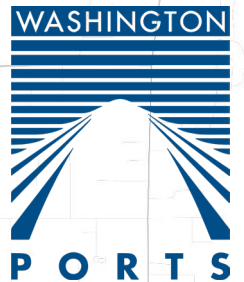


Washington Port Symbiosis Study Tour: Denmark

The background of the slide is a map of the Washington waterfront area, showing the city grid, water bodies, and a highlighted orange route that winds through the city and along the waterfront. The route starts near the city center, moves south, and then follows the waterfront towards the port area.

September 2025 trip led by the Center for Sustainable Infrastructure

WPPA 2025 Annual Meeting



Erin Adams	Seattle Good
JC Baldwin	Port of Chelan Douglas
Eron Berg	Port of Port Townsend
Sen. Mike Chapman	Legislative District 24
Rep. Brandy Donaghy	Legislative District 44
Kirk Esmond	Dept of Commerce
John Flanagan	Port of Seattle
Katharine Frazier	Port of Port Angeles
Joel Hansen	Ameresco
Justin Hopkins	Burnham RNG
Sandy Kilroy	Port of Seattle
Adam Lincoln	Port of Pasco
Cassi Marshall	Port of Camas Washougal

Stephen McFadden	Port of Pasco
Carly Michiels	WPPA
Nick Rohrbach	Port of Chelan Douglas
Lisa Smith	WA Microbusiness Association
Rep. Mike Steele	Legislative District 12
Rep. David Stuebe	Legislative District 17
Jasmine Vasavada	Port of Olympia
John Whitchurch	Cascade Energy
Rep. Alex Ybarra	Legislative District 13
Rep. Janice Zahn	Legislative District 41
Kyle Gitchell	Department of Commerce

Denmark Tour Delegation & Hosts



Rhys Roth
Center for Sustainable
Infrastructure



Emma Titley
Center for Sustainable
Infrastructure



Christina Østergaard
Østergaard Event

We wore a lot of yellow vests...



Washington Port Symbiosis Study Tour Agenda



Date	Activity
Sunday September 7	Welcome Orientation & Opening Dinner
Monday September 8	State of Green, DEA, & DHI
Tuesday September 9	Kalundborg Symbiosis
Wednesday September 10	Fredericia Energy Alliance & Port of Esbjerg
Thursday September 11	Esbjerg Municipality & Arla Food Products
Friday September 12	GreenLab, VCS Denmark, & Closing Dinner

HOUSE OF GREEN



Denmark's Green Energy Goals

- European Union and national regulations.
- Aim to be among the world's first climate neutral countries by 2050 and climate negative thereafter.
 - *Phasing out fossil fuels, 100% renewable.*
 - *2027 100% renewable electricity, 2030 ending coal, and 2035 renewable heat*
- Energy efficiency is a long-standing tradition and prioritization of energy supply security.
- Water conservation: "Water efficiency first" principle ("technical water" legislative designation)



Transition Strategies

- Robust financing
- Broad public-private partnerships
- Energy efficiency and preservation (tradition)
- Renewable energy development: offshore wind
- Bioenergy and agriculture
- Energy islands
- Carbon capture storage and carbon capture utilization
- Green hydrogen to replace fossil fuels
- Supporting infrastructure
- Incentivizing tools like Industrial Symbiosis



Port of Esbjerg tour, loading offshore wind components.

14 Climate Partnerships

- The climate partnerships **represent sectors** in the Danish economy
- The overall purpose of the partnerships was to establish a 2030-vision for how each sector will **contribute to the 70% reduction target**
- The Ministry of Industry, Business and Financial Affairs oversees the overall process
- Specific Climate Partnerships are linked to specific ministries
- Each Climate Partnership has been assigned a Secretariat – a business organisation



