

Update on EU initiatives on CCS

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SET - Plan

The links



*Integrated Roadmap Themes**

T10: Wind, PV, CSP, SHC

T1: Engaging consumers

T2: Activating consumers

T6: Smart grids

T7: Energy storage

T8: System flexibility

T9: Smart cities

T3: En. eff. buildings

T4: En. eff. H/C

T5: En. eff. industry

T13: Biofuels, FCH

T11: CCS

T12: Nuclear

Energy Union 4+2 R&I priorities

RES

Smart

Efficiency

Transport

CC(U)S

Nuclear

SET-Plan Communication Ten Priority Actions

1. Develop RES
2. Reduce cost

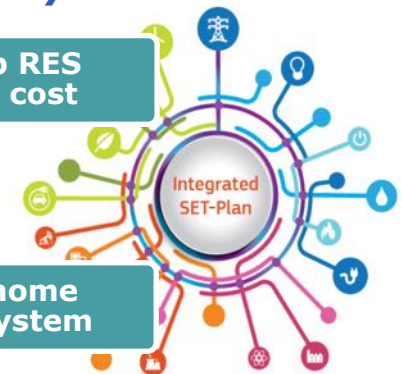
3. Smart home
4. Smart System

5. Building
6. Industry

7. Battery
8. RES-fuels

9. R&I on CC(U)S

10. Safety Nuclear





- CCS is one of the 10 priority actions in the development of the overall Energy Union approach to R&I
- Enhanced efforts are necessary for implementation of large-scale CCS demonstration projects in both power and industrial sectors
- Research and innovation is needed to explore the feasibility of CCS on carbon and energy intensive industries
- CCU options, such as transforming CO₂ into fuels, chemicals and material, could further improve the economic case for CCS
- The Commission to work closely with Member States to develop and deliver these priority actions.
- New governance structure, moving from ETP ZEP to ETIP ZEP (European Technology and Innovation Platform)



Renewing efforts to demonstrate carbon capture and storage (CCS) in the EU /Developing sustainable solutions for carbon capture and use (CCU)

- The EC invited stakeholders on 5 April 2015 to take position on the proposed targets/priorities
 - In particular for Stage 1 (Agreement on targets/ priorities).
- EC invited stakeholders to submit positions in the form of an "Input paper" to the SET Plan Secretariat by Monday 25h April 2016.
- Based on this Issues Paper and inputs from the stakeholders, a **Declaration of Intent** will be presented to the SET Plan Steering Group on the 24/05/2016, for a common agreement between research organizations, universities, industry Member States and the EC on the targets/priorities.



Rationale:

- **CCS is needed to meet our 2050 decarbonisation objectives by reducing CO₂ emissions in the power generation sector and in energy and carbon intensive industries in a cost effective way**
- **Commercial scale CCS demonstration projects are necessary as soon as possible in order to confirm CCS's technical and economic viability as a cost effective measure to mitigate CO₂ emissions in the power and industrial sectors**

Proposed key objectives and targets in CCS and CCU

By 2020:



