



# Finance for innovation: Towards the ETS Innovation Fund

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**as presented by**

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**as Rapporteur for Industry Stakeholders at [EVENT]**

**in Brussels on 12<sup>th</sup> June 2017.**

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# Engagement Process, Design & Mobilization

Jan 2017, DG CLIMA  
Launched Consultation Process

Experts and financiers started with a high-level conference that was followed by ten expert roundtables over 3 months

to collect expert views on:

- Future pathways and technologies for **low-carbon innovation**
- How the proposed **Innovation Fund** could be ideally designed to **mobilise the required investments**

## Sectors Covered

1	Ferrous Metals	Energy intensive industries
2	Non-ferrous Metals	
3	Pulp & Paper	
4	Oil Refining	
5	Chemicals & Bio-based Industries	
6	Cement & Lime	RES, Storage & CCS
7	Glass & Ceramics	
8	Renewable Energy	
9	Energy Storage	
10	CCS	

# Thanks to 250 experts from 195 organisations guided by 14 moderators...

## High-level Summary Report Launched

Sector-specific consultation sessions attended by more than **250 experts**

Moderated  
by:

Mukund Bhagwat, Jean-Pierre Birat, Hans Bünting, Patrick Clerens, Bernard de Galembert, Vincent Gilles, Eberhard Gschwindt, Jonas Helseth, Alan Kreisberg, Marco Mensink, Gianpiero Nacci, Jean-Baptiste Renard, Fabrice Rivet, and Peter Sweatman.

## Contributions from 195 firms & organisations

The following organisations participated at the expert workshops:

ASPIRE	Confederation of European Paper Industries (CEPI)	The Union of Electricity Industry (EURELECTRIC)	Joint Undertaking (FCH-JU)	Lasselsberger	Shell
Aalto University	The European Ceramic Industry Association (CERAME-UNIE)	Euroatomizado	Fuels Europe	Leclanché	Siemens
AAT Geothermae	Clariant	European Steel Association (EUOFER)	Gaelectric	Lhoist	Sofidel
Adelphi	CMI Group	European Non-ferrous Metals Association (EUROMETAUX)	GasNatural Fenosa	Lime Trade Association	SolarPower Europe
ADS tec	CO2GeoNET	European Association of Mining Industries (EUROMINES)	Gassnova	Linde	Solvay
Air Liquide	Complexul Energetic Oltenia	EuropaBio	General Electric Grid Solutions	LKAB	SSAB AB
Aker Solutions	Concawe	European Aluminium Association	GE Power	LyondellBasell	Statoil
AkzoNobel	Corbion	European Association for Storage of Energy (EASE)	Glass Technology Service	Magnesitas Navarras	Stazione Sperimentale del Vetro
Albermarle Europe	Covestro	Hüttentechnische Vereinigung der Deutschen Glasindustrie	Global Bioenergies	Milton	Stoelzle Glass Group
Alcoa	Credit Suisse	Hydrogen Europe	Global CCS Institute	Ministry of Petroleum and Energy, Norway	Stora Enso
Alfa Mediterranean Enterprises Limited	CRM Group	Iberdrola	GreenStream Network Ltd	Mitsubishi Hitachi Power Systems	Summit Power
ArcelorMittal	CSS Association	IF Steelman	Heidelberg Cement AG	Moixa	TAQA
Ardagh	Centre Technique du Papier	IG BCE	Moixa	Neste	Tata Steel
Argex	DCNS Group	Imerys	Neste	Netherlands Enterprise Agency	The European Biomass Association (AEBIOM)
Arkema	Diehl	Institute for Infrastructure, Environment and Innovation (IMIEU)	Netherland Enterprise Agency	Nickel Institute	Thyssenkrupp AG
Atlantis resources	Dow Chemicals	Industrial Europe	Nickel Institute	Norsk Hydro ASA	Tocardo
Aurubis	DP Energy	Ineos	Norsk Hydro ASA	North Sea Basin Task Force	TOTAL
BA Vidro	DSM	innogy SE	North Sea Basin Task Force	Nippon Sheet Glass	TRIMET Aluminium
BASF	Ecocem	International Bromine Council (BSEF)	Nippon Sheet Glass	Ocean Energy Europe	Turbodown
Bellona	Ecofys	International Association of Oil & Gas Producers (IOGP)	Ocean Energy Europe	Owens-Illinois	Uniper
Bio-based Industries Public-Private partnership (EU Joint Undertaking)	European Cement Research Academy (ECRA)	Irish Cement Limited	Owens-Illinois	Owens Corning	UPM
Bolloré	Electricite de France	ISPT	Owens Corning	Papiertechnische Stiftung	Valmet Oy
Borealis	EGS Energy Ltd	Evonik Industries	Papiertechnische Stiftung	PGE Polska Grupa Energetyczna	Veerhaventcapital
BP	Eiffel IG		PGE Polska Grupa Energetyczna	Energetyczna	Verallia
Caisse des Dépôts et Consignations	Elkem AS		Energetyczna	Plastics Europe	Vestas
Cambridge Energy Partners	Emerson		Plastics Europe	Port of Rotterdam	Vesuvius
Carbon Capture and Storage Association (CCSA)	Enel SpA		Port of Rotterdam	Pöyry Management Consulting	VoestAlpine
Carmeuse	ENGIE		Pöyry Management Consulting	Repsol	Voith
CCS project Cork	ENI		Repsol	RHI AG	VTT
Celsian	Ervia		RHI AG	Innventia	Wienerberger
Cemex	Estela Solar		Innventia	ROAD Project	Wind Europe
Centro Ceramico Bologna	EuLA/IMA Europe		ROAD Project		WVMetalle
					Yusa

