



An innovation system perspective on industrial transition

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Industry?!

Key for sustainable transition!

Innovation?!

A tool for growth or transition?

Industrial Energy-Related Technologies and Systems

*A Technology Collaboration Programme
for energy efficiency and radical GHG mitigation in industry*



Contact



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Vice Chairs: Eric Soucy, Canada &
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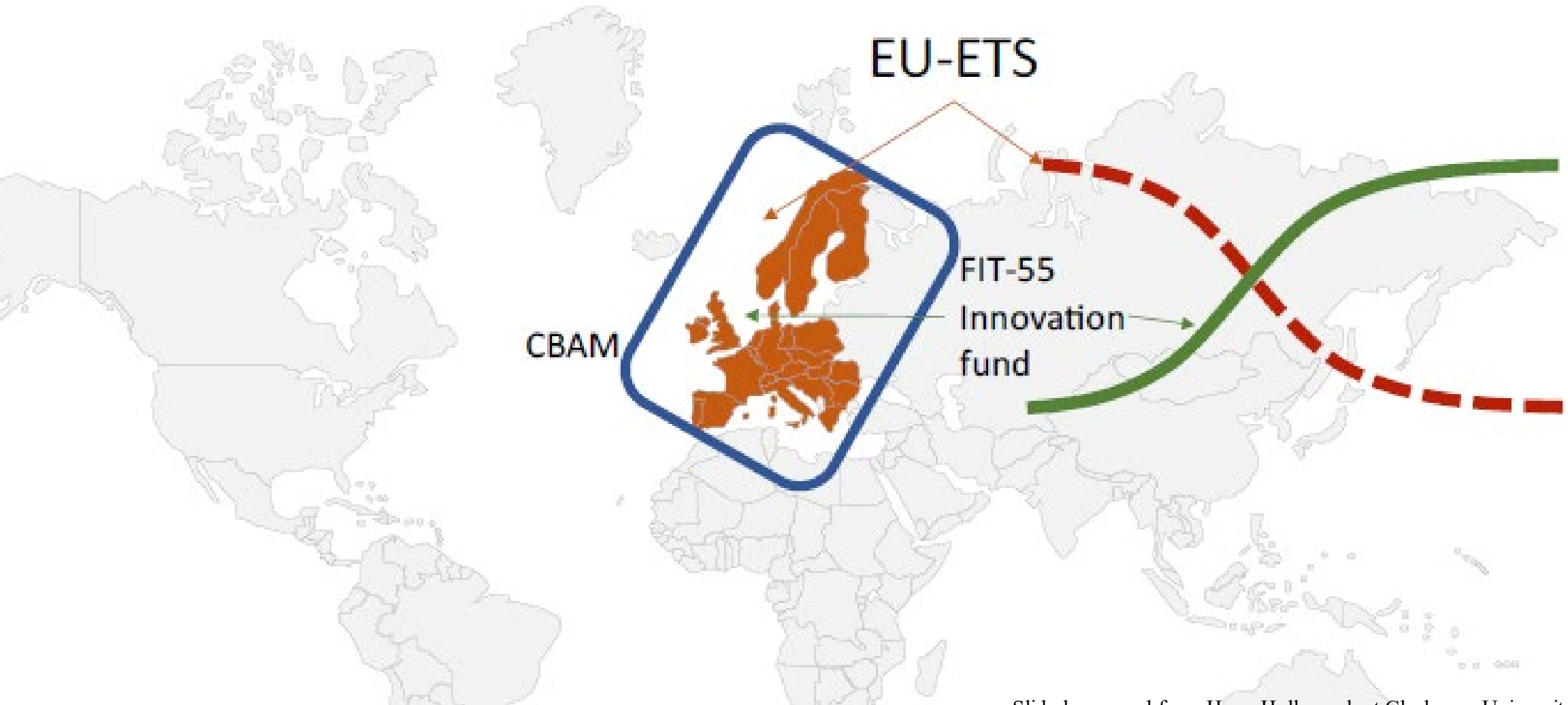


