

European Steel Technology Platform - ESTEP



ESTEP's highlights in 2016

Glossary

AlSBL Association Internationale sans but lucratif (internationally non-for-profit

acting association)

CEFIC European Chemical Industry Council
CEMBUREAU European Cement Association
CCU Carbon Capture and Usage
CCS Carbon Capture and Storage

DG GROW Directorate General for Internal market, Industry, Entrepreneurship & SMEs

DG RTD Directorate General for Research & Innovation

EERA European Energy Research Alliance

EMIRI Energy Materials Industry Research Initiative

EPOS Enhanced energy and resource Efficiency and Performance in process industry

Operations via onsite and cross-sectorial Symbiosis

ESTEP European Steel Technology Platform

EU European Union

EUROFER European Steel Association FOF Factories of the Future FP9 9th Framework Programme

H2020 Horizon 2020

I2M Intelligent Integrated Manufacturing

LCA Life Cycle Assessment
MATCH Materials Common House

New InnoNet Near-Zero European Waste Innovation Network

PPP Public Private Partnerships
R&D Research & Development
RFCS Research Fund for Coal and Steel

RTO Research and Technologies Organization

SET Strategic Energy Transition

SPIRE Sustainable Process Industries through Resource and Energy Efficiency

SRA Strategic Research Agenda ULCOS Ultra-Low CO₂ Steelmaking

WG Working Group

Links

Frontpage picture, https://commons.wikimedia.org/wiki/File:Wuppertaler Schwebebahn.JPG,

Page 1, RFCS Workshop "EU funded steel Projects", 2 February 2016,

 $\underline{http://ec.europa.eu/research/index.cfm?pg=events\&eventcode=B2F4050C-D736-902C-F3EFF37227C1855D}$

Page 2, Eurosteelmaster 2016, http://www.c-s-m.it/en/events_and_courses/eurosteelmaster/eurosteelmaster_2016.html

Page 3, EUROFER's Sustainability Vision Paper: "Steel the Backbone of Sustainability in Europe",

 $\underline{\text{http://www.eurofer.be/News\%26Events/PublicationsLinksList/20160405\%20Steel\%20the\%20Backbone\%20of\%20Sustainability\%2}$

Oin%20Europe.pdf, Page 3, Workshop on "Valorisation of carbon emissions for a sustainable, competitive European Industry"; 26

October 2016, https://ec.europa.eu/energy/sites/ener/files/documents/carbon capture and utilisation.zip

Page 5, SLC project, http://cordis.europa.eu/result/rcn/51040_en.html, Page 5, Alive, http://www.project-alive.eu/, Page 5,

Alliance, http://alliance-project.eu/, Page 6, SCANMET V international conference,12-15 June 2016,,

https://www.swerea.se/en/scanmet-v, Page 6, ULCOS, http://www.ulcos.org/en/about_ulcos/home.php, Page 6, SPIRE,

https://www.spire2030.eu/, Page 6, EMIRI, http://emiri.eu/, Page 8, EPOS, https://www.spire2030.eu/epos, Page 8, MATCH,

http://www.match-a4m.eu/, Page 8, NEW_InnoNet, http://www.newinnonet.eu/, Page 9, SET plan,

https://ec.europa.eu/energy/en/topics/technology-and-innovation/strategic-energy-technology-plan

Foreword

With this joint foreword, we would like to express our appreciation to all of our members for making 2016 a very productive and successful year.

Steel is a key sector for Europe's economic competitiveness and sustainability. The steel

Dr H. Fischer

industry is the backbone of the European value chain, the basis for prosperity and growth. Besides providing employment, the steel industry and its equipment manufacturers are at the forefront of technology and research, contributing to the circular economy. Indeed, as steel is omnipresent, the sector is part of the solution in addressing environmental concerns for many products

Dr K. Peters

and services. However, the sector is currently facing some challenges.

ESTEP's ambition is to contribute to the reinforcement of the global leadership of the EU steel industry. This means using research and innovation to develop new products and

processes that will foster competitiveness while meeting both growth and environmental targets. In this regard, the year 2016 was dominated by the significant progress in the work of the Task Force, the direction of ESTEP's future, the launch of the idea of a Big Scale EU steel innovation initiative and the update of the Strategic Research Agenda (SRA). In addition, ESTEP took also part in a Horizon steel debate in order to discuss the future sustainability potential of steel.