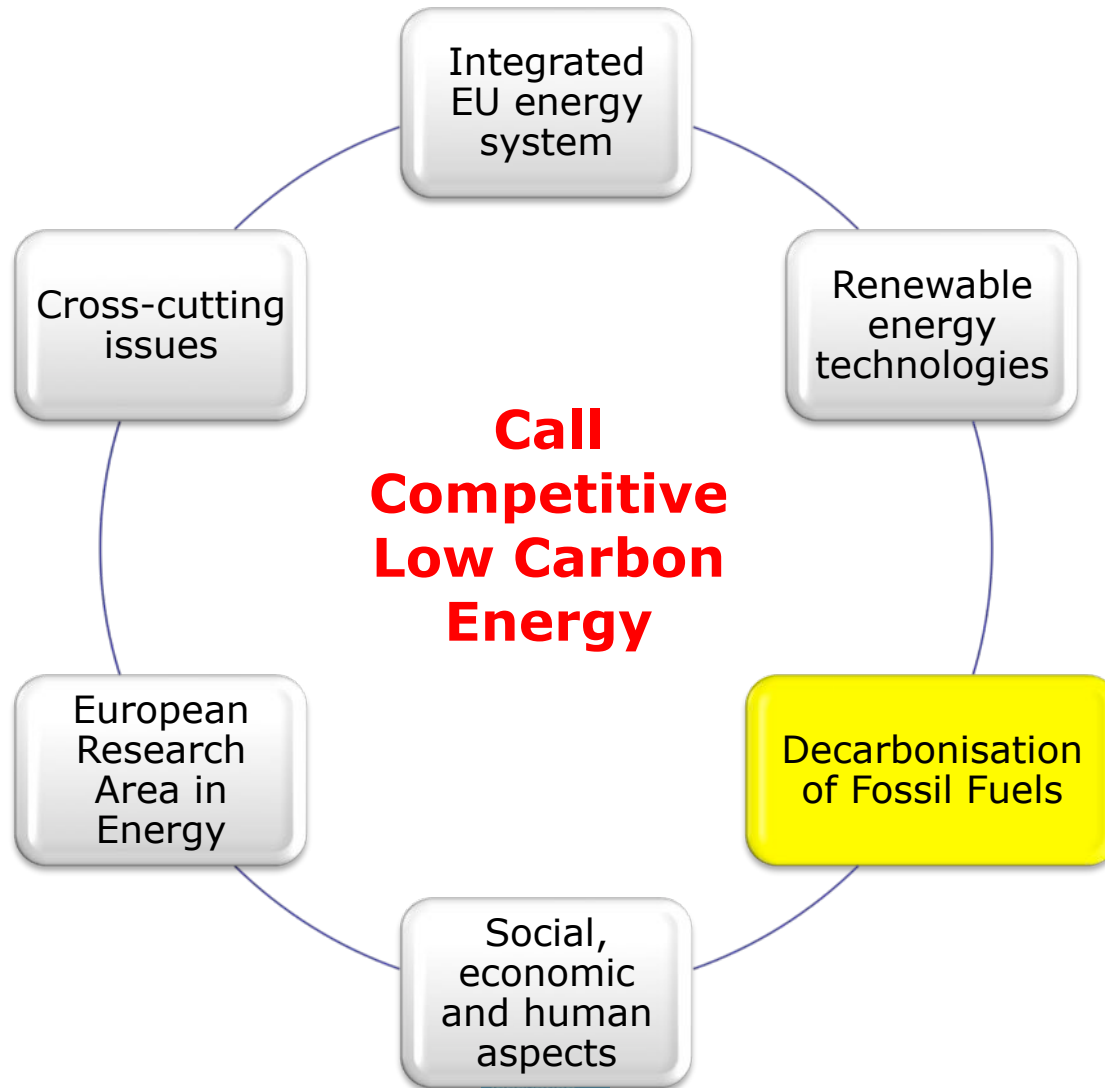
Objectives:

Reducing the cost of capture, cross border transport infrastructure, CO2 hubs and clusters, detailed appraisal of cost-effective storage capacity.

Targets:

- **Commercial-scale whole chain CCS demonstration**
- **Industrial CCS demonstration**
- **Common European Interest project(s) for CO2 transport infrastructure**
- **Feasibility studies of clusters in different regions of the EU**
- **Up-to-date detailed atlas of the geological storage capacity**
- **new CO2 capture pilots**
- **new CO2 storage pilots**
- **feasibility studies and pilots for the use of captured CO2**
- **Common European Interest project for demonstration of different CCU aspects**
- **Member States to establish in their national plans: the need of CCS, contributing to clusters, retrofitting fossil fuel power plants, CCU options**

