

# Industry session (LC-SC3-EE-6 and LC-SC3-EE-8)

11:00 -11:05	Welcome and Introduction	Adrian PERES, European Commission, EASME
11:05 – 11.25	Policy background	Serena PONTOGLIO, European Commission, DG ENER, Unit C.3
11:25 – 11:40	Introduction to SPIRE cPPP	Istvan RITZ, European Commission, DG RTD, Unit D.2
11:40 – 12:00	LC-SC3-EE-6-2018-2019 Topic	Silvia VIVARELLI, European Commission, EASME
12:00 – 12:10	LC-SC3-EE-8-2018-2019 Topic	Filippo GASPARIN European Commission, EASME
12:10 – 12:30	Questions & Answers	Adrian PERES, European Commission, EASME

# Questions



## Question & Answer session at the end

- You can raise your hand during that session !

**Or –during the presentations- you can also use your mobile phone or computer:**

- simply go to <https://www.sli.do>
- enter **#H2020Energy** and choose our room - we are in the room **Jenkins**
- **Enter your question** in the question box
- We will display questions at the end of the session



# ENERGY AUDITS FOR ENTERPRISES: ART.8 OF THE ENERGY EFFICIENCY DIRECTIVE

**SERENA PONTOGLIO**  
**DG ENER, UNIT C.3 ENERGY EFFICIENCY**





# THE CONTEXT

## THE CLEAN ENERGY PACKAGE

# What are our goals?

**CREATING JOBS & GROWTH, BRINGING DOWN GREENHOUSE GAS EMISSIONS,  
SECURING ENERGY SUPPLY**



Putting energy  
efficiency first



Demonstrating  
global leadership  
in renewables



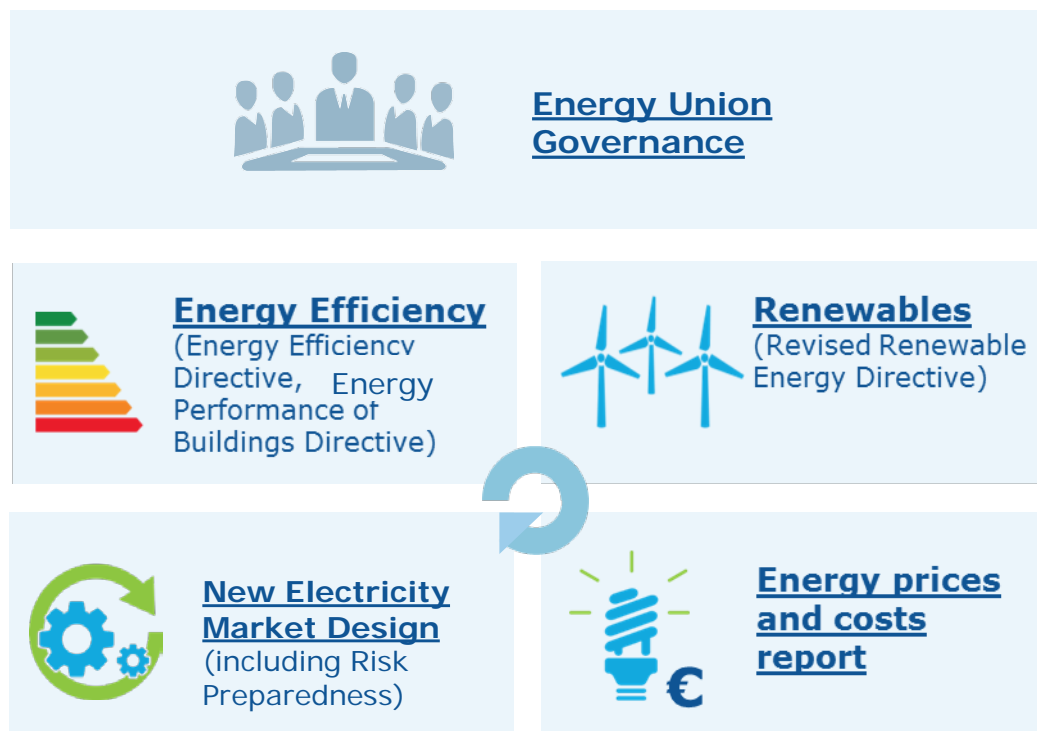
Delivering a  
fair deal for  
consumers

# HOW DO WE GET THERE?

## THE RIGHT REGULATORY FRAMEWORK FOR POST – 2020

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

*Commissioner Miguel Arias Cañete (2016)*



# What pieces of legislation?

## ACHIEVING THE BINDING 30% ENERGY EFFICIENCY TARGET BY 2030



### Energy Efficiency Directive

- Binding 30% energy efficiency target for 2030;
- Create 400,000 new jobs;
- Reduce gas imports by 12%;
- Save € 70 billion in fossil fuel imports;
- Empower consumers by granting access to information on their energy consumption.



### Energy Performance of Buildings Directive

- Clear vision for a decarbonised building stock by 2050;
- Smart & Efficient buildings through use of Information and Communication Technologies and Smart Technologies;
- Smart Finance for Smart Buildings initiative:
  - More effective use of public funding
  - Aggregation of funds
  - De-risking
- Protect vulnerable groups & address energy poverty.

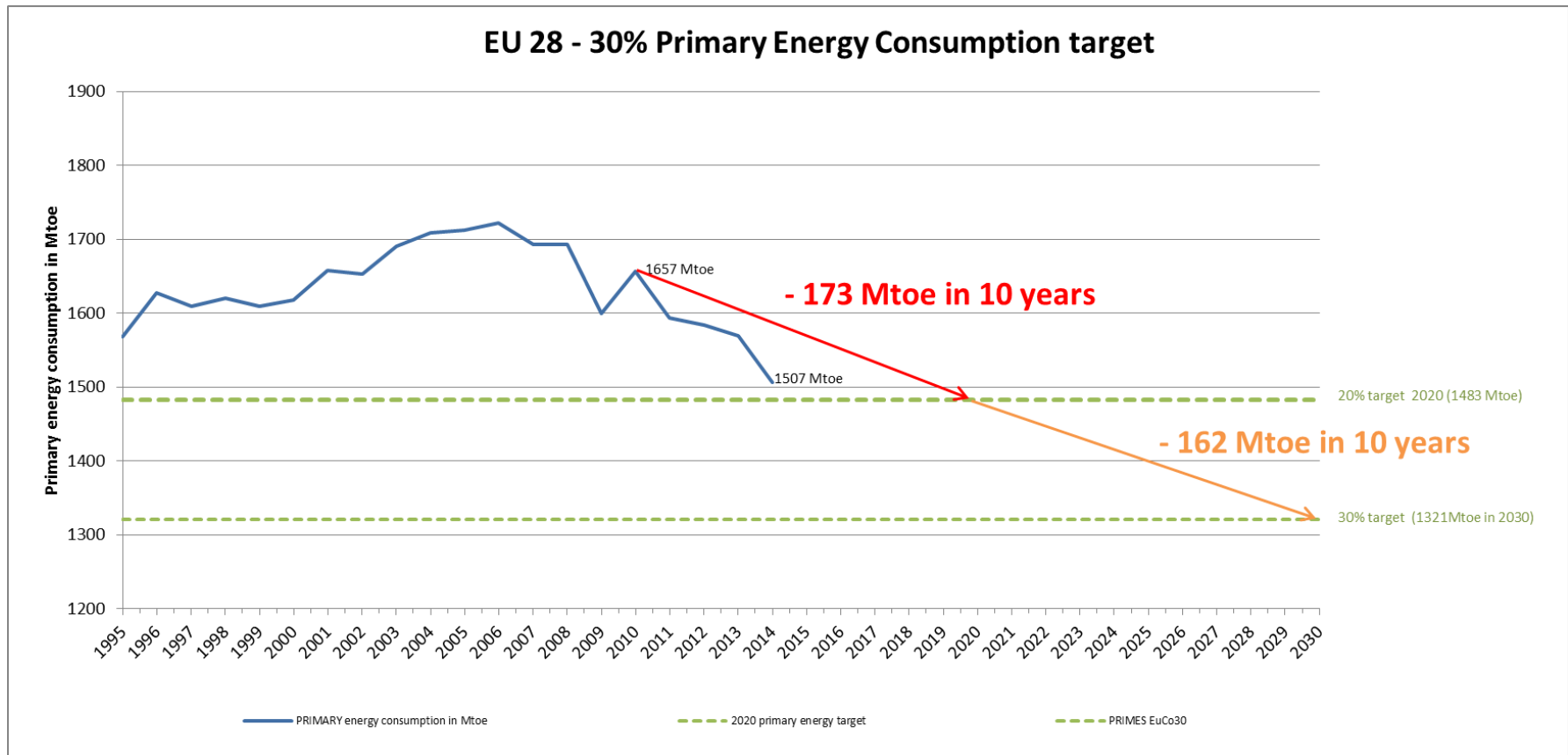


### Ecodesign Working Plan 2016-2019

- List of new product groups;
- Outline on how ecodesign will contribute to circular economy objectives;
- Specific measures on air conditioning;
- Guidelines on voluntary agreements.

