon capture and storage/use	27 Sept 2017	**Endorsed**
10	Nuclear Energy	2018	In progress

Progress to date

- **Targets** set and Implementation **Plans** drafted
- **Implementation of its Actions** for delivering the IP targets and ultimately the objectives of the Energy Union
- More demand for **monitoring progress and reporting** (Energy Union Governance - NECPs)

European Commission

WHAT'S in it for YOU

What's in it for you?

For the country/public administration/research agency:

- Coordination of national research efforts/ programmes and public strategies according to national priorities and also at European scale → create useful synergies

- Up-to-date on what is going on currently in the clean energy research and innovation landscape → more effective use of own resources

- Influence research and innovation priorities also at European scale, promote national priorities, technologies, industries

What's in it for you?

- Tangible research activities that translate into collaborative research schemes among countries targeting specific technology areas;

- cooperation on research and innovation activities/ projects under the Implementation Plans (various technology areas)

…. implemented through budget pooled together from participating countries in each IP and from private resources / also topped up, when needs be, with EU funds.

- and last but not least….. only recently….

Usefulness of SET Plan:

Case No 1

NECPs

New requirement, as of end 2018

- *Remember the Energy Union Strategy?*
- *The Clean Energy for All European Package?*
- *The Governance Regulation in it?*
- ***Now: provisions on reporting for …R&I !!***

The TEMPLATE (NECPs)

Annex I Part I Section A Part 2	
2.	**NATIONAL OBJECTIVES AND TARGETS**
2.5.	**Dimension Research, innovation and competitiveness**
i.	**[ ] N**ational objectives and funding targets for public and**, where available,** private research and innovation relating to the Energy Union including, if appropriate, a timeframe for when the objectives shall be met; **[ ]**
ii.	If appropriate, national objectives including long-term targets **[ ]** for the deployment of low-carbon technologies, including for decarbonising energy- and carbon-intensive industrial sectors and, if applicable, for related carbon transport and storage infrastructure
iii.	**If applicable, N**ational objectives with regard to competitiveness
3.	**POLICIES AND MEASURES**
3.5.	**Dimension Research, innovation and competitiveness**
i.	Policies and measures **related to the elements [ ]** set out in 2.5
ii.	**If applicable**, cooperation with other Member States in this area, including information on how the SET Plan objectives and policies are being translated to a national context, **where appropriate**
iii.	If applicable, financing measures in this area at national level, including EU support and the use of EU funds

What's in it for you?

For research institutes/universities participation to the SET Plan, may:

- Enhance understanding of what are the research and innovation priorities in a specific clean energy technology area,
- Facilitate linkages with many other research institutes in Europe and with industry,
- Exchange of information and knowledge, creation of synergies and partnerships,
- Leverage funding for similar research efforts across EU,
- Identify other sources for financing / pool together

Via EERA…EUA…etc.

What's in it for you?

For industry/private companies participation to the SET Plan:

-Facilitates coordination of research priorities with those of other partners in the same industry, research institutions and countries,
- Increases scale of a demonstration activity compared to the capabilities of one single industrial stakeholder.
- Promotes synergies, economies of scale and helps avoid duplications of activities
- Connects to and helps understand European and national research priorities.

Via the various ETIPs…

Usefulness of SET Plan:

