



April 9<sup>th</sup> , 2019  
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H2020

INDUSTRY



SPIRE



EU Projects



Private Public Partnership (PPP)

# SPIRE Sectors in Europe

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- EUR 1.8 trillion annual turnover
- EUR 565 billion of added value contributing to almost 4.7% of EU28 GDP
- 6.3 million jobs directly created and a further 19 million jobs indirectly

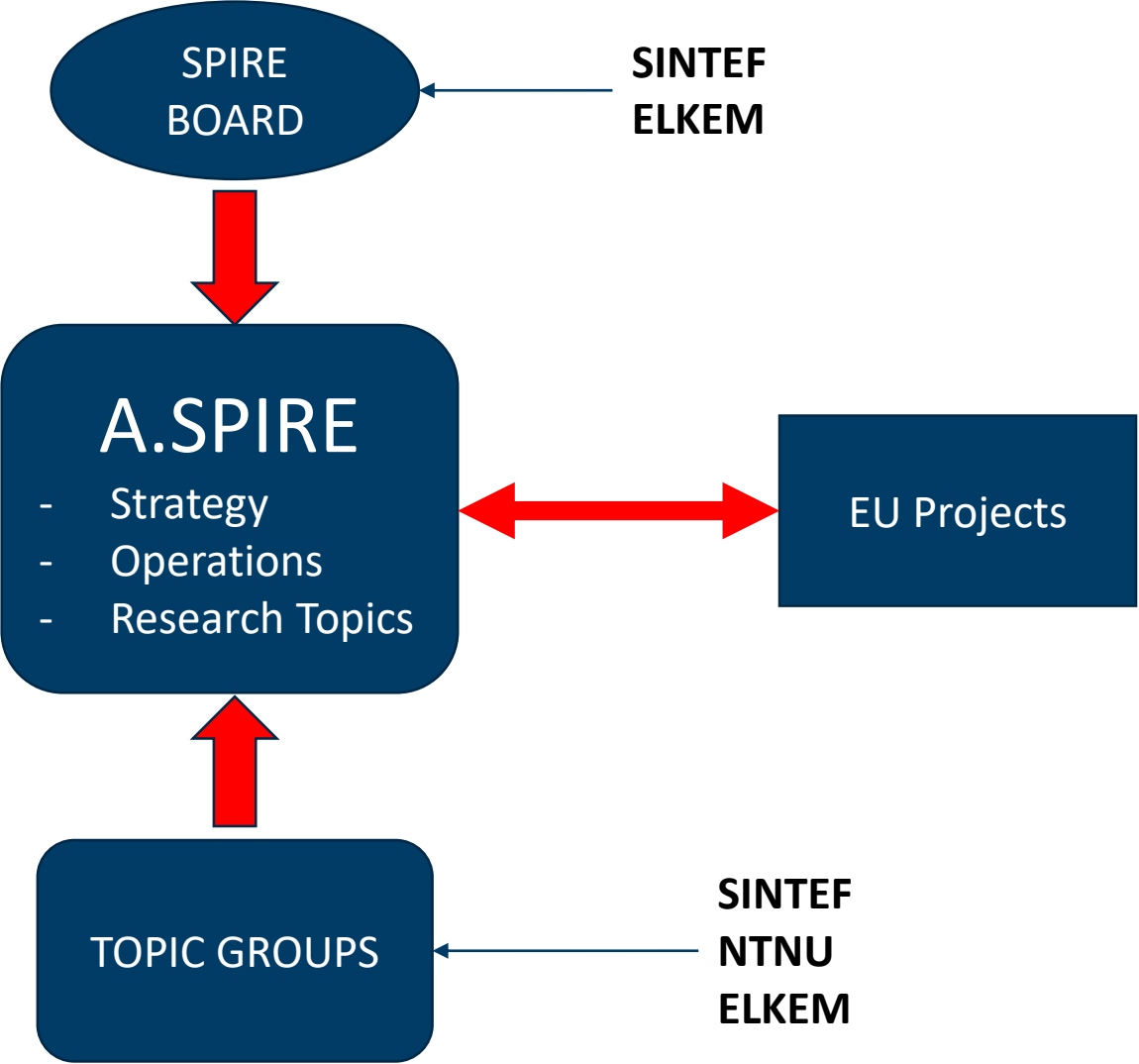


# SPIRE

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- SPIRE: cPPP between the European Commission and cement, ceramics, chemicals, engineering, minerals and ores, non-ferrous metals, steel and water sectors
- Launched in 2013 in the framework of Horizon 2020.
