SPIRE 'blueprint for skills' workshop

Blueprint for Sectoral Cooperation on Skills:
Industrial Symbiosis and Energy Efficiency

EPOS IS & EE training

Vienna, 29 October

Greet Van Eetvelde – INEOS Group Head Energy & Innovation Policy, Rolle CH
Elfie Méchaussie – INEOS Group Energy Manager, Rolle CH
Helene Cervo – INEOS O&P PhD & Research Engineer, Lavera FR

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EPOS
SYMBIOSIS IN INDUSTRY

SPIRE
Sustainable Process Industry through Resource and Energy Efficiency

Industrial symbiosis



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Industrial symbiosis ~ resource & energy efficiency



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Symbiosis in industry

• facility clustering • conference rooms • infrastructure • pipelines • tanks • equipement • machines • utilities • logistics • purchasing • catering • open days • personnel • job fairs • reception • fire panel & services • gate control • security guards • video surveillance • site lighting • window cleaners • building, road & green maintenance • water treatment • waste collection • storage facilities • waste streams • waste heat • byproducts • CCUS • resources • raw materials • renewables • energy • electricity • grid mgt • VPP • transport service • parkings • car pooling • fitness rooms • running tracks • CSR • site shops • post office • nursery • catering • restaurants •

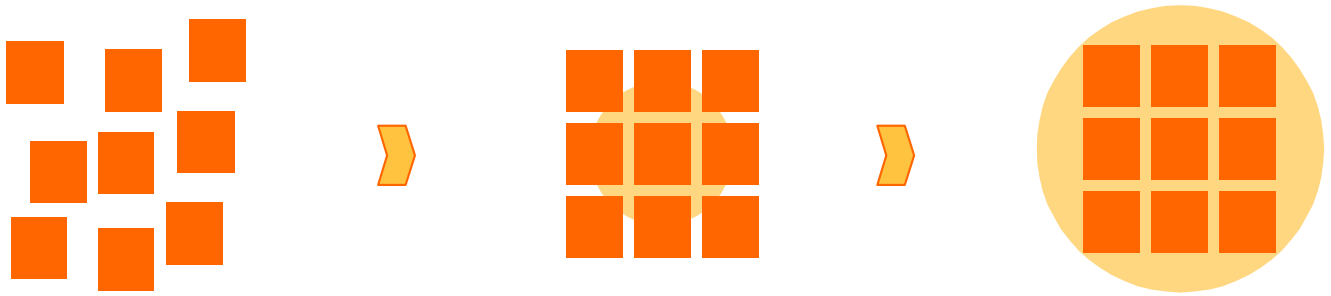
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Industrial symbiosis

- clustering



• wish • need • duty •

~society ~industry ~policy

Van Eetvelde, G. e.a. (2007) Sustainability scanning of eco-industrial parks. ERSCP

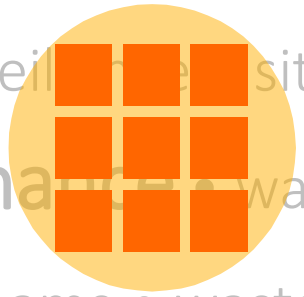
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Symbiosis = engineering + management

• facility **clustering** • conference rooms • infrastructure • pipelines • tanks • equipement • machines • **utilities** • logistics • purchasing • catering • open days • personnel • job fairs • reception • fire panel & **services** • gate control • security guards • video surveil[illegible] site lighting • window cleaners • building, road & green **maintenance** • water treatment • **waste** collection • storage facilities • waste streams • waste heat • byproducts • **CCUS** • **resources** • raw materials • renewables • **energy** • electricity • grid mgt • VPP • transport service • parkings • car pooling • fitness rooms • running tracks • **CSR** • site shops • post office • nursery • **catering** • restaurants •