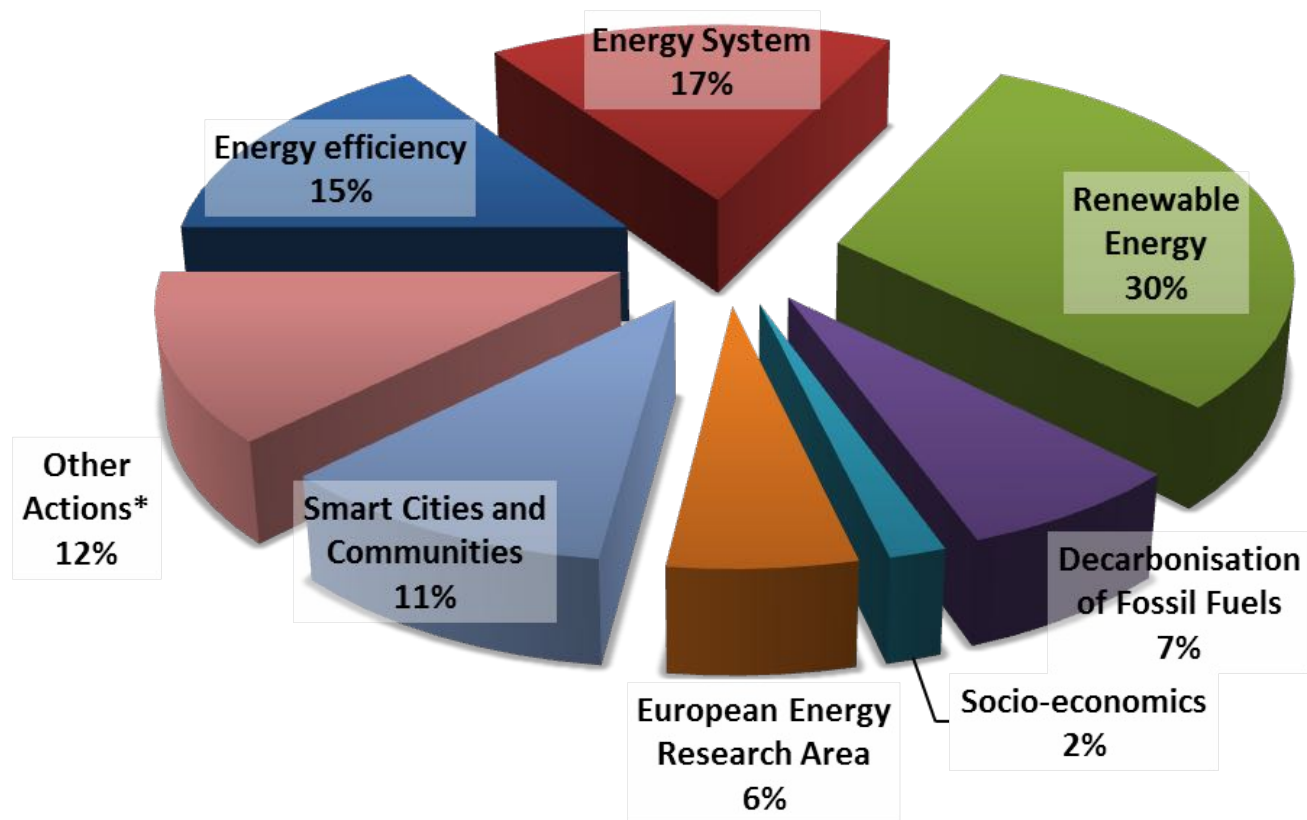
Horizon 2020 Energy Challenge



Decarbonisation of Fossil Fuels - Context

- Fossil fuels will be used in Europe's power generation as well as in industrial processes for decades to come.
- A forward-looking approach to **Carbon Capture and Storage (CCS)** and **Carbon Capture and Use (CCU)** for the power and industrial sectors is crucial for reaching the 2050 climate objectives in a cost-effective way.
- **Shale gas** can contribute to our energy security, provided that issues of public acceptance and **environmental impact** are adequately addressed.
- The integration of (fluctuating) renewable electricity generation in our energy system requires new solutions for fossil fuel power plants to provide **highly flexible yet efficient back-up power** to stabilise the grid.