Industrial Energy-Related Technologies and Systems (IETS TCP)

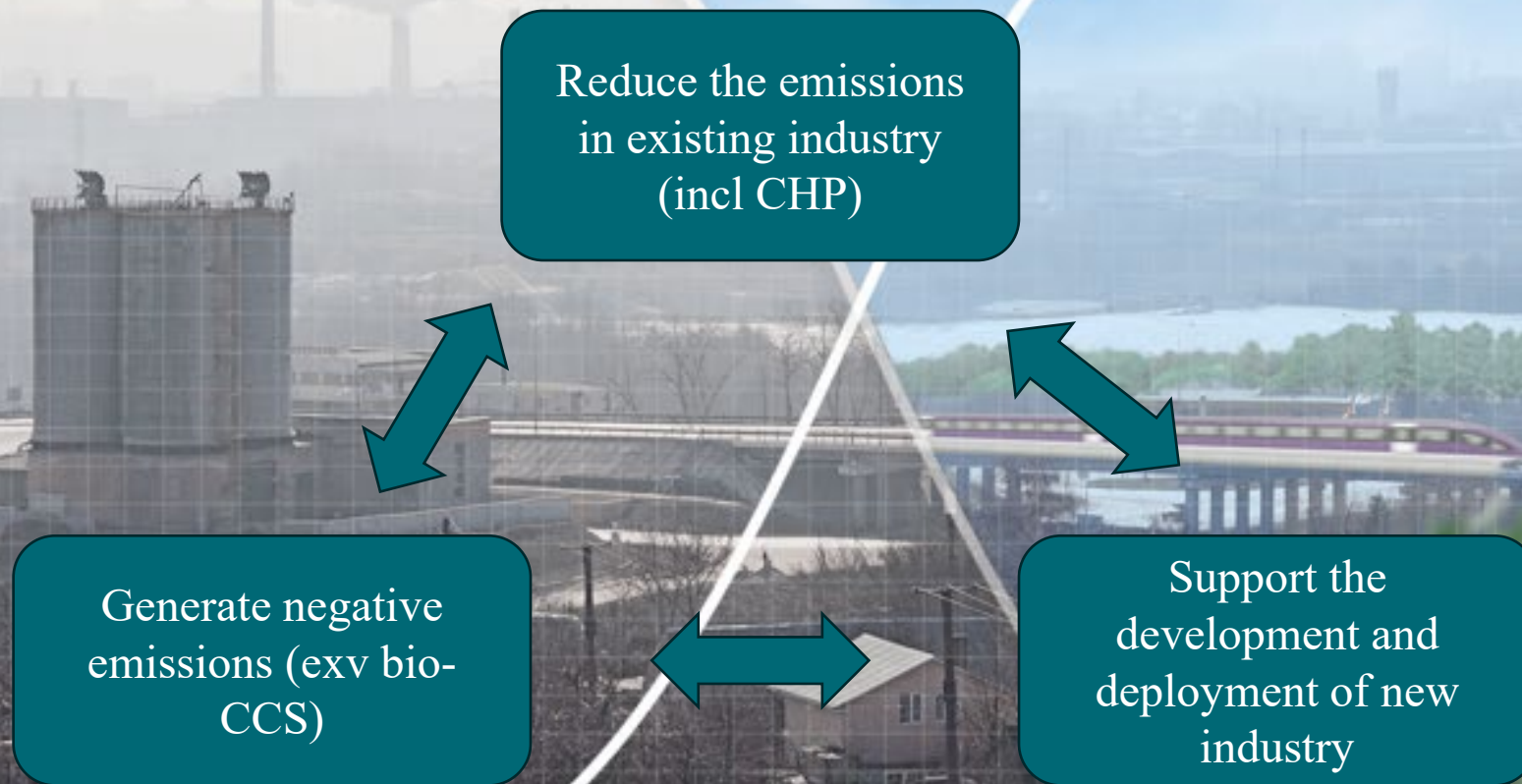
All contact details: iea-industry.org/contact