Case No 2

H2020

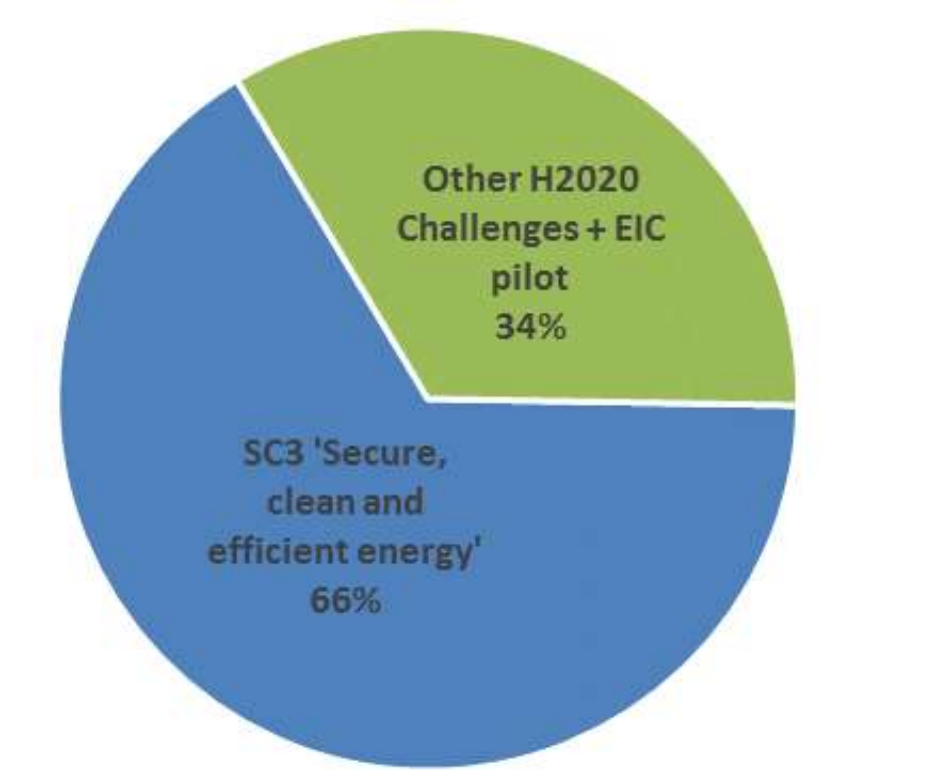
Horizon 2020 contribution to the SET Plan

Energy topics in Horizon 2020 WP (2018-2019) per SET Plan Key Action

SET Plan Key Action	Budget (m€)	% of total
Topics in SET Plan Key Actions	*2044*	*97,8%*
1/2 – Number 1 in renewables	282	13,5%
3 – Consumers and smart cities	226	10,8%
4 – Energy system	362	17,3%
5 – Energy efficiency in buildings	318	15,3%
6 – Energy efficiency in industry	95	4,5%
5/6 – Energy efficiency (in general)	13	0,6%
7 – Batteries	173	8,3%
8 – Bioenergy and renewable fuels	214	10,2%
9 – Carbon capture and storage / use	68,0	3,3%
Cross-cutting	294	14,1%
Other energy topics (non-SET Plan related)	*45*	*2,2%*
Grand Total	**2088**	**100,0%**

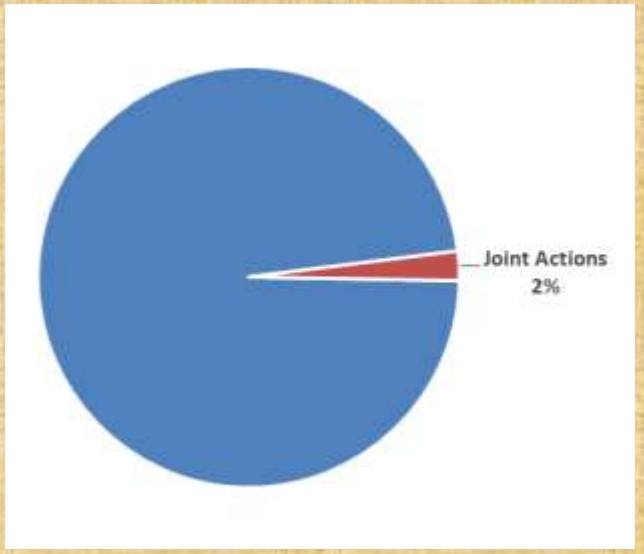
- Practically all Energy topics contribute to the SET Plan and vice-versa
- All SET Plan areas are covered
- Largest shares:
  - **Renewables**
  - **Energy system**
  - **Energy efficiency**

