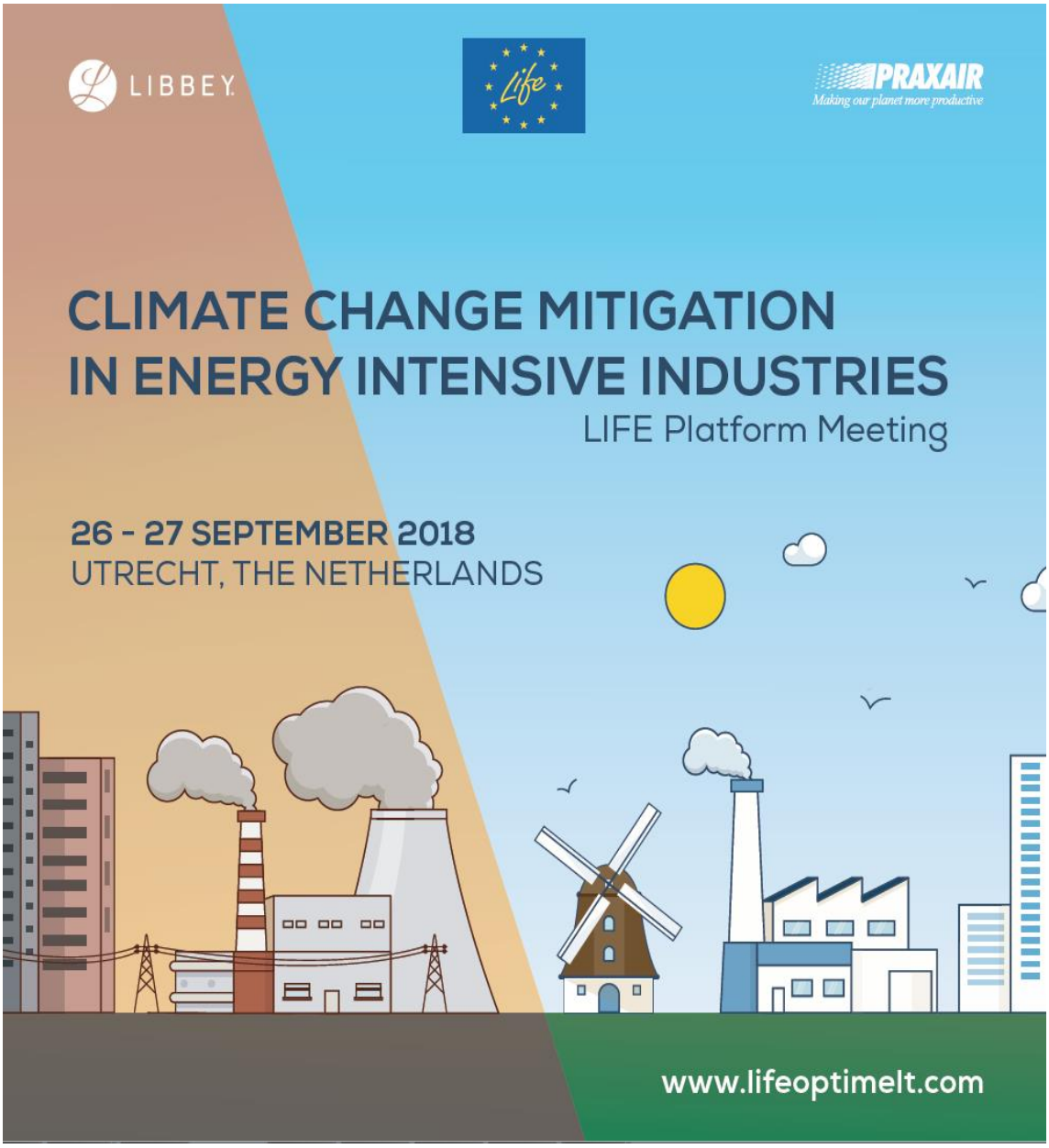
EUROPEAN COMMISSION
Executive Agency for Small and Medium-sized Enterprises



LIFE Platform Meeting
Climate Change Mitigation in Energy Intensive Industries (EII)

UTRECHT, THE NETHERLANDS, 26-27 SEPTEMBER 2018

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INTRODUCTION – BACKGROUND TO AND AIM OF THE PLATFORM MEETING

The Paris Agreement has renewed efforts to tackle climate change with the long-term goal of keeping the increase in global average temperature to well below 2°C above pre-industrial levels. In this context, energy intensive industries play a critical role in achieving such a goal, as they represent about 24% of global greenhouse gas (GHG) emissions and 36% of global total final energy consumption (2014 data)[1]. However, the financial and competitiveness cost for switching to new industrial processes requires significant upfront investment with no guarantee of returns.

Over the last couple of decades the European Union has put in place a series of legislative measures to help decoupling industrial production from CO_2 emissions, notably: the Emissions Trading System, Directive on Energy Efficiency, Industrial Emission Directive, Ecodesign Directive, Energy Performance of Buildings, Electricity Market Design, Renewable Energy Directive, the 2020 Climate and Energy Package, the 2030 Climate and Energy Framework, and the 2050 Low Carbon Road Map. Through the LIFE programme and its Climate Action sub-programme, the European Union has set up a financial instrument that contributes to the development of low-carbon technologies, the uptake of Best Available Techniques (BAT) and the demonstration of good practices in the energy intensive sector.

LIFE platform meetings aim to promote the exchange of knowledge and good practices, to **facilitate networking and synergies** among LIFE projects active in the same broad policy area and to **provide policy feedback to policy makers**. Such meetings also engage other relevant stakeholders from the European institutions, national and local authorities, civil society and the private sector. This interaction enables the exchange of views on the content and implementation of EU policies and can contribute to new or improved legislation.

As the first platform meeting to cover Energy Intensive Industries since the start of the LIFE programme, the Utrecht meeting attracted some seventy participants including beneficiaries of the LIFE and H2020 programmes, policy-makers from the EU and national level, civil society and private sector representatives with the overall goal to **discuss how Energy Intensive Industries (EII) can contribute to implementing the European Union's roadmap to emissions reduction** and, eventually, decarbonisation. The platform meeting covered the glass, ceramics, cement, steel and other metals sectors.

The meeting included three main parts:

- Plenary sessions on the policy context, implementation support mechanisms and technological solutions;
- Working groups focusing on key issues of shared concern and possible synergies among the participating projects;
- Visit to a LIFE and a Horizon 2020 project, from the glass and steel sector respectively:
  - LIFE OPTIMELT – Demonstration of thermochemical reforming of natural gas for reducing GHG emissions in energy intensive industries (LIFE15 CCM/NL/000121),
  - LOCO2FE – Development of low CO2 iron and steelmaking integrated process route for a sustainable European steel industry (H2020-SILC-II-2014).

[1] " Tracking clean energy progress", International Energy Agency, 2017.

Visit to the project LIFE15 CCM/NL/000121 - LIFE OPTIMELT

Visit to the project H2020-SILC-II-2014 - LOCO2FE

PART I – SUMMARY FOR POLICY-MAKERS

The platform meeting on climate change mitigation in Energy Intensive Industries illustrated that European industry has the skills, ideas and willingness to innovate along decarbonisation pathways that contribute to achieving the EU emission mitigation targets.

Barriers to deploying breakthrough technologies, which are at the research or pilot phase, are not only technical. They also have very much to do with the framework of policies, funding mechanisms, incentives and disincentives put in place. Therefore, the role of policy-makers and financial institutions, as well as the overall functioning of the economy, are key to enabling the transformation of industrial activities towards an increasingly decarbonised future.

Below are some **key policy recommendations** that emerged from the discussions held between a well-diversified group of some 70 participants, which included representatives of 27 LIFE projects and Horizon 2020 projects from the glass, steel / metals, cement and ceramics sectors, the European Commission, the Executive Agency for Small and Medium-sized Enterprises (EASME), the European Investment Bank (EIB), NGOs and consultancies:

Need for long-term vision, support and policy coherence

- The industry is ready to innovate in a climate-friendly direction but needs support with vision and long-term duration, commensurate with the long-term character of the large investments that need to be made.
- Several "push and pull" policies and instruments (funding schemes, tax and other incentives, etc.) at the EU, national and regional levels were mentioned by the participants as conducive to reducing the investment risk of the industry and triggering more relevant investments.
- The stability (long-term perspective), credibility and coherence of climate/energy/industry policies are key parameters; the rules should be known in advance by the EIIs to be considered in their long-term strategies.
- The role of the LIFE and H2020 programmes was highly appreciated by the participants, some of whom suggested that a step further should be taken towards long-term grants, which would help alleviate the high level of risk, long R&D time, and substantial investments required.

The role of the EU Emissions Trading System (ETS)

- Carbon pricing is a key driver of a low-carbon transition but cannot be used as the only lever to trigger investments in breakthrough technologies.
- Pricing mechanisms should be designed properly so as to mitigate the risk of "carbon leakage".
- A minimum floor price could provide more long-term certainty needed for investors in low-carbon innovations.

The role of financial institutions

- To scale up, successful LIFE and H2020 projects in climate mitigation and resilience (adaptation) need access to markets (funding).
- Clear standards are needed for financial institutions to identify and support green / low-carbon projects.
- The LIFE programme could serve as a validation tool, allowing successful projects a fast-track consideration regarding funding by financial institutions like the European Investment Bank (EIB), (e.g. from EIB and LIFE's PF4EE financial instrument - Private Finance for Energy Efficiency).

Complementarity of sectors and broader sustainability

- The energy and industry sectors should be better coordinated in their moves towards decarbonisation. A key issue for industry is reliable energy supply at reasonable cost, which could lead to electrification of industrial processes, if secured. Otherwise, the industry will continue to explore alternative fuels such as biomass, which would then be needed in large quantities.
- The demand side has an important role to play in encouraging industry transition towards decarbonisation. Green procurement is a key tool in supporting the market introduction of low-carbon products by establishing niche markets.
- Environmental/social benefits of industry innovation towards decarbonisation should be better monitored, measured and promoted, for example through monetisation and awareness raising.
- The participants proposed to further link up the LIFE programme to the global Sustainable Development Goals (SDGs).

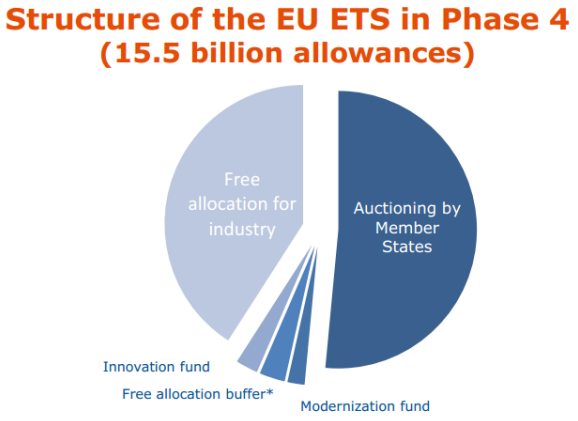
PART II – SESSION SUMMARIES

The Platform Meeting was structured into four sessions, which started after the Official Welcome by Mr **Marco Van Valburg** and Mr **Frank Schuurmans** (Libbey, host project Optimelt, see information on the project in Annex 4) and by Mrs **Laura Giappichelli** (EASME). Mrs **Mayke Derksen,** from the Office of the LIFE National Focal Point for The Netherlands / Netherlands Enterprise Agency (RVO), also addressed a greeting to the meeting participants and shared an overview of LIFE projects in The Netherlands.

Session 1 - EU-level policies on energy-intensive industries, GHG emission reduction and energy efficiency

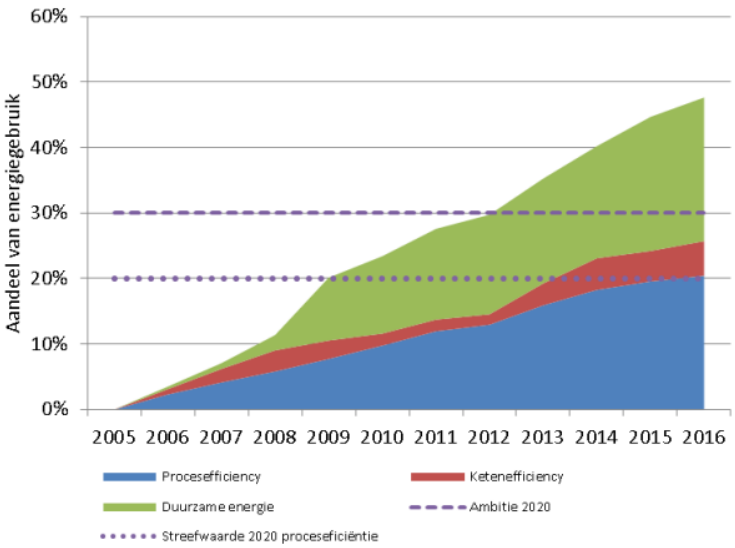
This first session was moderated by Mr **Franz Immler** (Head of Sector Climate Action, H2020, EASME) and aimed to inform the audience about European and national policies affecting energy-intensive industries.

After a short introduction to EU Emission Trading System (ETS) key facts and figures, Mr **Piotr Grzesikowski** (Policy Officer, DG Climate Action, European Commission) presented the ongoing revision process of the ETS Directive in view of phase 4 (2021 – 2030). The Directive's implementation started in 2005 with the aim to reduce the GHG emissions by 20 % by 2020 (compared to 2005 levels), knowing that the ETS covers about 45 % of EU GHG emissions. The reduction effort must be doubled during phase 4 compared to the three first periods, with a reduction goal of 43 % by 2030. To reach this objective, Mr Grzesikowski explained that the EU ETS will be strengthened, by increasing the annual emission reduction cap from -1.74 % per year during phase 3 to -2.2 % per year during phase 4. The mechanism to reduce the surplus of emission allowances in the carbon market, the Market Stability Reserve (MSR), will be reinforced and the amount of allowances to be put in the reserve will be doubled between 2019 and 2023 (24 %). Free allocations will be prolonged for a decade to preserve EU industry competitiveness and avoid carbon leakages. However, the system of free allocation has been revised to focus on sectors at the highest risk of relocating their production outside of the EU. Another key pillar of the revised Directive will be the inclusion of two new funds for low-carbon transition, i.e. the Innovation Fund (based on the existing NER300 Programme) and the Modernisation Fund.



Mr **Marc Streefkerk** (Programme Manager on Energy Efficiency, Dutch Ministry of Economic Affairs and Climate Policy) was invited to present the mechanisms put in place by the Dutch Government to reduce the GHG emissions of Dutch industry (also in sectors not covered by the ETS).