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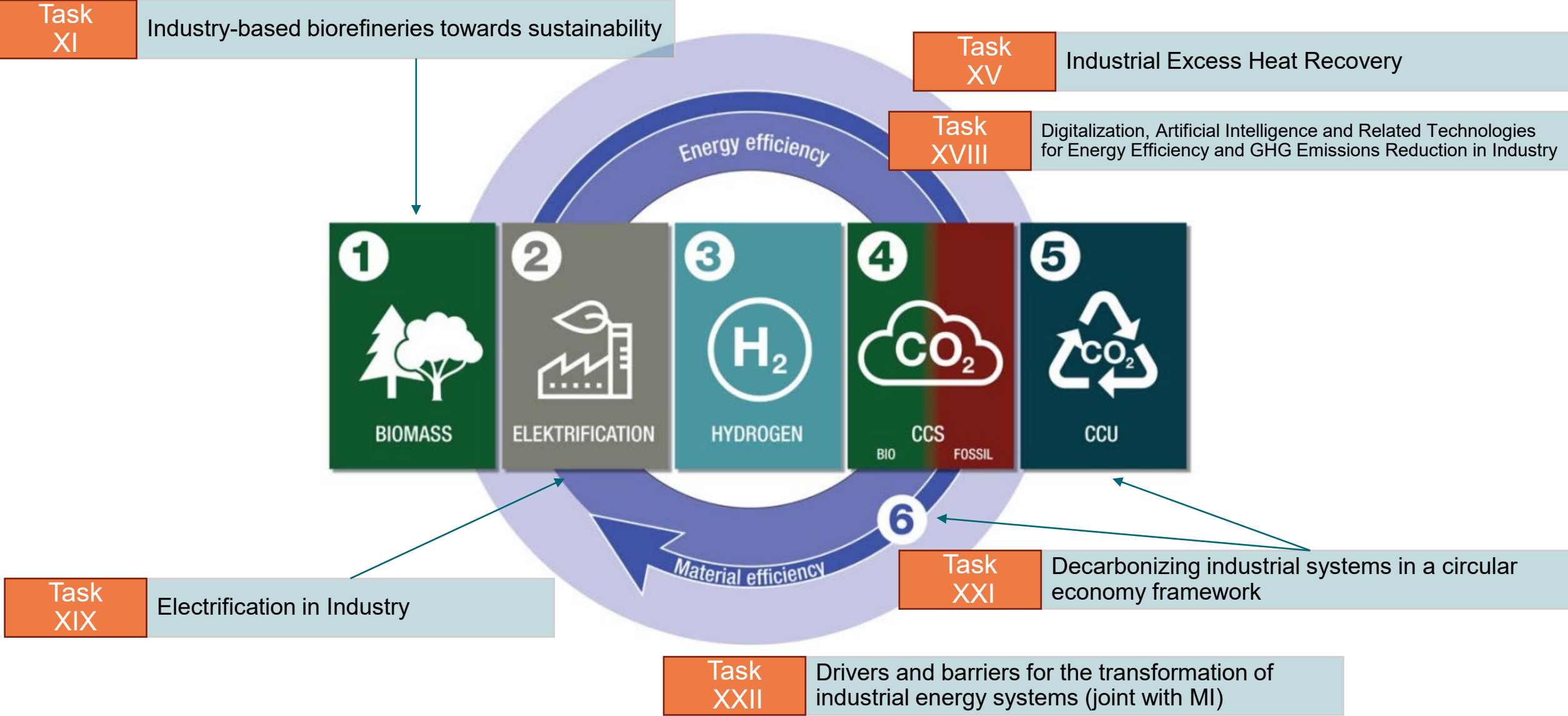
Cornerstones in the EU frameworks and its function from an innovation and transition perspective