- ~142 Members, Administrative budget ~700 kEUR
- SPIRE is 6 years old.
- 77 projects have been financed to date, with a 5.5 estimated leverage factor standing for more than €2,400 M investment to scale up or deploy more than 250 new systems and technologies.

# Operation of SPIRE



## SPIRE 2050 VISION

Answering:

- Global Challenges
- The demands from society



# Our ambitions



## Closing the climate technological gap

Development of the required solutions to fully contribute to the EU Climate Policy targets



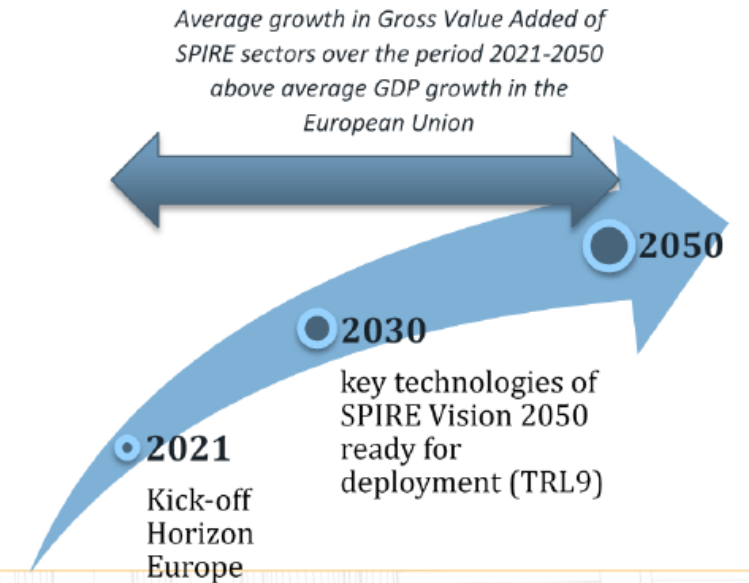
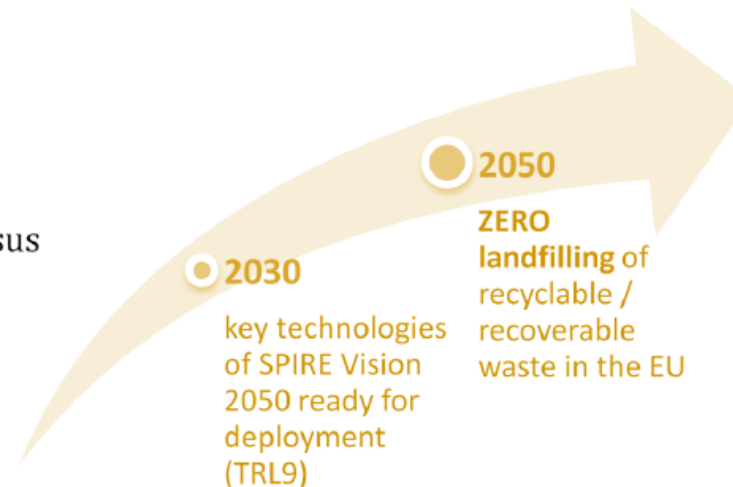
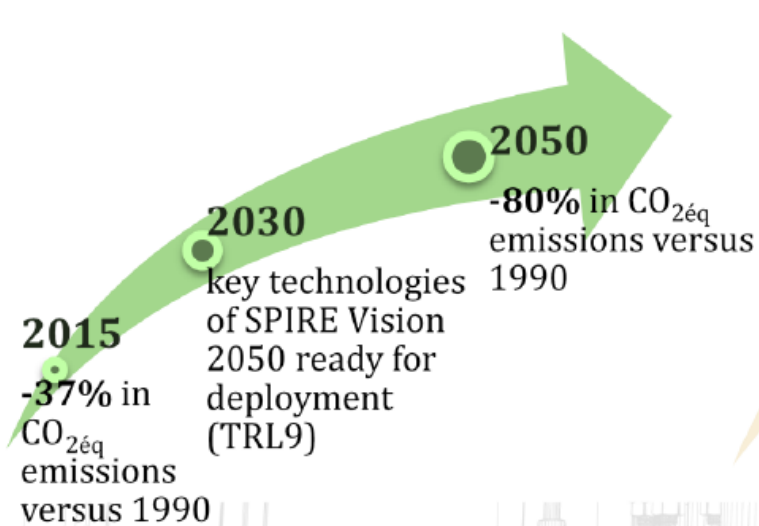
## Process industries as Hubs for circularity