We look forward to an interesting business year 2017 which will need all our efforts to support the ESTEP mission. We would be more than happy if the ESTEP community could count on your contribution in the working groups and support group as well.

Introduction

With the help of its members, ESTEP contributed successfully to various workshops, fostered common research projects at European level and launched several initiatives. ESTEP's work is highlighted in this activity report, which gives an insight into the organisation's many actions and achievements during the year 2016.

This report describes the main activities and meetings held in 2016. It then outlines the Working Groups' efforts and engagements, as well as ESTEP's involvement in different platforms, initiatives and programs. It finally gives a brief overview of activities and actions planned for 2017.

Unlike previous activity reports, this report is deliberately a condensed summary of important ESTEP's events and achievements. If more detailed information is required, previous reports, documents and additional information are available on ESTEP's website and in its newsletters.

Dr Heribert Fischer is the ESTEP Chairman and CTO of thyssenkrupp Steel Europe Dr Klaus Peters is the ESTEP Secretary General

During the workshop, Klaus Peters, the

Secretary General of the European Steel Platform, presented ESTEP's Strategic

Research Agenda. This was followed by

completed projects which are funded by

the RFCS. The presenting projects were

focused in two clusters, namely on

Industry 4.0, with a presentation on

Integrated Intelligent Manufacturing, and

construction cluster, with a particular

attention to fire safety and long span

bridges. Moreover, the president of the

German Steel Federation and chairman of

the World Steel Economics Committee,

perspective from the industry, with

benefits of steel research and a focus on

the challenges of increased steel imports

The workshop clearly demonstrated the importance of the RFCS program for the

Kerkhoff,

offered

Jürgen

Hans

into the EU.

on successful research within

ongoing

from

February

presentations

RFCS Workshop on EU funded steel projects DG RTD, the unit in charge of running the Research Fund for Coal and Steel (RFCS) organised a workshop on

Tuesday 2 February 2016 about the EU funding in the steel sector in order to increase the visibility of its activities. ESTEP and its Working Groups contributed considerably to the success of this event (see box 1). One hundred guests from all over Europe were engaged in discussions and listened to presentations about the steel industry and its research from both the European Commission's and the industry's side.

and



RFCS Workshop "EU funded steel Projects"

Box 1

The ESTEP working groups I²M and Construction contributed by helping to run two sessions respectively called "Cluster Industry 4.0" and "Cluster Construction". It had been demonstrated that the European Steel Industry is very active in these emerging fields, especially because of its strong support in the RFCS program since many years.



Peters, chairman of Working Group I²M, the "Integrated Intelligent on Manufacturing", three presentations about concrete research projects were "Integrated dynamic management for steel production "(Fabio Sanfilippo); "Predictive Sensor Mining for Product Quality Improvement" (Gabriel Fricaut) and "Development of a automation information new and paradigm for integrated intelligent manufacturing in steel industry" (Marcus

After the short introduction of Harald



As regarding the second cluster, Samir Boudjabeur, chairman of Working Group Construction, and Louis-Guy Cajot gave a short overview on construction, which was then followed by presentations on "Long span bridges "(Ulrike Kuhlmann) and

Neuer).



European steel sector. Significant industry involvement, a bottom-up approach, peerexpert review of RFCS projects and the opportunity for resubmissions were

identified as key success factors of RFCS.

13th ESTEP Steering Committee meeting

March On 22 March, the 13th Steering Committee meeting of ESTEP was held. As the European Commission could not attend the meeting, the key

messages were exchanged with DG RTD by phone.



For 2016, the main targets were the contribution to the RFCS program, the acceleration of projects and initiatives addressing the low carbon industry goal, the continuation of the close relationship with the European Commission and the assessment of ESTEP becoming a legal entity, particularly into the form of an international ASBL. The latter was followed up by a dedicated task force working on several issues, such as organisational structure, membership fees and communication with the ESTEP stakeholders.

May Eurosteelmaster

The VIII edition of the <u>Eurosteelmaster</u> was held successfully at the Acciai Speciali Terni training center from the 16 to 20 May

2016. The advanced course for the European steel and related industries, designed and directed by Enrico Gibellieri, was organised by the Centro Sviluppo Materiali (CSM), with the support of the European Commission, EUROFER, industriAll, ESTEP and Federacciai.