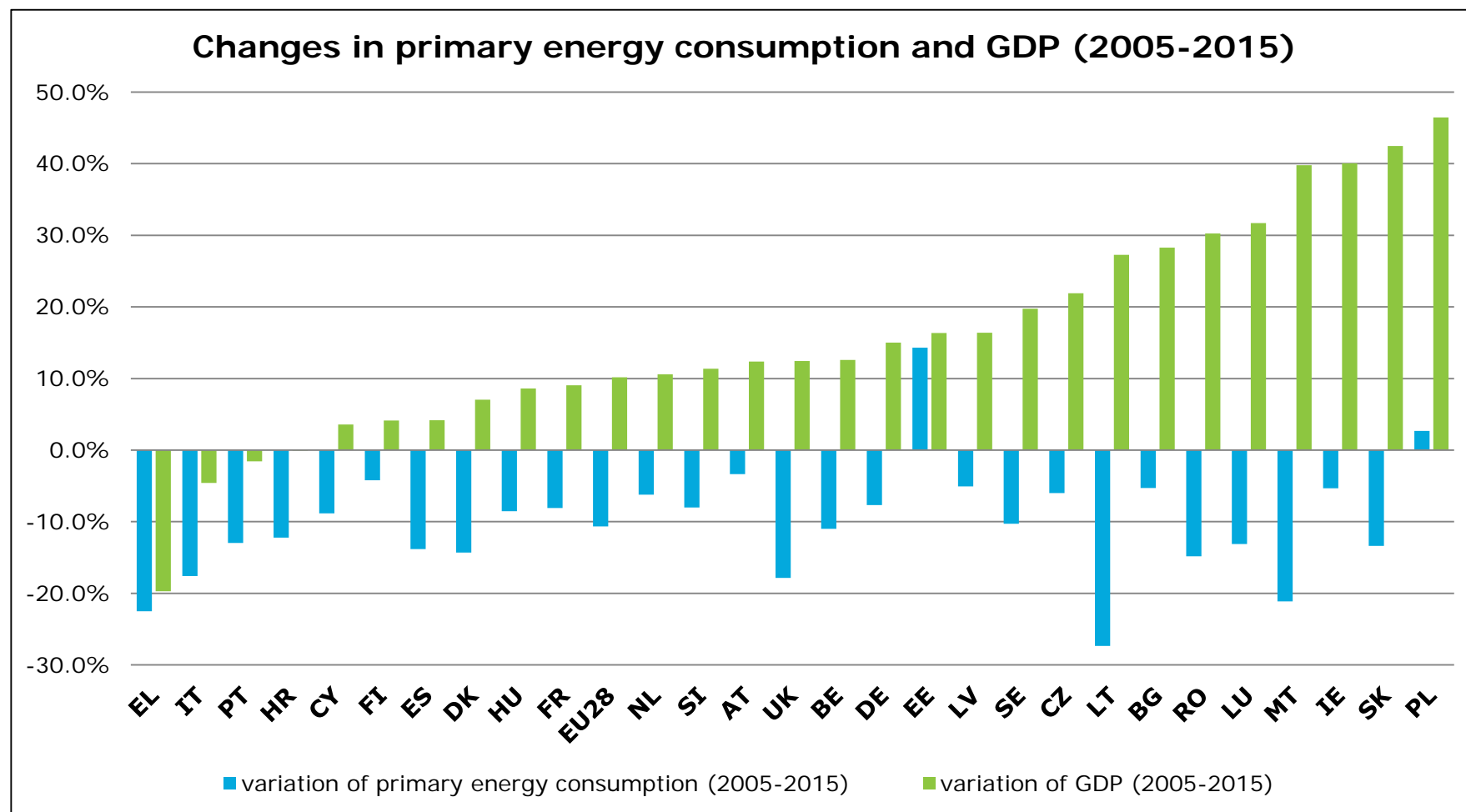


# Keeping the effort



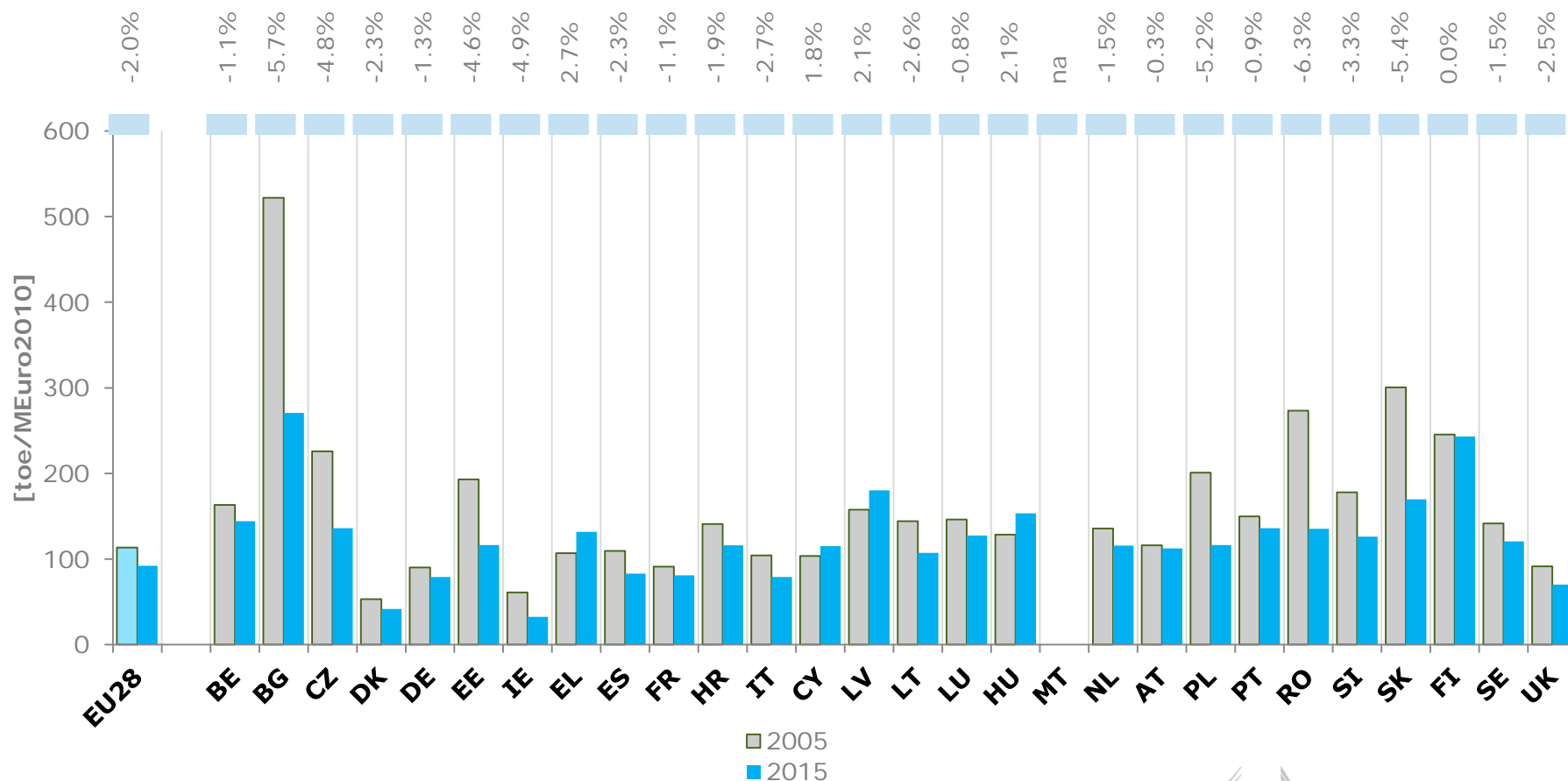


## TRENDS IN Primary Energy Consumption/GDP



## EE3: Final energy intensity in industry

average annual change 2005 - 2015 [%]



Source: European Commission based on Eurostat data



# ARTICLE 8 OF THE ENERGY EFFICIENCY DIRECTIVE

# Energy Efficiency Directive 2012/27/EU

Article 3: National energy efficiency targets

Article 4: Long term building renovation strategies

Article 5: Renovation of central government buildings

Article 6: Public procurement

Article 7: Energy efficiency obligations (or alternatives)

**Article 8: Energy audits and energy management systems**

Articles 9-11: Smart metering and billing

Article 14: CHP and district heating and cooling

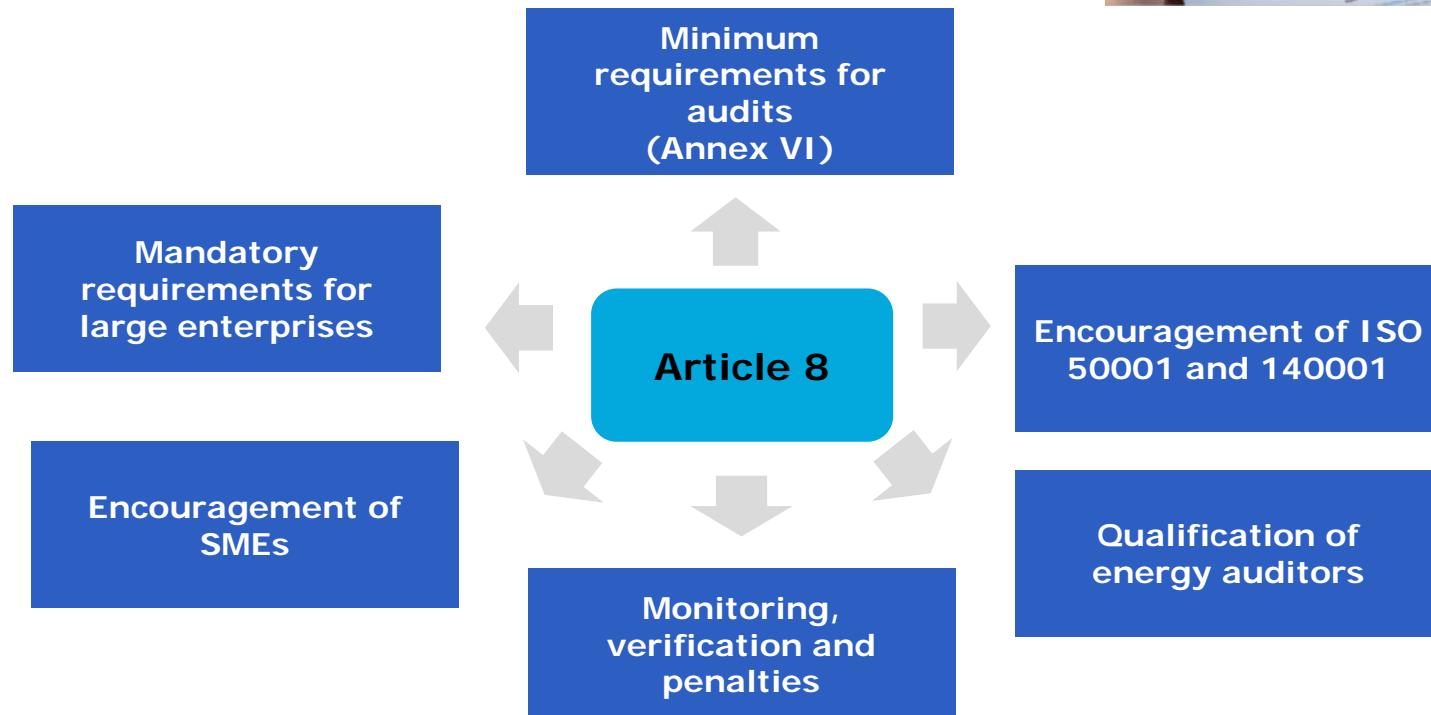
Article 15: Energy efficiency in grids and demand response

Article 16-17: Qualification, training and information

Article 18: Energy service markets



# The legislative framework





## WHAT'S NEXT

## Next steps

- Complete the work on an updated **Guidance document** (next round of audits in 2019).
- **Non-conformity checks** of national implementation of the EED.
- Overall **evaluation of energy audits provisions** (several studies already ongoing at national level in AT, DE, DK, IT, UK, etc.).