Three overall strategies for zero emission industries



Main (technological) transition pathways for industry






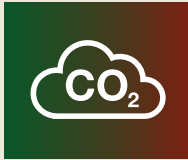


Main transition pathways for the hard-to-abate sectors within industry

	1 BIOMASS	2 ELEKTRIFIKATION	3 HYDROGEN	4 CCS	5 CCU	6 MATERIAL EFFICIENCY
Iron and steel industry	●	●	●	●		●
Refinery and chemical industry	●	●	●	●	●	●
Mineral industry	●	●		●		●
Other metals	●	●	●	●		●

Governance at EU level is increasingly crucial

◆ In the Green Deal **N** New legal act **D** Directive
◆ Within the Fit for 55 package **R** Revised Act **F** Regulation

Impact on the application of the main tracks

					General impact						
R	D	◆	◆	EU ETS – EU EMISSIONS TRADING SYSTEM	●	○	○	○	○		○
N	F	◆	◆	CBAM - Carbon Border Adjustment Mechanism	●		○	○			
R	F	◆	◆	LULUCF - Land use, land use change and forestry	●	○				○	
R	D	◆	◆	EED – Energy Efficiency Directive	●	○	○	○	○	○	
R	D	◆	◆	RED III - Renewable energy Directive	●	○	○	○	○	○	
N	F	◆	◆	REFuelEU Aviation – Sustainable Aviation Fuels		○		○		○	
N	F	◆	◆	FuelEU Maritime – Renewable fuels shipping		○		○		○	
R	F	D	◆	Gas market package		○		○			
R	F	D	◆	Reform of the EU's electricity market design	●	○	○	○	○	○	
R	D		◆	IED – Industrial emissions		○					
N	F		◆	NZIA – Net Zero Industri Avt	●	○	○	○	○	○	
N	F		◆	CRMA – The Critical Raw Material Act	●		○				○
R	F		◆	ESPR – Ecodesign for Sustainable Products							○
N	D		◆	Green Claims – Verification and communication of explicit environmental claims				○	○		○
R	F		◆	Battery Regulation			○				○

● Direct impact ○ Indirect impact

Impact on the application of the main transition tracks

Strengthening governance at EU level



Strong promotion of renewable electricity production and use



Changes in the rules for biomass extraction may affect the amount of biogenic carbon atoms available in industry



Major investments in establishing a European hydrogen market



Ambiguities about how negative emissions through bio-CCS should be accounted for



Significantly stricter rules for circularity are under negotiation

Several technology-related challenges need to be overcome to transform industry

- ...linked to technology development
- ...linked to technology dissemination
- ...linked to system solutions
- ...linked to policy development

More favourable state aid rules

may affect the competitiveness of national industry

How big a role should state aid and EU funding (joint funding) play in increasing the competitive edge of Europe's industries (e.g. decreasing cost of energy through reducing taxes, tariffs, supporting grid and renewable projects) while taking into account the integrity of the internal market and maintaining a level playing field?

Increasing degree of overlap between climate and industrial policies

Greater opportunities to provide state aid for initiatives that contribute to the industrial transition in the EU

For example, both within and outside the EU, large state subsidies have been paid out for investments in hydrogen-based steel production

Increased competition can help accelerate the transition in industry...

... But there is also a risk that the competitiveness of national industry will be negatively affected (especially in smaller/resource weaker countries)

Three reflections for continued discussion



1. Hydrogen – the Barbapapa of the energy system!

“Barbapapa was born in a garden, just like a flower.

He can take any form. He is very nice, everybody likes him.

Not far from the village where his friends Cindy and Frank live, he has built a house like him for his family.

With a few shape shifting and a brilliant imagination, he smoothly overcomes the most difficult situations!

