

Welcome!





Organiser:



Co-Hosts:







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AGENDA

WELCOME & INTRODUCTION

ENERGY EFFICIENCY IN INDUSTRY CONTRIBUTING TO EU ECONOMIC RECOVERY, CLIMATE AND ENERGY POLICIES HAITZE SIEMERS, DG ENERGY, HEAD OF UNIT C4

FOSTERING INNOVATIVE SOLUTIONS TIMO RITONUMMI, MINISTRY OF ECONOMIC AFFAIRS AND EMPLOYMENT, FINLAND

SHORT PRESENTATIONS OF IMPLEMENTED SUCCESS STORIES ÀNGELS ORDUÑA CAO, EXECUTIVE DIRECTOR A.SPIRE

WHAT IT NEEDS TO BE MORE EFFICIENT AND RECOVER MORE UNUSED HEAT FROM INDUSTRY PANEL DISCUSSION

WRAP-UP & CONCLUSIONS



22-26 JUNE 2020 ENERGY FOR THE EUROPEAN GREEN DEAL #EUSEW2020 ENERGY EFFICIENCY IN INDUSTRY CONTRIBUTING TO EU ECONOMIC RECOVERY, CLIMATE & ENERGY POLICIES

Haitze Siemers,

Head of Unit C2, DG Energy



European Commission



22-26 JUNE 2020 ENERGY FOR THE EUROPEAN GREEN DEAL #EUSEW2020

EE – Unlocking the Potential of Unused Heat and Cold in Industry

Fostering innovative solutions

26 June 2020, webinar

Timo Ritonummi



Ministry of Economic Affairs and Employment of Finland

Fostering innovative solutions



- How to be innovative, how to foster it?
- Innovation needs resources (not only finance) and push & pull
 - "Push" to develop and advance in TRLs
 - "Pull" to ask for new technologies and practices
 - Corona-virus, green recovery plans, new era...

• How to foster: more resources (rather stepwise) and better co-operation

• SET-Plan should be put more to the center – even inside EC

Kiitos / Thank you!



Processes4Planet 2050

Transforming the European Process Industry for a sustainable society

Àngels Orduña Cao *Executive Director A.SPIRE*



WHO ARE WE



A vibrant community with a joint strategic Vision



Processes4Planet: from the Vision to the Roadmap





Processes4Planet Vision and Roadmap integrate **technological and non-technological innovations** which aim at positioning European process industries **as global leaders and front runners in economically attractive solutions for climate-neutrality and a real circular economy.**

P4Planet Roadmap: Alignment with the Green Deal & Other Policies



The climate neutrality and circularity targets can only be reached jointly through the **common and crosssectoral R&I strategy**

- Similar innovation challenges
- Shared learning
- Faster deployment at scale
- Efficiency in resources
- Shared costs on benefit of circularity
- Strengthen connection with others initiatives



Processes4Planet Roadmap: Routes to Transformation





We need to start now, the way is long



Industrial-Urban SymbolicsSubset of Circularity
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Disruptive
Innovation*
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Disruptive
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Innovation area	2024	2030	2040	2050
Renewable energy integration				
Heat reuse				
Electrification of thermal processes				
Electrically-driven processes	\bigcirc			
Hydrogen integration				
CO ₂ capture for utilisation				
CO ₂ utilisation in minerals	\bigcirc			
CO ₂ & CO utilisation in chemicals and fuels	\bigcirc			
Energy and resource efficiency				
Circularity of materials				
Industrial-Urban symbiosis	\bigcirc			
Circular regions				
Digitalisation				
Non-technological aspects				

¹ Progress is depicted here as % of total TRL9 projects programmed in each area, and for circular regions, digitalisation, and non-technological aspects % of total investment needs until 2050

Progress up until milestone year¹

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Processes4Planet Roadmap: Overview of the Innovation Programmes

14 IAS	Innovation area	36 IPs	Innovation programme
1	Renewable energy integration	1a	Integration of renewable heat and electricity
		1b	Integration of bioenergy, waste and other new fuels
		1c	Hybrid fuel transition technologies
		1d	Flexibility and demand response
2	Heat reuse	2a	Advanced heat reuse
2	Electrification of thermal processes	3a	Heat pumps
		3b	Electricity-based heating technologies
4	Electrically-driven processes	4a	Electrochemical conversion
		4b	Electrically driven separation
4	Hydrogen integration	5a	Alternative hydrogen production routes
		5b	Using hydrogen in industrial processes
		5c	Hydrogen storage
6	CO2 capture for utilisation	6a	Flexible CO2 capture and purification technologies
7	CO2 utilisation in minerals	7a	CO2 utilisation in concrete production
		7b	CO2 utilisation in building materials mineralisation
8	CO2 & CO utilisation in chemicals and fuels	8a	Artificial photosynthesis
		8b	Catalytic conversion of CO2 to chemicals or fuels
		8c	Utilisation of CO2 and CO as building block in polymers
		8d	Utilisation of CO to chemicals or fuels
9	Energy and resource efficiency	9a	Next-gen catalysis
		9b	Breakthrough efficiency improvement
	Circularity of materials	10a	Innovative materials of the process industries
10		10b	Inherent recyclability of materials
10		10c	Upgrading secondary resources
		10d	Wastewater valorisation
11	Industrial-Urban symbiosis	11a	Demonstration of Industrial-Urban Symbiosis
12 (Circular regions	12a	European Community of Practice
		12b	Development of Hubs for Circularity
13	Digitalisation	13a	Digital materials design
		13b	Digital process development and engineering
		13c	Digital plant operation
		13d	Intelligent material and equipment monitoring
		13e	Autonomous integrated supply chain management
		13f	Digitalisation of industrial-urban symbiosis
14 1	Non-technological aspects	14a	Integration of non-technological aspects in calls
		14b	Human resources, skills and labour market