## Important aspects

- **Focus on the follow-up of energy audits:** from the audit recommendations to a business plan
- Better understanding of where the highest and more cost-efficient **energy efficiency potentials** exist (which sector/technology/process)
- Better understanding on the **barriers for investors – de-risking** instruments, benchmarking and indicators need





Thank you for  
your attention!

Serena.Pontoglio@ec.europa.eu

**DG ENER, European Commission Website:**

[http://ec.europa.eu/energy/efficiency/index\\_en.htm](http://ec.europa.eu/energy/efficiency/index_en.htm)

## Further information

- Energy savings and the potential in industry:  
[https://ec.europa.eu/energy/sites/ener/files/documents/151201%20DG%20ENER%20Industrial%20EE%20study%20-%20final%20report\\_clean\\_stc.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/151201%20DG%20ENER%20Industrial%20EE%20study%20-%20final%20report_clean_stc.pdf)
- Implementation of Article 8 of the EED:  
[https://ec.europa.eu/energy/sites/ener/files/documents/EED-Art8-Implementation-Study\\_Task12\\_Report\\_FINAL-approved.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/EED-Art8-Implementation-Study_Task12_Report_FINAL-approved.pdf)
- Commission Recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (notified under document number C(2003) 1422), OJ L 124, 20.5.2003 (2003/361/EC).
- (Existing) Guidance note on Article 8: <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52013SC0447>

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#InvestEUresearch

# Horizon 2020 Work Programme for Research & Innovation 2018-2020

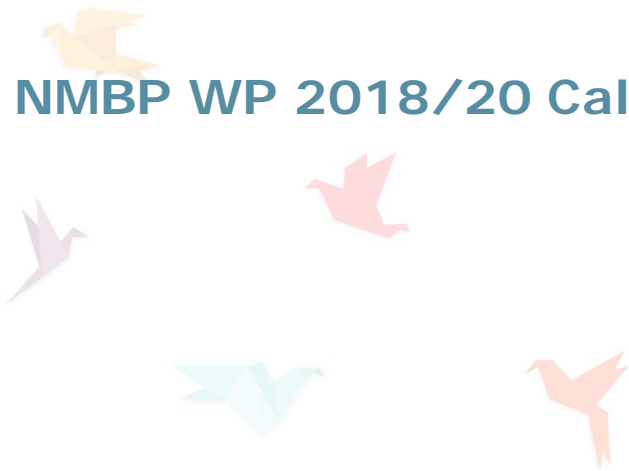
István RITZ  
DG RTD, D2 – Industrial Technologies

Energy Information Days  
Smart & Efficient Energy  
Industry Session  
Brussels 25 October 2017

Research and  
Innovation



# OUTLINE

- The contractual PPP approach
- Sustainable Process Industries through Resource and Energy Efficiency - SPIRE Contractual PPP
- NMBP WP 2018/20 Call – Industrial Sustainability





# What/Why Public-Private Partnerships in Horizon 2020?

- Partnership between a Public body and a Private association joining resources in order to achieve common goals
- R&D investments are essential for generating growth and high quality jobs
- EU business under-invests in R&D compared to other world regions
- Increasing international competition for leadership in strategic technologies
- Partnerships create stable frameworks for joint R&I investments in industrial domains
-  To facilitate prioritisation of R&I in line with the Europe 2020 objectives and industry needs
-  To leverage research and innovation efforts

# The contractual PPP approach

- **What is the same as in normal Horizon 2020:**

- The financial rules are those of Horizon 2020
- Final responsibility for the Work Programme stays with the European Commission
- Implementation remains with the Commission: selection of proposals, grant preparation, review of progress and payments
- Calls are open to non-members (~ 75% of funded participants are non-members)

- **What is different from normal Horizon 2020:**

- Long-term commitment by Commission to support the field
- Long-term commitment by industry to invest, with a need to demonstrate its fulfilment (monitoring & KPIs)
- Roadmap-based strategy. Close interaction in the Partnership Board to prepare the content of the calls.

# PPPs in Horizon 2020

Institutionalised PPPs	Contractual PPPs
<ul style="list-style-type: none"><li>• Innovative Medicines (IMI)</li><li>• Clean Sky</li><li>• Single European Sky ATM Research (SESAR)</li><li>• Fuel Cells and Hydrogen (FCH)</li><li>• Electronic Components and Systems (ECSEL - old ARTEMIS + ENIAC)</li></ul> <p>New:</p> <ul style="list-style-type: none"><li>• Bio-based Industries (BBI)</li><li>• Shift2Rail</li></ul>	<ul style="list-style-type: none"><li>• Factory of the Future (FoF)</li><li>• Energy-efficient Buildings (EeB)</li><li>• Green Vehicles (EGVI)</li><li>• Future internet (5G)</li></ul> <p>New:</p> <ul style="list-style-type: none"><li>• <b>Sustainable Process Industry (SPIRE)</b></li><li>• Robotics</li><li>• Photonics</li><li>• High Performance Computing</li><li>• Big Data</li><li>• Cibersecurity</li></ul>

\* All announced in the Communication on PPPs in H2020 (July 2013) except Big Data and Cibersecurity



# Sustainable Process Industries through Resource and Energy Efficiency (SPIRE cPPP)

- **Process industries** key to Europe's manufacturing base: 20% of European industry in terms of both employment and turnover.
- EU process industry highly dependent on raw materials and energy → **efficiency** key driver for both **competitiveness** and **sustainability**.
- Central objectives: optimise industrial processing, reduce energy and resource consumption and minimise waste **through cross sectorial approaches** → Significant contributions to the Circular Economy and to fighting climate change.
- SPIRE cPPP:
  - EC responsible for drafting and managing WP under H2020 rules
  - **Roadmap based strategy** developed by SPIRE community
  - Topics in LEIT-NMBP, SC3 Secure, clean and efficient energy and SC5 Climate action, environment, resource efficiency and raw materials



# Why SPIRE was created?



# SPIRE PPP

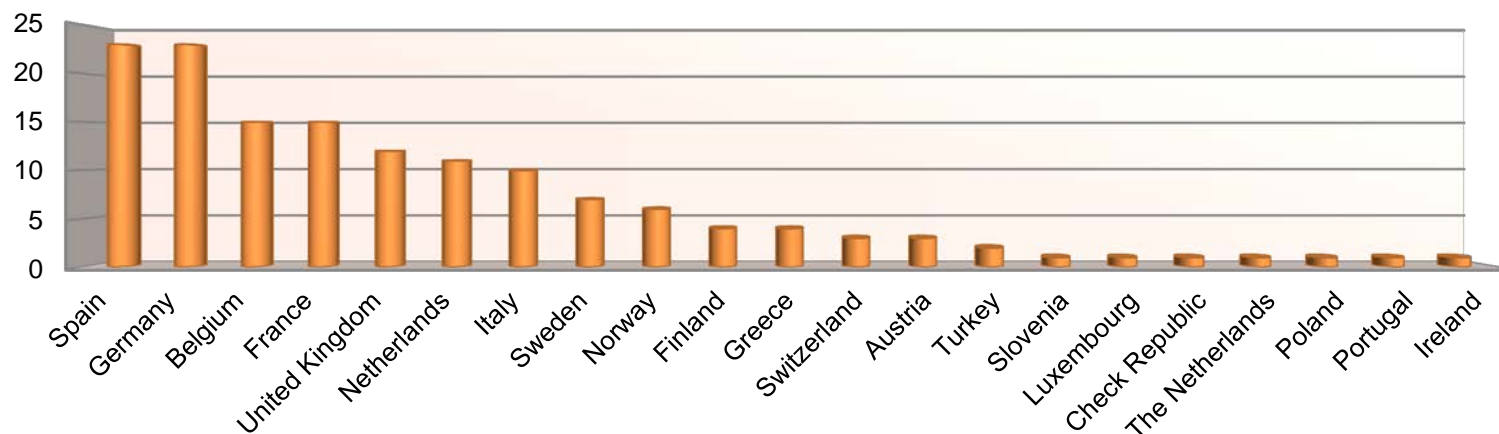
- Officially launched 17 December 2013 by the signature of a contractual agreement between the EC and A.SPIRE aisbl
- First-ever 7-year innovation partnership with Europe's process industry





Membership type	
Associate member	11
Associations	15
Industry member (intermediate)	2
Industry member (large)	29
Industry member (medium)	3
Industry member (small)	13
Research member (large)	41
Research member (small)	32
<b>Total</b>	<b>146</b>