# Over 80 technologies identified and “Techno-hubs”

## 80+ Pathways & Technologies

Which are economically and societally optimal?



Optimal Pathways are likely to involve:

- a. **Cross-sectoral technology solutions**
- b. **Collaboration**

## Cross-sectoral Initiatives:

Promotes research and innovation efforts across Europe by supporting the most impactful technologies in the EU's transformation to a low-carbon energy system

**EU SET-Plan**  
Strategic Energy  
Technology Plan

**European Technology Platforms**

Comprising 41 platforms, ETPs fosters research & innovation agendas and roadmaps for action at EU and ntl level to be supported by both private and public funding



**High-level Panel on the European Decarbonisation Pathways Initiative**

Steers the implementation of the European decarbonisation pathways initiative (EDPI), through the provision of independent strategic advice on objectives and milestones.

Supported by the WBCSD and comprising 165 companies and numerous sectoral technology plans



# Barriers and Risks Identified tended to focus on:

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**A**

Need to Improve,  
strengthen or identify



- The business case and drivers for long-term and deep decarbonisation beyond incremental and short-payback measures.

**B**

Often changing/ not fully  
developed regulatory  
frameworks



- Many less mature technologies (e.g. second generation renewables, energy storage, self-generation, demand response, CCU and hydrogen infrastructure) have uncertain future frameworks and some mature technologies also impacted by changing policies.

**C**

Project Approvals



- Issues around permitting, licensing and technical quality approvals for new technologies and low carbon products.

**D**

Collaborative Solutions




- The overall immaturity of “collaborative solutions” and their frameworks.

# Binary Challenges for Low-carbon Industries:

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## *Process, Product or System Innovation*

“Where” in the supply chain to deliver the final customer outcome the decarbonisation technology innovation is required



**a. Upstream**

- Decarbonising energy and resource inputs

**b. Process**


- Decarbonising the existing transformation assets

**c. Downstream**

- Decarbonising demand through product recycling or replacement with lower carbon intense alternatives

## *Cross-cutting, multi-sector Collaborative Technologies:*

Need to “collaborative consortia” that offer multi-sectoral opportunities to demonstrate key “end of pipe” breakthrough solutions



## **Industrial Ecology to deliver:**

**a. Intelligent Energy Management & Storage**

**b. Green Hydrogen Solutions**

**c. CCS**

# Cross-sectoral Segments have Unique Challenges:

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## *Decarbonising Energy Generation*

Challenge to Identify the most fertile areas for Technology Innovation – hand in hand with evolving regulatory markets



- a. **New Generation Renewables**
  - Adding to mature renewable technology portfolio
- b. **Smart Distribution Models**
  - Enabling modern and efficient energy networks
- c. **Storage as Enabler**
  - Cost effective energy storage can play different and evolving roles as renewable and EV shares increase.