Development of required solutions to move towards zero-waste-to-landfill and create Hubs for circularity across Europe

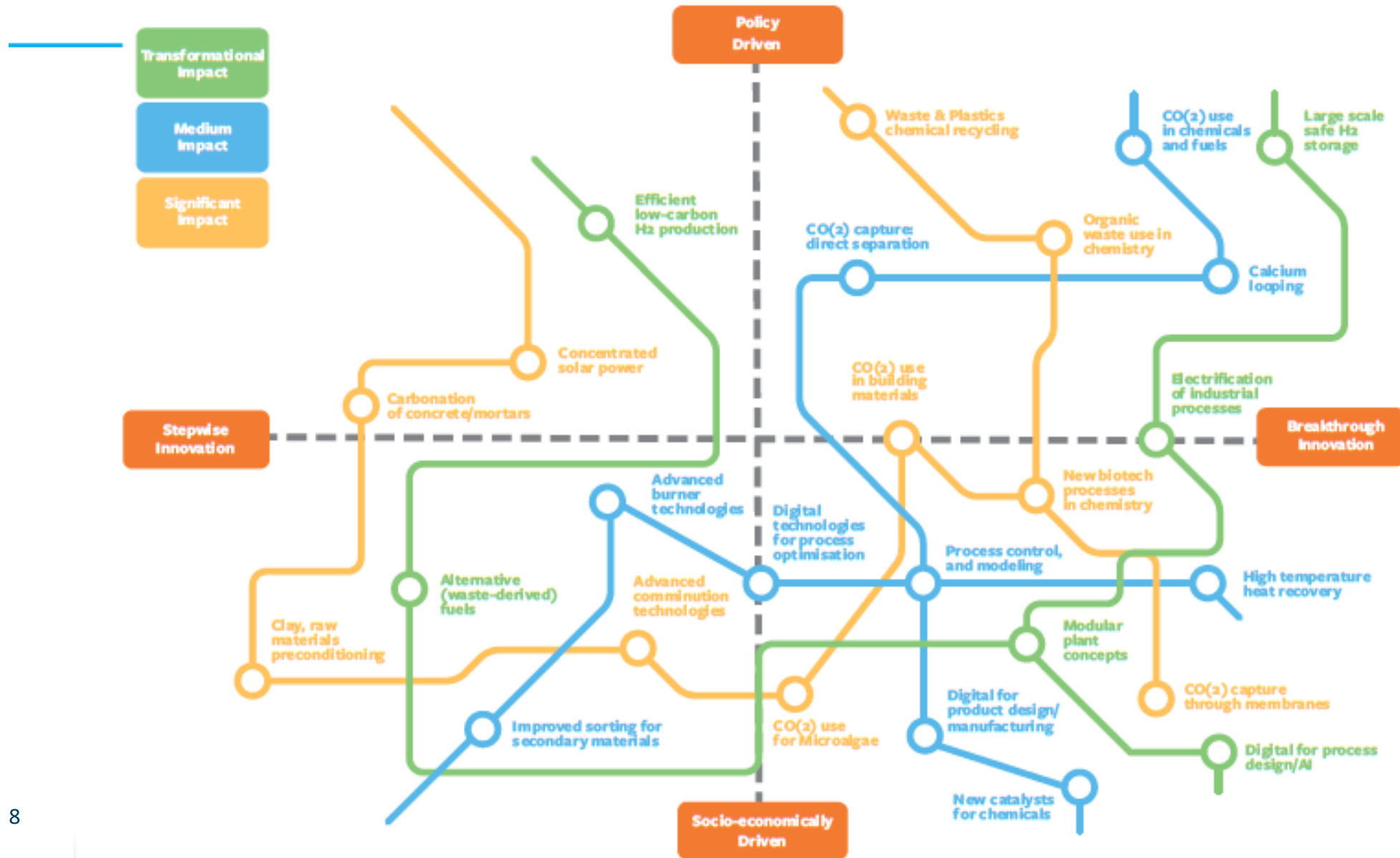


## Global competitiveness

Development of technologies which create new investment opportunities for globally competitive EU Process Industries