Energy topics in the WP (2018-2019) by source

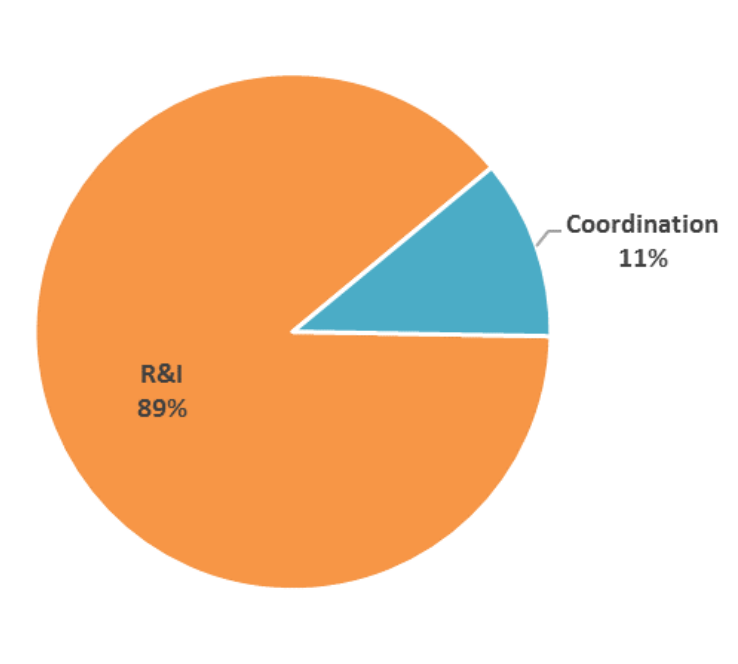


Energy Joint Actions in the WP (2018-2019)

Description	Type of joint action	Budget (m€)
Joint programming actions to foster innovative energy solutions	ERA-NET	10
Support action in preparation of a Joint Programming activity	CSA	1
Support to the realisation of the Implementation Plans of the SET Plan	CSA	6
ERA-NET Co-Fund Enhanced cooperation in Digitalisation of Energy Systems and Networks	ERA-NET	10
European Pre-Commercial Procurement Programme for Wave Energy Research &Development	PCP	20
Grand Total		**47**



Energy topics in the WP (2018-2019) by type of expense



Budget of R&I topics represents **89%** of the total

Coordination budget calculated as the sum of CSAs and 'grants to identified beneficiaries'

ERA-NETs in FP7

Key Actions		Number of ERA-NETs	Type	Grant Agreement signed budget (Million Euro)
1/2 - Number 1 in renewables	Concentrating Solar Power / Photovoltaic	1	ERA-NET	2
	Deep geothermal systems	1	ERA-NET	2
	Offshore wind	1	ERA-NET +	4.8
	Ocean energy	1	ERA-NET	2.2
3 - Consumers and smart cities				
4 - Energy system		1	ERA-NET	2.5
5 - Energy efficiency in buildings				
6- Energy efficiency in industry				
7 - Batteries				
8 - Bioenergy		2	ERA-NET +	7
9 - Carbon Capture and Storage/Use				
10 - Nuclear safety				
TOTAL		7		20.5