Mr Streefkerk emphasised the existence of Long-Term Agreements (LTA) that are signed between the Government and companies to promote energy savings in industry, service and agricultural sectors. They have been part of the Dutch energy policy since 1992 and now involve 1,110 companies (1,000 under the MJA3 schemes for non-ETS industries and 110 under the MEE scheme for ETS industries). This corresponds to an annual energy consumption of about 829 PJ, i.e. 80 % of industrial energy consumption in Netherlands and 25 % of total energy consumption. These agreements lead to obligations and benefits. An energy efficiency plan is defined with the support of the national energy agency (at least 4-year duration) and verified by the Ministry. Measures should be put in place to reduce energy consumption with a payback of less than 5 years. Once launched, the implementation of the plan is regularly monitored by the national agency. The results of these instruments have been satisfactory, with 112 PJ saved in total between 2008 and 2016 and an increase in energy efficiency of 20 %. The conditions of agreements evolve over time to include more features and a global climate agreement is under preparation (exceeding EU goals).



Energy efficiency and transition are encouraged by other general policies/legislations such as energy and/or energy tax, renewable energy subsidies, Demonstration Energy Innovation (DEI) grant scheme, Energy Investment Allowance (EIA - to invest in energy-efficient technology and durable energy under favourable fiscal conditions).

<u>Interactive panel session with Q&A involving the following LIFE projects and stakeholders:</u>

The above two presentations were followed by an interactive discussion involving Mr Grzesikowski, Mr Streefkerk and three discussants with LIFE project experience:

- Mr **Francesco Nicolli** (Research Associate, European University Institute) introduced the LIFE15 GIC/IT/000051 – LIFE SIDE project, which is under implementation by academic stakeholders and mainly aims to support the EU policy makers in the ETS Directive revision. It merges the conclusions of the EU ETS ex-post evaluation (2005 – 2015 period) with feedback from stakeholders collected through the organisation of workshops. An assessment report was developed on the "hot topics" of the ETS and includes five chapters. As the new ETS has now been approved, in the last part of its activities, the project will also focus on the extension of the EU ETS to other non-EU countries.

Mr Nicolli briefly presented some key conclusions of the assessment report:

- *Free allowance allocations*: since phase 3, the methodology to allocate allowances has been improving.
- *Impact of EU ETS on competitiveness and carbon leakage*: there is no evidence of the negative impact of the ETS on industry loss of competitiveness and subsequent relocating outside of the EU, which would lead to carbon leakage.
- *Capacity of EU ETS to support low-carbon investments*: there was a clear agreement among academic community and stakeholders that the ETS has not been able to drive low-carbon

transition, due to the financial crisis context and a lack of regulation of free allowances. Automatic mechanisms are needed to regulate the stock of free allowances, based on clear and long-term rules (which is one of the improvements foreseen in phase 4 of the ETS).
- *Policy interactions*: other policies and tools in addition to ETS are needed to address different targets (e.g. tools for renewable energy development). However, it was found that some tools have negative interactions, which leads to lower prices of allowances and lower investment capacities for low-carbon transition.

- Mr **Sam Van den Plas** (Senior Policy Officer, WWF European Policy Office) briefly summarised the achievements made in the framework of LIFE14 GIC/BE/000590 – LIFE MaxiMiseR project, which ended in July 2018.

Mr Van den Plas confirmed that there is an urgent need to shift more public and private financial resources towards the development of low-carbon technologies and infrastructures, using the ETS revenues from the auctioning of allowances. So far, 85 % of the ETS revenues have been invested in climate action, of which 90 % are used in the country itself and 10 % go to international funds.

A matter of concern is that the emissions of EIIs are currently stable and do not decrease quickly enough. According to the MaxiMiseR project conclusions, three main measures should be put in place to address this issue:

- *More scarcity of free allowances* to increase the allowance cost and generate more revenues from ETS. The cost of allowances has been increasing faster recently, which is a good signal (the threshold of 20 €/ton CO_2 has been reached).
- Allocating more investment to develop breakthrough technologies (based on the NER300 Programme model).
- Improving the quality of reporting on the use of allowance auctioning revenues by the member states for a better monitoring/evaluation.

- Mr **Lars Nilsson** (Professor, Lund University) is the coordinator of the H2020 project REINVENT (Realising Innovation in Transitions for Decarbonisation), which is an interdisciplinary project that includes modelling, social sciences and demonstration activities. Its aim is to study and understand transitions and emerging initiatives in sectoral contexts, where government climate policy is only one of many factors that shape perceptions and strategies. Through a bottom-up perspective, REINVENT focuses on meat/dairy, paper, plastics and steel – four industrial sectors that are financially important, but where low-carbon transitions are still relatively unexplored.

Mr Nilsson underlined that decarbonisation requires, in addition to new technical solutions, also non-technological factors such as supply chains, financing, trade, and social and economic impacts. This perspective is necessary for supporting the innovations and system-wide transformations that are needed.

For instance, electrification of industrial processes raises the questions of supply security and adaptation of energy infrastructure, which therefore changes the relationship between the industry and energy sectors.

The best pathway for decarbonisation of each of the sectors targeted by the project is clear for some of them (i.e. paper industry) but remains to be defined for the plastics sector.

These initial comments were followed by discussions among the panel participants, the moderator and the audience.

The key conclusions of Session 1 can be summarised as follows:

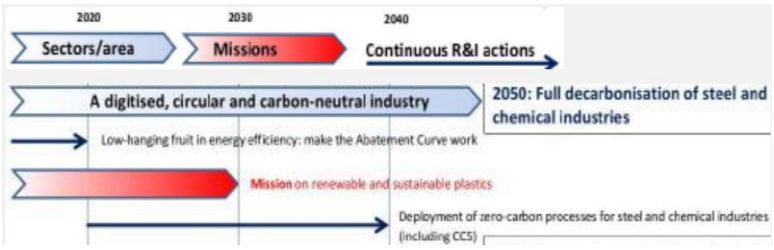
- **A more stringent policy is required to better regulate the carbon market and increase the carbon price; the availability of free allowances should be decreased and eventually suppressed.**
- **The carbon price is not the only driver for long-term investments and can intensify carbon leakage, if not properly regulated. It is therefore crucial to increase the investments in low-carbon technologies and infrastructures.**
- **The stability (long-term perspective), credibility and coherence of climate/energy/industry policies are key parameters; the rules should be known in advance by the EIIs to be considered in their long-term strategies. For instance, innovative technologies were developed in the energy sector where policies have been more stable (secured investments).**
- **The EU ETS is not the only policy instrument aiming to reduce the GHG emissions of EIIs. Several "push and pool" policies and instruments (funding schemes, taxes, other incentives) at the EU and national level are needed to improve the resource and energy efficiency of industries. However, these tools should work more in tandem and should be more coherent.**
- **The demand side has an important role to play; targeted green procurement enables the market introduction of low-carbon products by establishing niche markets and thus could be one of the possible levers, but capacity building and networking are needed to improve the knowledge of public authorities and other relevant stakeholders (i.e. final consumers).**
- **The contribution of academics and NGOs is crucial to assess the performance of companies in their transition to low-carbon economy.**

Session 2. Industry commitments, monitoring and implementation support mechanisms, including funding

The second session was moderated by Mrs **Femke De Jong** (Policy Director, Carbon Market Watch) and focused on the financial levers available to support the industry in the low-carbon transition and on those that need to be reinforced/created to accelerate the transition.

Ms **Irena Gabrielaitiene** (Project Adviser, H2020 Environment and Resources Office, EASME) was the first speaker of the session and provided an overview of the EU funding schemes available for 2019 – 2020 and beyond.

First, Ms Gabrielaitiene presented instruments that do not address specific sectors but rather support certain types of organisations, such as the SME Instrument, which supports for-profit SMEs willing to develop and bring to the market new products, services and business models. The H2020 Fast Track to Innovation (FTI) is meant for industry consortia (private for-profit). Then, Ms Gabrielaitiene presented a set of funding programmes addressing climate and environmental issues. On the energy efficiency topic, she focused on the following calls for proposals: H2020 - LC-SC3-EE-6-2018-2019-2020 (Business case for industrial waste heat/cold recovery) H2020 - LC-SC3-EE-8-2018-2019 (Capacity building programmes to support implementation of energy audits), H2020 - LC-SC3-EE-9-2018-2019 (Innovative financing for energy efficiency investments).



Ms Gabrielaitiene also briefly presented the following calls: H2020 - LC-CLA-02-2019 (Negative emissions and land-use based mitigation assessment), H2020 - CE-SC5-04-2019 (Building a water-smart economy and society). To conclude, Ms Gabrielaitiene showed the trends for the post-2020 period, based on the interim recommendations that had already been formulated and should be finalised by the end of year. It can already be said that funding will aim to support longer-term breakthroughs that can evolve into deployable technologies in the 2040 – 2050 horizon (i.e. zero-carbon processes for steel production and the chemical industry, breakthroughs in Renewable Energy Sources (RES), etc.).

Mr **Hans Verboven** (Executive Director, EY Climate Change & Sustainability Services, Professor, University of Antwerp) shared his expertise on sustainability management and value delivery. The notion of Corporate Social Responsibility (CSR), which covers economic, environmental and social development was emphasized. According to Mr Verboven, continuous improvement in these fields should be part of the development of any organisation. Tools (and consultants) are available to support this process, and companies are advised to rely on them.

Companies can be the solution to environmental and social issues, but they need to find the right business model to do it with the objective to create shared value.

Subsidised projects can be considered as start-ups, where a certain amount of time is devoted to developing a technology before reaching the market. Mr Verboven encouraged the project beneficiaries to think "out of the box", like start-up entrepreneurs, and to use appropriate tools to do it (including measurement and monitoring). He underlined that many companies fail to commercialise their product/service because they do not deliver something valuable for the customers. Key success parameters are:

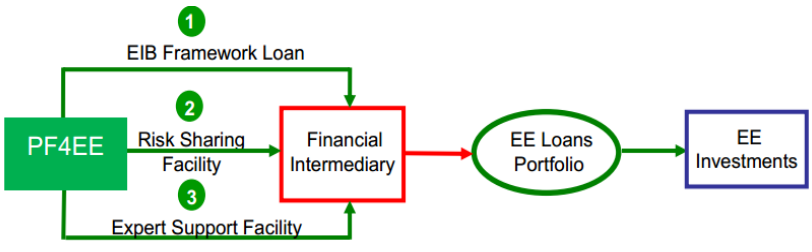
- Scalability: forward thinking, mindset, leveraging outside resources, lean manufacturing techniques, partner with big companies, continuous innovation strategy;
- Replicability: targeted customers and geographies, understandable/simple, franchising models;
- Viability: on economic and societal (environment/people/purpose) points of view.

Mr **Antonio Lopez Martinez** (Energy Engineer, Energy Transition Programmes, European Investment Bank – EIB) started his presentation by underlining that the EIB has the ambition that 35 % of its financial operations be related to climate action. The main obstacle to that, though, is to identify suitable projects with adequate consortia and capacity to measure impacts.

The presentation was focused on the Private Finance for Energy Efficiency (PF4EE) instrument, which is supported with resources from the LIFE Programme and aims to increase private financing for investments in projects that enhance energy efficiency and thus to support EU member states on their path towards achieving the EU energy efficiency targets.

Mr Lopez Martinez informed the audience on:

- *The eligible sectors and technologies*: energy efficiency in existing residential and public buildings, renewable energy integrated in existing buildings, energy efficiency in production facilities, energy efficiency in public lighting infrastructure, cogeneration of heat and power, energy efficiency in district heating or cooling.
- *The implementation status*: 12 Financial Intermediaries from 10 different EU countries had submitted applications, out of which 9 have signed cooperation agreements (Belfius Banque in Belgium, Zagrebacka Banka in Croatia, Credit Cooperatif in France, Komercni Banka in Czech Republic, Cyprus Cooperative Bank in Cyprus, BPER Banca in Italy, Banco BPI in Portugal, Banco Santander in Spain and Piraeus Bank in Greece).
- The three mechanisms included in the PF4EE instrument: EIB Framework Loan (loans to financial intermediaries to finance energy efficiency investments), Risk Sharing Facility (covers losses incurred in the portfolio of energy efficiency (EE) loans granted by the financial intermediaries), Expert Support Facility (consultancy services for financial intermediaries to help them develop EE lending in a sustainable way).



Interactive panel session with Q&A involving LIFE / H2020 projects and stakeholders:

The above three presentations were followed by an interactive discussion involving Ms Gabrielaitiene, Mr Verboven, Mr Lopez Martinez and three LIFE/H2020 project representatives:

- Mr **Michael Hayne** (Senior Analyst, 2° Investing Initiative) introduced the LIFE16 GIC/FR/000061 – LIFE PACTA project (15/06/2017 – 13/12/2019), which aims to reach two main objectives:
  - Develop a framework to measure and assess the alignment of financial markets with climate goals. This framework can form part of the UNFCCC stock-take, inform national dialogue around policies, support potential policy adjustments, and allow governments to develop voluntary and mandatory regulatory frameworks to mobilise non-state actors for the alignment with the Paris Agreement.
  - Provide financial supervisory authorities with the tools to measure and monitor financial risks in capital markets associated with the transition to a low-carbon economy, to reduce the information asymmetry between private sector actors and policymakers on climate policies and associated market trends, ensure a stable and smooth transition to a low-carbon economy that does not disrupt financial markets, and to improve the efficient intermediation of capital in a way that prices correctly long-term risks and by extension reduces the costs of the transition.

The PACTA model has been tested with 3 European financial institutions (Netherlands, Switzerland, UK) and with a bank located in California. Surveys were conducted but it is too soon at this stage to conclude whether a shift in financial institution investment patterns has really started or not.

- Mr **Marco Baresi** (Institutional Affairs and Marketing Director, Turboden SpA) illustrated how LIFE and H2020 programmes have supported since 2010 the development of Turboden's skills in waste heat recovery (WHR) technologies (through Organic Rankine Cycle process):
  - LIFE H-REII (2010 – 2012): screening of state-of-the-art WHR technologies, assessment of the WHR potential of EEIs trough energy audits;
  - LIFE H-REII DEMO (2012 – 2014): implementation of the first waste heat recovery plant in steel industry and contribution to the development and upgrade of regulations and incentive schemes concerning energy efficiency in general and waste heat recovery in particular;
  - H2020- SILC - W-HAVES (2013 – 2015): focused on finance, dissemination and exploitation aspects;
  - LIFE WHIN (2017 – 2020): Energy service company (ESCO) model applied to a new industrial sector (the ESCO makes the investment in the technology, according to a new economic model).

Mr Baresi underlined the delays in the development of waste heat recovery for power installations in Europe (30 small – medium size plants) compared to China (1,000 large size plants). These delays are due to several barriers according to Mr Baresi:

- General *lack of awareness*;
- *Intensive capital investment required*, longer than traditional payback time expected by industries;
- *Lack of support to innovation* whereas it should be continuous;
- *Policy*: no connection between carbon leakage policy (e.g. incentives to reduce grid surcharge costs) and mandatory investment in EE, no comprehensive definition of WHR, no common EU incentive framework targeting WHR (i.e. White Certificates);
- *Finance*: No public insurance mechanisms for Energy Performance Contracts and external benefits not included in the investment evaluation.