**A.SPIRE membership by countries**



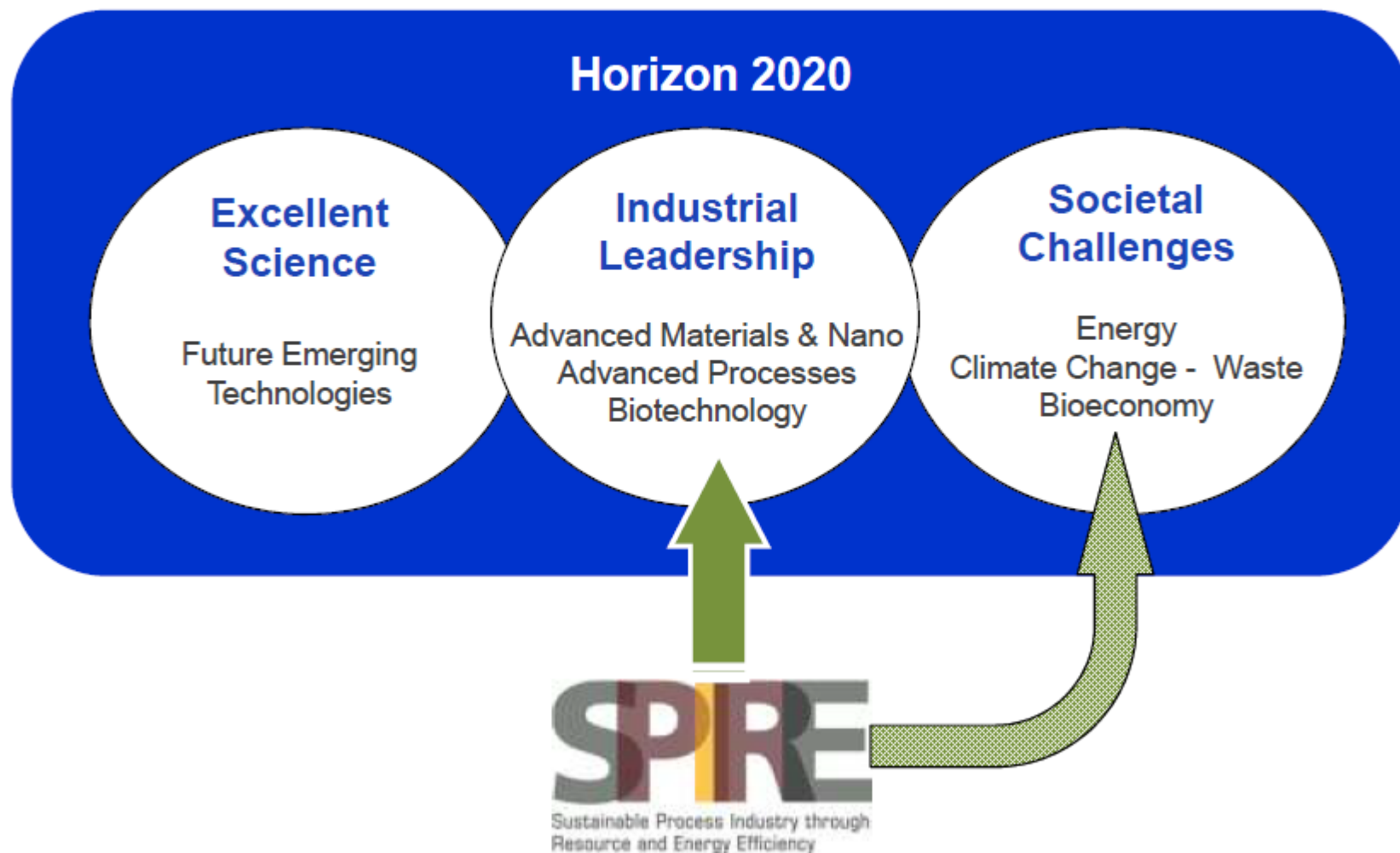
# SPIRE framework

- Public-Private Partnership between European Commission & A.SPIRE supporting R&I for Process industries
- “Public” SPIRE Budget: € 850M (DG RTD) + 50 (DG ENER) = **€900M (2014-2017: € 394 M)**
- Horizon 2020 rules for participation
- Industry: leading role in defining research & innovation priorities in this roadmap (allowing long-term investment plans)
- More emphasis on relevance of industry and impact towards sustainability
- Focused on enabling industrial technologies – European competitiveness

## Features:

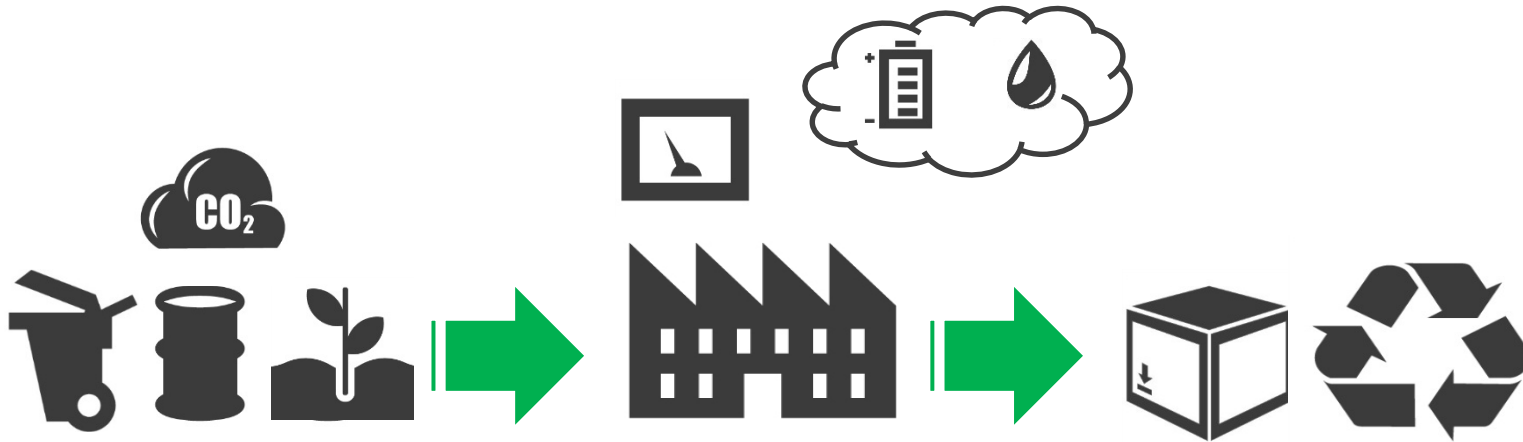
- **Openness:** supporting all partners of projects, welcoming new stakeholders and new sectors across the whole EU
- **Collaborative:** with the EC, Member States, Regions and all R&I stakeholders (members and non-members)
- **Innovation foresight:** moving towards the next generation of sustainable process industries

# Horizon 2020 & PPPs



# SPIRE Roadmap

## TO TOMORROW'S SCENARIO:



- **(Re)invent** feedstock (waste, bio, CO<sub>2</sub>)
- **Reduce** emissions; **(re)invent** energy & resource management concepts, incl. industrial symbiosis
- **Introduce** digital devices for better monitoring and control
- **(Re)invent** materials for optimised processes
- **(Re)invent** processes & materials with a significantly increased impact on resource & energy efficiency down the value chain: transport, housing
- **Reduce** waste & **(re)invent** technologies for valorisation of waste streams within and across sectors



# SPIRE Roadmap

## Part 1: Vision

- A Sustainable Process Industry for a resource-efficient and low-carbon economy: Rejuvenate the European process industry base and help decoupling economic growth from resource impact

## Part 2: Research and Innovation Strategy

- 6 Key-components:  
Feed, Process, Applications, Waste2Resources, Horizontal and Outreach

## Part 3: Expected Impacts

- Up to 30% reduction in fossil energy intensity from current levels
- Up to 20% reduction in non-renewable, primary raw material intensity compared to current levels
- Up to 40% improvement in CO<sub>2</sub>-equivalent footprints
- Leveraging additional investments





# Expected Impacts

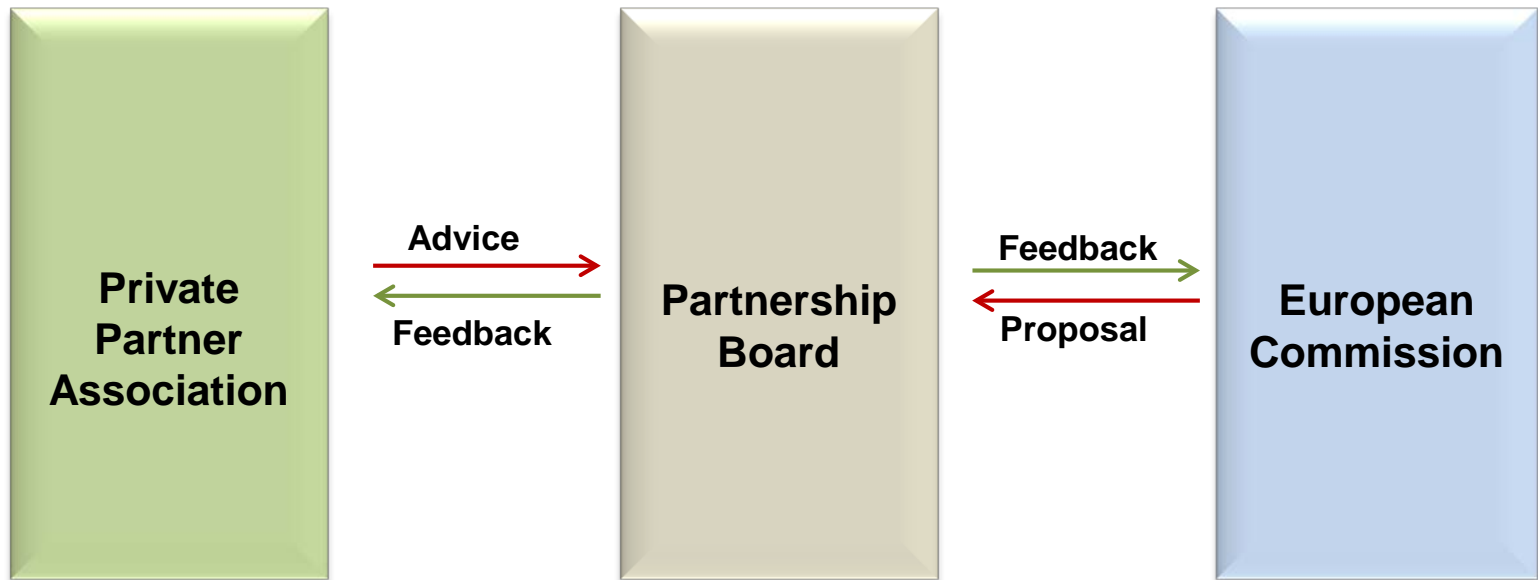
R+I to integrate and demonstrate at least 40 innovative systems and technologies:

- 7 in Adaptable processes able to use different feedstocks
- 6 in Reduction and re-use of waste with ambition to close the loop
- 9 in Innovative processes leading to CO<sub>2</sub> reduction
- 8 in Green technologies to develop novel materials for new and existing markets
- 6 in Industrial processes reducing water use
- 4 using Technology uptake within/between sectors to enable industrial symbiosis

... and capable of achieving across process industry (by 2030):

- **A reduction in fossil energy intensity of up to 30%**
- **A reduction in non-renewable, primary raw material intensity of up to 20%**
- **Efficiency improvement of CO<sub>2</sub>-equivalent footprints of up to 40%**
- **10 new types of high-skilled jobs**

# ... the Governance

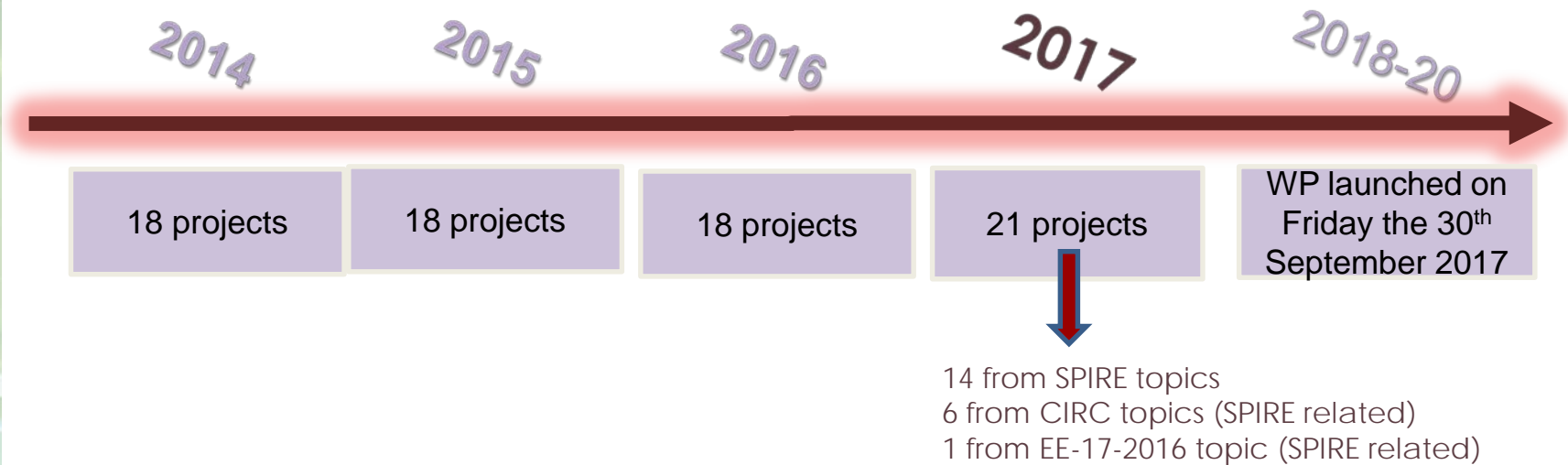


- Discuss priorities
- Propose call topics
- Form consortia
- Apply to calls

- Discuss priorities & call topics
- Assess progress

- Develop work programme
- Publish open calls

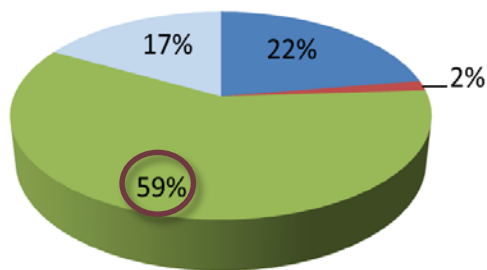
# SPIRE Projects overview



**72 ongoing projects + 3 finished = 75 SPIRE Projects**  
33 RIAs / 34 IAs / 8 CSAs

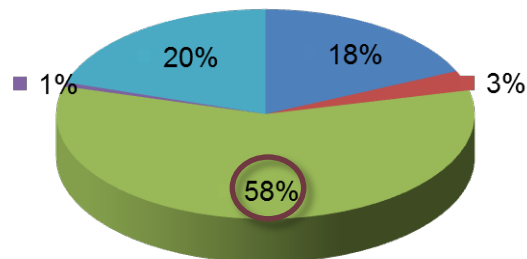
# Success rate development

2014 Results = 18 %

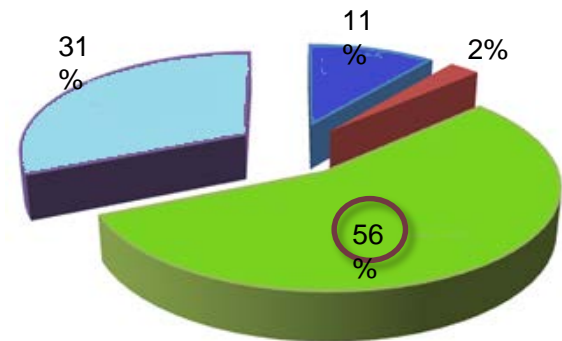


■ HES ■ OTH ■ PRC ■ REC

2015 Results = 15 %



2016 Results = 27 %



# Cross-sectorial approach



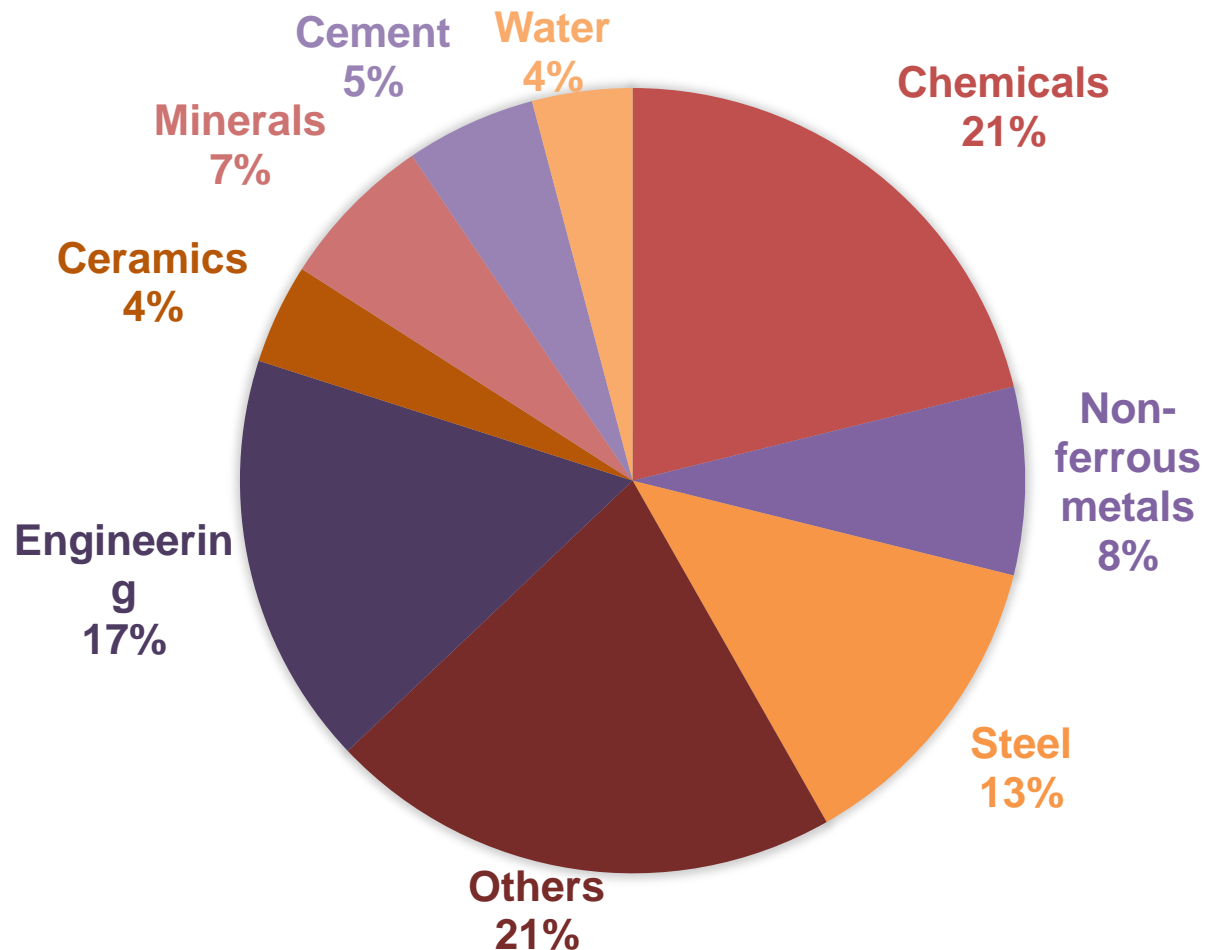
Cross-sectorial collaboration is cornerstone for SPIRE projects:

- Minimum: 2 sectors/project
- 7 or 8 sectors together are collaborating in various projects
- Average: 2.67 sectors/per project

# Cross-sectorial approach

Global sectors  
participation in  
SPIRE projects:

**All sectors  
benefit**





# Projects are core for a PPP

75 projects awarded



Results - Impact

Synergies



Sustainable Process Industry through Resource and Energy Efficiency

# SPIRE IMPACT

## SPIRE IS DEPLOYING RESULTS AND THE TARGETED INVESTMENTS REMAIN IN THE EU

- SPIRE has reached a **private leverage commitment of +750 M euros** in 3 y. (target by 2020 is: 1,400 M euros)
- Estimated **leverage factor in 2017 is 5,4** (target by 2020 ranks from 5 to 10)
- More than **95% of private investments related to SPIRE projects remain in Europe** demonstrating SPIRE's ability to keep and increase investments at home.
- 58% of SPIRE projects state that time to market will be reduced by 24 to 36 months thanks to SPIRE support
- **45% of SPIRE projects expect to fully deploy the results in the frame from 0 to 5 years** after the project is finished.





