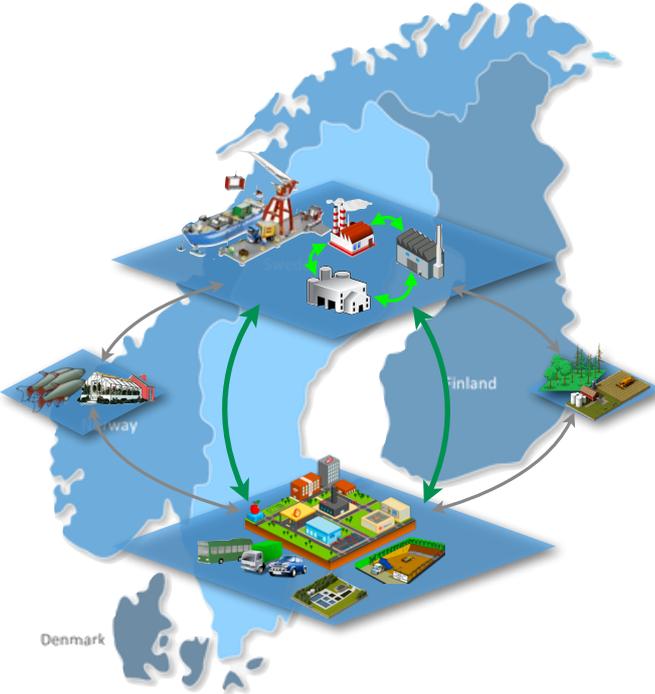


Industrial and Urban Symbiosis in Nordic Countries



Murat Mirata
Department of Management and Engineering

February 2020



Industrial and Urban Symbiosis



Regionally concentrated **connections** and **collaborations** among **diverse actors** and **sectors** improving **resource productivity** and fostering **eco-innovations**.

Increased value from secondary resources

Utility & service collaboration

Joint product & service innovation

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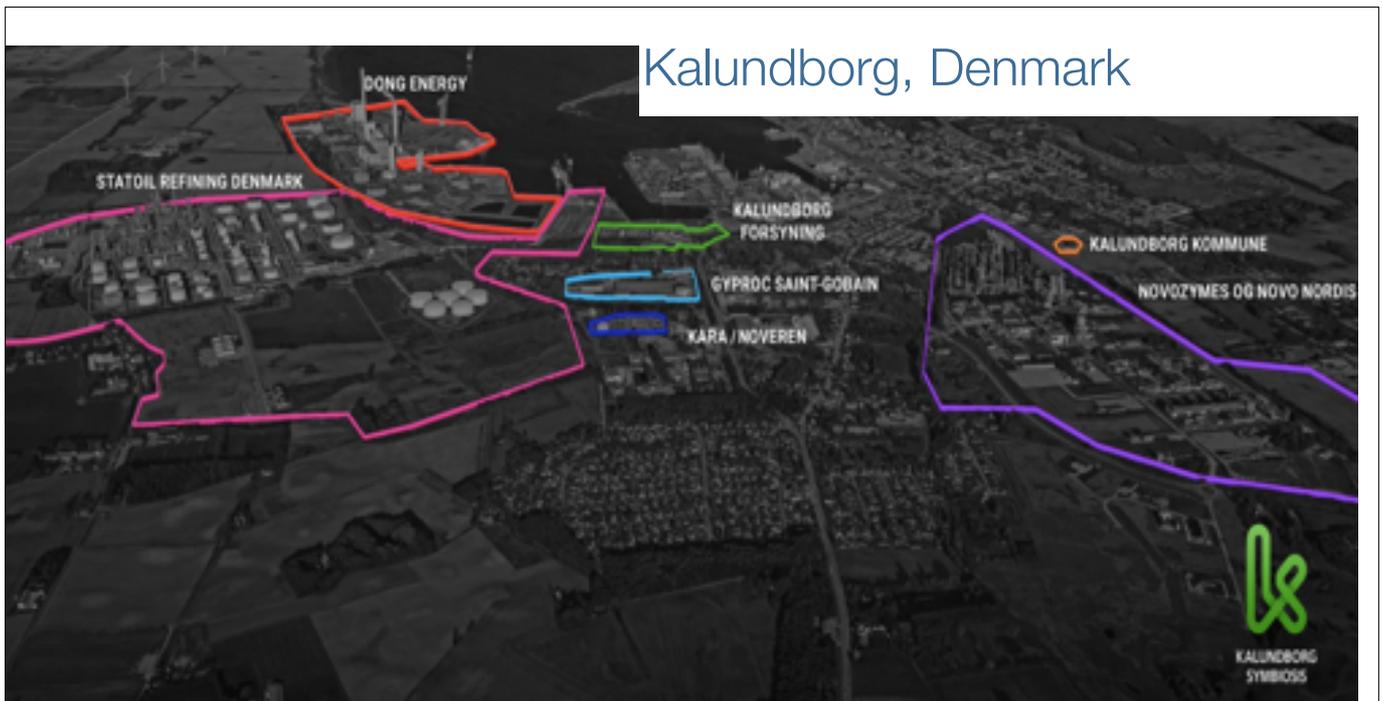