- Mr **Eise Spijker** (Energy-climate economist/researcher at Joint Implementation Network) spoke from his experience with the H2020 projects STORE&GO (Shaping the Energy Supply for the Future) and TRANSrisk (Transitions Pathways and Risk Analysis for Climate Change Mitigation and Adaptation Strategies).

For the STORE&GO project, Mr Spijker mainly underlined that the low-carbon transition should be fast to reach the 2°C target and will highly rely on gaseous fuels for energy storage (H_2, CH_4 produced from electrolysis and methanation respectively), due to the fact that renewable energy sources are volatile and generate electricity intermittently.

The TRANSrisk project aims to analyse the transition mechanisms/processes in various sectors. The project has been confirming that transition clearly needs to be accelerated. One main concern highlighted by Mr Spijker is the mismatch between the traditional project implementation scales (e.g. LIFE and H2020 projects) and the larger scale (from the socio-economic and geographical points of view) that would be required to properly roll-out the required transition. The good performance of a technology can be demonstrated at the project scale, but this is sometimes insufficient to replicate the technology at a larger scale, due to a number of other obstacles (infrastructures, demand side, etc.). More synergies should be created between these various scales of development and the corresponding funding schemes.

As for session 1, these interventions were followed by a debate with the participation of the panel members and the audience.

The key conclusions of Session 2 can be summarised as follows:

- **From their emergence to their commercialisation, industrial projects addressing resource and energy efficiency issues can be financially supported by several EU funds and the ambition of the Commission (DG CLIMA, DG ENER, DG GROW) is to generally increase the support to such projects (e.g. Structural Funds).**
- **The main link between H2020 – LIFE – EIB instruments is maturity. Low TRL technologies will be rather financed by H2020, while low/moderate TRL technologies will be financed by LIFE and high TRL technologies will be supported by EIB tools. The interactions between H2020/LIFE programmes and EIB instruments should be reinforced, but already exists through the P4FEE. Next step is to facilitate the access to EIB instruments for successful LIFE and H2020 projects.**
- **In terms of energy efficiency, good efforts have been made to reinforce the link between financial institutions and stakeholders. However, those have mainly been applied to the building sector (e.g. energy management schemes, audits, loans, energy service markets) and should be reinforced in the industrial sector.**
- **Financial intermediaries have a crucial responsibility in financing climate mitigation and resilience (adaptation). It is the role of EIB to support this trend. Green, social and sustainable bonds are emerging, but specific mechanisms should be developed, based on capacity building and awareness raising. Financial institutions need standards to define green projects and environmental/social benefits should be better monitored, measured and promoted (e.g. through monetisation).**
- **Key success parameters of projects are scalability, replicability, economic and societal viability. It is necessary to incorporate social sciences in R&D projects seeking to develop low-carbon technologies and products. A good stock of social science knowledge is needed at an early stage to adequately prepare the scale-up of a technology.**

Session 3. Focus on technological solutions and Best Available Techniques

Plenary Session 3, moderated by Mr **José Moya** (Scientific Officer, Joint Research Centre, European Commission), aimed to provide an overview of best available techniques to mitigate energy consumption and GHG emissions (with a focus on those tested in LIFE and H2020 programmes), their advantages/limits and overall degree of maturity, as well as their transferability/replicability potentials.

Ms **Anita Matic** (Policy Officer, DG ENV - Industrial Emissions and Safety, European Commission) opened the session by giving an overview of the Industrial Emissions Directive 2010/75/EU (IED) and Best Available Techniques (BATs).

The IED is the main EU instrument regulating pollutant emissions from industrial installations. About 50,000 installations undertaking the industrial activities listed in Annex I of the IED are required to operate in accordance with a permit granted by the authorities in the member states. The permits must take into account the whole environmental performance of the plant, covering e.g. emissions to air, water and land, generation of waste, use of raw materials, energy efficiency, noise, prevention of accidents, and restoration of the site upon closure. The permit conditions including emission limit values must be based on the Best Available Techniques (BATs) and should be updated within 4 years after the publication of the BAT conclusions (BATCs).

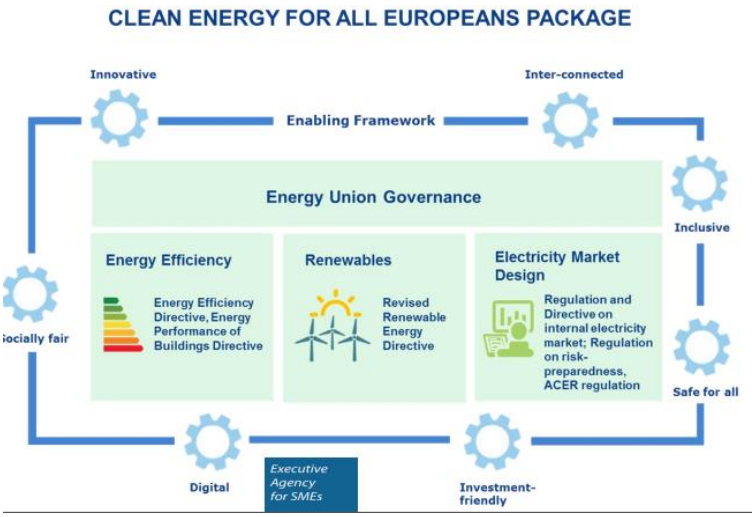
The procedures to draw-up and update reference documents on BATs (BREFs) are specified by the IED. The Commission organises an exchange of information with experts from member states (including working groups) to define the BATs according to an evidence-based methodology. The process is coordinated by the EU Joint Research Centre and the resulting BREFs are adopted by the Commission as Implementing Decisions.

Completed and published BATC	OJ publication date	Permit update
(1) Iron and steel production (IS)	08/03/2012	08/03/2016
(2) Manufacture of glass (GLS)	08/03/2012	08/03/2016
(3) Cement, lime and magnesium oxide manufacturing industries (CLM)	09/04/2013	09/04/2017
(4) Tanning of hides and skins (TAN)	16/02/2013	16/02/2017
(5) Production of chlor-alkali (CAK)	11/12/2013	11/12/2017
(6) Production of pulp, paper and board (PP)	30/09/2014	30/09/2018
(7) Refining of mineral oil and gas (REF)	28/10/2014	28/10/2018
(8) Wood-based panels production (WBP)	24/11/2015	24/11/2019
(9) Common waste water and waste gas treatment/management systems in the chemical sector (CWW)	09/06/2016	09/06/2020
(10) Non-ferrous metals industries (NFM)	30/06/2016	30/06/2020
(11) Intensive rearing of poultry and pigs (IRPP)	21/02/2017	21/02/2021
(12) Large combustion plants (LCP)	17/08/2017	17/08/2021
(13) Large Volume Organic Chemicals (LVOC)	07/12/2017	07/12/2021
(14) Waste Treatment (WT)	17/08/2017	17/08/2021

So far, 14 BATCs have been completed and published. BATs targeting energy efficiency are available in all BREFs except one (CWW – see table above) and contribute to the implementation of EED (impact estimated at -15 % of energy use by industries since 2008). Energy monitoring is also required in the majority of BREFs (9 among 14). Ms Matic then presented examples of BATs targeting energy efficiency for cement and glass industries. She concluded with some information on the Pilot Project on Innovation Observatory (IED), which aims at identifying and collecting information on novel/sustainable emerging techniques (ET) to include them in the BREF chapters on emerging technologies (candidates for BATs LIFE promotes ET as an objective in its calls for proposals.

Ms **Silvia Vivarelli** (Senior Project Adviser, H2020 Programme, Unit B.1 Energy, EASME) then presented an overview of the Energy Efficiency Directive (EED) framework, objectives and achievements.

She first reminded of the objectives of the 2030 climate and energy framework that was built on the 2020 package and adopted in October 2014, i.e. 27 % in energy efficiency increase (from 1990 levels), 27 % renewable energies in the energy mix and 40 % cuts in greenhouse gas emissions. To reach these targets, the EC proposed in 2016 the Clean Energy for all Europeans package, which notably includes a revised target of 32.5 % improvement of energy efficiency by 2030 and 43 % of emission cuts.



In this context, industry has a key role to play since it represents 25 % of energy consumption (main industrial sectors) and 20 to 50 % of the energy used in industrial processes is wasted, which contributes to energy use being a large part of operating costs (20 to 40 % of operating costs are related to energy consumption). Energy efficiency is therefore a key lever to preserve industry competitiveness. From 2005 to 2014, the industrial sectors in Europe reduced by about 16 % their energy consumption, but more drastic reductions need to be done.

Article 8 of the EED specifies the minimum requirements for energy audits. One main challenge of the industries is to implement EE plans once the audit is done, due to financial barriers. The Strategic Energy Technology Plan (SET-Plan) is the main tool to accelerate the research and innovation efforts for the low-carbon energy transition. EIIs are mainly concerned by Action 6 (Energy Efficiency for Industry) of the Plan, where priorities have been defined for each sector and considering the context of various member states.

Several projects have been already funded according to these priorities (H2020-SPIRE programme), among which 7 concerned WHR technologies. Ms Vivarelli presented 4 projects (TASIO, Indus3Es, Smartec, ETEKINA) and concluded the presentation with a description of the EU-MERCI project, which aimed at identifying the good practices put in place for EE in various industrial sectors in Europe (157 good practices analysed, database of 2,900 measures observed in EIIs, library with country and sector-specific analyses, etc.).

<u>Interactive session with Q&A involving LIFE / H2020 projects and stakeholders:</u>

These two presentations were followed by an interactive discussion involving Ms Matic, Ms Vivarelli, and four LIFE/H2020 project representatives:

- Before presenting the H2020-SILC-II-2014 LoCO2Fe project (Development of a Low-CO_2 Iron and Steelmaking Integrated Process Route for a Sustainable European Steel Industry), Mr **Koen Meijer** shared some key insights related to the steel industry:
  - All sectors depend on (quality) steel (e.g. transport, construction);
  - Steel is low-priced (e.g. the steel frame of a car represents a very small proportion of the final price) and this limits the capacity of the steel industry to invest in sustainable production processes;
  - World steel consumption has been constantly increasing (previously due to US/EU industrial growth and now mainly due to the economic growth of China and other emerging countries).

Main challenge is that world steel consumption may double in 2050, but the ambition is to cut CO_2 emissions by 50 % by 2050.

Steel companies have been working on new technologies for about 20 years. The HIsarna project, which brings together big steel manufacturers such as Tata Steel, Thyssen Krupp Stahl and Arcelor Mittal and was initiated in 2011, is a good example of these efforts to reduce energy consumption and GHG emissions.
Mr Meijer presented the development status of the H2020 LoCO2Fe / HIsarna project which is combining the use of biomass with the use of scraps and is achieving better results than expected. The next step is to build a full-scale plant with breakthrough technologies compared to those used in the current steel production facilities that were invented basically a century ago. Different pathways are being studied and selecting the right pathway takes time because many parameters should be taken into account, considering the long-life span of the plants and the not guaranteed volumes of biomass. Mr Meijer underlined that such R&D could have not been possible without subsidies, but the difficulty is to apply for successive short-term subsidies, when the development is long-term.

- After underlining the significant heat losses in industry, Mr **Raul Aragones** introduced the LIFE16 ENV/ES/000344 - LIFE HEAT-R project, which aims to demonstrate a new technology for directly converting waste heat into electricity, based on a thermoelectric principle called the Seebeck effect. The technology consists in a modular unit using multiple thermoelectric generator cells controlled through a patented programmable control unit, based on system-on-chip technology. Initially developed for the space industry, this technology could be adapted for EIIs thanks to H2020 and LIFE financial support. Through the LIFE project, the technology is implemented in various sectors and has shown a 20 % efficiency (heat to power, electricity directly sent to the grid) with no maintenance requirements.

- Mr **Vincent Meyer** then presented the objectives and achievements of the LIFE15 CCM/FR/000116 - SOLID LIFE project, which is developing low-carbon precast concrete products, combining innovation in both the production of Solidia cement (-30 % of energy/ CO_2 emissions due to changes in the raw mixes compared to Portland cement) and the Solidia concrete (CO_2-based curing process). Main challenges to scale-up the results are concrete durability, certification issues and market acceptance.

- Mr **Tunç Görüney** first supported Mr Meijer's key statements by underlining that one difficulty of the glass sector is that glass is low-priced and that the cost of energy in the production process represents 20 to 33 % of the cost of glass. The glass industry is therefore encouraged to implement energy efficiency technologies.

He then introduced the on-going LIFE16 CCM/BG/000059 - CleanOX project, which aims to decarbonise waste heat from the flue gases of oxy-fuel furnaces and reuse it in the process, based on the knowledge gained in the previous LIFE12 ENV/BG/756 - Eco-HeatOx project. According to Mr Görüney, subsidies are crucial for the development and testing of innovative technologies, so that they can be included in the next BREFs and be largely disseminated within the glass industry. But waste heat recovery is just a beginning and the next step is related to power generation, which should be based on renewable sources. To reach this target, centralising power generation to the power authorities is necessary (and industries are end-users). Meanwhile, these projects are intermediate steps which are needed to create a movement.

EU guidelines and national/local policies are sometimes not coherent, which puts industry in a difficult position. For example, the maximum level of NOx emissions recommended in BREFs is higher than the limits set by local authorities, which force the industry to further treat the NOx whereas the BREFs values were already respected.

Mr Görüney finally presented the LIFE17 CCM/BG/000069 – Smart Oxy-Boost project, which aims to improve the performance of a pre-existing technology and apply it to the flat glass industry. To conclude, Mr Görüney underlined the relevance and usefulness of the KPI database recently launched to monitor the impacts of LIFE projects.

As for sessions 1 and 2, these interventions were followed by a debate among the panel participants and the audience.

The key conclusions of Session 3 can be summarised as follows:

- **One key challenge for EIIs is that GHG emissions should be cut by 80 % by 2050 according to the EU low-carbon economy strategy, while the levels of production are expected to keep on increasing.**
- **Long-term policies should include long-term financing. The project representatives confirmed that the development of low-carbon technologies would not be possible without subsidies such as those granted by H2020 and LIFE programmes, considering the level of risks, long time needed for R&D and substantial required investments. The short-duration of some funding programmes is perceived as a barrier to developing breakthrough technologies. Long-term grants would facilitate progress.**
- **Selecting the right low-carbon pathway takes time because several internal and external parameters must be analysed, considering the level of investments and long-life span of the plants. For instance, Tata Steel engineers are preparing a 1-million-ton production facility that will require an investment from about 500 million euros if the current plant is renovated, to 3 billion euros if a new plant is built. Selecting the right design can only be made with a vision of the future, especially in terms of the energy supply landscape. The commitment of public institutions is needed to support these long-term strategies.**
- **One of the objectives of the H2020/LIFE projects is to develop technologies that can be included in BREFs. Impacting the next BREF update is among the objectives of most of the LIFE projects that participated in the event.**
- **Project beneficiaries can participate in the BREF update process by applying to join a working group,**
- **To increase the chances of successes of projects, the beneficiaries underlined that Intellectual Property issues (when several organisations collaborate) and risks of delays due to technical/administrative/organisational obstacles should be well anticipated at the proposal stage.**
- **Long, complex and expensive certification processes and the lack of market acceptance are common obstacles to technology scale-ups.**
- **Monitoring and measuring the impact of projects is necessary (e.g. to promote them on the market and in reference documents such as BATs) and the LIFE KPI database is one tool to do it.**

Session 4 a & b – Thematic working groups

Mr **Georgios Kostakos** (LIFE Climate Action Sector Coordinator, NEEMO) introduced the working groups, explaining how the discussion would be structured and the expected outcomes, to be summarised by the rapporteurs during the wrap-up session.