Participants and lecturers of the course came from European steel companies, research and technologies organisations (RTOs), research centres, EU institutions (EIB, EC), advisory

companies and universities. The course covered several topics ranging from politics, EU and Member

States' industrial policies, trade, technology, sustainability, technology, research & innovation, steel product development & applications to future of the EU steel sector.



September

VPs meeting of ESTEP's way forward

In 2016, ESTEP has initiated a task force in order to investigate which formal structure is the best for the organisation in the future. The focus was laid on two aspects, namely

	NAME	No	Task force member	Proxy
ESTEP chairman	Heribert Fischer	1 2 3	David Valenti Enrico Gibellieri Hans Ferkel	Sabine Will
ESTEP Secretary General	Klaus Peters	4	Klaus Peters	
ESTEP Support Group Chairman Vice Chairman	Michael Steinhorst Luc Chefneux	5	Michael Steinhorst Luc Chefneux	Wim Moonen
Associations & RTO	Peter Dahlmann	7	Peter Dahlmann	Ralph Sievering
EUROFER	Axel Eggert	8	Danny Croon Jeroen Vermeij	

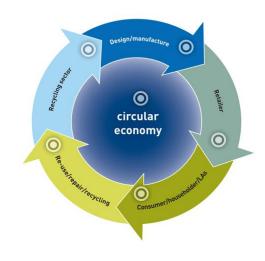
the modernisation of the Working Groups & the governance structure, and on the formal statutes of ESTEP's 'legal entity'.

The mandate of the task force was established in March 2016 at the 13th ESTEP Steering Committee meeting and was confirmed at an EUROPER Vice-Presidents' meeting held on the 16th of September 2016.

The members of the task force (see table) concluded that the best way forward for ESTEP is to become a legal entity, and therefore to transform it into an international ASBL (AISBL). In this regard, the final report of the investigation - including the recommendation - will be made in early 2017.

October Circular Economy Workshop

On 19 October, EUROFER and ESTEP organised a steel-internal workshop on Circular Economy (CE) with a participation of 72 people from the steel industry, RTOs and academia. The day was packed with presentations from members on various aspects of the role of the steel industry in the circular economy.



It began with a short description of the Circular Economy Package and on EUROFER's Sustainability Vision Paper: Steel - the Backbone of Sustainability in Europe, in which ESTEP's contributions are embedded. It was then followed by an overview of the political elements, the current state of play, the application of steel in various sectors, the problems and constraints of the steel industry within the circular economy. After Professor Alwood's challenging inspection into the future of European steel, members presented their experiences and reports into two sections: by-products & Circular Synergies, and CO₂ & Circular Synergies.



Carbon valorisation Workshop

On 26 October, ESTEP and EUROFER co-organised a <u>workshop on carbon valorisation</u> (CCU) with CEFIC and CEMBUREAU, which was hosted by DG ENER (Marie Donelly). High level industry representatives pointed out the opportunities of carbon valorisation, which are not being seized due to hurdles in the regulations. The Commission was represented by DG ENER, DG CLIMA and DG GROW (with DG RTD in the audience) and committed to continuing an open dialogue with industry on carbon valorisation and its related regulations.

November

7th ESTEP Mirror Group meeting

The 7th Mirror Group Meeting of ESTEP was held on 22 November with 26 participants. Presentations on Industry 4.0, Life Cycle Assessment and Biodiversity were given by steel experts before the "Big Scale" innovation initiative for EU-steel was explained.

After a kick-off meeting in September held in Düsseldorf, various ideas and activities were merged into a joint EU-steel "Big Scale EU Innovation initiative" which was then presented at the Mirror Group. The initiative aims to develop and pilot innovative and breakthrough technologies in a number of potential clusters, such as CCU, hydrogen metallurgy, green electricity, and the increased use of scrap for steelmaking.

Working Groups

In 2016, three Support Group (SG) meetings took place. The exchange between the Working Groups (WG), the Heads of Research of steel producers, and key representatives of steel stakeholders, who provided valuable feedback to the work programme of the Working Groups. The chairman of the SG, Michael Steinhorst, strongly supported the cooperation between the Working Groups as today's challenges are often broader than the scope of one Working Group. The outstanding example is the kick off of the large scale EU Steel innovation initiative for ultra-low carbon steelmaking, called "Big Scale".