Many Nordic examples



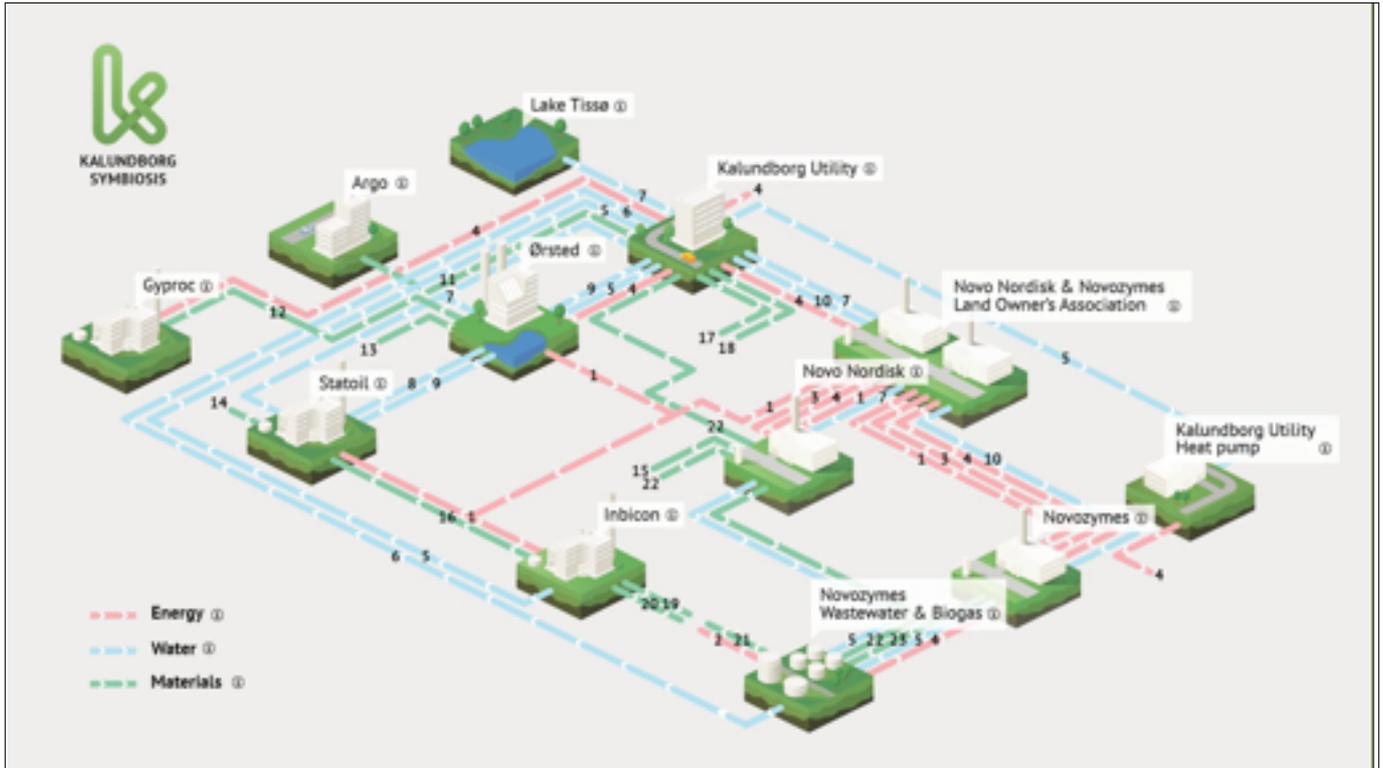
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Kalundborg, Denmark