Three working groups were organised to address 3 main topics:

1. Pros and cons of the policy context applying to Energy Intensive Industries (EII), including carbon pricing and EU ETS (9 projects),
2. Resource efficiency and waste reuse/reduction (use of alternative fuel, use of recycled material, carbon storage / utilisation) (10 projects),
3. Energy efficiency (energy recovery, new efficient processes or technologies) (11 projects).

Some details on the working group discussions (addressed questions, group composition, etc.) are available in Annex 3.

The conclusions on how to help energy-intensive industries to achieve climate policy goals were shared by rapporteurs (2 per working groups, 6 in total) at the beginning of the second day and are summarised in the following sections.

WG1 - Pros and cons of the policy context applying to Energy Intensive Industries (EII), including carbon pricing and EU ETS

The following remarks and recommendations were formulated by the participants:

<u>General remarks on energy and climate policies:</u>

- There is a need for greater coherence among energy, climate and industrial policies at EU, national and regional level is required,
- Technological innovations should be better supported: for example, recycling of scrap metal from steel-making to be re-used in carbon-neutral electric arc furnaces, recycling of cement (smart crusher upscaling),
- Industries should be more encouraged to invest in energy efficient technologies after implementing obligatory energy audits (according to EED requirements),
- Provision of tax deduction at EU level could incentivise foster industrial fuel switching and foster energy efficiency-related investments within the ETS and non ETS sectors,
- Long-term strategies are needed:

- A strict compliance to quantified targets should be put in place: cash flow impact / high cost-structure,
- The solutions that are being designed today may be outdated tomorrow: an investment decision requires long-term developments while subsidies for projects are granted for short-term developments,
- The temporary use of offsets under ETS can allow innovations to mature.

Pragmatic enforcement & compliance are needed.

- Consumption/behavioural changes for decarbonisation should be tackled.

<u>Focus on ETS:</u>

- EU ETS auctioning revenues are a promising resource to fund industrial decarbonisation,
- One main challenge is to avoid carbon leakages by supporting investments in energy efficiency,
- The EU ETS has not really affected industries so far, due to a lack of "pressure". Carbon prices should be higher,
- The EU ETS does not affect the sectors characterised by small producers that are exempted (e.g. ceramic, sanitaryware),

- Free allocations, which have been conceived in response to the concerns of energy some intensive industries, such as the steel industry, are not appropriate for all industrial sectors,
- EU ETS not applicable to specific EII sectors, especially when significant percentage of CO_2 emissions from production line is process-related,
- Free allocations and cost pass-through may lead to windfall profits,
- Several issues are unclear and need clarifications, i.e.:
  - How to valorise in ETS the investment in waste heat to power made by EIIs?
  - Why are transmission of electricity and gas exempted?
  - Does the use of freely allocated permits undermine competitiveness and favour some industries against others?
  - "Why not extending the ETS with a minimum price (the so-called 'floor price'), so as to provide long-term clarity and the certainty needed for investors in low-carbon investments?"

WG 2 - Resource efficiency and waste reuse/reduction (use of alternative fuel, use of recycled material, carbon storage/utilisation)

Innovation/practices to reduce resource use and waste:

- Internal reuse of waste as a raw material, which is the first type of improvements applied,
- Substitution of raw materials by recycled ones (circular economy): the main problem is that recycled materials do not always meet quality requirements,
- Reduction of the needed quantities of raw materials,
- Simplification of production processes,
- Local sourcing of raw materials to reduce transport.

Barriers:

- Technical barriers to implement circular economy due to requirements of virgin materials in some cases (quality issues),
- Emission limits that can impede the use of some alternative fuels,
- Legislative barriers due to raw material storage if they come from recycling materials,
- Legislation do not necessarily promote the products that are manufactured according to circular economy principles (e.g. by delivering specific labels). Labelling approaches should be harmonised for products based on circular economy,
- Strengthening legislation is needed at the EU-level but also efforts to further support and boost material efficiency and circular economy related principles at national level through supervision, aiming at preventing from additional barriers created locally/regionally. The legislation should be harmonised (e.g. landfilling costs) at the EU and global level,
- Definitions on what is considered as waste and what can be considered as bi-products/recycled raw materials are not clear enough.

Mechanisms at the EU level that incentivise circular economy:

- Most of the participants (mainly technicians and engineers from the industrial sectors) have been applying circular economy approaches, but there is a general lack of knowledge of the EU policy framework around circular economy,
- Main identified financing tools related to circular economy are: LIFE, H2020.

Carbon Capture and Storage (CCS)/Carbon Capture and Use (CCU):

- Most participants have tested some carbon utilisation approaches in their sectors (e.g. direct use as pressurising element or in the food industry, chemical reactions to generate recycled

raw materials or fuels, feeding algae, etc). All of these proved to be technically feasible but not economically viable.

- Most utilisation solutions require additional energy and could possibly become viable only as "energy storage" mechanisms (e.g. spot grid abundance from renewables?)
- An obstacle to CO_2 utilisation is related to the quality grade (clearer definitions and a common approach are needed),
- Geological carbon storage is not considered safe and hardly represent a viable solution in the long term.

WG 3 - Energy efficiency (energy recovery, new efficient processes or technologies)

Strong and weak points in EU and national policies regarding energy efficiency and renewable energies:

- Main issue is the financial risk, energy efficiency and renewable energy sources are driven by costs. Even with funding, the risks remain big.
- Other risks: time scale, reliability in energy procurement, competition outside EU,
- Constraints: awareness (the stakeholders do not always have access to the right information), company size (e.g. small in Italy compared to other countries), agility of funding policies,
- Diverse situations among EU countries,
- What is expected is the mitigation of risks.

Possibilities to fully replace on the long term the direct use of fossil fuel in the energy intensive industry production with alternative fuel and/or electricity supply:

- Some industries can decarbonise their production by fully switching to electricity supply (e.g. medium size glass industry),
- Some industries need carbon as a raw material (as a reactant in the production process) and/or the production process leads to CO_2 emissions due to the raw material transformation (e.g. decarbonation of lime stone in cement industry). In those industries, electrification is not a way to decarbonise the processes,
- The main obstacle to low-carbon transition of industries is the high investments required in breakthrough technologies that can only be prepared on the long-term (20 – 30 years of time cycle). To be fully sustainable by 2050, the design of the technology should be prepared now, as currently done by Tata Steel (Netherlands) for the steel industry,
- Modifications of energy supply nature will require infrastructure adaptation. For instance, electrification of industry processes at the large scale require to adapt the power infrastructures, sometimes in isolated places,
- Energy supply security is also a key question in the perspective to decarbonise energy sources (since a furnace cannot be switched off because it takes time to reach operational conditions after interruptions),
- The selection of one green energy source should be made considering the long-term price trends of green energies (which is not really the case, due to a lack of long-term visibility).

Internal and external use of waste heat:

- Improvements in terms of waste heat recovery technologies remain important levers to improve the energy efficiency of industries,
- Recovered waste heat are most often used internally (process, offices, etc.).

- In many cases, internal needs are insufficient compared to the volumes of waste heat. In these contexts, heat to power technologies are relevant and the performances of those technologies are being improved continuously.
- External uses of industrial waste heat are investigated in many projects but are often not concretised due to a number of barriers (lack of infrastructures to transfer the heat or no investment budget available to develop them, no anticipation of such schemes in land use plans, allocation of carbon credits between stakeholders, etc.).

The meeting was concluded in the morning of the second day by Mrs **Laura Giappichelli** (EASME) and Mr **Marco Van Valburg** (Libbey), who summarised the outcomes of the various sessions and emphasised the intense and productive character of the discussions held. Participants also had the opportunity to watch parts of the documentary "The Tipping Point. Energy aNew" produced by the LIFE14 GIC/PL/000008 - LIFE_WZROST_PL project.

Thereafter participants proceeded to visit two industrial sites -- Tata Steel in Wijk aan Zee and Libbey in Leerdam -- associated with a H2020 project and a LIFE project respectively.

Field visits

Horizon 2020 LoCO2Fe - Development of a Low-CO_2 Iron and Steelmaking Integrated Process Route for a Sustainable European Steel Industry (H2020-SILC-II-2014)

Participants were welcomed on the premises of Tata Steel at Wijk aan Zee, where the Horizon 2020 LoCO2Fe project is located. They were given a detailed presentation of the project by members of the project team. The paragraphs that follow constitute a summary of the presentation.

The project aims to show that the HIsarna iron-making technology can lead to a significant reduction of energy consumption and CO_2 emissions compared to a blast furnace operated site based on current Best Available Technology.

The HIsarna technology is characterised by a main reactor in which the iron ore is injected at the top. The ore is liquified in a high-temperature cyclone and drips to the bottom of the reactor where powder coal is injected. The powder coal reacts with the molten ore to produce liquid iron that is the base material to produce high quality steel. The gases that leave the HIsarna reactor are concentrated CO_2.

Compared to existing technology, HIsarna consists of fewer pre-processing steps and requires fewer stringent conditions on the quality of the raw materials used, which leads to substantial efficiency gains. This reduces energy consumption and CO_2 emissions by 20% as well as the emissions of fine particles, sulphur dioxide and nitrogen oxide (between 60 to 80 %).

Through the LoCO2Fe project, new operation parameters are being tested and the objective is to reach the stability of the process and equipment under these new conditions for long periods of time. The objective is also to validate the process parameters for upscaling to a 0.8 Mtpa plant.

The HIsarna technology has been jointly developed with the mining company Rio Tinto. Currently, Tata Steel, Rio Tinto, ArcelorMittal, ThyssenKrupp, Voestalpine and technology supplier Paul Wurth are

working on testing and further developing the Hlsarna technology. Several test campaigns have been carried out since 2011. Around €75 million have been invested by the partner companies (60%) with support from the EU, the Dutch Economics Ministry and the European Research Fund for Coal and Steel (40%). If the current experiments are successful, the project will reach a crucial stage, i.e. designing, constructing and testing a large-scale pilot plant for a foreseen investment of €300 million.

LIFE OPTIMELT - Demonstration of thermochemical reforming of natural gas for reducing GHG emissions in Energy Intensive Industries (LIFE15 CCM/NL/000121)

The second visit took place at the Libbey glass factory in Leerdam, where the LIFE Optimelt project is based. The tour of the facilities started with a short presentation on the project implementation. It was followed by a walk next to the new Optimelt furnace, to observe its operation, including the control room. The tour ended in the starting showroom area, where further questions were asked.

The Optimelt technology is an innovative heat recovery technology, which can be used in high temperature melting processes like glass, steel, aluminium industries. It has the potential to reduce the energy consumption and related GHG emissions, in the area of heat recovery technology, to a level not yet realised by existing technologies.

In this demonstration project a new glass furnace has been built with a natural gas/oxygen combustion system and the Optimelt system. Together with the furnace an oxygen generator has been installed on site, with a liquid oxygen supply for back up.

The furnace is equipped with the Optimelt system, meaning that the hot flue gas is used to preheat the natural gas, via specifically built regenerators, together with some used flue gas. The preheated natural gas/flue gas converts into syngas and is combusted in the melting furnace together with oxygen. The OPTIMELT™ technology uses endothermic reaction of natural gas with water vapour/CO2 in the flue gas to recover more heat beyond what is currently possible.

The project is currently in the optimising phase of the Optimelt process, and certain process parameters are being fine-tuned to optimise the energy consumption. This takes time and requires patience, but the project team expects to have clear results by the end of 2018.

The Optimelt technology is being developed by Praxair, with Libbey as the coordinating beneficiary. Praxair and many of its European locations are acting as project partners.

CONCLUSIONS

The platform meeting participants had plenty of opportunities to share knowledge and good practices, explore synergies and provide policy-relevant feedback during the meeting's plenary sessions, working group discussions and field visits. The meeting illustrated well the contribution of LIFE and H2020 projects (see summaries of all participating projects in Annex 5) to reducing the GHG emissions of European energy-intensive industries and innovating along decarbonisation pathways.

One of the key messages of the meeting was that barriers to making the necessary investments in breakthrough technologies are of course technical, but not only. The role of policy-makers, including through push factors like carbon pricing and pull factors like public procurement, as well as the role of financial institutions through their funding priorities are key to enabling a low-carbon transition.

Project beneficiaries were encouraged by the meeting organisers to communicate broadly outside their traditional networks (i.e. sectoral associations) the challenges that industry is facing, and to use non-technical language, so that policy-makers and other stakeholders could also be made aware of the need for corrective measures. The organisers committed to elaborating and distributing more broadly all important insights gained through the platform meeting. This final report is part of that effort, while the Summary for Policy-makers, which comprises the platform meeting's key findings and recommendations, will be distributed in various forms to relevant audiences.

All participants were aware of the need to shift to a climate-friendly paradigm. Most of the industry participants also believed that adopting relevant actions would not only reduce their climate footprint but would also improve their overall competitiveness, provided that there was an adequate policy framework in place. Establishing a common long-term vision, complementarity and policy coherence were important for these participants, as was the need to maintain safeguards against carbon leakage.

Participants expressed their appreciation to the organisers for the initiative to convene the platform meeting and the preparatory work done in terms of content and logistics. Having several industrial sectors in the same room, and even direct competitors – a rather uncommon occurrence, allowed for synergies to be built and for approaches and solutions implemented by one sector to become a source of inspiration for the others.

Finally, the role of the LIFE and Horizon 2020 programmes was considered significant for alleviating the high level of risk and substantial investments required for the validation of new, climate-friendly technologies in Energy Intensive Industries and for enhancing broader environmental, economic and social sustainability.

The annexes that follow provide the platform meeting agenda, background to the working groups, information on the participating projects, the speakers and other attendees, as well as links to relevant information material.