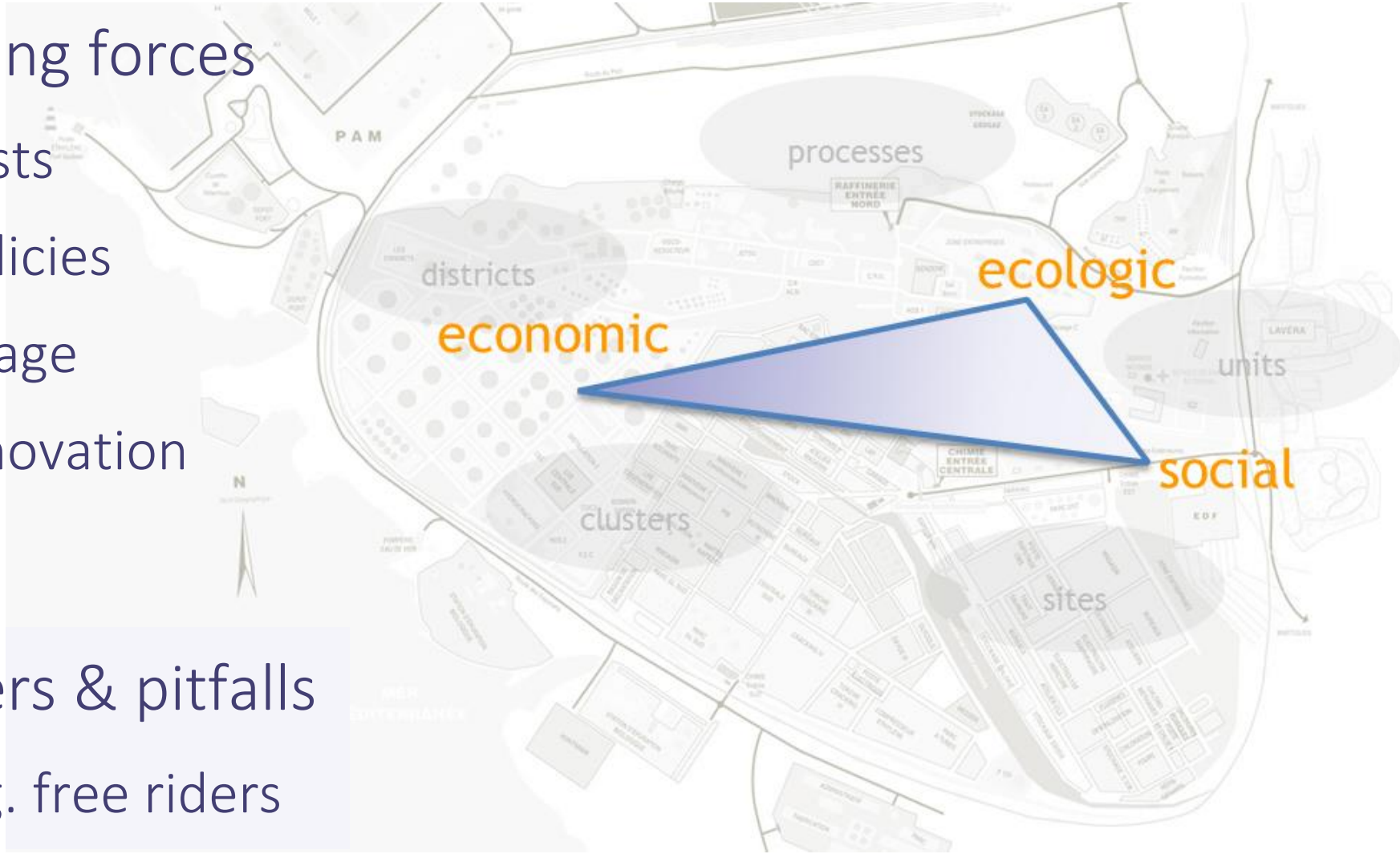
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Industrial symbiosis ~ sustainable improvement

- moving forces
  - costs
  - policies
  - image
  - innovation
  - …
- drivers & pitfalls
  - e.g. free riders