Working Group Integrated Intelligent Manufacturing (I²M)



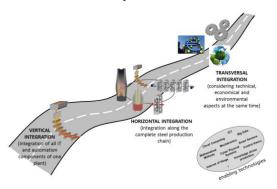
In 2016, the main activities for the I²M Working Group were covered in four regular meetings. The main inputs were a contribution to the RFCS workshop in February, the finalisation of the technological roadmap, and the construction of a RFCS dissemination project regarding I²M topics.

Finalisation of the "Integrated Intelligent Manufacturing (I²M) Roadmap"

After nearly two years of work, the technological roadmap of the I²M working group was completed. The roadmap starts with a description of the industrial objectives (here *Sustainability, Quality, Lead Time, Profitability* and *Health & Safety* have been used) and with a presentation on the basic concepts of future "Smart Steel Industry". It is followed by an outline on the key enabling technologies, a list of some challenges and a particular focus on the future research needs. The roadmap is public and can be ordered by contacting the chairman of the working group I²M or the Secretary General of ESTEP.

RFCS proposal for the dissemination of results of I²M projects

The objective of this dissemination project is to revisit the most important



European projects related to "Integrated Intelligent Manufacturing" / "Industry 4.0" technologies in the field of steel production carried out the last 10 years. The purpose was to highlight the most important results, which are based on an integrated critical analysis of more than 40 funded projects. It is useful to distribute and promote the exploitation of the results. The result of the above analysis could be used as additional input for a public consultation into the new I²M roadmap. In the meantime, the proposal was successful and the work will start on 1 July 2017.

Working Group Transport

In June 2016, ESTEP's Working Group Transport nominated a new chairman, Oliver Moriau from ArcelorMittal Global R&D. He is the successor of Mr. Chan (Thyssenkrupp Steel Europe), who was replaced by Lothar Patberg (Thyssenkrupp Steel Europe), co-chair of the working group.

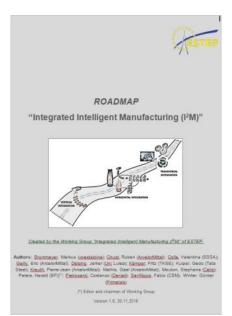
The first meeting in September addressed the importance of several priorities, such as Life Cycle Analysis which supports the application of steel solutions in vehicle engineering. The participation of ESTEP's members in big collaborative projects such as <u>SLC</u>, <u>Alive</u> and more recently, <u>Alliance</u>, is needed to defend the use of steel in future vehicle engineering. The participation of members of the Transport Working Group in European Council for Automotive R&D (EUCAR) meetings supports this intention. The Working Group proposed confirming the RFCS priority defined in 2015 as: *Cost effective lightweight steel solutions for new vehicle concepts or components with improved LCA or safety performance*.

However, discussions between members indicated that intensive research and development efforts are currently needed regarding enabling technologies for the new generation of Advanced High Strength Steels. This topic could also be a source of collaborative projects between steel companies and research organisations. Specific contact with the chairman of the RFCS TGS7 was suggested. In addition, the Working Group's activities for the rest of the year 2016 were dedicated to update the SRA.

Planet Working Group

The mandate of Working Group Planet, as defined in 2013, and its goals for 2016 have been reviewed. These focussed the attention on resource efficiency, energy transition and more generally, on the circular economy.





Participation in the Working Group is stable with 11 active members representing universities (16%), RTOs (37%), industries (37%) and associations (10%). The Working Group met 3 times in 2016: face-to-face meetings in January and June, with a telephone conference in October.

In 2016, besides contributing to the Circular Economy workshop in October, the Working Group Planet, with its chairman Enrico Malfa, also proposed and launched, at the Support Group, the cross-Working Group Task Force on Sustainability (see box 2). This Task Force, held on 29 January, promoted a one day ESTEP/EUROFER workshop on steel industry technologists and researchers from a range of disciplines and backgrounds.

Box 2 ESTEP's Working Groups were involved in the Task Force on Sustainability and had a good collaboration with EUROFER for the publication of "The European Steel industry vision, EUROFER sustainability Vision Paper".

Steel, the Backbone of

Another key achievement in 2016 was the finalisation of the position paper entitled *Examples of steel production going hand in hand with biodiversity* by Valentina Colla. This document was presented during the November Mirror Group Meeting.

Working Group Planet members contributed to reviewing the SRA and the definition of the RFCS priorities linked with the topics related to

Sustainable Steel Production in relation to the EU institutions' new focus on the circular economy.

