



Outlook on the 2019 H2020 Work Programme and results of the SPIRE-2018 calls



**SPIRE Brokerage event
Achema**

Frankfurt 14 June 2018

**Carmine Marzano
DG Research and Innovation
European Commission**

2018 SPIRE Evaluations results

CE-SPIRE-02-2020: Processing of material feedstock using non-conventional energy sources (IA)

10 proposals (total requested funding: € 73M)

4 proposals selected for funding

CE-SPIRE-03-2018: Energy and resource flexibility in highly energy intensive Industries (IA 50%)

4 eligible proposals (total requested funding: € 37M)

3 proposals selected for funding

CE-SPIRE-10-2018: Efficient recycling processes for plastic containing materials (IA)

17 eligible proposals (total requested funding: € 112M)

5 proposals selected for funding

Total EU contributions for GAP: € 95.3M

Average success rate: 39%

SPIRE calls for 2019 and other relevant ones...

- Provide major momentum to R&I across the process industry sectors with more than 200 M€ in calls only for 2019.
- 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, digitalisation and recovery technologies
- Support the development of integrated process technologies and smart retrofitting concepts to improve performance of existing large scale installations
- Enable the shift to RES
- 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)



European
Commission

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.

***EUR from 10 to 14
millions***

IA 70%

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.

***TRL
From 5 to 7***

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

Scope (1/2):

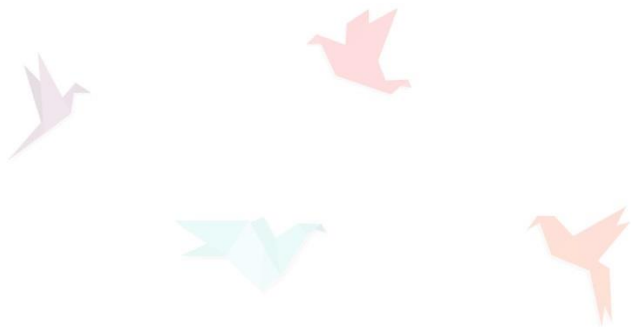
Proposals need to cover the following:

- 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

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

TRL
5-7

Expected impact:

- ↑ 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.

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

Expected impact:

TRL
5-7

- 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.

Deadlines 2018– 2019 / Indicative Budgets

Topic	Budget 2019 (M€)	Deadlines
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



SPIRE topics under the SC3: Secure, clean and efficient energy



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If interested, please note it closes soon.... Hurry up...

CE-SC3-NZE-2-2018: Conversion of captured CO₂

Specific Challenge:

- Conversion of captured CO₂, for example using hydrogen made from renewable energy, to produce fuels is a means to replace fossil fuels, as well a promising solution for seasonal energy storage.
- There are significant scientific and technological challenges to exploiting CO₂ as a chemical and fuel feedstock in a systematic manner, the main challenge being that the conversion process is highly energy intensive.

CE-SC3-NZE-2-2018: Conversion of captured CO2

Scope:

- Development of energy-efficient and economically and environmentally viable CO2 conversion technologies for chemical energy storage or displacement of fossil fuels that allow for upscaling in the short to medium term
- Projects have to substantiate the potential for CO2 mitigation through an LCA
- Proposals have to define ambitious but achievable targets for energy requirements of the conversion process, production costs and product yields

***EUR from 3 to
4 million***

RIA 100%

CE-SC3-NZE-2-2018: Conversion of captured CO2

Expected impact:

New solutions for the conversion of captured CO2, either from power plants or from carbon-intensive industry, to useful products such as fuels or chemicals for energy storage (CCU) that will create new markets for innovative industrial sectors, diversify the economic base in carbon-intensive regions, as well as contribute to achieving a Circular Economy.

***TRL
From 3-4 to 5-6***

***International cooperation is encouraged, in particular with relevant
Mission Innovation countries such as China***

LC-SC3-RES-7-2019: Solar Energy in Industrial Processes

Specific Challenge:

- Large potential of applying solar energy for industrial purposes
- Using solar energy to provide the heat or cooling necessary to industrial processes that need high reliability, high quality heat & cooling and continuous operation
- Industrial processes might need to be adapted to the use of the solar resource
- Industrial actors expect solutions with limited installation, maintenance and operation requirements and which are easy to operate.