# Technology Mapping $\Rightarrow$ Extensive Consultation with Industry



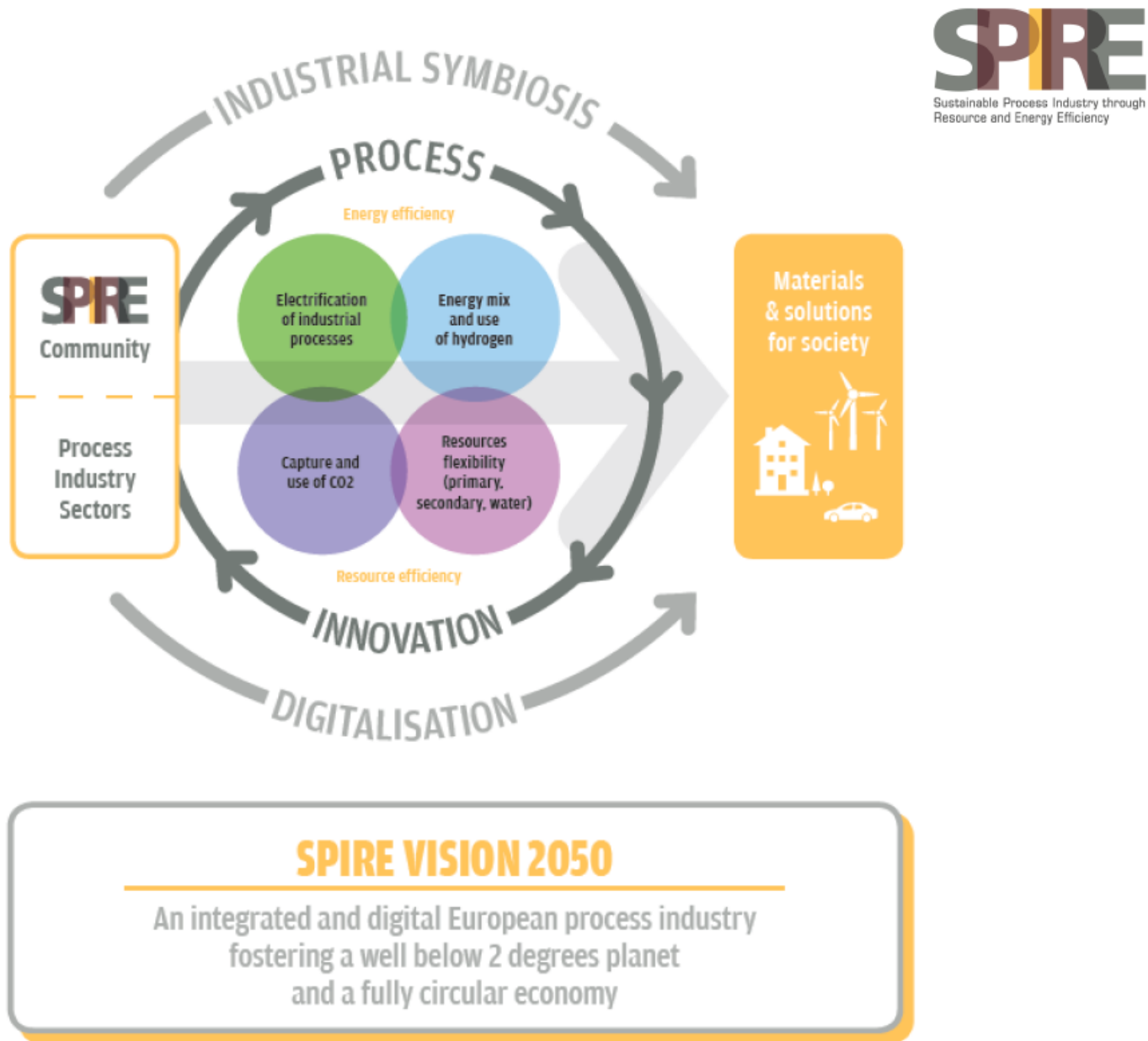


## 4 technological drivers