**Join SPIRE and let your voice be heard**

[www.spire2030.eu](http://www.spire2030.eu)

# NMBP WP 2018-20

## Call – INDUSTRIAL SUSTAINABILITY

- **Goal**

- *To further strengthen the global leadership of Europe's industry in environmental sustainability.*
- *EU Climate and Energy targets by 2030:  
GHG reduction by 40% ; renewables share 27% ; energy efficiency 30%*
- *Contributes to the Sustainable Development Goals.*

- **Covers**

- ***SPIRE** and catalysing the Circular Economy*
- *Clean energy through innovative materials*
- *Energy-Efficient Buildings*

## NMBP-SPIRE calls for 2018-2020

- Provide major momentum to R&I across the process industry sectors with 320 M€ in calls only from NMBP
- Build on the positive results achieved so far, aiming at large scale demos to enable prompt industrial deployment
- Target breakthrough gains in resource and energy efficiency across the process industry, through IS and cross-sectorial integration, recycling and recovery technologies
- Support the development of smart retrofitting concepts to improve performance of existing large scale installations
- Enable the shift to renewable electricity (e.g. electrification)
- International cooperation may be particularly appropriate in some areas of the Sustainable Process Industry, in particular with Eastern Partnership countries (Ukraine, Moldova, Georgia, Armenia, Azerbaijan and Belarus)

## NMBP-SPIRE calls for 2018-2020

- CE-SPIRE-02-2018: **Processing of material feedstock using non-conventional energy sources**
- CE-SPIRE-03-2018: **Energy and resource flexibility in highly energy intensive industries**
- CE-SPIRE-04-2019: **Efficient integrated downstream processes**
- CE-SPIRE-05-2019: **Adaptation to variable feedstock through retrofitting**
- CE-SPIRE-06-2019: **Digital technologies for improved performance in cognitive production plants**
- CE-SPIRE-10-2018: **Efficient recycling processes for plastic containing materials**

# CE-SPIRE-02-2018: Processing of material feedstock using non-conventional energy sources

## Specific Challenge:

- Non-conventional energy sources (e.g. microwave, plasma) as well as electrochemical and photochemical processes have been applied to process intensification showing, mostly at lab scale, potential for significant improvements in process performance (e.g. selectivity, crystal nucleation, productivity). Nonetheless, this domains remains still mostly untapped in terms of wide industrial deployment.
- Need for processing paradigms that allow real time monitoring and control of the transformations.
- Need for intensified technologies that are electricity powered and therefore suitable for integration in a renewable energy grid.
- Need for flexible processes that can better follow market demand and enable leaner production paradigms.
- Need for technologies with potential for downscaling (e.g. transition batch to continuous processing).

## **CE-SPIRE-02-2018: Processing of material feedstock using non-conventional energy sources**

### **Scope:**

**Development of technologies applying non-conventional energy sources to processes of high industrial interest.**

- Potential for integration in a renewable electricity grid, and consider the inherent limitations (energy supply fluctuation),
- Improve significantly resource and energy efficiency,
- Improve flexibility, working at variable throughputs without major losses in the overall process performance (critical in fluctuating operations),
- Main focus on continuous processes, possibility to enable the transitions batch to continuous,
- If/where relevant, containerised and/or mobile technologies could be considered,
- LCA to substantiate the environmental benefits is expected,
- Replicability and scalability should be proved.

## **CE-SPIRE-02-2018: Processing of material feedstock using non-conventional energy sources**

### **Expected impact:**

- Allowing for a -30% to +30% energy input within RES fluctuations timeframes, without significant losses in specific energy efficiency,
- Improvement in energy efficiency of 30%,
- Improvement in resource efficiency of 30%,
- Decrease in CO2 emissions by 40% (without considering the electricity generation and at steady state),
- Decreased OPEX and CAPEX by 15%,
- Effective dissemination of major innovation outcomes, through the development of learning resources with potential for integration in learning programs (e.g. existing curricula, undergraduate level, etc.).

Relevant indicators and metrics, with baseline values, should be clearly stated in the proposal.

# CE-SPIRE-03-2018: Energy and resource flexibility in highly energy intensive industries

## Specific Challenge:

- Energy intensive industries to achieve sustainable production processes and unit operations which can be adapted to highly fluctuating energy supply
- Energy and resource flexibility by means of process optimisation of energy streams, heat recovery and raw materials flows with variable properties
- Integration among sectors at regional level for the optimisation of production system as a whole. Reduce emissions and environmental impact, while maintaining competitiveness and job security.



# CE-SPIRE-03-2018: Energy and resource flexibility in highly energy intensive industries

Scope (1/2):

Value chain optimisation in the design phase

IA  
100- 50%

TRL  
5-7

In particular, proposals are expected to develop:

- Technologies allowing **flexibility for raw materials**. Consider quality of the main products and by-products for valorisation;
- Novel **advanced energy systems**, could include **new combustion and gasification techniques** applied to the highly resource and energy intensive industries have to be developed;
- How the **use of sustainable electrical energy sources, or heat recovery**, could enhance energy efficiency and cope with a fluctuating energy input.
- Significant **impact on the sustainability profile** of the process and/or the final products

# CE-SPIRE-03-2018: Energy and resource flexibility in highly energy intensive industries

## Scope (2/2):

IA  
100- 50%

TRL  
5-7

Proposals need to consider the following elements:

- A significant **reduction**, valorisation, re-use and recycling of **by-products and waste streams** (solid, liquids and gaseous);
- System, process modelling and integration (up and down-stream) improving **energy and raw materials efficiency and flexibility**, and **minimising the impact** on the environment of the **whole value chain**. Taking also into consideration optimisation at a plant/system level. The activities have to be supported by a **quantitative Life Cycle Assessment**.
- **Multiple demonstrators**, including **retrofitting** of industrial installations,
- **Relevant regulations** (waste).
- **Structural and regional funds /smart specialisation strategies** strongly encouraged.

# CE-SPIRE-03-2018: Energy and resource flexibility in highly energy intensive industries

*EUR*  
*(8-12 millions)*

## Expected impact:

- Cost reduction of the process of at least 10% (flexible scheme in raw materials, including secondary raw materials, process and product quality specifications)
- Improved process efficiency by at least 15% (re-utilisation of energy and/or material process streams);
- CO<sub>2</sub> emissions reduction by at least 5% and reduction of the environmental impact by at least 15% in terms of the main key performance indicators;
- Dissemination of major innovation outcomes (learning resources with flexible usability).
- Relevant indicators and metrics, with baseline values, clearly stated

# CE-SPIRE-04-2019: Efficient integrated downstream processes

## Specific Challenge:

- Downstream processing represents on average 50-60% of the total capital (CAPEX) and operating costs (OPEX) and they can account for up to 45% of the process energy in industrial operations.
- Energy and cost intensive downstream processing operations are often linked to the inefficiencies in the upstream process (e.g. low conversion, formation of co-products, by-products and/or impurities).
- Hybrid approaches (e.g. chemical + biochemical steps) can provide major advantages in terms of upstream process performance (high selectivity, milder process conditions). However, their industrial application is still relatively limited.
- Better integration of upstream and downstream unit operations can lead to significant resource and energy efficiency gains in the process industry.

## CE-SPIRE-04-2019: Efficient integrated downstream processes

### Scope:

**Development of economic and industrially viable intensified process technologies providing a deeper integration of upstream and downstream operations.**

- Multistep upstream processes, potentially hybrid approaches (e.g. chemo and bio catalytic) and PATs,
- Complex downstream operations, integrating different separation techniques and purification steps,
- Consider modularity and flexibility, as well as potential for transition from batch to continuous operations,
- Increased in safety, productivity, purity and quality of products, as well as resource and energy efficiency while lowering the process environmental footprint, production costs and time to market,
- DEMOs must be included. In real industrial settings (added-value),
- Integration current industrial landscape and replicability to be considered.

## **CE-SPIRE-04-2019: Efficient integrated downstream processes**

### **Expected impact:**

- 20% decrease in greenhouse gas emissions,
- Increased in resource and energy efficiency by at least 20%,
- Novel modular and scalable integrated (upstream-downstream) pilot line technologies with 10% decrease in CAPEX and OPEX,
- Effective dissemination of major innovation outcomes, through the development of learning resources with potential for integration in learning programs (e.g. existing curricula, undergraduate level, etc.).

Relevant indicators and metrics, with baseline values, should be clearly stated in the proposal.

# CE-SPIRE-05-2019: Adaptation to variable feedstock through retrofitting

## Specific Challenge:

- Long lifetime of the equipment in the process industry for adequate viability (>30 years)
- Challenges:
  - Keeping facilities up to date both from technological and regulatory point of view (e.g., zero waste, circular economy).
  - Increased variety of inputs, need for higher energy efficiency

# CE-SPIRE-05-2019: Adaptation to variable feedstock through retrofitting

*IA*  
*100-50%*

*TRL*  
*5-7*

## Scope (1/2):

Proposals need to cover the following:

- Simulation models and decision support tools, including the detection of inefficiencies (flexibility to use feedstock of variable composition, energy efficiency and product quality)
- The development of tools and methodologies to streamline and support retrofitting;
- Find the most efficient operational input conditions to optimise the performances;
- Develop indicators to modify input variables and its potential of replication across the industry;



# CE-SPIRE-05-2019: Adaptation to variable feedstock through retrofitting

*IA*  
*100-50%*

*TRL*  
*5-7*

## Scope (2/2):

- **Adapt equipment** → larger number and more diverse feedstock → transition to variability in quality, quantity and price of feedstock
- Demonstrate the **feasibility** and suitability at **industrial scale** in different process industries covering **both the technology** and the **process control**
- **Cooperation** with other projects; **user involvement**; **accessibility** and **reusability of data**

# CE-SPIRE-05-2019: Adaptation to variable feedstock through retrofitting

Expected impact:

**EUR**  
**(8-12 millions)**

- ↑ Resource and energy efficiency > 20%;
- ↓ GHG emissions > 30%;
- ↓ Fossil resources > 20%;
- ↓ OPEX by 30%; ↑ productivity by 20%;
- Dissemination of major innovation outcomes (learning resources with flexible usability).