Indicative budget distribution per area for Energy calls 2016-2017



Total budget 2016-2017: EUR 1 344 million

H2020

Ongoing CCS projects



- **Total funding CCS 2014/2015: 75,8 M€**

CCS in Industry

CEMCAP

CO2 capture from cement production

EU Contribution 8.8 M€; *Coordinator: SINTEF*

STEPWISE

SEWGS Technology Platform for cost effective CO2 reduction in the Iron and Steel Industry

EU Contribution 12.97 M€; *Coordinator: ECN*

LEILAC

Low Emissions Intensity Lime and Cement

EU Contribution 11,93 M€; *Coordinator: CALIX (EUROPE) (UK)*

H2020

Ongoing CCS projects



CO2 Storage

STEMM-CCS

Strategies for Environmental Monitoring of Marine Carbon Capture and Storage

EU Contribution 15,92 M€; *Coordinator: NERC(UK)*

ENOS

Enabling Onshore CO2 Storage in Europe

EU Contribution 12,58 M€; *Coordinator: BRGM (F)*

CCS infrastructure

GATEWAY

Developing a Pilot Case aimed at establishing a European infrastructure project for CO2 transport

EU Contribution: 0,79 M€; *Coordinator: SINTEF*

ERA-NET

ACT

Accelerating CCS technologies as a new low-carbon energy vector

EU Contribution 12,81 M€; *Coordinator: The Research Council of Norway (NO)*



Decarbonisation of Fossil Fuels – Topics 2016

Activities supported in **2016**

LCE-24: New generation high-efficiency capture processes

- TRL 2/3 -> 5; Budget: EUR 17 million (~ 2-5 M€/project)
- Twinning with South Korean projects

LCE-25: Utilisation of captured CO2 as feedstock for the process industry

- TRL 5/6 -> 6/7; Budget EUR 10 million (~ 6-10 M€/project)

LCE-26: ERA-NET on Applied Geosciences

- Covering ground water, raw materials and geo-energy
- Produce reliable scientific information on resources and potential consequences of their exploitation
- Budget: EUR 10 million; ERA-NET Cofund

Decarbonisation of Fossil Fuels – Topics 2017

Activities supported in **2017**

LCE-27: Measuring, monitoring and controlling the risks of CCS and unconventional hydrocarbons

- Scope to be defined in 2016

LCE-28: Highly flexible and efficient fossil fuel power plants

- TRL 3 -> 4-6; Budget EUR 15 million (~ 3-6 M€/project)

LCE-29: CCS in industry, including Bio-CCS

- TRL 4/5 -> 7; *Budget EUR 20 million (~ 4-9 M€/project)

LCE-30: Geological storage pilots

- TRL 4/5 -> 6; *Budget EUR 20 million (~ 9-16 M€/project)

From R&I to demonstration and deployment

- WP 2018 will earmark 20M€ for an ERA-Net Cofund to support ROAD (total expected budget 60M€)



- EC Membership at: **IEA, CSLF, Global CCS Institute**
- EC Bilateral S&T cooperation:
 - **China** – NZEC project, Phase IIA under preparation,
– Cooperation in H2020 under "CCS in industry"
 - **USA** –, EU-US knowledge sharing event on storage pilots, 10th CO2GeoNet forum, Venice
 - **Australia**
 - Twinning in FP7 2013 call on capture processes - 6 on-going twinning projects, cooperation CO2 storage is foreseen in H2020
 - **South Korea** – EU-Korea twinning workshop on CCS, 9 Feb. 2014, Twinning cooperation on advanced CO2 capture in H2020 Call 2016: dry sorption, wet sorption and membranes
 - **GCC countries**- Workshop on cooperation on CCS , Doha, February 2016

HORIZON 2020

The image is a conceptual graphic for the Horizon 2020 program. It features a large, dark blue globe of the Earth in the background, showing the outlines of continents. In the center, a smaller, transparent globe of the Earth is positioned, which appears to be emitting a bright, intense blue light. This light creates a strong lens flare effect, with numerous rays of light radiating outwards in all directions. The text 'HORIZON 2020' is superimposed over the center of the image, written in a clean, white, sans-serif font. The overall color palette is dominated by various shades of blue, from deep navy to bright cyan, creating a futuristic and high-tech atmosphere.