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Fastening a competitive EU Process Industry transformation







P4Planet Porfolio output



MARBLES: a showcase of the Process Industry transformation



• First-of-a-kind Large scale plants in operation

- Combine one or several P4Planet Innovations towards the 2030/2050 ambitions to reach Climate neutrality and circularity
- Acting as Hubs of bulk amounts of resources from industry and the municipalities.
- Several marbles will likely connect to reach together the targets of the partnership's KPIs
- 50+ Marbles identified of which ca. We aim to launch 15 in the period 2021 – 2030, responding to the green-deal plan, and enabled by the P4planet innovation portfolio

PRIVATE INVESTMENTS

- Industry leader commitment
- when technical and economic feasibility is proved through Horizon Europe programs.
- Public support needed to de-risk and accelerate

MASSIVE INVESTMENTS NEEDED TO REACH IMPACT





H4Cs CONCEPT

Self-sustaining economic industrial ecosystems for full-scale Industrial-Urban Symbiosis and Circular Economy, closing energy, resource and data loops and bringing together all relevant stakeholders, technologies, infrastructures, tools and instruments necessary for their incubation, implementation, evolution and management.

- Territorial systemic solutions (regional approach)
- → Processes4Planet inside!

Starting Hubs

→ Facilitation necessary to overcome non-technological barriers to symbiosis

Intermediate Hubs



European Community of Practice



Platform for non-competitive exchange of knowledge and best practices

- Practical toolbox: technologies and tools
- Innovation programmes for finding the missing pieces in the puzzle of symbiosis
- **Modelling** circular concepts and plants of the future
- Enhancing **replicability**
- Communication and transfer of technologies and solutions
- Education and training
- **Sustainability** of the network

The process industry is in a position to decarbonise many value chains and reconnect resources into a circular economy









SPIRE PROJECTS: Waste heat valorisation



EMB3Rs: energy matching tool for industrial excess heat/cold (30/0/X)

Energy matching

Heat transfer

INDUS3ES: Absorption heat transformer For low temp heat (<130°C) (x/0/x)

I-THERM: Plug & Play waste heat recovery solution (70 – 1000 °C)

SUSPIRE: Energy recovery by new Heat Transfer Fluids Phase Change Materials (16/0/?)

DRYFICIENCY: closed loop high temperature heat pumps for recovery of waste heat (75/0/20)

ETEKINA: waste heat recovery (X/X/X)

Storage

SMARTREC: waste heat recovery & Thermal storage

Power

TASIO: waste heat to Power Via ORC (x/X/X)

DryFiciency:



Key Performance Targets:

• Improve energy efficiency by up to 80%,



Recovering more than 40% of the waste heat stream in energy intensive industries

Reducing environmental impact and energy bills

Heat exchanger to withstand challenging exhaust streams

Aiming at a payback time of less than three years

HEAT PIPE TECHNOLOGY



Research for an efficient thermal recovery

of energy through heat absorption and

vaporisation

Applications in

•

- Steel industry
- Aluminium industry
- Ceramic industry

SKILLS FOR THE CIRCULAR ECONOMY JOBS

- A blueprint for an industry-driven, long-term strategy focused on industrial-urban symbiosis and digital skills
- Proactive adjustments to the workforce to enable deployment and implementation of new technologies to optimise processes
- Monitoring and shortening the implementation of industry relevant qualifications in national Vocational Education & Training (VET) systems
- Developing and exchanging modules, tools and experiences in implementing the new skills agenda and strategy
- Disseminating the SPIRE-SAIS blueprint and discussing and comparing solutions with those from other sectors
- Effective roll-out of skills activities at regional, national and European level



"European Energy Intensive Industry Skills Agenda and Strategy"

- implementation of new skills demands
- cross-sectoral industrial symbiosis (IS) and energy efficiency

ERASMUS + PROJECT

A.SPIRE Process Industry Sectors:

Cement, Ceramics, Chemicals, Engineering Non-ferrous metals, Minerals and Water

Refining & Pulp&Paper invited to join





Marco Ruggiero,

External Funding & Research Collaborations Technical Leader at Baker Hughes



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Waste energy in gas transport : the Italian scenario

Gas Transport Network (high pressure)



Transported gas >70B m³/year



Industrial & residential end users (low pressure)



Impacts

Gas burnt ~ 0.1% => 70 Mm³/year

~ 800 GWh/year of wasted energy (pressure + heat)
~ 150k Ton/year of emitted CO₂



Heat Injection Pressure Energy Recovery (HIPER)





Single Installation energy recovery

1.8 GWh annual production with ZERO emissions

Covering 15% of italian pressure would yield energy comparable with a traditional 300MW power station with an emission reduction of ~ 1 MTon/year CO2eq



System prototype installed at INRETE plant close to Bologna



Panel Discussion with

- Ludo Diels, Senior Research Leader at VITO
- Sònia Clarena Barón, Deputy Secretary General EUTurbines
- Haitze Siemers, DG Energy, Head of Unit C2
- Timo Ritonummi, Finnish Ministry of Economic Affairs and Employment & SET-Plan Action 6
- Àngels Orduña Cao, Executive Director at A.SPIRE



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WRAP-UP & CONCLUSIONS



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THANK YOU!

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