LC-SC3-RES-7-2019: Solar Energy in Industrial Processes

Scope:

- Support will be given to solutions that cover the highest possible share of the heating and/or cooling demand of one or more industrial processes by means of solar thermal energy
- In the case of heating, the process temperature shall be higher than 150°C
- Individual industrial sites and/or industrial parks (coupled to a district heating and/or cooling network) are in scope

LC-SC3-RES-7-2019: Solar Energy in Industrial Processes

Expected impact:

- Increased decarbonisation of the industrial sector, reduced dependency on fossil fuels, reduction of emission of air pollutants
- Enhanced visibility to the potential of applying solar thermal energy in industrial processes, especially in those EU countries where such systems currently have very limited or no application
- Contribution to the development of relevant BREFs under the Industrial Emissions Directive

**TRL
to 4-5**

***SMEs encouraged
to participate***

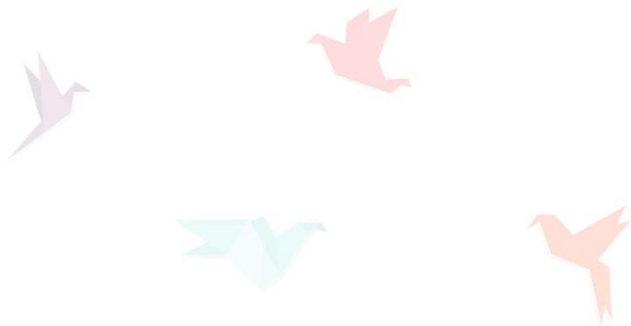
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LC-SC3-EE-6-2018: Business cases for industrial waste heat/cold recovery

Cost-benefit models for industrial waste heat/cold recovery

Specific Challenge:

- Still no wide-scale deployment of industrial waste heat/cold recovery
- Lack of financial/ economic justification and 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)
- Include business model development and dissemination and communication
- 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 is expected

**EUR from
3 to 4 millions**

IA 70%

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

Cost-benefit models for industrial waste heat/cold recovery

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
- Valorization 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 with increased capacity
- Primary energy savings triggered (GWh/year)
- Investments in sustainable energy triggered (million Euro)
- (If relevant and quantifiable) Reduction of the emissions of CO₂ (tCO₂eq/year) and/or air pollutants (kg/year)

**TRL
from 4 to 8**

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

Symbiosis in industrial parks and clusters – non-technological barriers

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
- Sources of heat/cold losses can be a valuable resource



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 3rd 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

SPIRE topics under the SC5: Climate action, environment, resource efficiency and raw materials topics



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CE-SC5-04-2019

Building a water-smart economy and society

a) Symbiosis between industry and water utilities

Specific Challenge:

IA
70%

- Growing demand for water for various economic activities
- To secure water for our society & make available alternative water resources
- Need to better exploit water resources and all the valuable substances that could be obtained through the wastewater treatment and reuse process
- Innovations in this domain remain fragmented
- Testing and deployment in operational environments and at scales suitable for encouraging wider uptake missing

CE-SC5-04-2019

Building a water-smart economy and society

a) Symbiosis between industry and water utilities

Scope:

- Demonstrate resource-efficient solutions derived from symbiotic inter-linkages between wastewater treatment in industry and by water utilities
- E.g. reuse of treated WW, use of substances or energy derived from WW treatment, dynamic allocation of right quality water for the right purpose, while ensuring health and safety.
- Innovations can be technological, business models or governance
- Enabling digital solutions for monitoring, control and optimisation encouraged
- Potential regulatory barriers to be addressed
- SMEs participation encouraged
- TRLs 5 – 7

TRL
5-7

CE-SC5-04-2019

Building a water-smart economy and society

a) Symbiosis between industry and water utilities

Expected impact:

- Reduced use of water from freshwater sources
- Improved recovery and use of resources & energy
- Mobilisation of water-related investments and synergies with other funding instruments
- New business opportunities & increased competitiveness EU industry
- Supporting the implementation of relevant EU water policies, Water EIP, transition to a more circular economy, contribution to SPIRE Roadmap

