Cultivating Industrial Symbiosis between Process Industries

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Challenge

Setting the frame for industrial symbiosis between different process industries within the EPOS project

Background

Why process industries?

- 20% of European manufacturing industry (employment and turnover)
- **EPOS** industries represent
  > 400 manufacturing sites
  > 160 billion euros in sales
  > 500,000 employees
  > 250 million (metric) tonnes of steel, cement, minerals, refining, petro-, bulk & fine chemicals, bio-based products, etc.

Industrial symbiosis (IS) is a means to achieve resource efficiency via (1) mutualisation of resources and (2) substitution of raw materials with wastes or by-products from other sources, thus reducing CO_2 emissions to the environment.

Methodology

On the industry clusters, a case study approach is adopted as to cope with the complexity of the system and its actors.

Scope – to gain understanding of the activities on an industrial site.

Boundary – EPOS industrial clusters.

The full **LESTS** survey covers three levels:

1. regional
   » weigh landscape elements
2. cluster
   » engage with IS facilitation platforms
3. company/plant
   » sound IS bottom-up appreciation

	LEGAL	ECONOMIC	SPATIAL	TECHNICAL	SOCIAL
FRAME	**policy context** framing cluster agreements	**economic instruments** sponsoring cluster management	**regional planning** organising cluster design	**equipment & infrastructure** supporting cluster activities	**societal challenges** answering cluster stakeholders
TOP-DOWN	no legal ground nor contracts in place → contractual multi-party clustering	no wins recognised, gains internalised → entity in place driving symbiosis	no proximity nor connection options → integrated in regional planning	no technical feasibility → circular economy principles met	no awareness nor acceptance → proactivity towards any social actor
BOTTOM-UP					

A system's perspective is applied for
- **initiating industrial symbiosis**
- **cultivating cross-sector clustering**