PART III – ANNEXES

Annex 1: Agenda of the meeting

WEDNESDAY, 26 SEPTEMBER 2018	
8:30 - 9:00	**Registration of participants and morning coffee**
9:00 - 9:30	**Welcome statements** **Moderator: Marco Van Valburg, Libbey EMEA and LIFE OPTIMELT** **From the host project** - Frank Schuurmans, EMEA Batch & Furnace Engineer, Libbey EMEA and LIFE OPTIMELT project **From the LIFE Programme/EASME** - Laura Giappichelli, Project Adviser, Executive Agency for Small and Medium-sized Enterprises (EASME) **From the Netherlands LIFE National Contact Point** - Mayke Derksen, Netherlands Enterprise Agency (RVO) **From the external monitoring team, including on meeting agenda and logistics** - Elias Demian and Lorenzo Mengali, LIFE Monitoring Experts, NEEMO EEIG
9:30 - 10:45	**Session 1. EU-level policies on energy-intensive industries, GHG emission reduction and energy efficiency** **Moderator: Franz Immler, Head of sector Climate Action, EASME** **EII and Climate Action – The policy context** • Piotr Grzesikowski, Policy officer, DG Climate Action, European Commission **A national perspective – Dutch industry and innovation policy** - Marc Streefkerk, Dutch Ministry of Economic Affairs **Interactive session with Q&A involving the following LIFE projects and stakeholders:** - Francesco Nicolli, LIFE SIDE - LIFE15 GIC/IT/000051 (ETS)[2] - Sam Van den Plas, Senior Policy Officer, WWF European Policy Office - Lars Nilsson, H2020-SC5-2016-OneStageB REINVENT (Realising Innovation in Transitions for Decarbonisation)
10:45 -11:15	**Coffee-Break**

[2] Connected via Skype.

11:15 - 12:30	**Session 2. Industry commitments, monitoring and implementation support mechanisms, including funding** **Moderator: Femke De Jong, Policy Director, Carbon Market Watch** **Support for Energy Intensive Industries in Europe** - Irena Gabrielaitiene, Project Adviser, H2020 Environment and Resources Office, EASME **Sustainability management and value delivery** - Hans Verboven, Executive Director, EY Climate Change & Sustainability Services, Professor, University of Antwerp **Private Finance for Energy Efficiency (PF4EE)** • Antonio Lopez Martinez, Energy Engineer, Energy Transition Programmes, European Investment Bank (EIB) **Interactive session with Q&A involving the following LIFE projects and stakeholders:** - Michael Hayne, LIFE PACTA - LIFE16 GIC/FR/000061 (The role of financial institutions in directing investments for the transition to a low-carbon economy) - Marco Baresi, Institutional Affairs and Marketing Director, Turboden SpA - Eise Spijker, H2020 projects STORE&GO (Shaping the energy supply for the future) and TRANSrisk (Transitions Pathways and Risk Analysis for Climate Change Mitigation and Adaptation Strategies)
12:30 - 13:30	**Group photo & Lunch Break**
13:30 - 15:15	**Session 3. Focus on technological solutions and Best Available Techniques** **Moderator: José Moya, Scientific Officer, Joint Research Centre, European Commission** **Industrial emissions and Best Available Techniques (BAT)** - Anita Matic, Policy Officer, DG Environment - Industrial Emissions, European Commission **Support to waste heat recovery in industry under H2020-Energy Efficiency** - Silvia Vivarelli, Senior Project Adviser H2020 Programme, EASME **Interactive session with Q&A involving the following LIFE projects and stakeholders:** - Koen Meijer, H2020-SILC-II-2014 LoCO2Fe (Development of a Low CO2 Iron and Steelmaking Integrated Process Route for a Sustainable European Steel Industry)

	- Raul Aragones, LIFE HEAT-R - LIFE16 ENV/ES/000344 (Waste heat valorisation by modular thermoelectric recovery system for resource efficiency in energy intensive industries) - Vincent Meyer, LIFE SOLID LIFE - LIFE15 CCM/FR/000116 (Production of low-emission cement and concrete products at industrial scale) - Tunc Görüney, LIFE CleanOX - LIFE16 CCM/BG/000059 (Innovative radiative heat exchanger-based which facilitates waste heat recovery in oxy-fuel furnaces) and LIFE12 ENV/BG/756 - LIFE Eco-HeatOx (Demonstration & validation of a heat recovery packaged solution for decreasing oxy-glass factories' environmental impact)
15:15 - 15:45	**Coffee Break**
15:45 - 17:30	**Session 4a. Thematic Working Groups - Parallel sessions** **Introduction to the Working Groups: Georgios Kostakos, LIFE Climate Action Sector Coordinator, NEEMO** ***WG1*** Pros and cons of the policy context applying to Energy Intensive Industries (EII), including carbon pricing and EU ETS ***WG2*** Resource efficiency and waste reuse / reduction (use of alternative fuel, use of recycled material, carbon storage / utilisation) ***WG3*** Energy efficiency (energy recovery, new efficient processes or technologies)
	Networking reception after end of Session 4a

THURSDAY, 27 SEPTEMBER 2018	
08:45 - 09:00	**Projection of short video**
09:30 - 10:30	**Session 5. Communicating the EII agenda and engaging stakeholders fo implementation – The way forward** - Brief concluding statements on expectations and commitments by participating representatives of EU institutions, national / regional authorities, the industry, LIFE projects, civil society, other stakeholders - Interactive exchanges - Wrap-up comments by the organisers (EASME, DG CLIMA, Host Project, NEEMO) - Q&A

10:30 – 17:30	**PROJECT VISITS** ***LOCO2FE - DEVELOPMENT OF A LOW CO2 IRON AND STEELMAKING INTEGRATED PROCESS ROUTE FOR A SUSTAINABLE EUROPEAN STEEL INDUSTRY (H2020-SILC-II-2014)*** - Visit to the facilities of Tata Steel. ***LIFE OPTIMELT - DEMONSTRATION OF THERMOCHEMICAL REFORMING OF NATURAL GAS FOR REDUCING GHG EMISSIONS IN ENERGY INTENSIVE INDUSTRIES (LIFE15 CCM/NL/000121)*** - Visit to the facilities of Libbey.

Annex 2: List of speakers and facilitators

MARCO VAN VALBURG	
Organisation	**Libbey EMEA**
Job title	**Technical Director**
	Marco Van Valburg has been working in the tableware glass industry for 30 years, with a broad experience in production, maintenance, engineering, including product and process engineering. Mr. Van Valburg held several positions as technical specialist, trainer, production manager, plant manager. Glass industry is known as an energy intensive industry; leading energy teams and implementing new glass melting technologies are key elements of Mr. Van Valburg's missions since many years already. He also represents Libbey in this area on regional, national and European levels, as secretary general in the board of the Dutch Glass Association (VNG).
FRANK SCHUURMANS	
Organisation	**Libbey EMEA**
Job title	**Furnace engineer, Research and Development, Design Engineering**
	Frank Schuurmans holds a Bachelor in Mechanical Engineering (Avans University of Applied Sciences Den Bosch, The Netherlands). He is a Furnace Engineer for Libbey Europe and works on furnace rebuilding projects as project manager. Mr Schuurmans has been working for 29 years in the glass industry at various glass companies in Europe and has joined Libbey 10 years ago. Frank Schuurmans has an extensive experience in hot repairs, cold repairs and process improvement projects regarding furnace emissions and glass quality.
LAURA GIAPPICHELLI	
Organisation	**European Commission - Executive Agency for Small and Medium Sized Enterprises (EASME), LIFE Unit**
Job title	**Project Adviser, LIFE Climate Action**
	Laura Giappichelli is a Project Advisor at the LIFE Unit of the Executive Agency for Small and Medium-sized Enterprises (EASME) in charge of climate projects and integrated projects. Prior to this assignment, Laura has been working at the European Commission as a Policy Officer and a Programme Manager on environmental and climate projects for developing and neighbourhood countries. Before joining the European Commission, she has been working with the United Nations (UNDP and UNESCO) for four years managing and evaluating environmental and climate projects. Laura Giappichelli holds Bachelor and Master's degrees on Development Economics and a specialisation on evaluation of environmental programmes.

MAYKE DERKSEN	
Organisation	**Netherlands Enterprise Agency (RVO)**
Job title	**Coordinator of Corporate Social Responsibility and advisor on LIFE-subsidies**
	Mayke Derksen (Geldrop, 1973) has already been involved in LIFE projects for more than 10 years. However, since 3 years she has been working at the Netherlands Enterprise Agency and directly involved in advising projects about successfully obtaining LIFE subsidies. This gives her a boost and lots of energy, but also being pro-active, creative and setting concrete steps are making her happy. Mayke enjoys it to inspire people in finding creative solutions that are dealing with societal problems. She can perfectly realize this passion via the LIFE projects. Besides her work, Mayke loves spending time outdoors, in nature as well as cities.
FRANZ IMMLER	
Organisation	**European Commission - Executive Agency for Small and Medium Sized Enterprises (EASME), LIFE Unit**
Job title	**Head of sector Climate Action**
	Franz Immler was born in Schongau (Germany) on 28 Nov 1967. He holds a PhD in physics and worked as a researcher at the Alfred-Wegner-Institute and the German Meteorological Service (DWD), where he was advancing Atmospheric Sciences and Climate Observations. In 2011, he joined DG Research & Innovation in the European Commission as a Scientific Officer and implemented those parts of the Horizon 2020 Research and Innovation Programme dealing with Climate Science with a focus on the Arctic. Since 2014, he is serving as Head of Sector Climate Action in the Executive Agency for SME (EASME).
PIOTR GRZESIKOWSKI	
Organisation	**European Commission | Directorate-General for Climate Action**
Job title	**Policy Officer, DG Climate Action, Unit B.2 – ETS Implementation and IT**
	Piotr Grzesikowski is a graduate of the Warsaw School of Economics. He started his professional career in 2000 in the Polish governmental administration, working on the files related to the preparation of Poland for the implementation of various European policies. He started his career in the European Commission in DG Environment where he was involved in the implementation of the LIFE Programme as a Country Desk for a number of projects in Germany, Austria and Poland. Currently, he is a Policy Officer in DG Climate Action, dealing with the implementation of the EU Emission Trading System. Since 2010, he has been involved in the preparation and implementation of the third phase of the EU ETS, and recently in the preparation of the implementation of the fourth phase of the EU ETS.

MARC STREEFKERK	
Organisation	**Dutch Ministry of Economic Affairs**
Job title	**Programme manager on energy efficiency**
	Marc Streefkerk is Programme manager on energy efficiency at the Dutch Ministry of Economic Affairs (Ministerie van Economische Zaken en Klimaat).

FRANCESCO NICOLLI	
Organisation	**Climate Unit of the Florence School of Regulation of the European University Institute**
Job title	**Research Associate**
	Francesco joined the climate team at the Florence School of Regulation (FSR) in September 2017. His research interests lie within the fields of Environmental Economics, Energy Economics, Waste Economics, Economics of Eco-Innovation and Applied Econometrics. Before joining FSR, Francesco was Post-Doctoral Research Fellow at IRCrES-CNR, where he contributed to several research projects on Eco-Innovation and Industrial Development. He has been contract professor of Environmental Economics and Econometrics at the University of Bologna and Ferrara and, before joining IRCrES-CNR, he has been Post-Doctoral Research Fellow at the University of Ferrara. Francesco holds a PhD in Economics (European Policy) from University of Ferrara (2009), and a Msc in Environmental and Natural Resource Economics from University of Birmingham (2008).

SAM VAN DEN PLAS	
Organisation	**WWF European Policy Office**
Job title	**Senior Climate Policy Officer**
	Sam Van den plas is Senior Climate Policy Officer at WWF European Policy Office. His responsibilities include advocacy work with the European institutions and the linking of WWF's national organisation network in Europe to the EU legislative and policy-making cycles on climate and energy issues. His main areas of expertise include EU climate policy, carbon markets, the EU Emissions Trading System and industrial decarbonisation. He has been working with WWF since 2005 when he joined the in order to lead the work on climate and energy policy at Belgian level, before moving to the European Policy Office in 2010. Prior to 2005 he worked in an environmental advice centre in Gent, Flanders. He studied at the University of Gent, where he earned a MSc in Biochemistry and a postgraduate degree in Environmental Sciences.

LARS NILSSON	
Organisation	**Faculty of Engineering, Lund University**
Job title	**Professor of Environmental and Energy Systems Studies**
	Lars J. Nilsson has a PhD in Energy Systems Studies (1993) from Lund University and was a Visiting Research Fellow at Princeton University in 1994-95. He has more than 25 years of experience in the fields of energy and environmental systems studies, technology assessments and policy analysis. Recent research has been on different aspects of low carbon transition policy strategies and governance in the context of multi-objective strategies for sustainable development. A topical field of research is transitions in industry and their co-evolution with energy system transitions, and industrial development policy strategies. He was an author in the 2011 IPCC SRREN and is appointed convening lead author for the industry chapter in the upcoming IPCC WG3 AR6. He is/was a member of the Scientific Advisory Board of the Wuppertal Institute (2014-) and the E.ON Energy Research Centre at RWTH Aachen University (2011-2015). He is also a member of Seoul International Energy Advisory Council (SIEAC).
FEMKE DE JONG	
Organisation	**Carbon Market Watch**
Job title	**Policy director**
	Femke is Policy Director at Carbon Market Watch. She oversees the implementation of all our campaigns and is responsible for ensuring coherence across different policy areas. Before joining Carbon Market Watch, she worked as a political advisor in the European Parliament and as a researcher for an environmental consultancy. Femke is deeply motivated about advancing climate protection through more effective carbon pricing. She also enjoys travelling and playing the piano.
IRENA GABRIELAITIENE	
Organisation	**European Commission - Executive Agency for Small and Medium Sized Enterprises (EASME)**
Job title	**Project Adviser H2020 Programme**
	Irena Gabrielaitiene is working on Implementation of H2020 Societal Challenge 5 - Climate Action, Environment, Resource Efficiency and Raw Materials at Executive Agency for Small and Medium-sized Enterprises (EASME). She manages projects that focus on decarbonizaiton of EU economy. Previously she worked as a Scientific and Technical officer at EC, and managed EC initiatives on energy efficiency and renewable energy measures with a focus on a local level as part of the EU 20 20 20 climate and energy strategy. She is an engineer by training and did her PhD in the field of energy systems.

HANS VERBOVEN	
Organisation	**EY Climate Change & Sustainability Services / University of Antwerp**
Job title	**Executive Director / Professor**
	Hans is executive Director of EY Climate Change & Sustainability Services and helps companies to rethink their sustainability policy in order to create more value and profit at a lower environmental and social cost. He is a specialist in business model optimization and innovation. Hans is part-time professor at the Faculty of Applied Economics of the University of Antwerp and teaches sustainability management. He has wide experience in case-study based research in the field of business modelling and strategic management, business process optimization, renewable and ISO 9001 implementation.

ANTONIO LOPEZ MARTINEZ	
Organisation	**European Investment Bank (EIB)**
Job title	**Energy Engineer, Energy Transition Programmes**
	Antonio Lopez is an Energy Engineer, currently working in the Projects Directorate of the European Investment Bank. He is involved as key technical expert in several projects in Asia, Latin America and Europe. Antonio works on direct investment projects, policy dialogue activities, capacity building and measures to integrate EIB's policies and guidelines in the design and implementation of energy sector projects. Prior to joining EIB, he spent five years at the Asian Development Bank in similar roles as technical adviser and loan officer in several projects across Asia and the Pacific. Before ADB, he spent five years working on applied research and development projects in the solar energy field at the Plataforma Solar de Almeria (PSA), the largest European research and development centre for concentrated solar technologies.