IA
70%

SMEs

EUR 10-15
millions

Deadlines 2018– 2019 / Indicative Budgets

Topic	Budget 2018 (M€)	Budget 2019 (M€)	Deadlines
CE-SC3-NZE-2-2018	12.0		06 Sept 2018
LC-SC3-RES-7-2019		19.0	27 Aug 2019
LC-SC3-EE-6-2018	9.0		04 Sept 2018
LC-SC3-EE-6-2019		10.0	03 Sept 2019
CE-SC5-04-2019		72.0	1 st stage 19 Feb 2019 2 nd stage 04 Sept 2019

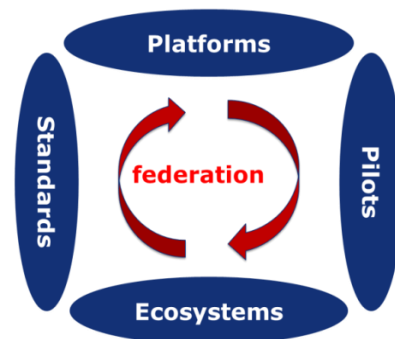


ICT WP2019

Digital Manufacturing Platforms for Connected Smart Factories

DT-ICT-07-2018-2019 (IA + CSA: here IA only)

- Specific Challenge
- **Increasing role digital manufacturing platforms**
- **Advances needed in integration different technologies, making data accessible, and allowing complementary applications**
- **Challenge to exploit new concepts and technologies**
- **NB:**
 - Part of Focus Area "Digitising and transforming European industry and services: digital innovation hubs and platforms"
 - Introductory texts "Platforms and Pilots" are applicable, in addition to specific topic texts
- Scope (Innovation Actions)
 - **Develop platforms for connected smart production facilities**
 - **Driven by EU actors and safeguarding European interest**
 - **Two industrial sectors**
 - **Target at least one 'grand challenge' *:**
 - Human factor: human competences and technological progress
 - Sustainable Value Networks: manufacturing in circular economy
 - **Reference implementations preferably but not necessarily in open-source**
 - **Max 20% financial support to third parties (typically 50-150 k€)**
- Expected Impact
 - **Significant increase options SMEs/mid-caps to integrate technologies, unlock value data, deploy complementary applications, and become responsive link in supply and value networks**
 - **Strengthened competitive position European platform providers**
 - **+ Expected Impacts from introductory text!!**
- Closure of call: 2 April 2019
- See also
 - <https://ec.europa.eu/digital-single-market/en/news/digital-manufacturing-platforms-connected-smart-factories-presentations-info-session>
 - **ICT 2018 Event, 4-6 December 2018, Vienna**
 - *** See document "Factories 4.0 and Beyond" on <http://www.effra.eu/>**



45 M€ for IAs, up to 16 M€ would be appropriate, at least one per 'grand challenge'

ICT WP2019

Security and resilience for collaborative manufacturing environments

ICT-08-2019

- Specific Challenge
 - **Reliability and security requirements of physically-entangled systems in manufacturing environments versus digital connections with external partners in value chains**
 - **Data exchange leads to data security challenges**
 - **Solutions needed that guarantee adequate security without limiting capability to exchange data**
- Scope (Research and Innovation Actions)
 - **Develop tools and services guaranteeing adequate level of data security for collaboration**
 - **Practically usable solutions in real manufacturing facilities**
 - **Address threat detection and countermeasures, evolution and real-time response**
 - **Semi-autonomous or fully autonomous solutions**
 - **At least one use case**
- Expected Impact
 - **Take-up by industry of practically usable solutions which guarantee significantly increased cyber-security levels in daily operations for manufacturing facilities and other actors in the value chains**
 - Closure of call: 28 March 2019
 - See also:
 - **ICT 2018 Event, 4-6 December 2018, Vienna**
 - **Webinar to be announced**

*RIA: total budget 11 M€ (2019),
between 4-6 M€ would be appropriate per proposal*

Wishing you success!! Thank you!

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