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ANNUAL SAVINGS BY LIFE CYCLE ASSESSMENT (LCA)

635.000 ton
CO₂ (environmental)

The same amount of CO₂ used on average over a year by **37.352 Danes**

106 mill.
DKK (socioeconomic)

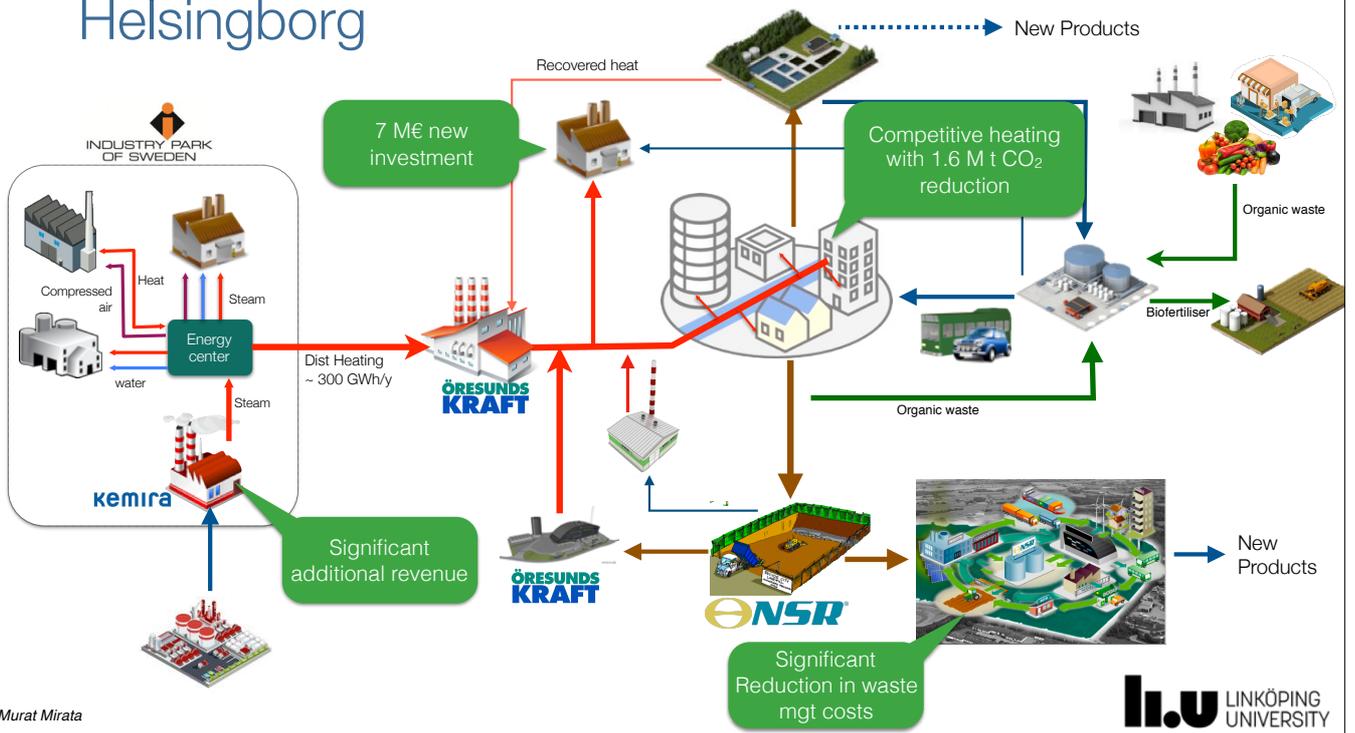
Enough to buy **354 brand new** electric powered cars

182 mill.
DKK (business economic)

Equivalent to having **252 academics** employed for a year

Courtesy of Per Møller, Kalundborg Symbiosis.