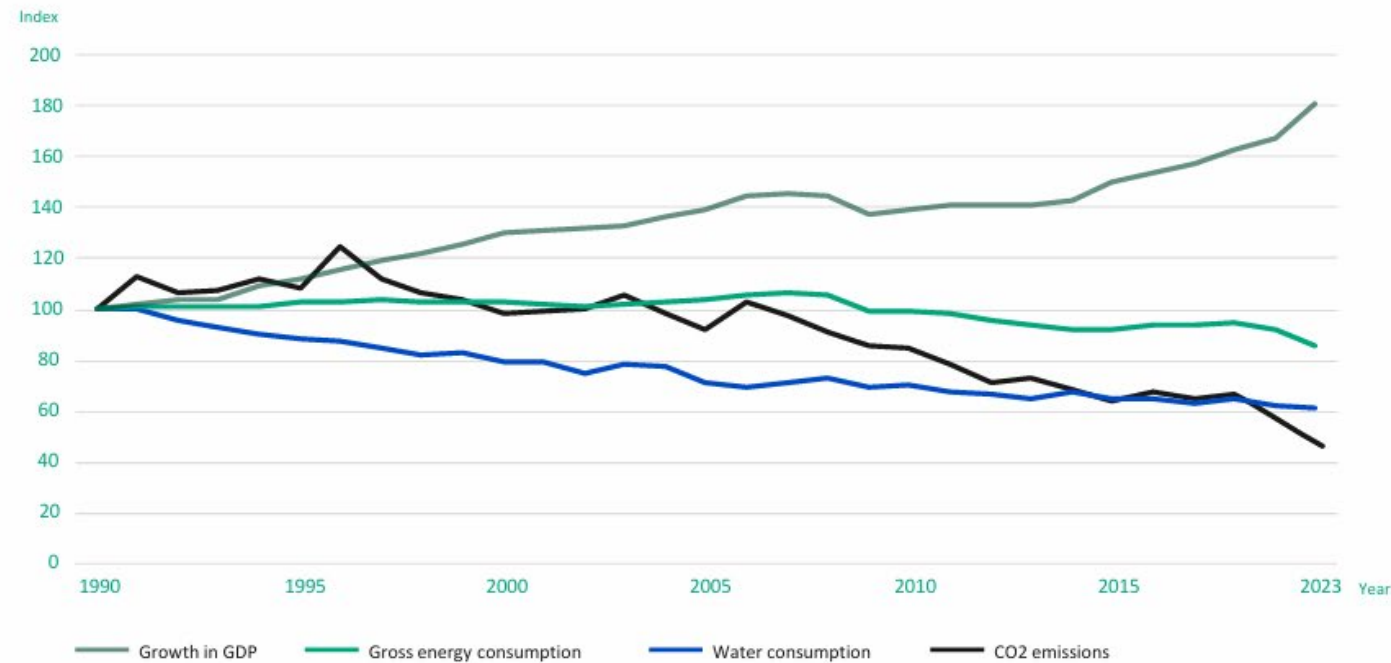
Energy Transition Outcomes

- Denmark is on track to meet their energy goals
- Three consistent priorities: green energy, “security of supply”, affordability
- New model for public-private partnerships with sector-specific recommendations
- Business lead climate action and a focus on industry: “Green business is good business.”
 - *CO2 taxes structured by sector*
 - *Subsidies, and schemes (The Business Pool) that drive the green transition*
 - *Competitiveness: Support sustainable industry practices and reuse/circularity*
- **Decoupling energy consumption from economic growth**



[Denmark]

We have increased GDP by 76%



76%

growth in GDP

-15%

gross energy consumption

-40%

water consumption

-48%

CO2e





What is Industrial Symbiosis?

Industrial symbiosis is a broad term referring to industrial operations that involve collaborations and exchanges between multiple industries, allowing for a circular transformation of materials through industrial processes. Through an exchange of resources and energy, interdependent networks are created between industries, allowing for the excess or waste materials from one industry to be used in the production process of another industry. **This process may help reduce consumption of resources production of waste as well as address environmental challenges related to energy inefficiencies.**

From the Department of Commerce,
[Washington State Refinery Economic Impact Study \(PDF\)](#)



Okay, but what is it...?