Van Eetvelde, G. (Ed.) e.a. (2005). Groeiboeken duurzame bedrijventerreinen. Vanden Broele Uitgeverij

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Industrial symbiosis ~ sustainable improvement

- share ...
  - » energy, resources, services, knowledge, ...
- ... win
  - » economic & sustainability gains

chemical industry



process industry



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EPOS

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www.spire2030.eu/epos

Efficiency

Performance

Operations

Symbiosis

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EPOS objective

- make businesses and operations
  - more efficient
  - more cost-effective
  - more competitive and
  - more sustainable

  across process sectors
- via **symbiosis**
  - on process industry sites
  - in cross-sectorial clusters

EPOS industrial symbiosis

- EPOS: 5 global process industries

  from 5 key relevant sectors:



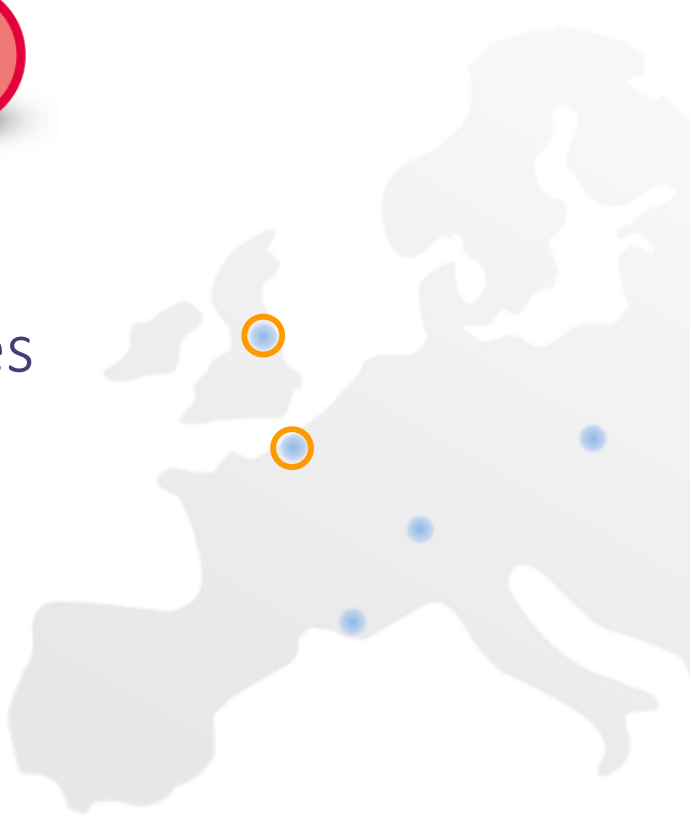
  plus: 5 highly R&I minded SMEs

  2 excellent science institutes

» validate IS in process industry

  - in & across sectors





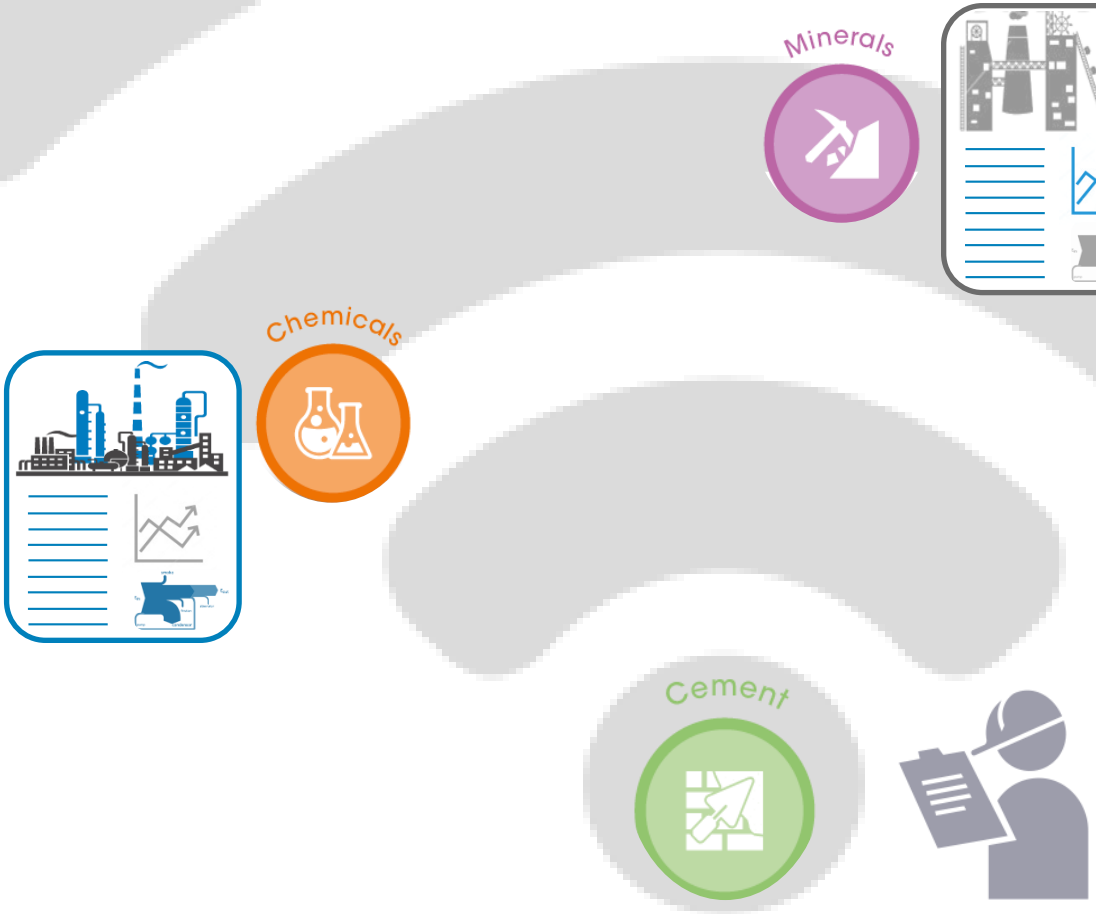
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EPOS industrial clusters, eg Hull UK

IS across 3 process sectors



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EPOS district clusters, eg Dunkirk FR