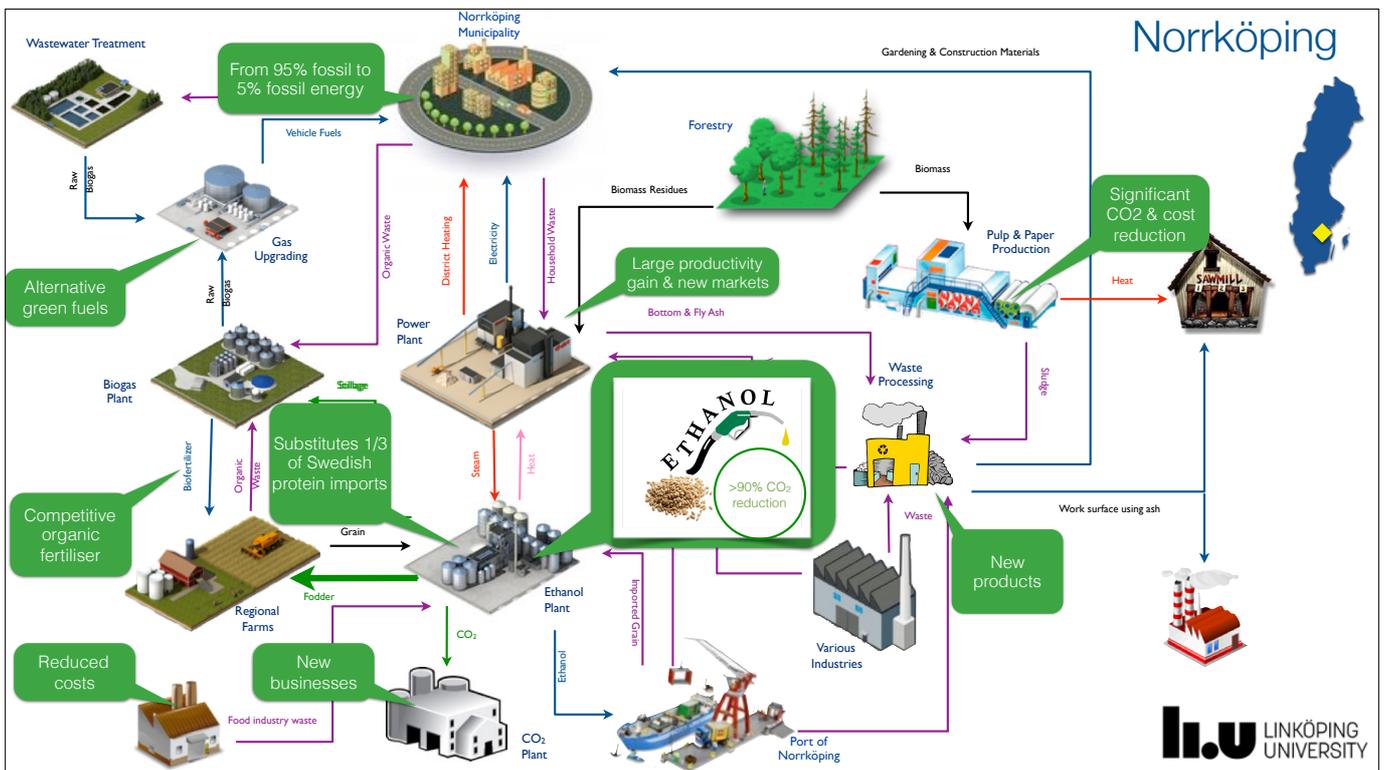
Helsingborg



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Norrköping

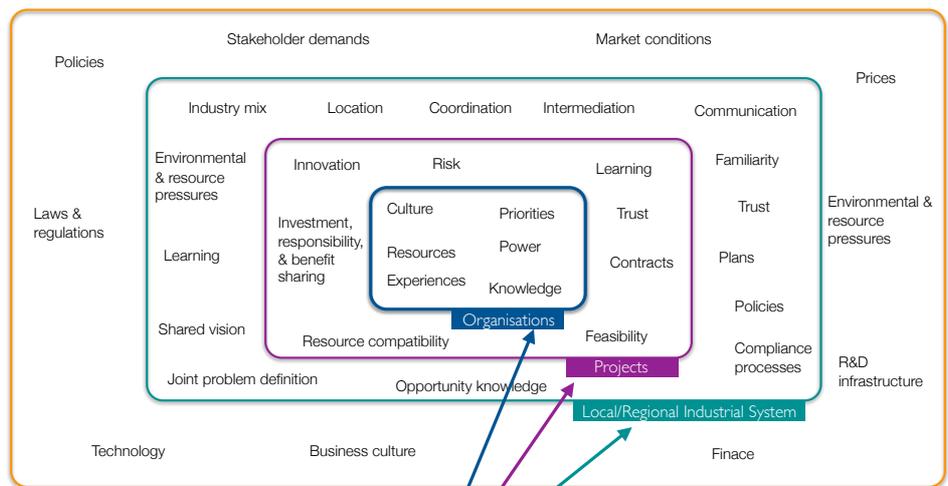
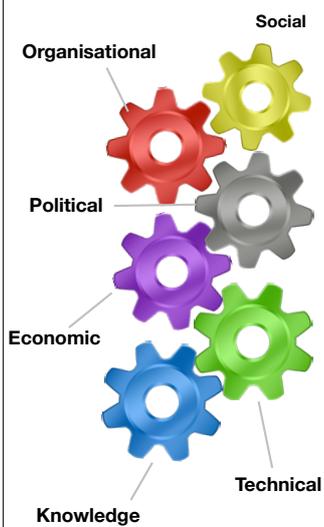


Self-organised

Facilitated

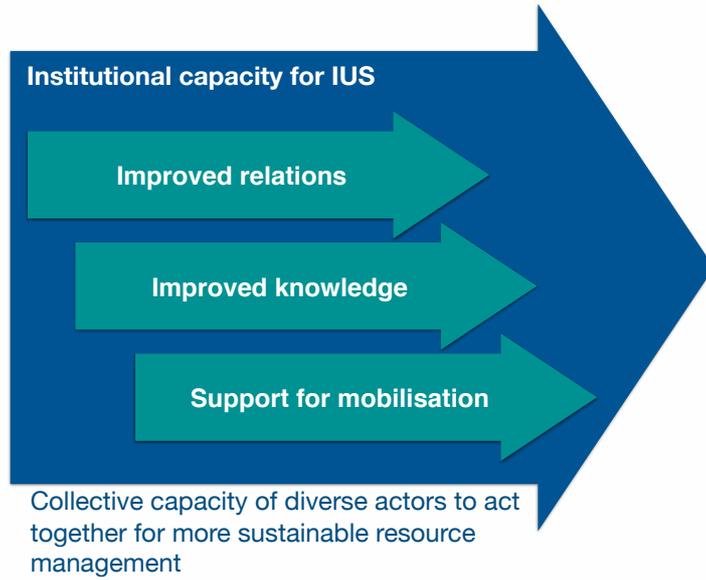
Industrial and Urban Symbiosis in Nordic Countries

Facilitation requires