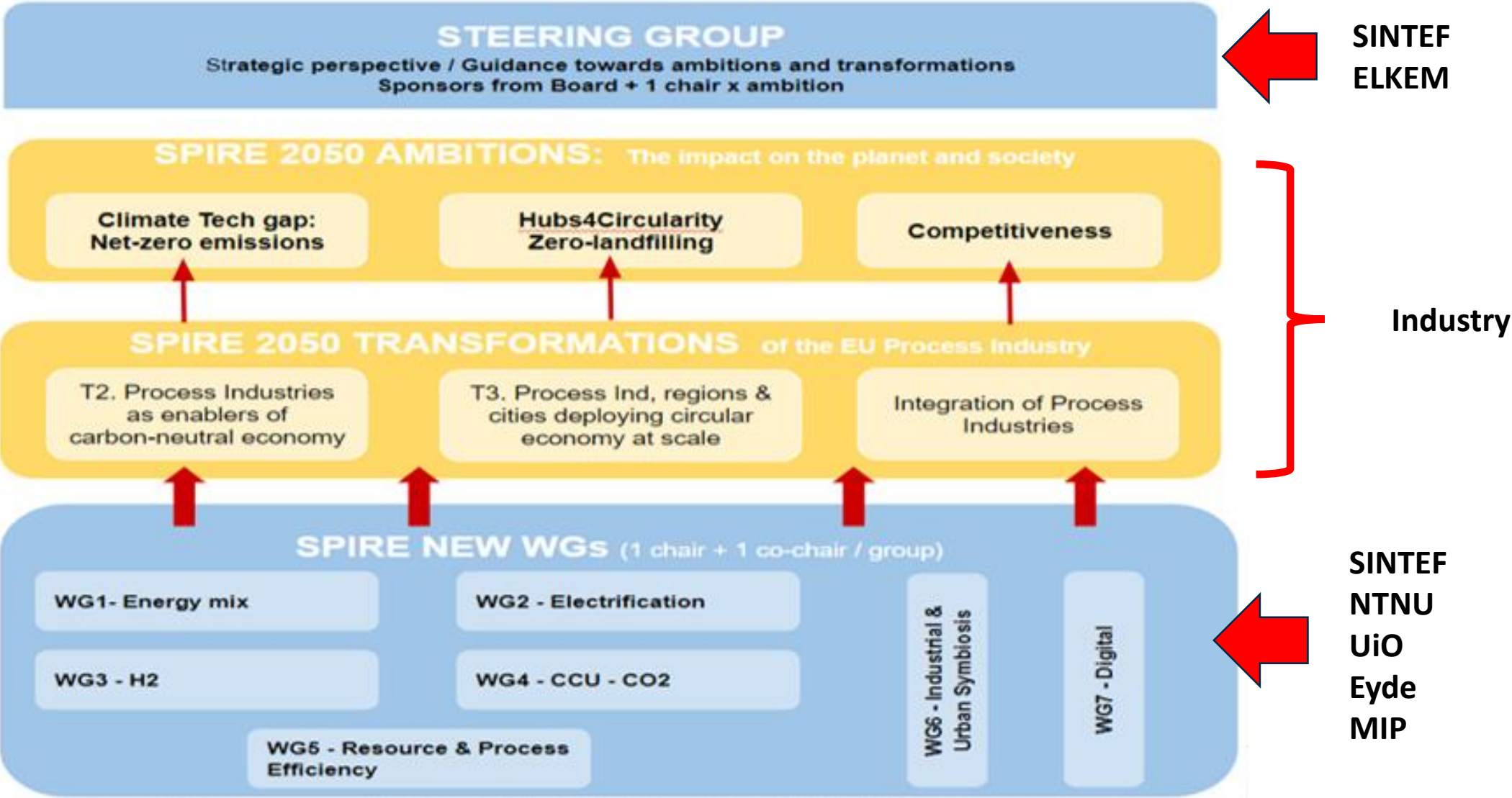
Electrification  
Energy mix and H<sub>2</sub>  
Capture and Use of CO/CO<sub>2</sub>  
Resources flexibility