MICHAEL HAYNE	
Organisation	**2° Investing Initiative**
Job title	**Senior analyst**
	Michael Hayne is a senior advisor at the 2° Investing Initiative. He co-wrote the first climate scenario alignment methodology in 2015, and since has been applying this with financial supervisory bodies and institutional investors. He has a Master in renewable energy management alongside bachelors in both engineering and commerce. His background also includes research in modelling the cost of Carbon abatement through the Clean Development Mechanism as well as founding an engineering company designing and producing agricultural cultivation equipment for sustainable farming in rural Australia.

MARCO BARESI	
Organisation	**Turboden**
Job title	**Institutional Affairs and Marketing Director**
	Marco Baresi is *Institutional Affairs & Marketing Director* of Turboden, company of Mitsubishi Heavy Industries Group, in charge of managing the Company's Public and Regulatory Affairs, advisory and communication activities, political intelligence, networking and support to business internationalization. Graduated from the University of Pavia (Italy) with a Degree in Environmental Engineering, he is actively involved in the activities of the working groups for the Integrated Roadmap SET Plan and the Energy Efficiency Financial Institutions Group (EEFIG), as well as of trade associations operating in the renewable and energy efficiency fields. As such, he is Vice President of the European Geothermal Energy Council (EGEC) and holds the Vice Presidency of ANIMA Italcogen – the Italian Association for Cogeneration and Waste Heat Recovery within Confindustria. As of January 2018, Mr Baresi is also member of the General Council of the Industrial Association of the city of Brescia (Confindustria-AIB).
EISE SPIJKER	
Organisation	**Joint Implementation Network**
Job title	**Energy-climate economist/researcher**
	Eise Spijker (MSc) is a senior researcher at JIN Climate & Sustainability on market and innovation system analysis, low-emission transition pathways, bio-energy, sustainable agriculture, emissions trading and policy interactions. He is co-editor of the JIQ Magazine. He participated as researcher, in several EU research projects on technology transfer (ENTTRANS), low-emission transitions (TRANSrisk), policy interactions (APRAISE), energy efficiency directive (ENSPOL, and acted as coordinator of EU projects on sustainable biomass to energy pathways (BIOTEAM) and Dutch-German project on cross-border trade in green gas certificates (INTERREG IVa).
JOSE ANTONIO MOYA	
Organisation	**DG JRC – DIR C – Energy, Transport and Climate Knowledge for Energy Union**
Job title	**Scientific officer**
	Jose Moya is a mining engineer with 25 years of work experience. He joined the European Commission in 2009, and since then he has been working in the Joint Research Centre in Petten. His main task has been analysing the role of technology innovations in energy-intensives industries to reduce CO2 emissions and energy consumption. He and his team have analysed the five major energy-intensive industries (cement, steel, aluminium, chemical and petrochemical, and pulp and paper). His findings can be found in 5 JRC reports and 10 peer review papers.

ANITA MATIC	
Organisation	**European Commission, Directorate General for the Environment, Unit C4 - Industrial Emissions**
Job title	**Policy officer**
	Anita is a policy officer in the Commission's Directorate general (DG) for Environment since 2014. She has been responsible for the implementation of the Industrial Emission Directive with focus on large combustion plants and waste incineration plants. She collaborates with the European Integrated Pollution Prevention and Control Bureau EIPPCB who organises and coordinates the exchange of information that leads to the drawing up and review of (Best Available Techniques) BAT reference documents (BREFs). Previously, Anita was a Senior Adviser in the Ministry of Environment in Croatia. Anita graduated at Faculty of Chemical Engineering and Technology, University of Zagreb.
SILVIA VIVARELLI	
Organisation	**Executive Agency for Small and Medium-sized Enterprises (EASME)**
Job title	**Senior Project Adviser**
	Ms Silvia Vivarelli is Senior Project Adviser at the Executive Agency for Small and Medium-sized Enterprises (EASME) of the European Commission. She joined EASME (previously EACI) in 2007 to work for the Intelligent Energy Europe Programme, where she was responsible for bioenergy projects. Since 2014 she has been working for the Energy Efficiency focus area of Horizon 2020. Silvia has more than 18 years' experience in the area of sustainable energy. After a short experience as a researcher at the University of Pisa, she first worked as a Project Engineer for the design and construction of biomass energy and waste to energy plants with Termomeccanica Ecologia. She then became a Project manager for ETA-Renewable Energies, a company working in the renewable energy field at EU/international level, until she joined EASME. Silvia holds a Masters Degree (MSc) in Chemical Engineering, specialization in Environmental Engineering, from the University of Pisa.
KOEN MEIJER	
Organisation	**Tata Steel**
Job title	**Project manager of Hlsarna pilot plant**
	Koen Meijer is the project manager of the Hlsarna project at Tata Steel Research & Development. After his study Mechanical Engineering at the University of Delft, the Netherlands, he joined (at that time) Hoogovens Staal at IJmuiden in 1987. After starting his career in Research, he held positions in Aluminium production and Engineering & Contracting within Corus/Tata Steel. He returned to Research & Development in 2007 to manage the contribution of Tata Steel to the ULCOS project. As part of this project the Hlsarna pilot plant was built in 2010.

RAUL ARAGONES	
Organisation	**AEinnova**
Job title	**Chairman of the Board and business developer officer**
	Raul Aragones has a PhD in microelectronics and industrial engineer. He has been involved for 16 years in research projects related to wireless sensor networks and energy harvesting technologies. He is Adjunct professor in Microelectronics at the UAB and founder of Alternative Energy Innovations - AEinnova.
VINCENT MEYER	
Organisation	**LafargeHolcim**
Job title	**R&D project manager / Research Engineer**
	Process engineer degree obtained in 2004 at ENSGTI school in France (Pau). PhD obtained in 2007 at Pau et Pays de l'Adour University. PhD on heavy oils cold production process in partnership with TOTAL and CNRS. Research and business engineer at Oxand in 2007. Studies related to risk analyses in the framework of carbon capture and sequestration projects. (oil wells integrity, concrete degradation in contact of CO2, fluids flow simulations to support risk analyses). Research engineer at Lafarge in 2010 and research project manager till 2015. Currently Solidia LIFE project manager.
TUNC GÖRÜNEY	
Organisation	**Şişecam Group**
Job title	**Corporate Energy and Environmental Manager**
	Dr. Tunç Görüney currently serves as Energy and Environmental Manager responsible for integrating new energy and environmental technologies to glass manufacturing facilities. He received his Bachelor's degree from Istanbul Technical University and Master's and PhD degrees in Mechanical Engineering from Lehigh University specializing in fluid mechanics. During his three years with Şişecam, Dr. Görüney led three European Commission LIFE projects to further improve the energy- and environmental performance of tableware and flat glass manufacturing. Prior to joining Şişecam, Dr. Görüney led the development, commercialization and intellectual asset management of new offerings for global glass industry at a US-based Fortune-500 industrial gas company, Air Products. He has numerous publications in his field including patents on oxy-fuel combustion.

DAREK URBANIAK	
Organisation	**European Commission - Executive Agency for Small and Medium Sized Enterprises (EASME), LIFE Unit**
Job title	**Project Adviser, LIFE Climate Action**
	Darek Urbaniak is a Project Adviser at the LIFE Unit of the Executive Agency for Small and Medium-sized Enterprises (EASME) in charge of climate and integrated projects. Prior to this assignment, Darek has been working at the WWF European Policy Office as a Senior Energy Policy Officer. Darek holds Bachelor and Master's degrees in International Affairs.

GEORGIOS KOSTAKOS	
Organisation	**NEEMO Central Team**
Job title	**LIFE Climate Action Sector Coordinator at NEEMO EEIG**
	Georgios Kostakos holds MA and PhD degrees in International Relations (Kent, UK), and a Mechanical Engineering degree (NTUA, Greece). He served on various positions at the United Nations, including as Senior Adviser and Acting Deputy Executive Secretary of the UN Global Sustainability Panel (GSP), as climate change focal point in the Secretariat of the UN System Chief Executives Board for Coordination (CEB), and on UN field missions. He has also worked with the UN Framework Convention on Climate Change (UNFCCC) Secretariat, the University of Athens and the University of Kent, among others. He is currently LIFE Climate Action Sector Coordinator for NEEMO EEIG.

ELIAS DEMIAN	
Organisation	**NEEMO EEIG - Prospect C & S**
Job title	**Climate Change Monitoring Expert - NEEMO LIFE TEAM**
	Elias Demian holds an MSc in Environmental Management and Policy (Lund University, Sweden), an MSc in Applied Economics and Finance (Athens University of Economics and Business, Greece) and a BSc in Environmental Sciences (Aegean University, Greece). He has worked with international and Greek organisations (i.e. UN for Environment, Greek Association of Entrepreneurs etc.). He joined the LIFE External Monitoring Team in 2013 and monitors Climate change adaptation, mitigation and Environment projects implemented in South East Europe (Greece, Cyprus, Bulgaria). In an effort to research further the economic implications of climate change, he also holds the position of Researcher at the Foundation for Economic and Industrial Research (IOBE), a well-known Greek think tank.

PANOS FETSIS	
Organisation	**Neemo EEIG – AEIDL**
Job title	**LIFE Communications team**
	Working as a Climate Change Expert in the LIFE Communications team, Panos is responsible for the active analysis and dissemination of the results of the LIFE Programme. Due to his concern over environmental degradation, he sought to combine his background in economics and 4 years of work experience at Ernst&Young with environmental and sustainable energy generation projects. At Piraeus Bank, as a coordinator in the first "Green Banking branch" in South-Eastern Europe, he provided consulting services in the field of environmental technologies, including economic, technical and policy advisory. Panos has actively participated in the elaboration of various EU environmental projects, mainly focused on three areas: socio-economic impact of natural resource management; climate change economic risks and opportunities; climate change mitigation technologies. Panos holds a Master degree in Economics for Natural Resource and Environmental Management. He speaks Greek, English and French.
AURORE LOPEZ	
Organisation	**NEEMO EEIG – Oreade-Breche**
Job title	**Climate Change Monitoring Expert - NEEMO LIFE TEAM**
	Aurore Lopez holds an MSc in Process Engineering (National Institute of Applied Sciences, Toulouse, 2010) and has first conducted for 3 years technical studies for companies and public institutions in the field of environmental and climate issues l collaboration with research laboratories. Aurore then provided consultancy services in the field of building eco-design, based on Life Cycle Assessment tool. She joined the LIFE External Monitoring Team in January 2015 and monitors Climate change adaptation, mitigation and Environment projects implemented in France.
LORENZO MENGALI	
Organisation	**NEEMO EEIG – TIMESIS**
Job title	**Climate Change Monitoring Expert - NEEMO LIFE TEAM**
	Lorenzo Mengali holds an MSc in Aerospace Engineering (Pisa University, Italy) and worked from 2008 to 2016 as a researcher/technical consultant in the Nuclear Research Institute (GRNSPG) under the University of Pisa. He joined the LIFE External Monitoring Team in 2012 and monitors Climate change adaptation, mitigation and Environment projects implemented in Italy.

LUDOVICO SUSANI	
Organisation	**NEEMO EEIG – TIMESIS**
Job title	**Climate Change Monitoring Expert - NEEMO LIFE TEAM**
	Ludovico Susani graduated in Environmental Chemistry at the University of Siena he took a PhD in Chemistry at the same University. The PhD, focusing on LCA and innovative energy analysis, allowed him developing a specific expertise on climate change mitigation measures. Since then, he works as consultant in the field of energy efficiency and energy production from renewable sources both for building and industrial sectors. Since 2006, he is certified professional energy manager and Climahouse expert. Ludovico joined the Astrale EEIG consortium in 2011 (and then the NEEMO EEIG in 2015) to monitor EU LIFE projects implemented in Italy in the field of Climate change adaptation, mitigation and Environment

NATHALIE VAN ISACKER	
Organisation	**NEEMO EEIG – Prospect C & S**
Job title	**Climate Change Monitoring Expert - NEEMO LIFE TEAM**
	Nathalie Van Isacker holds a Master degree in agronomical engineering from the Université Libre de Bruxelles (ULB). Her professional experience includes consultancy services and scientific education and outreach. She started her career as a Research Analyst in consulting. She then worked for 7 years in a transport consultancy, STRATEC, where she contributed to studies on freight transport and environmental impact assessments. In 2008, she joined the International Polar Foundation. As a Scientific Officer, she was involved in the content development of communication tools and teaching tools on climate change and polar sciences. She joined the LIFE External Monitoring Team in September 2016 and monitors Climate Change, Nature and Environment projects.

Annex 3: Working Groups (session 4a on the agenda)

1. Overview

Three Working Groups (WGs) were held in the afternoon of the first day of the platform meeting to discuss the topics indicated below before reporting to the plenary. The platform meeting participants were divided into the three WGs according to the preferences that they expressed during the online registration and the relevance of the WG topics to their project or organisation. Persons from the same project or organisation were assigned to different WGs. Discussion at the WGs was based on preset questions, which are given below under the title of each WG. The discussion was organised according to a 'World Café' format, which is briefly explained at the end of this Annex.

2. Objective

The focus of the WGs was to draw conclusions on good practices emerging from the work of relevant LIFE or H2020 projects, how those practices serve EU policy objectives and how they can best be shared with interested professional associations and the industry for further replication. Identification of barriers, including how they might be overcome, and opportunities also formed part of the exercise.

3. General discussion questions

WG1- PROS AND CONS OF THE POLICY CONTEXT APPLYING TO EII, INCLUDING CARBON PRICING AND EU ETS

a. What is the main climate policy requirement that your project aims to address and what is the main way that you have chosen to address it? What results have you achieved up to now?

b. What is the main climate policy requirement that your project aims to address and what is the main way that you have chosen to address it? What results have you achieved up to now?

c. More generally, how the various policies, namely EU ETS, circular economy, industrial emissions, energy efficiency, eco-design, have positively or negatively affected your competitiveness? What would you like to see - more, less or different - in terms of the policy framework that applies to your industry? Could you provide some concrete examples?

d. Could you describe particularly successful policy measures (e.g. market-based instrument, voluntary scheme) implemented at national level by EU member states - as part of the transposition into national policy of the Energy Efficiency Directive or other EU policies - that significantly supported energy-efficiency practices in the EII-related sector?

WG2 - RESOURCE EFFICIENCY AND WASTE RE-USE/ REDUCTION (USE OF RECYCLED MATERIALS, INNOVATION IN PRODUCT DESIGN, CARBON STORAGE / UTILISATION)

a. Could you describe innovative technologies and practices that you are implementing, based on the successful re-use of available resources or waste re-use, in the context of circular economy? Have you put in place circular economy-related solutions that could be easily transferred to other industries/industrial processes? What are the benefits in terms of productivity, competitiveness and profitability?

b. What are the common barriers that prevent the use of recycled/secondary materials by your EII?

c. Are there mechanisms at EU level that successfully incentivise, in terms of policy provisions but also financially, the adoption of circular economy practices and what has been your experience with them?

d. Have you explored the possibility to invest in carbon sequestration technologies to further reduce your carbon footprint? Is the use of such technologies viable in the medium/long term in your opinion?