*CCS and other potential transformational technologies require collaboration:*

Need to “collaborative consortia” that offer multi-sectoral opportunities to demonstrate key “end of pipe” breakthrough solutions



## **Industrial Ecology to deliver:**

- a. **Green Hydrogen Solutions**
- b. **CCS (and CCU)**



# Technology Innovations: “Green Hydrogen” and CCS

## “Green” Hydrogen

1. HYBRIT, H2Future, SuSteel and SALCOS (Steel)
2. Hydrogen as a reducing agent (cf. the CIRCORED process – Steel)
3. Hydrogen based production processes (NFM)
4. Hydrogen to take Sulphur out of transport fuels and for conversion schemes (O&R)
5. Fatal H2 generated as side stream (C&BB)
6. Hydrogen as low-carbon fuel for the transport sector (RES)
7. Renewable hydrogen as storage medium (ES)
8. Hydrogen production with CCS

## CCS

1. Detailed feasibility study, complete with requests for storage authorizations, was an integral part of the ULCOS-II program proposed around the ULCOS-BF project under NER-300
2. Carbon2Chem (ThyssenKrupp) and Steelanol (ArcelorMittal & Lanzatech)
3. Building materials incorporating CO2 (C&L)
4. Conversion to Syn-fuels (NFM)
5. Biogenic & boosting forest carbon capture (P&P)
6. Chemical valorization of CO2 (& CO) from gaseous industrial effluents (C&BB)
7. Pre-and post-combustion capture (O&R)
8. Soda-ash production (local small scale application - G&C)
9. Carbon sequestration and reuse (C&L)
10. Second generation capture technologies (such as high pressure turbines or subsea separation)
11. Innovations in transport of CO2 (gas pipelines, buffer storage, ship transport and their combinations and sharing of infrastructure)
12. Increasing of storage capacity by pressure management, better knowledge sharing, development of CCS hubs and clusters, Enhanced Oil Recovery demonstration



# **Key Cross-Cutting Recommendations**

# IF: Which Instruments, Procedures and Structure ?

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## *What Instrument(s) are needed from the Innovation Fund?*

Experts discussed wide spectrum of instruments such as: grants, concessionary debt or equity, risk sharing instruments, guarantees, revenue support, insurance, working capital facilities (OPEX) and various hybrids.



- There was a tendency to prefer grants from all the sectors
- The need for working capital (or OPEX) financing as well as CAPEX.

## *What procedures and structures are needed by the market?*

The Innovation fund should have transparent procedures, simple administration, reduce the “weight” of procedures through a two-stage application and provide funding upfront and against milestones.



- The IF should remain flexible, as much can happen over a decade
- IF can target support at projects that produce collaborative partnerships

# IF: Nine Key Recommendations

1	Transparent and Clear Qualification Criteria
2	Clear list of finance products on offer (primarily grants; and complementary de-risking products (e.g. FLP, loans, equity))
3	The Innovation Fund should ideally be a revolving fund
4	Simple, two-stage application process with multiple competitive calls
5	Expert and independent decision making processes and adequate resources
6	Milestones-based disbursement logic
7	Signposting (and potentially project development assistance) as a complementary “Service” provided by IF
8	Advantages for “collaborative consortia with cross-sector technologies” (at stage 1)
9	Stable regulatory environment for the Innovation Fund

- Each sector has identified incremental and breakthrough technology needs.
- Many of the production sectors can also benefit from cross-cutting decarbonisation technology solutions such as:
  - Carbon Capture and Storage/Use
  - Green Hydrogen
  - Intelligent Energy Management
  - Renewables and Storage

# Thank you

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