Facilitation interventions

Facilitation by institutional capacity development



MM, SA

Increasing facilitation initiatives



At different scales

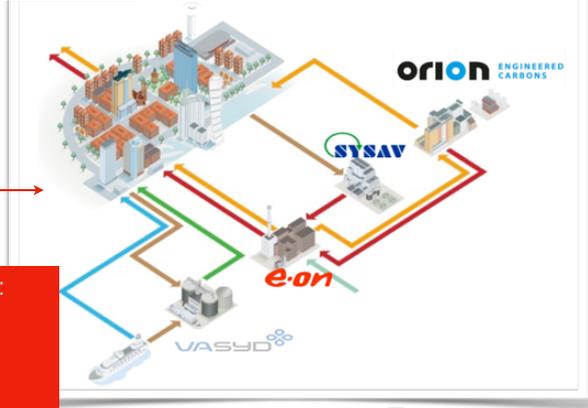
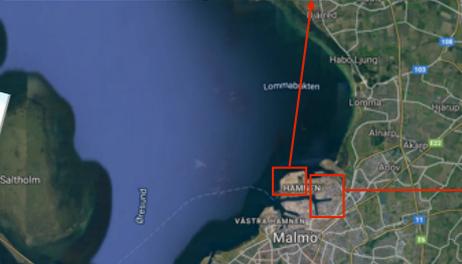
With a strong focus on business development and progress towards circular and bio-based economies.