## 2 transversal topics

Digitalisation  
Industrial symbiosis



# SPIRE 2050 Road map Working Groups



# Membership of working Groups: Relevance for Hypros

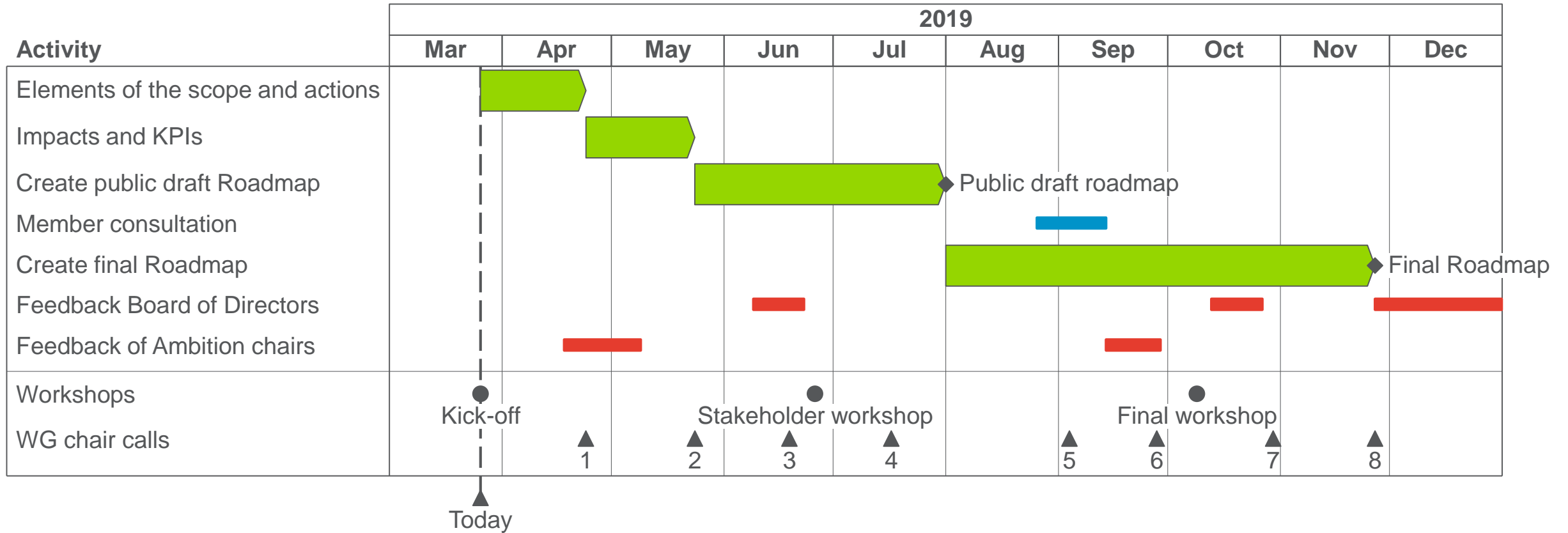
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- G1 - Energy Mix
- G2 - Electrification of Industrial Processes (**NTNU**)
- G3 - Use of Hydrogen
- G4 - Capture and Use of CO2 (**SINTEF**)
- G5 - Resource and Process Efficiency (**SINTEF is Chair, NTNU**)
- G6 - Industrial and Urban Symbiosis (**Eyde**)
- G7 – SPIRE Digital (**SINTEF, NTNU**)