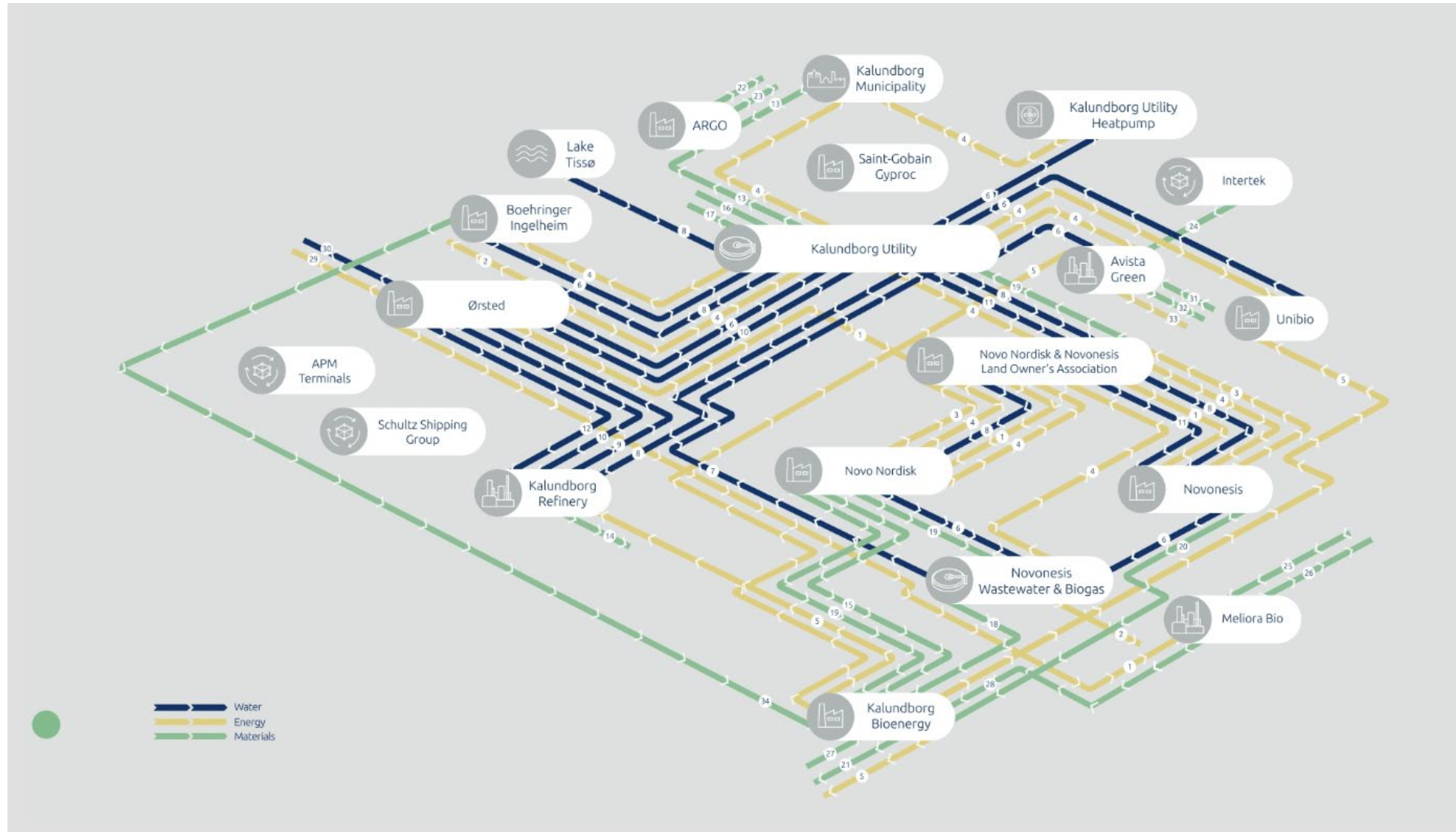
1. Collaboration and interdependence among industrial processes and businesses
2. Multiple industries/businesses exchanging resources, materials, or energy
3. Identifying resources and residuals then matching demand and value
4. One's waste becomes another's resource
5. Reducing energy inefficiencies

By allowing for a circular transformation of materials through industrial processes, interdependent networks are created, and excess or waste materials from one can be used in the production process of another.