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Malmö, 2012



Port-city tensions & competitive pressures on the port



Proactive municipality with strong sustainability ambitions

- Climate neutrality by 2020
- 100% renewable energy by 2030.

Highly limited dialogue:

- Among municipal units
- Among utility operators
- Among industry
- And among the all three



Two projects focused on



A 3-year applied research program supported by EU, aimed at building capacity for symbiotic bio-energy based developments.

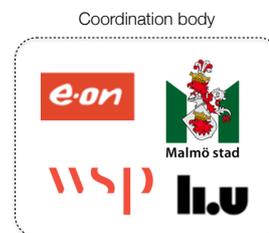


+

2 Stages of a "Challenge driven Innovation" program



Part sponsored by VINNOVA





Malmö stad

A range of activities



Breakfast meetings



Bilateral meetings



Study trips



Technical, business and policy reviews



Workshops



Lectures and seminars



Research by universities

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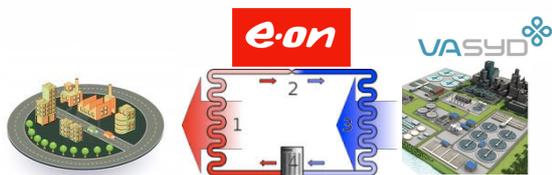
Stronger relations & key structures



An innovation platform



New resource synergies established



200 GWh heat, corresponding to 8% of city's heating need and saving 50 000 t CO₂/y



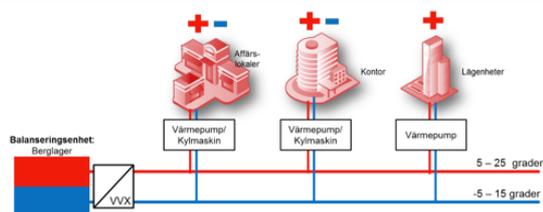
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Innovations with large new market potential



A smart heating grid concept and technology enablers



Innovative, 5th gen Dist Heating system with strong global market potential

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Business models for increased reuse.

Numerous entrepreneurs

VASYD



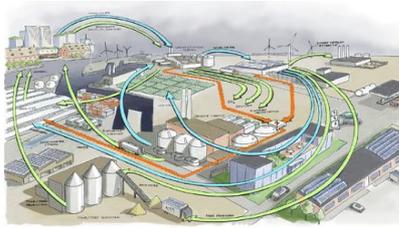
SYSAV

Sustainable Business Hub

A reuse center



SJÖLUNDA ARV OCH INDUSTRIELL SYMBIOS



VASYD

Local water utility company exploring secondary water utilisation

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Policy adaptations



Industrial symbiosis is adapted as a key strategy in the action plan.

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New vision for the port

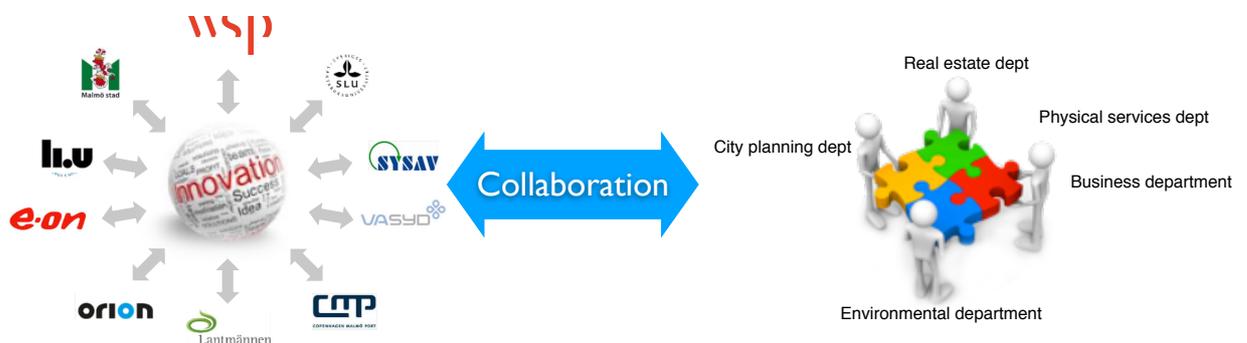
In Malmö's Port Area We Share

- enhanced competitiveness through industrial symbiosis!