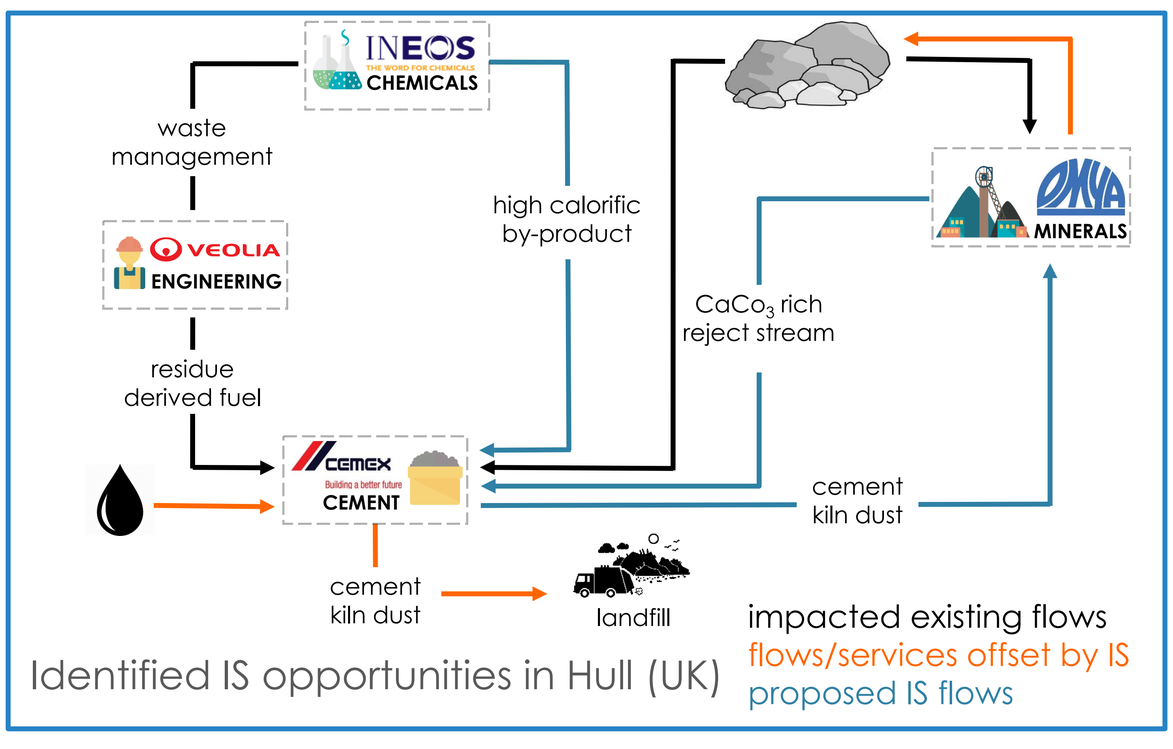
by using the LESTS framework

	Non-technological	Technological
Understanding system settings	**identifying** wishes, needs, duties **engaging** change makers	**mapping** energy & resource utilisation **identifying** IS opportunities
Interpreting system trends	**defining** LESTS cluster pentagons & companies SWOT analyses	**assessing** economic & environmental value of substituting energy & resource streams
Steering towards sustainability	**facilitating** industrial symbiosis (IS) **expanding** IS boundaries	**proposing** circular business models

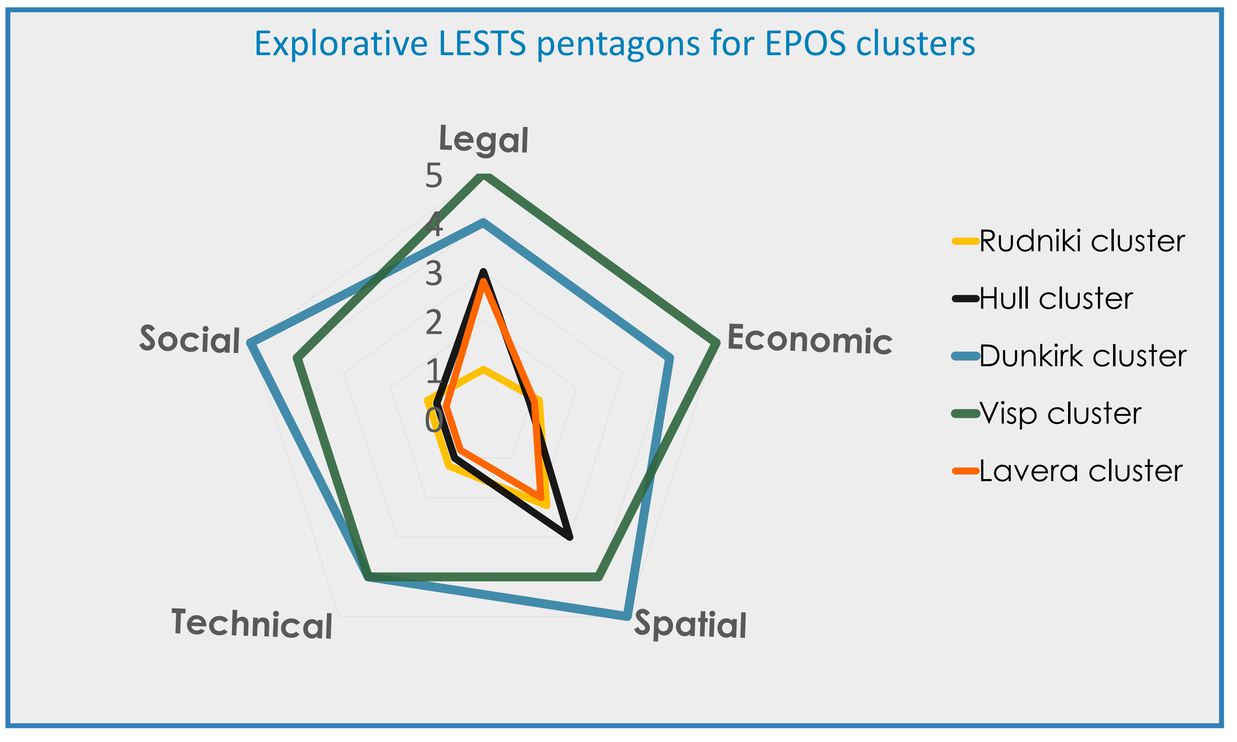
EPOS

- 5 global process industries
- 5 cross-sectorial clusters
- 5 key relevant sectors:
  steel, cement, minerals, chemicals and process engineering

Results



Identified IS opportunities in Hull (UK)



Reference
[1] Van Eetvelde, G., Deridder, K., Segers, S., Maes, T., & Crivits, M. (2007). Sustainability scanning of eco-industrial parks. Presented at the In 11th European Roundtable on Sustainable consumption and Production (ERSCP).

EPOS SYMBIOSIS IN INDUSTRY

This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 679386
This work was supported by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 15.0217
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the European Commission nor of the Swiss Government.

SPIRE Sustainable Process Industry through Resource and Energy Efficiency

European Commission