IS with nearby community

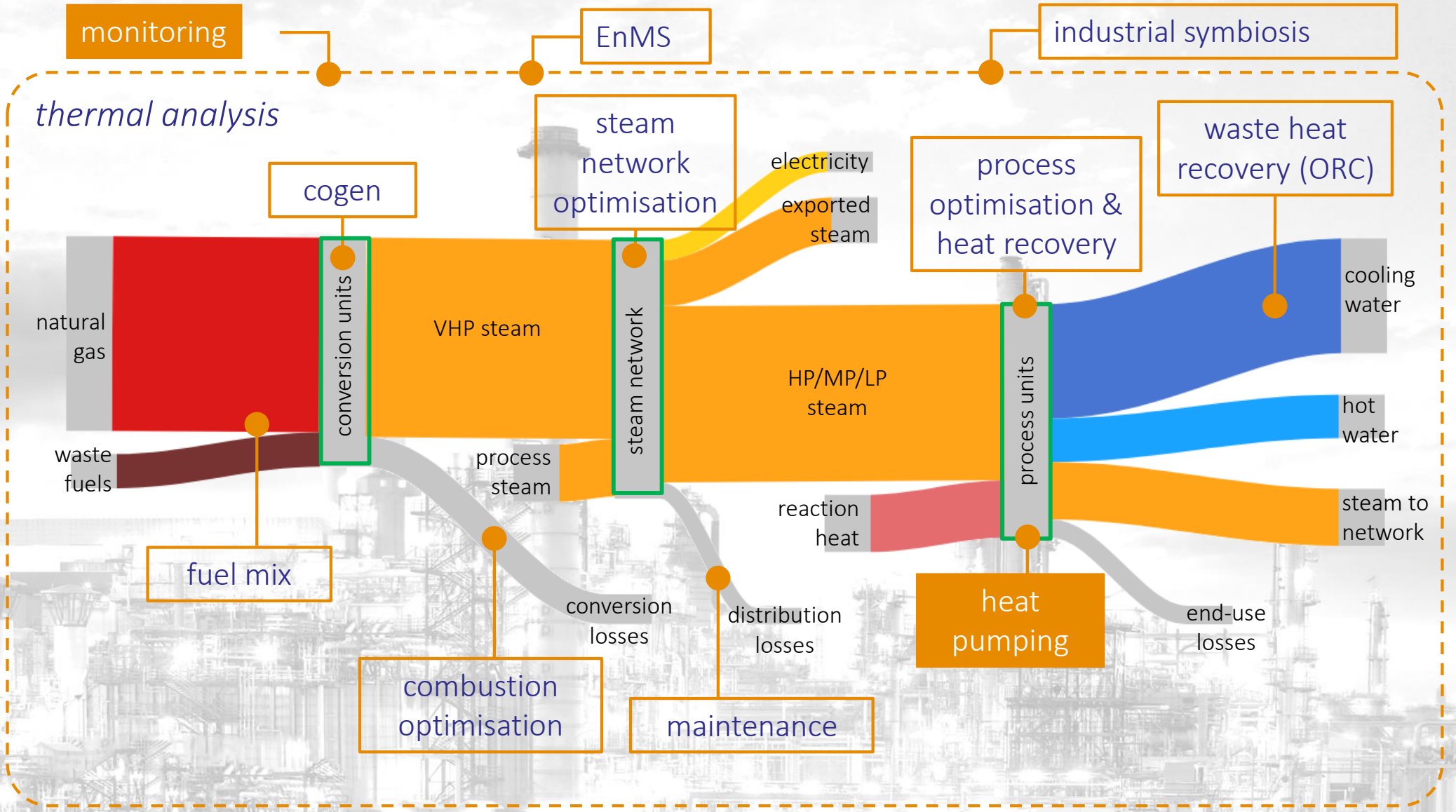


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INEOS chemical cluster analysis



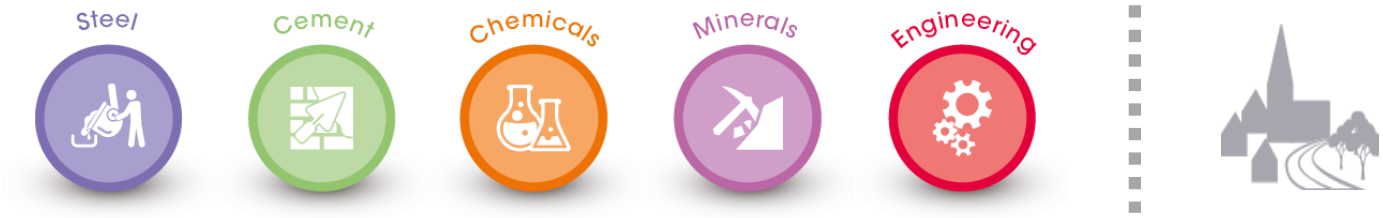
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EPOS training

- industrial symbiosis & energy/resource efficiency







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Skills for (cross-sector) industrial symbiosis

- energy-intensive industries & sectors
  - process engineering practice, techno-economics

- policy framework
  - low-carbon economy
  - circular economy
    - waste vs 2nd resources
  - bio-based economy
  - sharing & caring economy
  - …

- societal challenges
  - health, climate, energy, water, transport, …
  - climate change
  - responsibility
  - sustainability
    - next generations
  - …