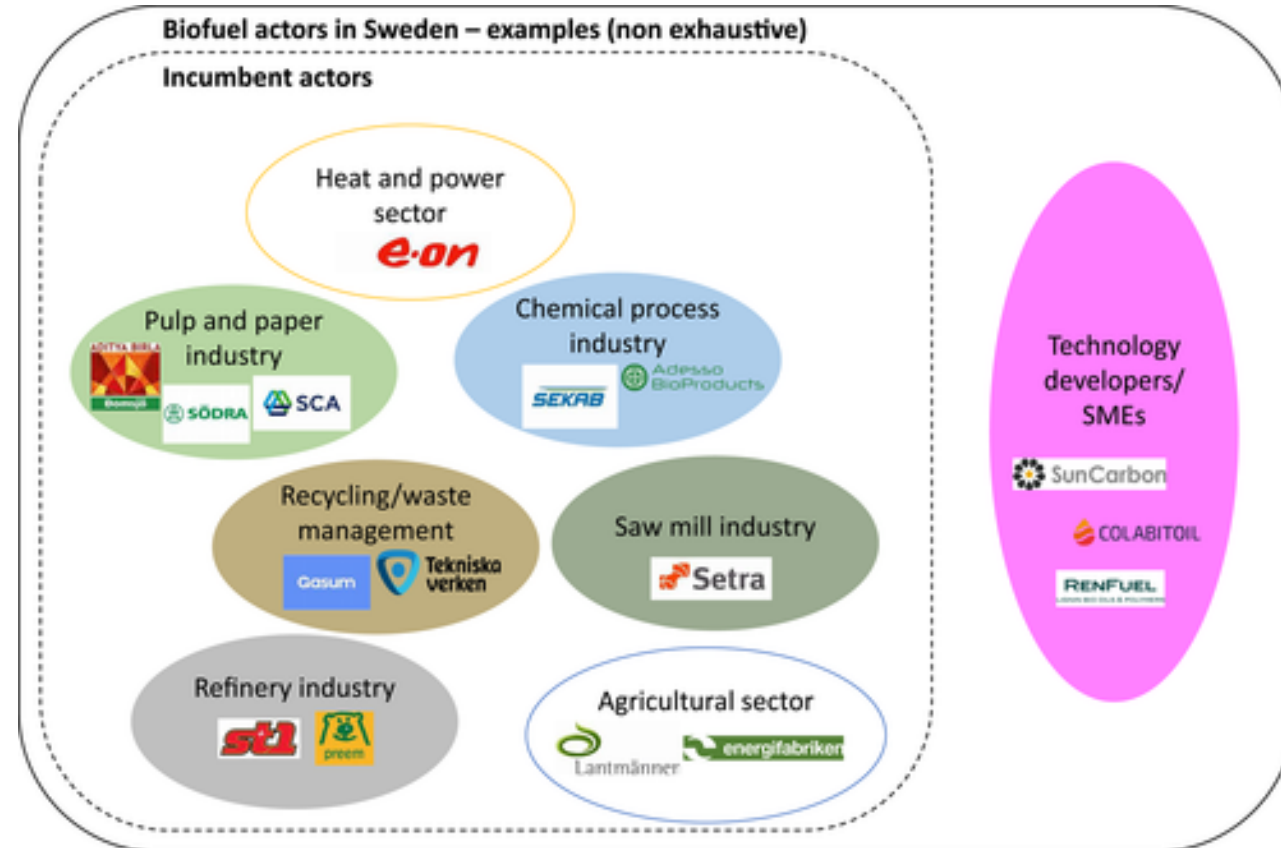
He is always ready to help. His goodwill is inexhaustible.”



2. Industrial transition drives industrial convergence

- Who is the biorefinery industry?
- Who will be producing electrofuels?
- ...and electrochemicals?
- A new type of process industry?