ERA-NETs in H2020

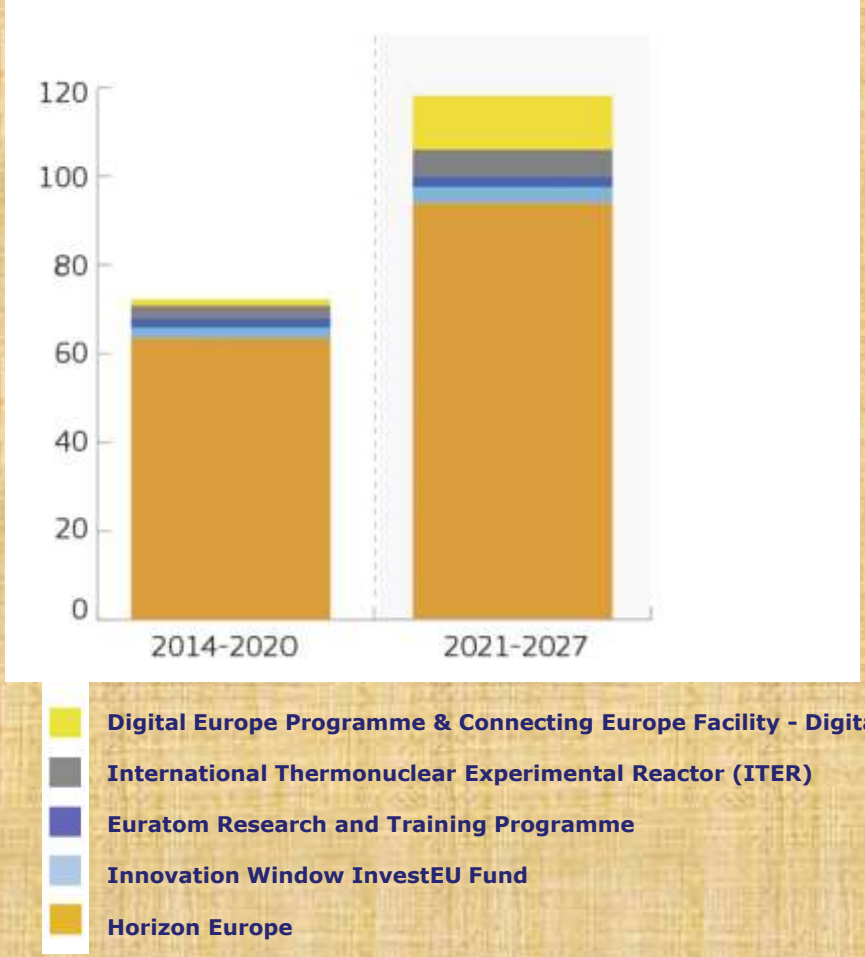
Key Actions		# ERA-NET	Work Program budget (Million Euro)	Grant Agreement signed budget (Million Euro)
1/2 - Number 1 in renewables	Concentrating Solar Power / Photovoltaic	2		13.4
	Deep geothermal systems	2		18.6
	Offshore wind	2		19
	Ocean energy	1		6
3 - Consumers and smart cities		1		9.1
4 - Energy system		2		25.9
5 - Energy efficiency in buildings				
6- Energy efficiency in industry				
7 - Batteries				
8 - Bioenergy		1		7.5
9 - Carbon Capture and Storage/Use		1		12.8
10 - Nuclear safety				
TOTAL		11	174.8	112.3 (64%)

Horizon Europe

New Programme for energy R&I

R&I in the next long-term EU budget:

Investing in the future



Building on the success of the EU's past flagship research and innovation programmes, the Commission proposes to **increase investment in research-innovation and digital** by allocating **€ 114.2 billion** for the future Multiannual Financial Framework.

Source: European Commission
Note: Compared to the Multiannual Financial Framework 2014-2020 at EU-27 (estimate)

Horizon Europe: evolution not revolution

Specific objectives of the Programme

Support the creation and diffusion of high-quality knowledge

Strengthen the impact of R&I in supporting EU policies

Foster all forms of innovation and strengthen market deployment

Optimise the Programme's delivery for impact in a strengthened ERA

Pillar 1
Open Science

- European Research Council
- Marie Skłodowska-Curie Actions
- Research Infrastructures

Pillar 2
Global Challenges and Industrial Competitiveness

Clusters
- Health
- Inclusive and Secure Society
- Digital and Industry
- Climate, Energy and Mobility
- Food and natural resources