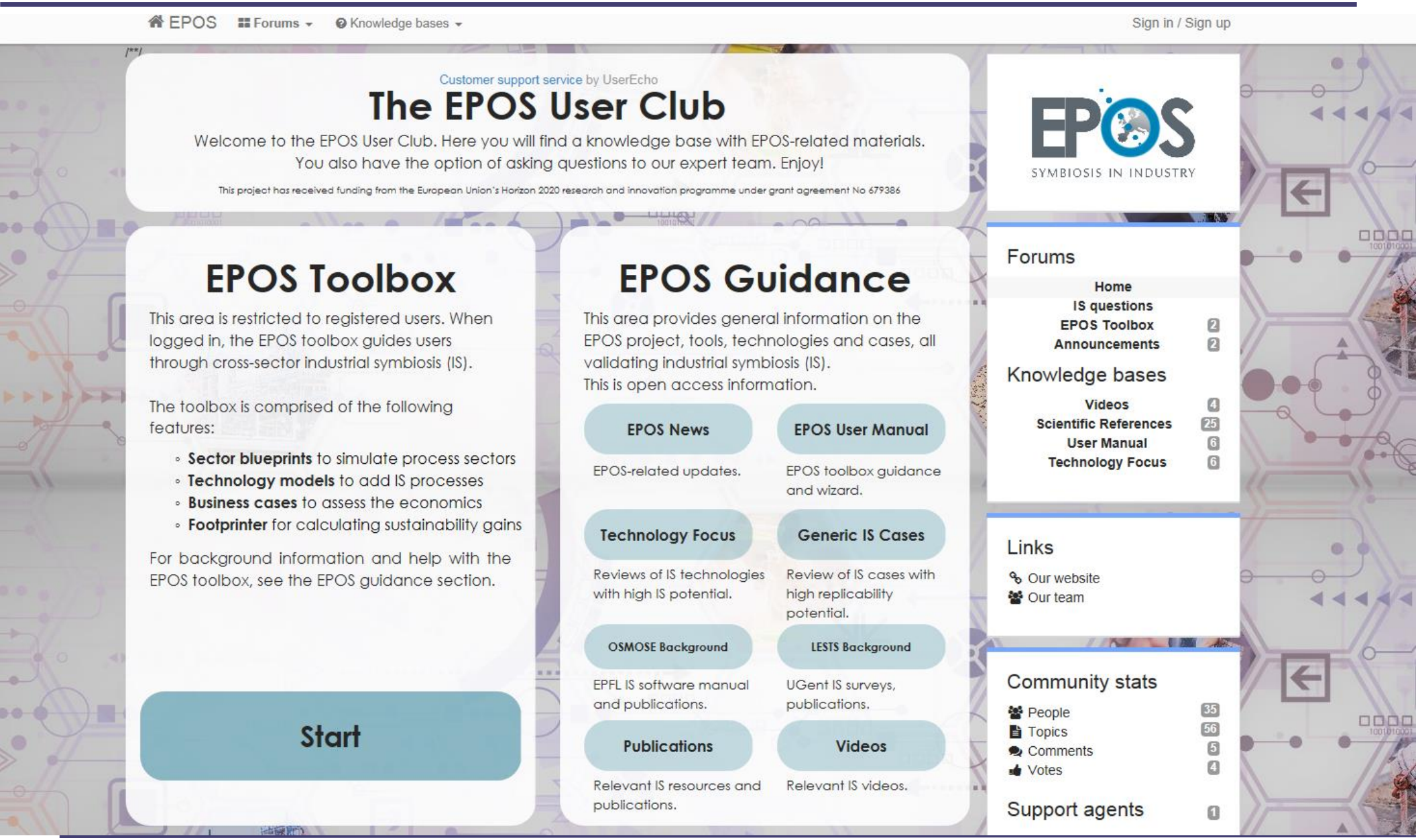
academic background / expertise

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EPOS guidance



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greet.vaneetvelde@ineos.com
elfie.mechaussie@ineos.com
helene.cervo@ineos.com
www.ineos.com

SYMBIOSIS IN INDUSTRY

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