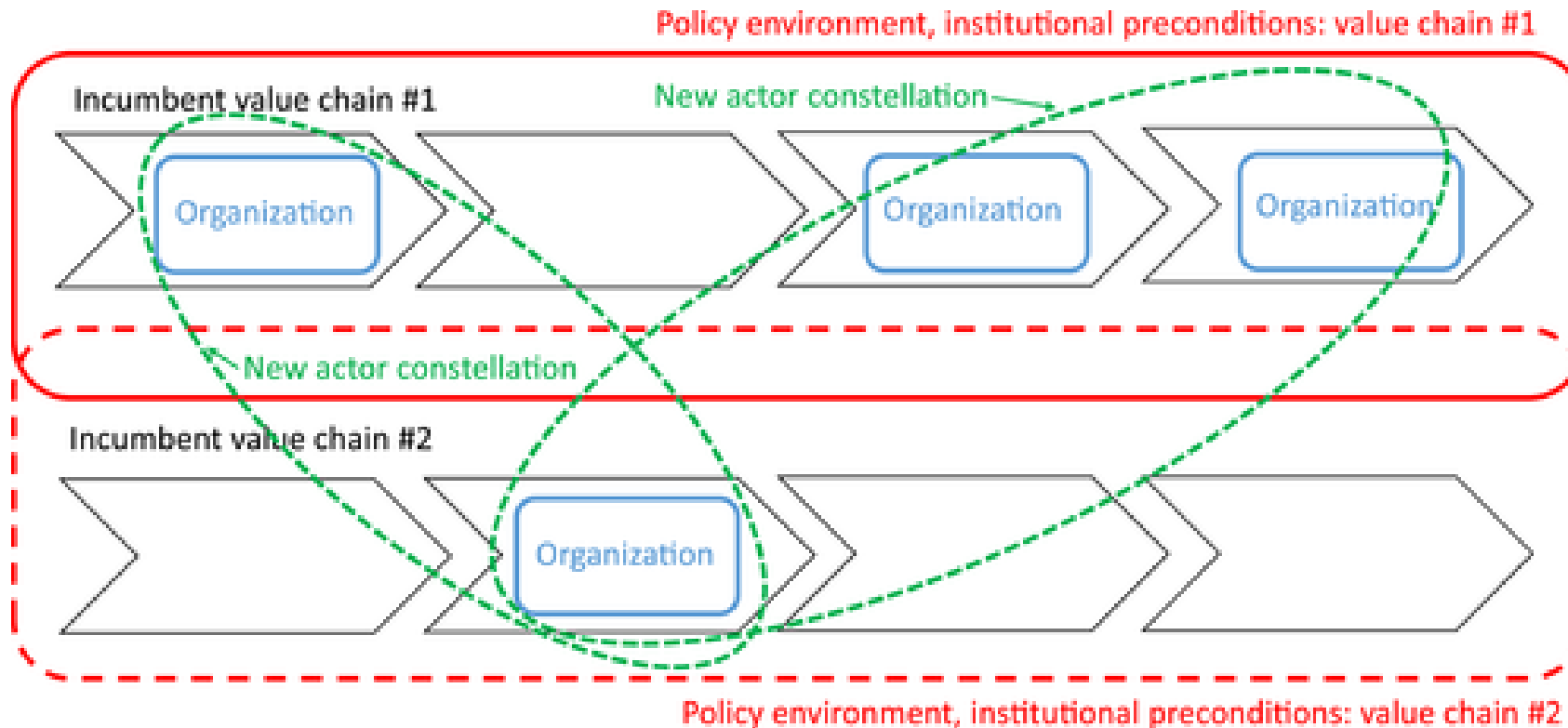
- Demands policy coordination!



Challenges of sustainable industrial transformation: Swedish biorefinery development and incumbents in the emerging biofuels industry - Mossberg - 2021 - Biofuels, Bioproducts and Biorefining - Wiley Online Library

3. Value chain cooperation as a strategy for industrial transition

- The example of Södra/Sunpine/Preem



But cooperation is challenging!

- Organizational level
- Alliance level
- Policy level

The image is a composite. The background is a blue sky with white clouds. In the foreground, there are green plants, possibly a field of tall grasses or reeds, which are slightly out of focus. In the middle ground, there is a large industrial facility, likely a refinery or chemical plant, with several tall distillation columns and a large cylindrical storage tank on the right. The entire image has a semi-transparent green overlay, and the text is centered in white.

Industry of the future?

Same same but different?

Thank you for listening!

For further discussion, connect with me on LinkedIn!