WG3 - ENERGY EFFICIENCY (ENERGY RECOVERY, NEW EFFICIENT PROCESSES OR TECHNOLOGIES, USE OF ALTERNATIVE FUEL)

a. Is the current policy framework on energy efficiency, at EU and national level, practical and helpful for your industry, both in technical and financial terms? What are its strong and weak points? Does it help or hinder the competitiveness of EU industries on the global market?

b. Have you integrated in some way Renewable Energy Sources (RES) solutions and other highly efficient processes or technologies in your industry and/or sector? What are the challenges and opportunities with regard to the existing RES regulatory framework and financial incentives?

c. Do you see in the long-term perspective the possibility to fully replace the direct use of fossil fuel in the energy intensive industry production with alternative fuel and/or electricity supply? Do you have any medium to long-term plans in this direction?

d. Are you planning to invest, or have you already invested in technology for the combined production of heat/power or for the recovery of waste heat at low temperature? Have you implemented synergy at industrial district level to optimise the efficiency of the district and maximise the recovery of the energy flows with low enthalpy?

Annex 4: Host Project – LIFE OPTIMELT

The LIFE platform meeting was hosted by the **LIFE OPTIMELT project (LIFE15 CCM/NL/000121)**, which is implemented by the companies BV Koninklijke Nederlandsche Glasfabriek Leerdam / Libbey and PRAXAIR EUROHOLDING S.L.

Project objectives

The LIFE OPTIMELT project aims to test an innovative waste heat recovery concept at the industrial scale. The demonstration is being performed in a furnace producing 105 tons/day of domestic glass.

The technology, called OPTIMELT, uses an endothermic reaction of natural gas with water vapour/CO_2 in the flue gas to recover more heat than previously possible in high-temperature manufacturing processes. It serves as an add-on to existing oxy-fuel combustion furnaces, making this option more environmentally friendly and cost-effective (20% reduction in fuel and oxygen consumption).

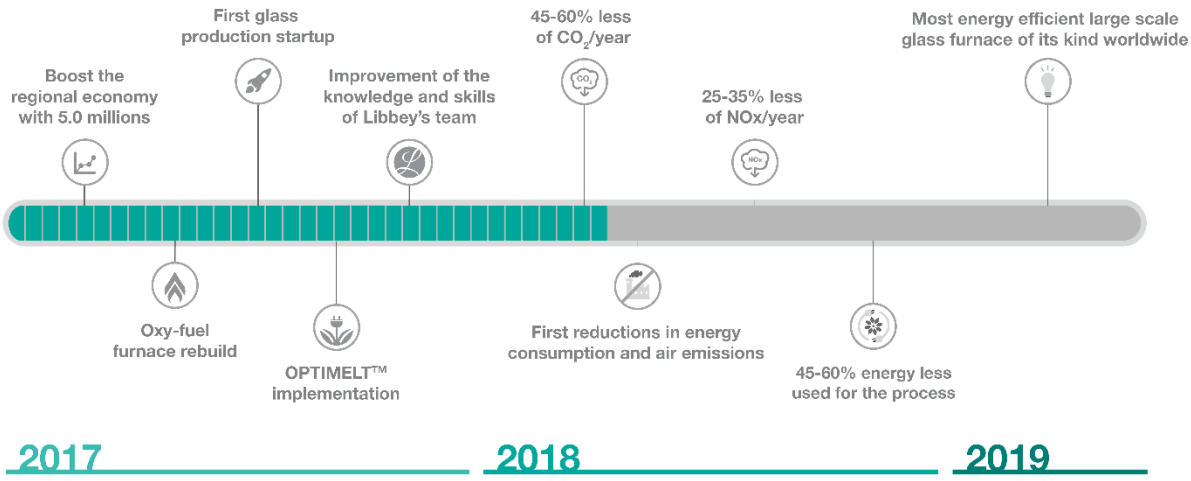
Specific objectives are as follows:

- Energy consumption and greenhouse gas emission savings of at least 20% compared to best available technique in the glass industry (oxy-fuel combustion), and lower nitrous oxide emissions;
- Demonstration of the economic viability of OPTIMELT technology;
- Dissemination of project results to at least 500 relevant manufacturing locations of energy-intensive industries in the EU; and
- Definition of technical requirements for steel and aluminum manufacturing in which OPTIMELT is applicable, to facilitate technology transfer to project stakeholders from these industries.

Project information

Coordinator:	Koninklijke Nederlandse Glasfabriek Leerdam (Royal Leerdam Crystal) is an international enterprise that has been manufacturing glassware in Leerdam, South Holland, since 1875. In 1995, the company was acquired by Danone, which sold the table glass and crystal business to the US-based glass manufacturer, Libbey, in 2003. Libbey has European operations in Portugal as well as Libbey Leerdam in the Netherlands.
Associated beneficiary:	Praxair produces, sells and distributes atmospheric, process and specialty gases and high-performance surface coatings. Praxair has factories and operations in more than 20 countries around Europe with over 100 production sites and 150,000 customers across Europe. Praxair is a leader in patented technologies (around 4000 active patents) working with customers from a wide range of markets (Glass, Aerospace, Chemicals and Pharma, Energy, Food and Beverage, Manufacturing, Metals) to help them lower costs, improve productivity and meet environmental goals by reducing energy use. Named among the "World's Most Innovative Companies" by Forbes, it is the only industrial gas company in the Carbon Disclosure Project's Carbon Disclosure Leadership Index.
Duration	15-JUL-2016 to 15-OCT -2019
Total budget	8,284,751.00 €
EU contribution	2,275,538.00 €
Project location	Leerdam, The Netherlands

Project status



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Find more information on the project website.

Annex 5: Participating projects' overview

H-REII - Policy and governance actions to reduce CO2 emissions by energy valorisation of process effluents in Energy Intensive Industries (LIFE08 ENV/IT/000422)
The H-REII project's main objective involved establishing a Local Pilot Observatory for improving energy conservation in EIIs, with the aim of reducing CO_2 emissions. The project contributed to the Europe 2020 strategy goals by confirming the potential of EII heat recovery systems as effective energy-saving tools. The Observatory team produced their intended methodology for assessing EII heat recovery options by testing it in glass, cement, steel and other EIIs. Positive results concerning application of heat recovery systems were recorded in 22 of the Italian EIIs studied. An additional 48 audits were carried out in Austria and findings from this work confirmed the methodology's transferability.

H-REII DEMO - Integrated fumes depuration and heat recovery system in energy intensive industries (LIFE10 ENV/IT/000397)
The H-REII DEMO project aimed to develop and study a heat recovery system, completely integrated into a fume extraction plant, by using water in a closed loop for cooling waste fumes and operating at a higher temperature and pressure than traditional methods. This led to a significant reduction in total power consumption and an improvement in the performance of the fume depuration plant in energy-intensive industrial applications (iron and steel industries, cement, glass, etc.).

HOxyGas - Validation of an innovative automotive glass process: hot oxygen combustion and hot natural gas (LIFE11 ENV/CZ/000488)
The 'HOxyGas' project aimed to demonstrate a new type of production system for automotive flat glass that has a lower carbon footprint than comparable systems in terms of reduced fossil fuel consumption and reduced greenhouse gas emissions. The project's innovative process enabled the production of glass using only hot natural gas, oxygen and a hot oxy-combustion technology.

LIFE PRIME GLASS - Innovative PRImary MEasures for reduction of NOx emissions and Energy consumption by glass furnaces (LIFE12 ENV/IT/001020)
The aim of the project was to test and demonstrate technologies that will significantly improve the environmental impact of the glass industry. In particular, NOX formation during the combustion process in the glass furnace was significantly reduced at the source and the energy performance of glass furnaces was improved. The innovative systems demonstrated in this project were designed to provide results that will feed into further BREF revisions.

LIFE Eco-HeatOx - Demonstration & validation of a heat recovery packaged solution for decreasing oxy-glass factories' environmental impact (LIFE12 ENV/BG/000756)
Oxy-combustion technology could significantly reduce energy consumption and GHG emissions from the glass industry; however, it is currently only economically feasible for large-scale production. The project aimed to adapt and implement the technology at a tableware glass industrial furnace, demonstrating the potential of Oxy-combustion for small and medium-sized producers. The project beneficiary achieved to cut energy use by 23% and reduce the GHG emissions linked to tableware glass production (CO_2 by 23% and NO_X by 90%).

LIFE SANITSER - Sanitaryware production: use of waste glass for saving energy and resources (LIFE12 ENV/IT/001095)
The project aims to revise the production process in the Vitreous Sanitary Ware (VSW) ceramic sector by introducing appropriate amounts of cullet from urban glass collection streams into VSW ceramic

formulas. Actions will focus on process innovations designed to ensure the availability and recovery of suitable quantities of glass cullet waste (soda lime glass: SLG), improve the environmental performance of the ceramic sector by reducing CO_2 emissions, and enhance sustainability by saving energy and raw materials.

LIFE OxyUp - Biomass gasification for CO2 emissions reduction and valorization of bio-wastes in energy-intensive industrial processes (LIFE13 ENV/BE/000517)
The LIFE OxyUp project intends to validate a new and economically-viable oxy-gasification unit, testing it as an alternative to fossil fuels, in energy-intensive industries such as brickmaking, glass and tile manufacturing. The project also tests the viability of the technology when using various 'difficult' biomasses such as sludge from wastewater treatment and agro-residues.

LIFE M&M Man and Metal - New business model to increase efficiency of resources aimed at products great durability with use of recycled materials (LIFE14 ENV/IT/000082)
The goal of the project is to replace zinc with lighter, thinner 'quasi-alloys' in the galvanised steel wire production process. These quasi-alloys will be made from recovered materials containing aluminium. The new process is expected to reduce zinc use by 90%, embodied energy and CO_2 emissions. It will also increase the useful life of galvanised steel wire (by up to 800% in industrial appliances).

LIFE MaxiMiseR - Ticking boxes, or marking success? - Maximising the potential of the EU's Monitoring Mechanism Regulation for LIFE (LIFE14 GIC/BE/000590)
The LIFE-MaxiMiseR project aims to use low-carbon development strategies (LCDSs) for transitioning to low-carbon economies. The project has three main specific objectives: to increase multi-stakeholder engagement, collaborative action, and the sharing of best practice and information relating to the Monitoring Mechanism Regulation (MMR) through the development of a multi-actor EU cooperation platform; to ensure Member States' LCDSs are strong and effective tools for driving decarbonisation, through the development of a quantitative/qualitative best practice monitoring tool that encourages their iterative improvement; to influence and disseminate solutions for resourcing the delivery of low-carbon development in Europe so that more funds will be available, notably through assessment of the EU Emissions Trading Scheme revenue uses.

LIFE OPTIMELT - Demonstration of thermochemical reforming of natural gas for reducing GHG emissions in Energy Intensive Industries (LIFE15 CCM/NL/000121)
The project will carry out the first full-scale demonstration of an innovative waste heat recovery concept for high-temperature manufacturing processes. The demonstration will take place at the Libbey Leerdam glassware factory in the Netherlands. The OPTIMELT technology serves as an add-on to existing oxy-fuel combustion furnaces. The project aims to reduce energy consumption and greenhouse gas emissions by at least 20% compared to the best available technology in the glass industry. Results will be disseminated to at least 500 European factories using high-temperature manufacturing processes.

SOLID LIFE - Solidia low CO_2 cement: from cement production to precast industry (LIFE15 CCM/FR/000116)
The project aims to demonstrate that it is feasible to produce low-emission cement and concrete products on an industrial scale in existing facilities using a low-calcite and non-hydraulic binder. The new products will have equivalent cost, give a superior performance and reduce CO_2 emissions by 70% compared to conventional Portland cement. A key part of this project involves communicating results to the cement production chain.

LIFE ECONOMICK - Energy consumption and CO_2 and NOx emissions Minimised in an Intermittent Ceramic Kiln (LIFE15 CCM/IT/000104)
The project aims to reduce greenhouse gas emissions in the ceramic industry. It will demonstrate an intermittent kiln for production of ceramic tableware and sanitary ware that re-uses waste heat. The new technology is designed to significantly reduce greenhouse gas emissions and the consumption of energy and raw materials without affecting product quality.

LIFEPOSITIVEMgOFGD - New desulfurization technology for SOx reduction with positive net environmental impact based on MgO reagents (LIFE15 ENV/GR/000338)
The production of magnesium oxide generates sulphur dioxide and other pollutants. Current techniques to prevent this either require use of large volumes of water or have other environmental disadvantages. The LIFEPOSITIVEMgOFGD project will showcase a new technique using magnesium oxide reagents for desulphurisation. Some 90% of solid waste will be recovered in a process that uses 40% less energy and 80% less water than wet flue gas desulphurisation. The by-product of the new technique will be used to produce fertilisers and construction materials.

LIFE SIDE - Supporting the Implementation and Development of the EU ETS (LIFE15 GIC/IT/000051)
The project aims to contribute to the revision of the rules for the EU ETS by creating a knowledge hub and a point of reference for policy-makers involved in the design and implementation of the scheme. This will include an economic assessment of the first 10 years of the EU ETS, a forum for constructive policy dialogue, the creation of a network of some 20 experts and online resources to enhance coordination.

LIFE WHIN - Waste Heat recovery in silicon INdustry (LIFE16 CCM/FR/000104)
Silicon manufacturing is an energy-intensive process that produces a lot of greenhouse gas emissions. This project will install a pioneering full-scale waste heat recovery system in a silicon plant in France. This system is expected to recover at least 47% of the waste heat generated during the production process and transform it into carbon-free electricity using an organic rankine cycle that replaces traditional refrigerants with a climate-friendly alternative. The system will reduce by 10% electricity costs for the plant's furnace and eliminate more than 50 000 tonnes per year of carbon dioxide emissions, i.e. 26% reduction. The project will identify a further 10 industrial sites where its heat recovery technology could be used and draft detailed plans for installation.

LIFE CleanOx – Cleanest oxy-fuel combustion technology with radiation-based waste heat recovery for glass melting furnaces (LIFE16 CCM/BG/000059)
For every tonne of tableware glass produced, 600 kg of carbon dioxide is emitted. A new heat-exchanger system to capture and recycle waste heat from oxy-fuel furnaces could cut process CO_2 emissions by 30% and nitrous oxide emissions by 90%, as well enhancing thermal efficiency and significantly reducing operating costs. The technology being demonstrated by this LIFE project is applicable to any industrial furnace operating above 700°C, and it could therefore be widely used in the cement, steel and porcelain sectors, as well as the glass industry.