Relevant indicators and metrics, with baseline values, clearly stated

# CE-SPIRE-06-2019: Digital technologies for improved performance in cognitive production plants

## Specific Challenge:

Shortage in raw materials, increased energy prices and environmental constraints require the European process industry to improve its performance and flexibility and there are unexploited opportunities for digitising a large range of enterprises of very different size in the process industry.

Digitisation endows the production system with capabilities for analysis. This should enable the autonomous operation of the system based on embedded cognitive reasoning, while relying on high-level supervisory control.

As a consequence, changes in the production process need to be detected and the system needs to be able to respond to these dynamic fluctuations, by adapting the production to stay within the target ranges of production costs and rate, as well as those of and sustainability parameters.

A fully up-to-date interactive and self-learning process control integrated with management tools is essential to obtain an optimal efficiency, while maintaining adequate flexibility of the system in regard to changing feedstock, energy sources and product demand.

# CE-SPIRE-06-2019: Digital technologies for improved performance in cognitive production plants

## Scope:

- Improvement of online monitoring and innovative control technologies in terms of process performance and flexibility, maintenance needs and product quality;
- Digital retrofitting of existing assets, integration towards and holistic optimisation of operations, data-analytics, real-time capability, use role-specific representation of information, feedback control & detect deviations and adjust operations immediately decision support (e.g. advanced process control, reactive scheduling);
- Several among the following concepts: apply low-cost sensors for on-line assessment of product quality and integration into process control; robust optimisation methods to distributed targeted process monitoring; simulation methods for the analysis, characterisation and study of systems for enhanced operations and decision-making combination of various forms of data with cognitive insight to optimise and enhance resources;

Replicability and scalability of the concepts should be considered appropriately.

**TRL**  
**5-7**

**IA**  
**70%**



# CE-SPIRE-06-2019: Digital technologies for improved performance in cognitive production plants

***EUR (6-8 millions)***

## Expected impact:

- Increased production performance, energy and resource consumption, or waste or by-products production will be significantly improved by more than 20%.
- Project outcomes should demonstrate a positive environmental impact, by reducing CO2 emissions compared to the state of the art and in the scale relevant for the different applications
- Show potential for improved performance in cognitive production plants
- Effective dissemination of major innovation outcomes to the current next generation of employees of the SPIRE sectors, through the development, by education/training experts, of learning resources with flexible usability. These should be ready to be easily integrated in existing curricula and modules for undergraduate level and lifelong learning programs.

Relevant indicators and metrics, with baseline values, should be clearly stated in the proposal.

# CE-SPIRE-10-2018: Efficient recycling processes for plastic containing materials

## Specific Challenge:

- Plastic materials are everywhere in our society, they are used in all sorts of applications (e.g. packaging) because of their properties and price.
- The use of complex hybrid plastic materials is also increasing significantly, for example lightweight polymer composites to substitute metals.
- Their wide use brings about problems linked to the huge amount of plastic waste generated, and not sufficiently recycled.
- The redesign of plastics and advanced recycling processes is essential to recycle and reprocess plastic waste into valuable products avoiding landfill.
- A major challenge lies in the development of appropriate process technologies, able to process heterogeneous plastic waste material (at least in part) for the production of added value products and process streams to support the establishment of a circular economy.

***EUR from 6 to 8  
millions***

## **CE-SPIRE-10-2018: Efficient recycling processes for plastic containing materials**

### **Expected impact:**

- More efficient and sustainable process and processing technologies utilising plastic waste as starting material for the production of added value products such as recyclable plastic materials (e.g. composites) and chemicals (excluding fuels),
- The technologies proposed should provide a decreased utilisation of primary fossil resources in the process industry of at least 30 %,
- The concepts proposed should provide a decrease in CO2 emissions of at least 20%,
- The concept should utilise at least 70% of waste material including at least 40% of plastic waste,
- Effective dissemination of major innovation outcomes, through the development of learning resources with potential for integration in learning programs (e.g. existing curricula, undergraduate level, etc.).

Relevant indicators and metrics, with baseline values, should be clearly stated in the proposal.

## **CE-SPIRE-10-2018: Efficient recycling processes for plastic containing materials**

### **Scope:**

#### **Processes for the production of recyclable materials containing plastics.**

- Improved energy and resource efficiency, and lower environmental footprint compared to the current state of the art proved by LCA. LCC is expected to prove the economic viability,
- Integration with the relevant value chains. Meaning securing the supply of raw material streams and the involvement of the relevant actors,
- Flexibility in the utilisation of heterogeneous plastic waste (incl. composites) as input, to allow the recycling and the re-processing into added value products (excluding fuels). Bio-based raw materials are also in scope,
- Best valorisation of all components (e.g. fillers or fibres from composites),
- Consider issues related to the quality of the raw materials (Primary/ secondary) -heterogeneity of plastic waste, further additives- and of the yielded streams,
- Non-technological hurdles, such as regulations and standards, and economic indicators (e.g. CAPEX and OPEX),
- DEMOs in real industrial settings are expected.



# Deadlines 2018– 2019 / Indicative Budgets

Topic	Budget 2018 (M€)	Budget 2019 (M€)	Deadlines
CE-SPIRE-02-2018 CE-SPIRE-03-2018 CE-SPIRE-10-2018	Total: 97.5		31 Oct.17- 22 Feb. 2018
CE-SPIRE-04-2019 CE-SPIRE-05-2019		Total: 65.8	16 Oct.18- 21 Feb. 2019
DT-SPIRE-06-2019		32.9	16 Oct.18- 21 Feb. 2019



# Thank you!

[www.ec.europa.eu/research](http://www.ec.europa.eu/research)

**Pre-publication – Draft WP:**

**[https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/h2020-leit-nmbp-2018-2020\\_pre-publ.pdf](https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/h2020-leit-nmbp-2018-2020_pre-publ.pdf)**



# Industry session (LC-SC3-EE-6 and LC-SC3-EE-8)

11:00 -11:05	Welcome and Introduction	Adrian PERES, European Commission, EASME
11:05 – 11.25	Policy background	Serena PONTOGLIO, European Commission, DG ENER, Unit C.3
11:25 – 11:40	Introduction to SPIRE cPPP	Istvan RITZ, European Commission, DG RTD, Unit D.2
11:40 – 12:00	LC-SC3-EE-6-2018-2019 Topic	Silvia VIVARELLI, European Commission, EASME
12:00 – 12:10	LC-SC3-EE-8-2018-2019 Topic	Filippo GASPARIN European Commission, EASME
12:10 – 12:30	Questions & Answers	Adrian PERES, European Commission, EASME



#H2020Energy

# Horizon 2020 Work Programme for Research & Innovation 2018-2020

LC-SC3-EE-6-2018-2019  
**Business case for  
industrial waste heat/cold  
recovery**

Silvia VIVARELLI

Project Advisor

Unit B1 H2020 Energy EASME

Research and  
Innovation



# LC-SC3-EE-6-2018-2019: Business cases for industrial waste heat/cold recovery

## Specific Challenge:

- Energy and fuels represent an important part of production costs in several Resource and Energy Intensive Industries
- Wide-scale deployment of industrial waste heat/cold recovery in industry hindered by lack of financial/economic justification and by limited industrial applicability
- Waste heat/cold can be a valuable resource for other industries and buildings/District Heating and Cooling operators



# LC-SC3-EE-6-2018: Business cases for industrial waste heat/cold recovery

## *Cost-benefit models for industrial waste heat/cold recovery*

### Scope:

- Develop **integrated cost-benefit simulation tools** that allow industrial sites/parks **to determine the most financial attractive option** for their recovered waste heat/cold and/or surplus renewable energy
- Consider characterization of processes and waste streams, barriers and opportunities (on the DHC side) and other variables (e.g., technology, infrastructure, administrative and legal costs, energy prices, demand)
- Simulation tools should be **flexible to allow different types of industrial sites/parks to use them**
- Validation through **demonstration in real operating conditions in industrial facilities** expected
- Include **business model development and dissemination and communication**

**TRL  
from  
4 to 8**

**IA  
70%**



European  
Commission

# LC-SC3-EE-6-2018: Business cases for industrial waste heat/cold recovery

## *Cost-benefit models for industrial waste heat/cold recovery*

**EUR 3-4  
millions**

### Expected impacts:

- Accurate prediction and holistic modelling of industrial waste heat/cold and/or surplus renewable energy from industrial or other sources
- Better impact of various factors/variables on the cost-benefits
- Valorisation in assessments of costs-benefit of industrial heat/cold and/or surplus renewable energy from industrial or other sources
- Number of industrial sectors/sites/parks, public authorities, large private facilities and DHC operators aware, interested and supporting
- Primary energy savings triggered (GWh/year)
- Investments in sustainable energy triggered (million Euro)
- (If relevant and possible) Reduction of greenhouse gas emissions (tCO<sub>2</sub>eq/year) and/or air pollutants (kg/year)



# LC-SC3-EE-6-2019: Business case for industrial waste heat/cold recovery

*Symbiosis in industrial parks and clusters – non-technological barriers*

CSA  
100%

## Scope (1/2):

Improve energy efficiency of industrial parks districts and clusters by unlocking market potential and supporting demand and offer of high-quality energy services by addressing **at least one of the following**:

- Customer/business level: Development and testing of **instruments facilitating actual implementation of energy cooperation**. Including capacity building of senior and executive management of companies and other related stakeholders.
- Service provider level: Development and testing of **replicable business models and service concepts for joint energy services**. Including capacity building of ESCOs and other 3<sup>rd</sup> party organisations.



# LC-SC3-EE-6-2019: Business case for industrial waste heat/cold recovery

*Symbiosis in industrial parks and clusters – non-technological barriers*

CSA  
100%

## Scope (2/2):

Proposals should:

- Address **legal issues** in order to adapt regulatory and legal frameworks
- Take into account **sustainability in time** of the proposed symbiosis
- Ensure **applicability of solutions to other** industrial parks/business sectors

Strong **communication and dissemination** components needed.