**Coordination**

# TIMELINE



**Legend**  WG + Navigant collaboration  A.SPIRE members  BoD / Ambition Chairs



# Oversikt over relevante kommende utlysninger

# SPIRE 2020 Topics

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- CE-SPIRE-01-2020: Tapping into the potential of Industrial Symbiosis (IA 70%)
- CE-SPIRE-07-2020: Near zero discharge for fresh water used by industry (IA 70%)
- CE-SPIRE-08-2020: Improved Industrial Processing using novel high-temperature resistant materials (RIA 100%)
- CE-SPIRE-09-2020: Mineral waste, by-products and recycled material as feed for high volume production (IA 70%)
- (New) NMBP-xx-2020: Materials lifecycle analysis methodology for the circular economy (RIA)
- (New) CE-SPIRE-xx-2020: Harnessing the power of Artificial Intelligence and Big Data Technologies for Process Industries (CSA)

# ENERGY 2020 Topics

## Topic: Energy efficiency

LC-SC3-EE-5-2018-2019-2020: Next-generation of Energy Performance Assessment and Certification (IA) September 3, 2019

LC-SC3-EE-13-2018-2019-2020: Enabling next-generation of smart energy services valorising energy efficiency and flexibility at demand-side as energy resource (IA) September 3, 2019

## Topic: Global leadership in renewables

### Subtopic: Next Renewable energy solutions

LC-SC3-RES-29-2019: Converting Sunlight to storable chemical energy (RIA) August 27, 2019

LC-SC3-RES-1-2019-2020: Developing the next generation of renewable energy technologies (RIA) April 25, 2019

LC-SC3-RES-3-2020: International Cooperation with USA and/or China on alternative renewable fuels from sunlight for energy, transport and chemical storage (RIA)

### Subtopic: Renewable energy solutions for implementation at consumer scale

LC-SC3-RES-7-2019: Solar Energy in Industrial Processes (RIA) August 27, 2019

### Subtopic: Renewable energy solutions for energy system level implementation

LC-SC3-RES-16-2019: Development of solutions based on renewable sources that provide flexibility to the energy system (RIA) August 27, 2019

### Subtopic: Renewable Fuels for transport

LC-SC3-RES-23-2019: Development of next generation biofuel and alternative renewable fuel technologies for aviation and shipping (RIA) August 27, 2019

LC-SC3-RES-25-2020: International cooperation for Research and Innovation on advanced biofuels and alternative renewable fuels (RIA)