Working Group Planet is continuing its dissemination activities by participating in the <u>SCANMET V international conference</u> (Lulea, Swden on 12-15 June 2016), with the plenary section presentation on the *European Steel Technology Platform's Strategic Research Agenda*: a *Vision for Sustainable Steel Production in the 2030*s and with the submission of

the abstract Steel and biodiversity: a promising alliance, for the SAM 11 conference of 15-16 May 2017.

Working Group Energy Market

During 2016, the Working Group continued to strongly support the European Commission on public-private-partnership (PPP) initiatives dealing with topics such as Sustainable Process Industry Resource

Efficiency (<u>SPIRE</u> - Applications) and the Energy Materials Industrial Research Initiative (<u>EMIRI</u>).

Various initiatives on more specific energy topics, such as oil & gas transportation, renewable energy, energy storage, power generation and many other energy topics were also conducted. In addition, a consistent participation of members to the European Energy Research Alliance (EERA) activities, especially for nuclear matters, was recorded.



Concerning both the proposals and projects presented and approved in the RFCS framework, the increase in those numbers in comparison to previous years has to be highlighted. Interest in energy steel products and applications continues to grow and the preparation of new proposals is currently ongoing.

Moreover, various initiatives and actions in the framework of Horizon 2020 have been carried out. Among them, representatives of the Working Group participated in various brokerage events regarding SPIRE (Applications) and EMIRI held in Brussels. Additionally, Pietro Gimondo, chairman of the Working Group, gave a lecture at the Eurosteelmaster training course.

All these initiatives on energy themes put once more the activities of the Working Group on the wave top in the EU research and innovation activities.

Working Group Profit

In 2016, ESTEP's Working Group Profit nominated a new chairman, Jean Borlee from CRM. The working group focused on updating ESTEP's strategic research agenda. Its members are active in the field of ultralow carbon steel making (<u>ULCOS</u>) and similar climate change mitigating activities, many of which were also presented at the circular economy workshop in October 2016.

Working Group People

In 2016 the Working Group People went to several events and had three meetings in January, May and October.

Box 3

The Working Group People conducted a full day internal workshop on the "Management of Knowledge" on 27 January in Brussels on current practices in the management of knowledge within steel companies. It also included discussion on the latest scientific approaches from a human-centric perspective. The actual framework conditions, possibilities and constraints were summarised, as were research questions and future strategies and approaches.

Peter Limberger attended the Workshop on the Sustainable Steel Roadmap Task Force held on 29 January 2016, and represented people-related issues for the Sustainable Steel Roadmap.

Veit Echterhoff, chairman of the Working Group, held a lecture on *Future Challenges for HR in the EU steel industry* at the Eurosteelmaster in May 2016.

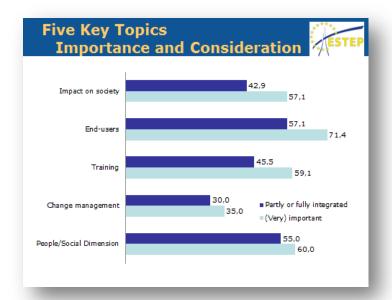
Working Group People also developed an online survey (see box 3) for all ESTEP Working Group members. This was to identify the degree of interaction between technical and social elements. It was to reflect the relevance of social and

people-related issues by focusing on the general importance and the degree to which these elements are



ESTEP Online Survey:

"Social



considered. Thirty questionnaires were conducted, mainly referring to ongoing projects in ESTEP's members. The main finding was that social and people-related issues are already well integrated in about 30-57% of the projects/proposals. The results were presented on 5 October 2016 (See chart left).

The Working Group People also held the first Common Meeting/Exchange with Working Group I²M on 5 October. Indeed, because of new technological developments, especially concerning the internet of things and industry 4.0, such a common workshop with

the Working Group I²M was considered necessary. The resulting meeting focused on exchanging technological and social views on Knowledge Management. Another common workshop has been scheduled for January 2017.

The 20^{th} Italian Steelmaster Course took place in Cremona and Vicenza in October ($10^{th} - 14^{th}$) and November ($7^{th} - 11^{th}$) 2016. Besides ESTEP, EUROFER, EU policy makers and steel company presenters, Working Group People was represented by Antonius Schröder, who gave a half day lecture entitled *ESTEP & Human resources in the European Steel Industry*.

Finally, in December 2016, the Working Group People completed its chapter for the Strategic Research Agenda.