LIFE 4GreenSteel - Excellent Model for High Strength PM Steel parts production by resource and energy efficiency and CO_2 and REACH decrease (LIFE16 ENV/IT/000231)
The project aims to demonstrate the feasibility of replacing the traditional energy-intensive machining process with innovative High-Density Powder Metallurgy (HDPM) technology for the manufacturing of high-performance steel components for the automotive market. To achieve this, the project will develop a demonstration system incorporating the Die Wall Lubrication (DWL) technique. The HDPM technology is expected to result in considerable energy and material savings, and to reduce by more than 70% the lubricant premixed with metal powder, increasing energy efficiency and solving related emission problems.

LIFE - HEAT-R - Waste heat valorization by modular thermoelectric recovery system for resource efficiency in energy intensive industries (LIFE16 ENV/ES/000344)
This project will showcase a marketable, new technology for directly converting waste heat into electricity, based on a thermoelectric principle called the Seebeck effect. The technology consists of a modular unit using multiple thermo-electric generator cells controlled through a patented programmable control unit based on system-on-chip technology. The technology will be demonstrated in industrial sectors with high levels of waste heat emissions, through three pilot projects (classified by temperature ranges) that will permit part of the wasted energy to be recovered in the form of heat and transformed into electricity. The net effect will be to reduce greenhouse gas emissions.

LIFE: Force of the Future - New circular business concepts for the predictive and dynamic environmental and social design of the economic activities (LIFE16 ENV/IT/000307)
Construction accounts for about 40% of the EU's total energy consumption and contributes almost 36% of its greenhouse gas emissions. To alleviate these significant environmental impacts, there has been a growing move towards more sustainable processes. This project will demonstrate dynamic monitoring of environmental, economic and social impacts at a ceramics company and will use these to inform a 'new production systems' concept. An integrated management tool will be used to identify the sustainable properties of materials and processes. This will enable the project to develop prototypes of more sustainable ceramic tiles, which will be produced on a small scale.

LIFE GreenPower - Demonstration of an innovative energy conversion technology for waste heat recovery in the glass industry and other EIIs (LIFE16 CCM/DE/000085)
Europe's energy-intensive industries waste heat with a usable energy potential of over 2 800 MW, equivalent to a large power station. LIFE GreenPower will test a new technology for converting low-grade waste heat from a glass container factory into mechanical energy. It is expected to show that fluorinated greenhouse gases in waste heat recovery can be eliminated and energy savings for compressed air production of up to 30% achieved. A further three installations of the technology are expected during the project, and five potential European customers will be identified.

LIFE PACTA - Paris Agreement Capital Transition Assessment of European financial markets and institutions (LIFE16 GIC/FR/000061)
By applying the Paris Agreement Capital Transition Assessment (PACTA) model, this project will give financial regulators and policy-makers the ability to assess EU insurance companies and pension fund assets against global climate goals. This will help them to better assess the risks of investments under a range of different decarbonisation scenarios. At least 200 EU financial institutions are expected to adopt the PACTA model within three years of the project's completion. The project will also contribute to the broader goal of standardising climate-related accounting.

LIFE Smart Oxy-Boost - Smart oxygen boosting for reducing energy consumption and emissions of glass melting furnaces (LIFE17 CCM/BG/000069)
Glassmaking is an energy-intensive industry that is responsible for high levels of carbon dioxide emissions. But adjustments can be made to the melting furnace, where most of the energy is consumed in maintaining the very high operating temperatures. The LIFE Smart Oxy-Boost project will partially convert an air-fuel float glass furnace at a tenth of the normal cost so that it uses 4.2% less natural gas. It will also reduce carbon dioxide emissions related to combustion by the same amount. The Bulgarian glass producer Trakya Glass calculates a return on investment of two to three years.

LIFE360 - A multi-stakeholder platform for inclusive and ambitious 2030 climate plans (LIFE17 GIC AT000039)
Some EU Member States need help to finalise their national energy and climate plans for 2030, which are scheduled to be ready next year. LIFE360 will set up an online platform to support the process in Hungary, Italy, Poland, Romania and Spain, by involving more people in meaningful consultation processes, developing and implementing effective national plans and improving climate governance. The platform will foster dialogue among local and regional authorities and NGOs, develop tools such as scenarios, training kits and a crowd-sourcing database, and enable best practice to be shared. It will also create a policy monitoring portal to assess and score national climate policies. Results will be shared with the Covenant of Mayors Association and other civil society umbrella groups.

H2020 REINVENT - Realising Innovation in Transitions for Decarbonisation
REINVENT focuses on meat/dairy, paper, plastic and steel - four industrial sectors that are financially important, but where low-carbon transitions are still relatively unexplored. Project's approach is to study and understand transitions and emerging initiatives from within sectoral contexts, where government climate policy is only one of many factors that shape perceptions and strategies. The transition to a zero-carbon society requires more than new technical solutions. REINVENT will study the entire value-chains of the industries to gain a broader understanding of the possibilities of transition. That includes non-technological factors such as supply chains, financing, trade and social and economic impacts. This perspective is necessary for supporting the innovations and system-wide transformations that decarbonisation requires.

H2020 LoCOFe - Development of a Low-CO2 Iron and Steelmaking Integrated Process Route for a Sustainable European Steel Industry
Over the past decade, the steel industry in Europe has been spending heavily on the research and development of technologies that will help achieve the EU's CO_2 emissions targets and reduce the cost of EU ETS compliance. From the initial stages of feasibility studies, several technologies were put forward for further development, one of which is the Hlsarna melting reduction process The LoCO2Fe project's objective is to prove the ability of the Hlsarna ironmaking technology to cut CO_2 emissions by at least 35% compared to blast furnace operated sites based on current Best Available Technology.

STORE&GO - Power-to-Gas: A key enabler for an innovative CO2-neutral energy system
Future energy systems will be based on intermittent renewable energy sources and will therefore need large-scale energy storage to ensure security of supply. Chemical energy carriers provide the highest energy density, and gas provides the highest existing storage capacity. Power-to-Gas technologies could thus be applied to use any surplus renewable energy to create a synthetic natural gas. While the technical feasibility of this process has been shown in several research projects, the new Horizon 2020 project STORE&GO aims to demonstrate that it can be upscaled and form part of the daily operation of European energy grids. The project will demonstrate three different Power-to-Gas concepts in Germany (Falkenhagen), Italy (Troia) and Switzerland (Solothurn).

TRANSrisk - Transition pathways and risk analysis for climate change policies
TRANSrisk is studying the risks and uncertainties within low carbon transition pathways, and how these transitions can be implemented in ways that are technically, economically and sociably feasible. The project's objective is to produce a new assessment framework and an accompanying toolbox for policy-makers. To this end, it has selected 14 country case studies, from Europe and North America to the fast-growing economies of Asia, Africa and South America, of the key economic sectors and low carbon technologies for the country. Each case study is led by expert academics based in the country. The results will help policy- and decision-makers implement more effective climate change policies, and improve their understanding of the costs, benefits, risks and uncertainties of rolling out low carbon technologies.

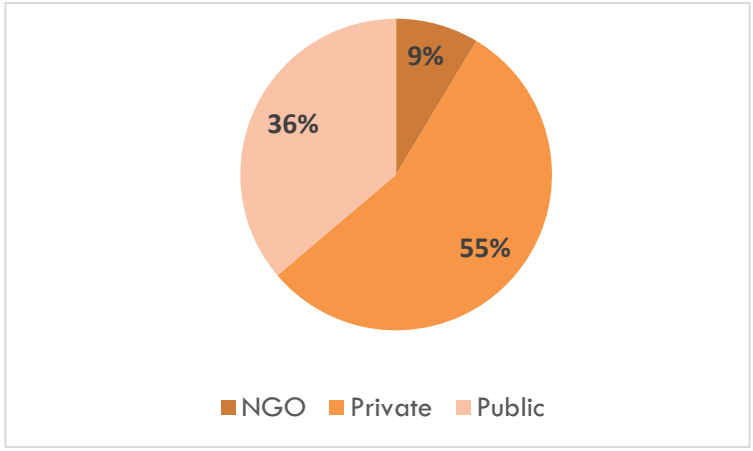
Annex 6: List of participants and related statistics

	Last Name	First Name	Organisation	Job title
1	Antonella	Contino	AGC Glass Europe	Head of department
2	Aragonés ortiz	Raúl	Alternative Energy Innovations (AElnnova)	Chairman - President
3	Araújo	Rui	Agência Portuguesa do Ambiente	Higher Technician on the Climate Change Department
4	Baresi	Marco	Turboden spa	institutional affairs and marketing director
5	Bel	Jordy	Libbey	Project coordinator / Project engineer
6	Bosch, van den	Hans	Libbey	Manager technical engineering
7	Bruchmüller	Jörn	Glatfelter Falkenhagen GmbH	Energy Manager
8	Comellas vogel	David	Alternative Energy innovations s.l.	Chief executive officer
9	Corbisier	Geoffroy	Xylowatt	Business development manager
10	D'Angelo	Deva	Life cycle Engineering srl	LCA analyst
11	De Diego Rincón	Joaquín	Praxair Euroholding S.L.	Combustion Applications European Manager
12	De Jong	Femke	Carbon Market Watch	Policy Director
13	Demian	Elias	NEEMO EEIG	LIFE External Monitoring Team
14	Derksen	Mayke	Rijksdienst voor Ondernemend Nederland	National Contact Point LIFE
15	Eldridge	John	NEEMO EEIG	Journalist
16	Ferrari	Anna Maria	University of Modena and Reggio Emilia	Associate Professor
17	Fetsis	Panos	Neemo EEIG	LIFE Communications team
18	Gabrielaitiene	Irena	EASME - H2020	Project Adviser
19	Gaubert	Christophe	DALKIA	Project manager
20	Giappichelli	Laura	EASME - European Commission	Project Advisor
21	Girardini	LUCA	K4SINT S.r.l.	Chairman of the board of directors
22	Goruney	Tunc	Sisecam	Manager, Energy and Environment
23	Grzesikowski	Piotr	European Commission	Policy Officer

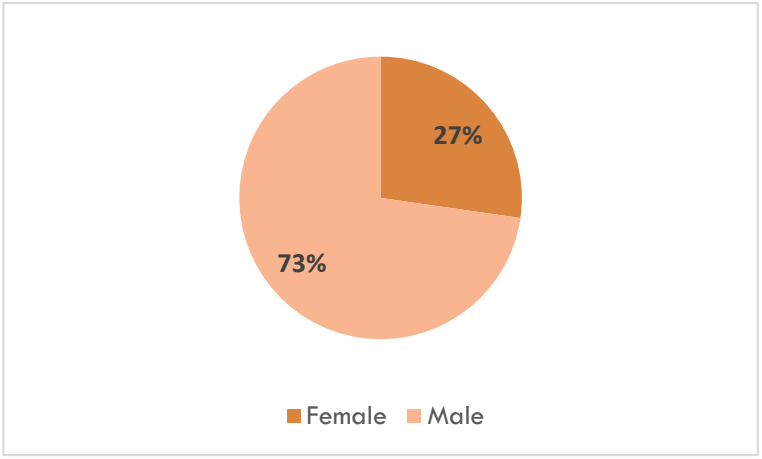
24	Hayne	Michael	2° Investing Initiative	Senior Analyst
25	Heynen	John	Netherlands Enterprise Agency (RVO)	NCP LIFE and H2020 SC5 Climate, Circularity, Raw Materials
26	Huuskes	Gustav	Libbey	Project Engineer
27	Immler	Franz	EASME	Head of Sector - Climate action
28	Kostakos	Georgios	NEEMO EEIG	LIFE Climate Action Sector Coordinator
29	Krafft	Richard	FERROPEM	Project Manager, Heat recovery expert
30	Loos	Alexander	THERMOLECTRIC Industrial Solutions GmbH	CEO
31	Lopez	Aurore	NEEMO EEIG	Monitoring expert
32	Lopez Martinez	Antonio	European Investment Bank	Energy Specialist
33	Matic	Anita	European Commission DG Environment	Policy Officer
34	McCall	Andrew	Energy and Climate, Scottish Government	Policy Adviser, Energy Intensive Industries
35	Meijer	Koen	Tata Steel	Project Manager, Hlsarna pilot plant
36	Mengali	Lorenzo	NEEMO	Monitoring expert
37	Meyer	Vincent	Lafarge Centre de Recherche	Project Manager
38	Mezquita	Ana	AICE-ITC	Head of Energy Unit.
39	Minestri	Giorgio	Stara Glass	Senior R&D Engineer
40	Mola	Alessandro	Stara Glass	R&D Director
41	Moya	Jose	European Commission - DG JRC	Scientific Officer
42	Nicolli	Francesco	Florence School of Regulation - European University Institute	Research Associate
43	Nilsson	Lars	Lund University	Professor
44	Rijsdijk	Edward	Libbey	E&I Teamleader
45	Roggenbuck	Anna	CEE Bankwatch Network	Policy Officer
46	Sahin	Hakan	Pasabahce	Development Manager
47	Schuurmans	Frank	Libbey	Furnace Engineer
48	Shukri	Erdinch	Pasabahce Bulgaria, Tableware plant	Furnace Chief
49	Spijker	Eise	JIN Climate & Sustainability	Senior Researcher

50	Streefkerk	Marc	Dutch Ministry of Economic Affairs and Climate Policy	Programme Manager on Energy Efficiency
51	Susani	Ludovico	NEEMO - Timesis	External Expert
52	Urbaniak	Darek	EASME - European Commission	Project Advisor
53	Van den plas	Sam	WWF European Policy Office	Senior Policy Officer
54	Van Isacker	Nathalie	NEEMO EEIG	Monitoring Expert
55	Van Leijen	Gertruud	Van Leijen Srl	European Grant Consultant
56	Van Rhede van der Kloot	Peter	Vereniging Nederlandse Glasfabrikanten	Chairman
57	Van Sluisveld	Mariësse	PBL Netherlands Environmental Assessment Agency	Researcher Climate & Energy
58	Van Trijp	Jac	RVO.nl	Project manager
59	Van Valburg	Marco	Libbey Holland	Strategic Program Director Libbey EMEA
60	Vannuzzi	Eleonora	Life Cycle Engineering Srl	Communications & Marketing assistant
61	Verboven	Hans	EY Climate Change & Sustainability Services	Executive Director Belgium
62	Vivarelli	Silvia	EASME - European Commission	Senior Project Adviser
63	Volkmer	Reno	Glatfelter Falkenhagen GmbH	Manager Product Innovation
64	Volpi	Lucrezia	University of Modena and Reggio Emilia	Researcher
65	Yiannoulakis	Haris	Grecian magnesite	Research engineer
66	Zampetakis	Theofilos	Grecian magnesite	R&d center manager

Breakdown of participants per sector



Gender distribution of participants



Annex 7: Communication materials

The Utrecht Platform meeting on LIFE's website:

http://ec.europa.eu/environment/life/news/newsarchive2018/october/index.htm#carbon

All the presentations from the platform meeting can be found at:

http://ec.europa.eu/environment/life/news/newsarchive2018/documents/eiis_presentations.zip

The video shown at the closing session is available at:

Day 2: https://www.youtube.com/watch?v=sFcx66kquJc&t=1263s