Stronger relations & key structures

An innovation platform



A municipal unit + a workflow (symbiosis funktion)

Stadens Symbios Funktion



Symbiosfunktion will guide...



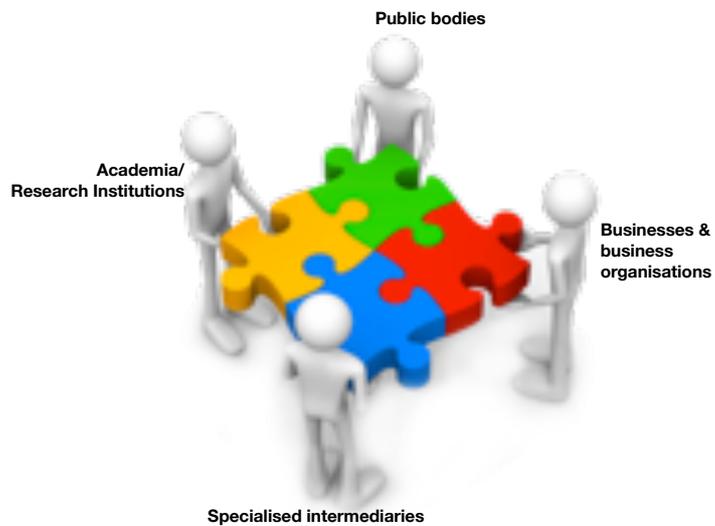
NYHAMNEN 2019



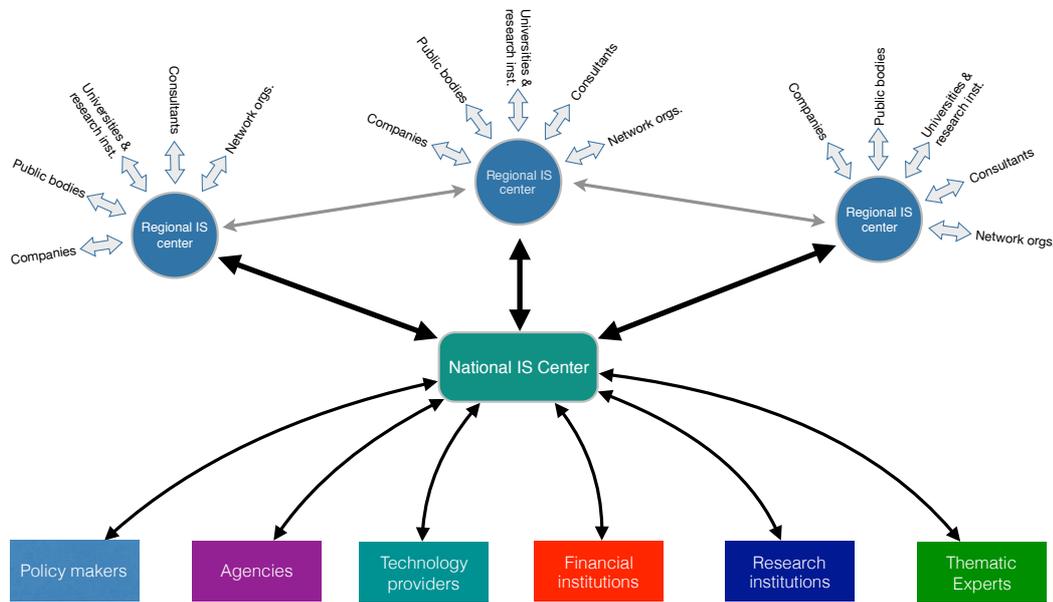
NYHAMNEN 2045



Long-term commitment from many



Our view for advancing IUS in Sweden



- Build/enhance regional capacity to support IUS
- Increase knowledge creation, cooperation, & learning
- Develop & diffuse tools/platforms benefiting all
- Secure necessary support from relevant agencies/experts
- Improve national & international profiling



Thank you

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