Working Group Construction

Members of the Construction Working Group had an active - 2016, which was mainly driven by reviewing and aligning the SRA. A dedicated workshop with an external guest was organised in Delft, the Netherlands, in order to kick start the revision of the SRA. This is aligned with Horizon2020 and covers things such as the

circular economy, digital construction, steel applications and performance.

In addition to its contribution to the RFCS workshop in February, Samir Boudjabeur, chairman of the Working Group, spoke twice at a high profile conference in Bratislava on the re-industrialisation of Europe. In the session on *Smart energy for energy transition*, he explained the contributions of smart steel solutions in construction to the Energy transition strategy. The next day, he provided a large body of evidence showing how the EU steel industry is strongly committed to further contributing to building a more circular economy in Europe.



ESTEP's involvement

ESTEP is involved in a number of initiatives. During 2016, it has continued its contributions to the Research Fund for Coal and Steel (RFCS), to Public Private Partnerships (PPP) on Sustainable Process Industries through Resource and Energy Efficiency (SPIRE), to Factories of the Future (FoF) and the Energy Materials Industry Research Initiative (EMIRI), which are creating funding opportunities for steel related projects.



ESTEP is also contributing to three Horizon 2020 projects as an advisor, namely to Enhanced energy and resource Efficiency and Performance in process industry Operations via onsite and cross-sectorial Symbiosis (EPOS), Materials Common House (MATCH) and The Near-Zero European Waste Innovation Network (NEW_InnoNet). EPOS's main objective is to enable cross-sectorial Industrial Symbiosis and to provide a wide range of technological and organisational options for making business and operations more efficient, more cost-effective, more competitive and more sustainable across process sectors. MATCH is a coordination and

support action to promote the creation of a strong, sustainable, inclusive network where any European materials players, such as industry, research and academia, feel comfortable and gain real value for their respective interests. It also looks at the integration of concerted and strategic actions responding to regional, national and European challenges in the field of materials. As for <u>NEW InnoNet</u>, its main goal is to mobilise stakeholders towards building a circular economy by developing the European Near-Zero Waste Platform.

ESTEP re-joined the <u>Strategic Energy Transition</u> (SET) plan, which is a public consultation, to strengthen the position of the steel sector, particularly in actions "6 and 9"², along with EUROFER and steel producers. In the last meeting on 8 December, EUROFER presented a comprehensive list of steel sector contributions to an enhanced energy efficient industry.

In 2016, ESTEP became a member of Knowledge4Innovation (K4I), which has important connections with the European Parliament in regards to Research and Innovation. Thanks to this, ESTEP can now use this platform and its connections to communicate its advocacy messages.

ESTEP also became a member of the High Level Group of Energy Intensive Industries, which is the successor of the High Level Group on Steel. During the kick-off meeting, it was decided to deal with the topics of energy, innovation and overcapacity in the subsequent meetings.

Outlook 2017

2017 will be an important year for ESTEP as it is on its way to becoming a legal entity. This will enable ESTEP to directly participate in established projects. Indeed, ESTEP's becoming a legal entity – in the form of an international ASBL – is important in respect to liability issues as for the moment the participants act on the behalf of companies, whereas the Secretary General faces a different situation.

2017 will also be marked with the designation of the new chairman of ESTEP and with the finalisation of the update of the Strategic Research Agenda (SRA).

As ESTEP is not simply involved in research nor only connected with the Commission through the Horizon 2020 and RFCS programs; it is also a European Technology Platform and will as such, continue working on its visibility and on providing input for the decision making process at European level. It will also continue on finding opportunities for its community in order to provide topics of the highest interest for its members.

Furthermore, in order to raise further awareness of steel success stories, ESTEP will participate in, and contribute to, several workshops during the course of 2017. One of the main activities will be the *Future of European steel: Innovation and sustainability in a competitive world and EU circular economy* workshop from DG RTD.

In 2017, the cornerstones of the next framework programme (FP9) will be defined. ESTEP will provide its input to the various consultations and activities in order to continue the success of Horizon 2020.

² Action 6 of the SET Plan Communication focuses on continuing efforts to make EU industry less energy intensive and more competitive.

Action 9 steps up research and innovation activities on the application of carbon capture and storage (CCS) and the commercial viability of carbon capture and usage (CCU)

Edited by Klaus Peters and Delphine Snaet, ESTEP, April 2017

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