# LC-SC3-EE-6-2019: Business case for industrial waste heat/cold recovery

*Symbiosis in industrial parks and clusters – non-technological barriers*

## Expected impact:

- Primary energy savings triggered (GWh/year)
- Investments in sustainable energy triggered (million Euro)
- Number of plant sites (within one industrial park) and number of industrial parks committed to energy cooperation
- Number of relevant stakeholders aware of and/or interested in implementing joint energy services
- Number of policies and legal frameworks created and/or adapted to facilitate energy cooperation

**EUR 1-2  
million**

## Lessons learned from previous Calls

- Respond to the topic and have a clear focus!
- Actively involve relevant industries
- TRL level as requested for topic
- Concrete implementation in industry expected
- Substantiate proposed impacts with adequate baselines, assumptions and calculations
- Proposed impacts to be credibly deriving from proposed activities
- Sustainability in time and replication potential to be demonstrated

# Timeline and indicative budget EE-6-2018-2019

## 2018

- Total indicative budget: **9 Million €**
- Opening date: **25 Jan 2018**
- Deadline: **04 Sep 2018**

## 2019

- Total indicative budget: **10 Million €**
- Opening date: **24 Jan 2019**
- Deadline: **03 Sep 2019**



# Industry session (LC-SC3-EE-6 and LC-SC3-EE-8)

11:00 -11:05	Welcome and Introduction	Adrian PERES, European Commission, EASME
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# Horizon 2020 Work Programme for Research & Innovation 2018-2020

EE-08: Capacity building programs  
to support implementation of  
energy audits

Filippo Gasparin  
Project Adviser

Executive Agency for Small and Medium-sized  
Enterprises (EASME)  
Unit B1 Energy

Research and  
Innovation

## Art. 8 of the Energy Efficiency Directive

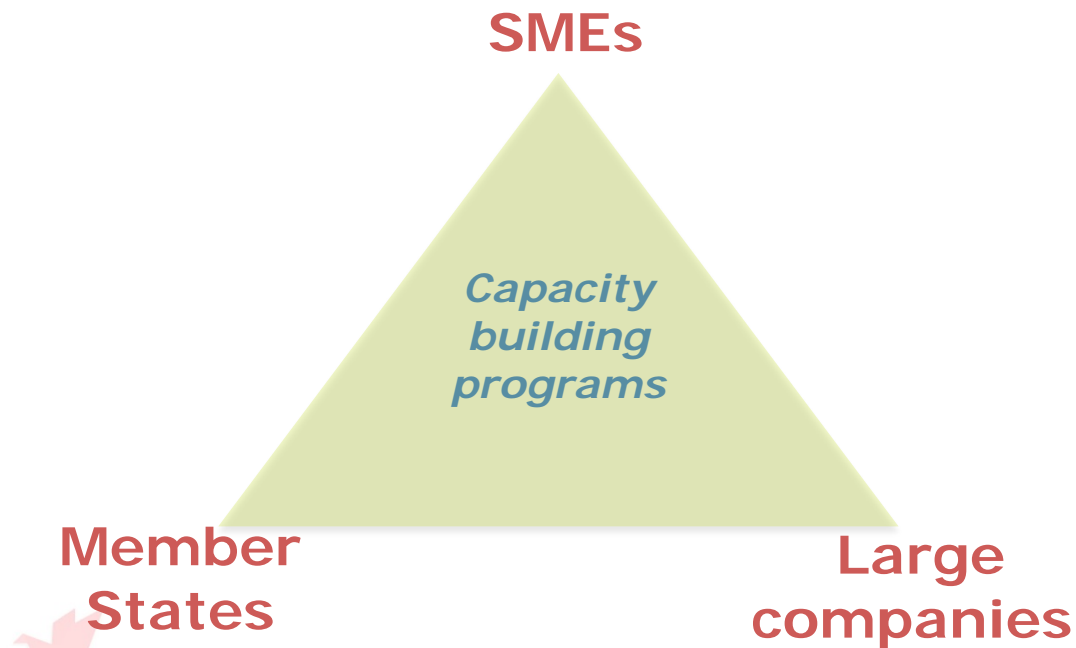
- (4) Member States shall ensure that enterprises that are not SMEs are subject to an energy audit carried out in an independent and cost-effective manner by qualified and/or accredited experts or implemented and supervised by independent authorities under national legislation by 5 December 2015 and at least every four years from the date of the previous energy audit.
- (2) Member States shall develop programmes to encourage SMEs to undergo energy audits and the subsequent implementation of the recommendations from these audits.

## The **specific challenge** of the EE-08-2018-2019

- The lack of expertise, time and capital, including energy audit supporting scheme, often prevents SMEs from implementing energy conservation measures [...].
- The effectiveness of energy audit recommendations is also influenced by people's behaviours and the improvement of enterprises' energy cultures [...] in order to support large enterprises to concretely achieve energy savings.
- Member States to develop programmes encouraging SMEs to undergo energy audits and to implement the recommended energy-saving measures.



## The **Scope** of the EE-08: *the three issues*

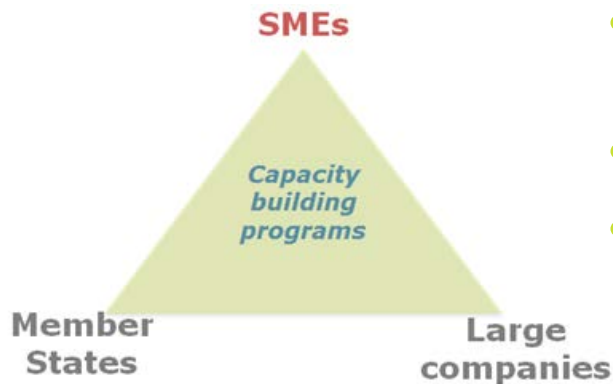


**Addressing them all do not necessarily mean to be successful**

## Scope (1/3)

Staff trainings and capacity building programs facilitating SMEs to undergo energy audits and to implement the recommended energy-saving measures.

### Proposal shall focus on:



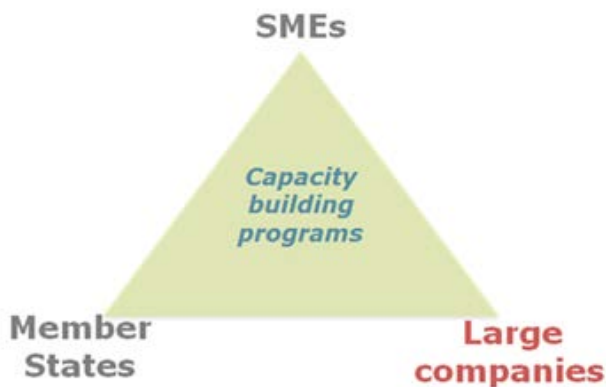
- SMEs specificities (size, lifetime of the company, national/local conditions, sectors, etc.)
- Highlighting the financial aspects/de-risking tool
- Bridge the gap between Demand and supply side (SMEs, energy auditors, financial institutions, technology and service providers)
- Behavioural changes can also be addressed

**Target Groups:** SMEs (managerial and operational staff). The involvement of relevant stakeholders is also encouraged (e.g. multiplier organisations).

## Scope (2/3)

Capacity building programs supporting the take-up of audits recommendations and undertake the actions necessary to reduce energy consumption.

### Proposal shall focus on:



- Boosting investment in sustainable energy (maintenance or investments in new equipment)
- Development of corporate policy measures
- Fostering behavioural change and enhancing energy corporate culture
- Including the Multiple benefits concept of Energy efficiency measures in the decision making process

**Target Groups:** **Large companies** (managerial and operational staff) along with decision makers (e.g. board member) and different departments. The involvement of relevant stakeholders is also encouraged (e.g. multiplier organisations).

## Scope (3/3)

Initiatives supporting Member States in empowering or establishing national supporting schemes for SMEs providing appropriate incentives to undergo energy audits and/or to implement the recommended energy-saving measures.

### Proposal shall focus also on:



- Facilitating peer to peer review and fostering cross boarder collaboration among MSs
- Fostering best practices exchange and knowledge-sharing on audit supporting schemes for SMEs
- Development of financial tools (rotating funds/synergies with structural funds)

**Target Groups:** Member States, Managing Authorities (both at national, regional and local level). The involvement of relevant stakeholders is also encouraged (e.g. multiplier organisations).

# Impacts of the EE-08-2018-2019

CSA  
100%

- **Primary energy savings** triggered by the project (in GWh/year);
- **Investments in sustainable energy** triggered by the project (in mln€);
- **Market stakeholders with increased skills and long-lasting training schemes;**
- **Number of people/enterprises with enhanced energy culture** as well in terms of the sustainability of the behavioural change;
- **Policies and strategies taken to improve/create audit supporting schemes** and/or number of SMEs supported in the implementation of energy audit.

# Timeline and indicative budget of the EE-08-2018-2019

## 2018

- Total budget: **≈10 Million €**
- Opening: **25 Jan 2018**
- Deadline: **04 Sep 2018**
- *Indicative 5-8 projects*

## 2019

- Total budget: **≈5 Million €**
- Opening: **24 Jan 2019**
- Deadline: **03 Sep 2019**
- *Indicative 2-3 projects*

The expected EU-contribution is **between 1 and 2 million €** per proposal.

**Nothing prevent you from requesting a higher amount**

# List of relevant projects for the EE-08-2018-2019

IEE Database: <http://ec.europa.eu/energy/intelligent/projects/en>

- STEEEP
- SME Energy Check-Up
- EMSPI
- ECOINFLOW
- EUREMplus
- SET

H2020 Database: [http://cordis.europa.eu/projects/home\\_en.html](http://cordis.europa.eu/projects/home_en.html)

- EnergyWater
- ENERWATER
- WaterWatt
- STEAM-UP
- EE-METAL

*Note: This is not a restrictive list*

# Thank you!

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[www.ec.europa.eu/research](http://www.ec.europa.eu/research)

*For all questions: [EASME-Energy@ec.europa.eu](mailto:EASME-Energy@ec.europa.eu)*





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# Horizon 2020 Work Programme for Research & Innovation 2018-2020

## Time for your questions!

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# Horizon 2020 Work Programme for Research & Innovation 2018-2020

**25th October 2017**  
**Lunch break**  
**12:30 – 14:00**

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