LC-SC3-RES-26-2020: Development of next generation renewable fuel technologies from CO<sub>2</sub> and renewable energy (Power and Energy to Renewable Fuels) (RIA)

LC-SC3-RES-36-2020: International cooperation with Canada on advanced biofuels and bioenergy (RIA)

LC-SC3-RES-27-2020: Demonstration of advanced biofuels production from aquatic biomass (IA)

LC-SC3-RES-37-2020: Combined clean biofuel production and phytoremediation solutions from contaminated lands worldwide (RIA)

## Topic: Enabling near-zero CO<sub>2</sub> emissions from fossil fuel power plants and carbon intensive industries

LC-SC3-NZE-4-2019: Integrated solutions for flexible operation of fossil fuel power plants through power-to-X-to-power and/or energy storage (IA) August 27, 2019

LC-SC3-NZE-5-2019-2020: Low carbon industrial production using CCUS (IA) August 27, 2019



# BBI 2019 Topics

Deadline 4. September

## **Strategic orientation 1: Foster supply of sustainable biomass feedstock to feed both existing and new value chains**

### **Improve the utilisation of existing feedstock sources**

BBI2019.S01.D1 – Scale up conversion of lignin into valuable compounds for application in specific market sectors

BBI2019.S01.D2 – Produce components for various materials, including for food and feed, from microalgae

### **Expand the exploitation of under-utilised or new feedstock for the bio-based industries**

BBI2019.S01.R1 – Use tree species and/or varieties to create new bio-based value chains

BBI2019.S01.F1 – Valorise the organic fraction of municipal solid waste through an integrated biorefinery at commercial level

## **Strategic orientation 2: Optimise efficient processing for integrated biorefineries through R&D&I 2 Pre-treatment**

BBI2019.S02.R2 – Develop breakthrough technologies to improve the cost-effectiveness and sustainability of pre-treatment steps within biorefining operations

### **Conversion of pre-treated feedstocks to bio-based chemicals and materials**

BBI2019.S02.R3 – Apply microorganisms and/or enzymes to resolve end-of-life issues of plastics

BBI2019.S02.R4 – Develop surface or bulk treatments for improved wood-based materials

BBI2019.S02.R5 – Convert plant oils and fats into safe high-added-value products for various applications including food and personal care

BBI2019.S02.F2 – Apply technological combinations to valorise all components of biomass feedstock

### **Downstream processing**

BBI2019.S02.R6 – Improve biorefinery operations through process intensification and new end products

### **System modelling**

BBI2019.S02.R7 – Model the composition of bio-based residual streams and its evolution to optimise its management and processing

## **Strategic orientation 3: Develop innovative bio-based products for identified market applications 2 Bio-based products that outperform fossil-based counterparts**

BBI2019.S03.R8 – Develop sustainable bio-based materials for high-volume consumer products

BBI2019.S03.R9 – Develop bio-based fibres and/or functional molecules to improve the performance of textile products

BBI2019.S03.R10 – Develop bio-based high-performance materials for various and demanding applications

BBI2019.S03.D3 – Produce bio-based functional ingredients and additives for high-end markets

BBI2019.S03.D4 – Demonstrate bio-based pesticides and/or biostimulant agents for sustainable increase in agricultural productivity

BBI2019.S03.F3 – Produce high-performance bio-based alternatives to harmful products or processes to protect and enhance human health and the environment

## **Strategic orientation 4: Create and accelerate the market-uptake of bio-based products and applications**

BBI2019.S04.S1 – Assist brand owners to 'switch to bio-based'

BBI2019.S04.S2 – Establish methods and communication for applying mass balance principles to attribute biomass co-feedstock to products

BBI2019.S04.S3 – Shaping the bio-based economy through a participatory approach

BBI2019.S04.S4 – Empower SME clusters to bring SMEs 'across the valley of death'



Teknologi for et bedre samfunn