Joint Research Centre

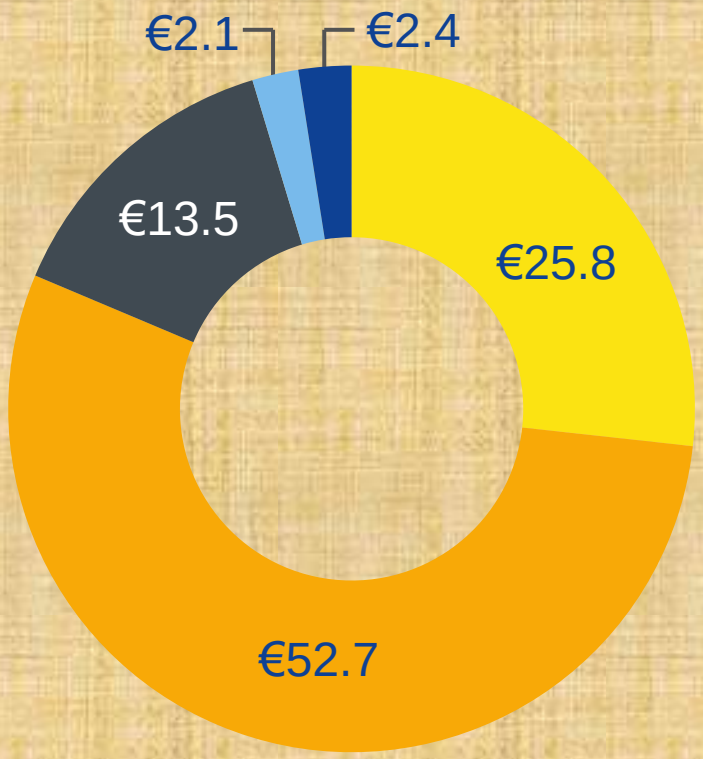
Pillar 3
Open Innovation

- European Innovation Council
- European innovation ecosystems
- European Institute of Innovation and Technology

Strengthening the European Research Area

- Sharing excellence
- Reforming and Enhancing the European R&I system

Budget: €100 billion* (2021-2027)



€ billion
In current prices

- Open Science
- Global Challenges & Ind. Competitiveness
- Open Innovation
- Strengthening ERA
- Euratom

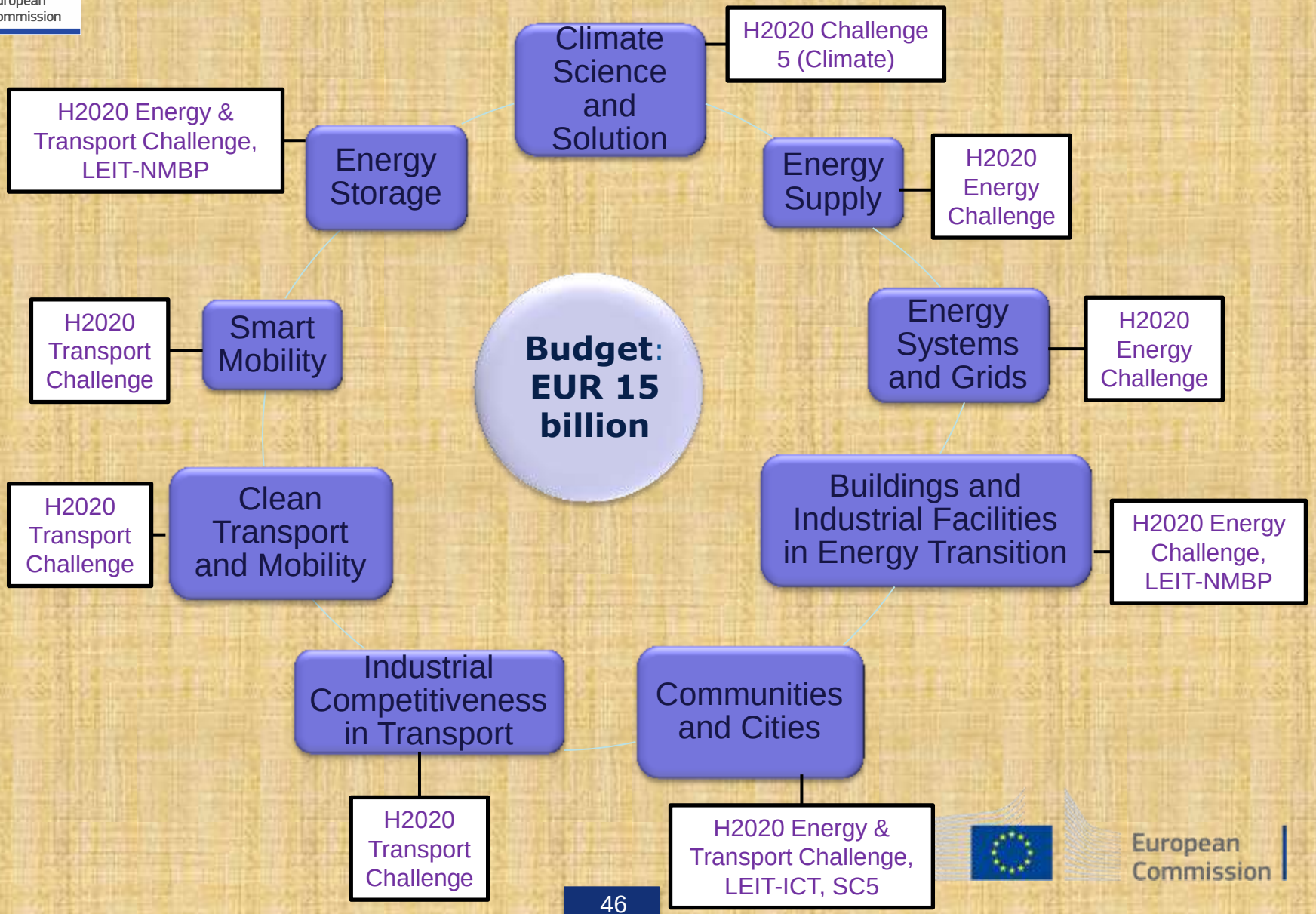
* This envelope includes EUR 3.5 billion allocated under the InvestEU Fund.

Pillar 2
Global Challenges & Industrial Competitiveness:

boosting key technologies and solutions underpinning EU policies & Sustainable Development Goals

Clusters implemented through usual calls, **missions & partnerships**	Budget (€ billion)
Health	*€ 7.7*
Inclusive and Secure Societies	*€ 2.8*
Digital and Industry	*€ 15*
Climate, Energy and Mobility	*€ 15*
Food and Natural Resources	*€ 10*
Joint Research Centre supports European policies with independent scientific evidence & technical support throughout the policy cycle	€ 2.2

Cluster ‘Climate, Energy and Mobility’ - Scope



Cohesion Policy 2014-2020

Support may come from the European Structural and Investment Funds (ESIF), in particular:

- **38 billion € for the shift towards a low-carbon economy,**
- **40 billion € for research and innovation,**
- **33 billion € for enhancing the competitiveness of SME's.**

Other: Smart specialisation strategy

Smart specialisation

The Eye@RIS3 tool provides a mapping of regions' and Member States' preferences in terms of smart specialisation fields, allowing to detect possible partners: http://s3platform.jrc.ec.europa.eu/map

The emerging fields of specialisation are related to:

- **Energy (= top priority: 2/3 of all regions)**
- **Life science**
- **ICT**
- **Environment**
- **Agro-food**
- **Tourism**
- **New materials**

Scope on cooperation and fine-tuning!

European Commission

Clean energy innovations in regions

- → **upcoming edition of *EU Week of regions and cities***
- → **Brussels, 8 to 11 October 2018**
- → **Event organised by the European Commission (DG RTD and DG REGIO) in its context**

Energy

Seeking to:

- exploit synergies between H2020 and Cohesion policy tools
- focus specifically on the R&I proposals labelled with a Seal of Excellence (SoE) – i.e. applicants in the area of clean energy that could not be funded under H2020 despite the high quality of their proposals.
- The event aims at exploring funding possibilities for these proposals.

On the programme :

- individual match making meetings will be organised between innovators, holders of the SoE, and interested regions on 9 October 2018.
- On 10 October, an opportunities providing session (share experiences and information on the uptake of Seals of Excellence on clean energy across Europe)

European Commission

- The Annual SET Plan Conference
- This year in Vienna
- 20-21 Nov. 2018

Useful links

1/ SET Plan information:
https://setis.ec.europa.eu/

2/ Clean Energy for All Europeans (legislative proposals):
https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans

3/ H2020 Framework Programme:
https://ec.europa.eu/programmes/horizon2020/

Σας ευχαριστώ!

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Is there a research and innovation National Plan/agenda/programme for clean energy technologies reflecting the policy priorities Greece (or setting national objectives)?

→ If so, which are the low carbon technologies Greece prioritises to promote via research and innovation? At which scale and at which TRL level?

→ Is there a specific national budget allocated to research and innovation projects for clean energy technologies?

If not, how can one address the research innovation and competitiveness Pillar of the National energy and Climate Plans? Is there already a EL draft plan being prepared? Are you aware of this new development in the first place?

Would you - the research institutes/universities see a good reason to participate to the SET Plan structures (for example via EERA)? Is there an added value for you in exchanging knowledge, getting in contact with partners for putting forward future (R&I) projects with other countries?

Would you - the energy technology associations/industries/enterprises see a good reason to participate in the SET Plan via the respective Technology Platform? Is there an added value for you to influence their future agendas, roadmaps, proposals? Would it be an opportunity for you to participate to common projects with other actors across Europe?