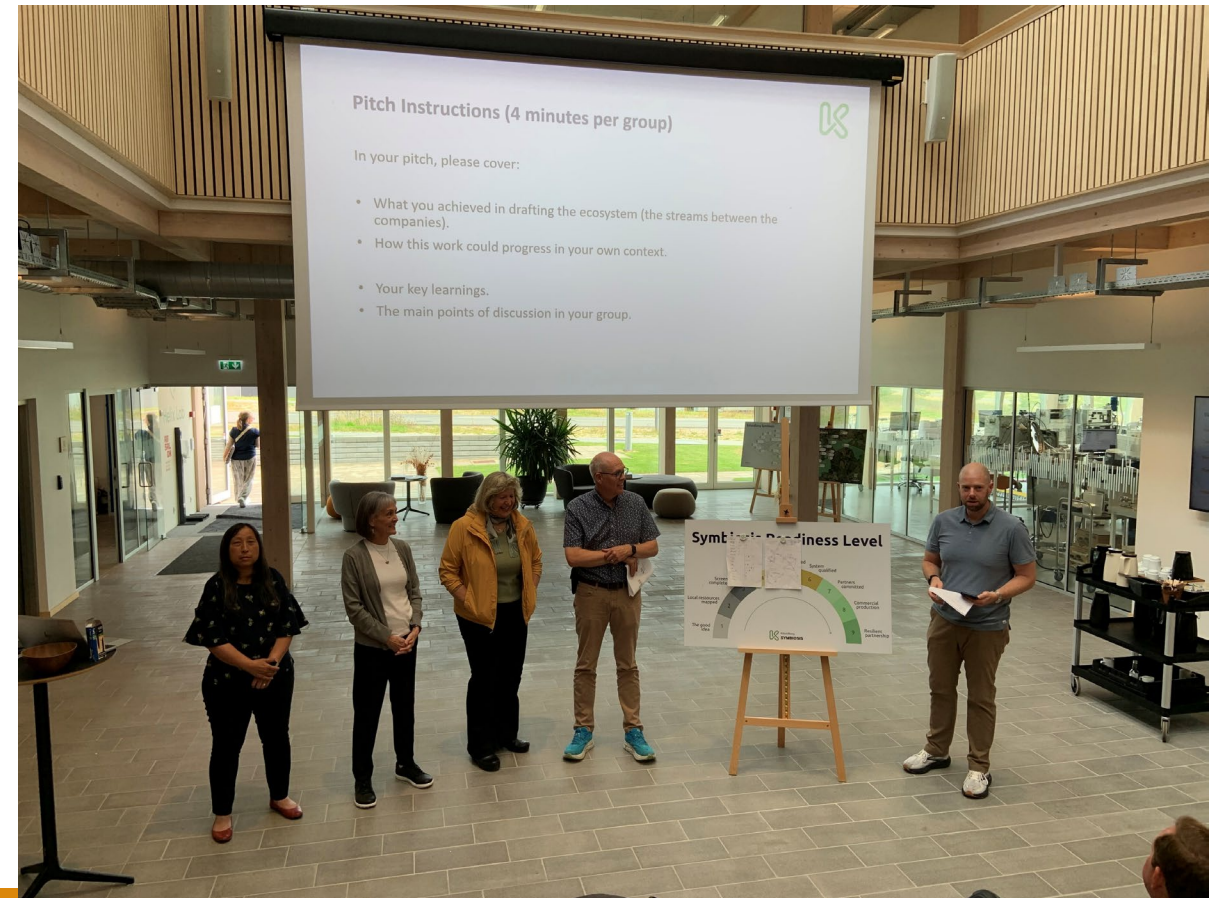


The cheesy analogy that works...

A dating app: matching resources instead of people.

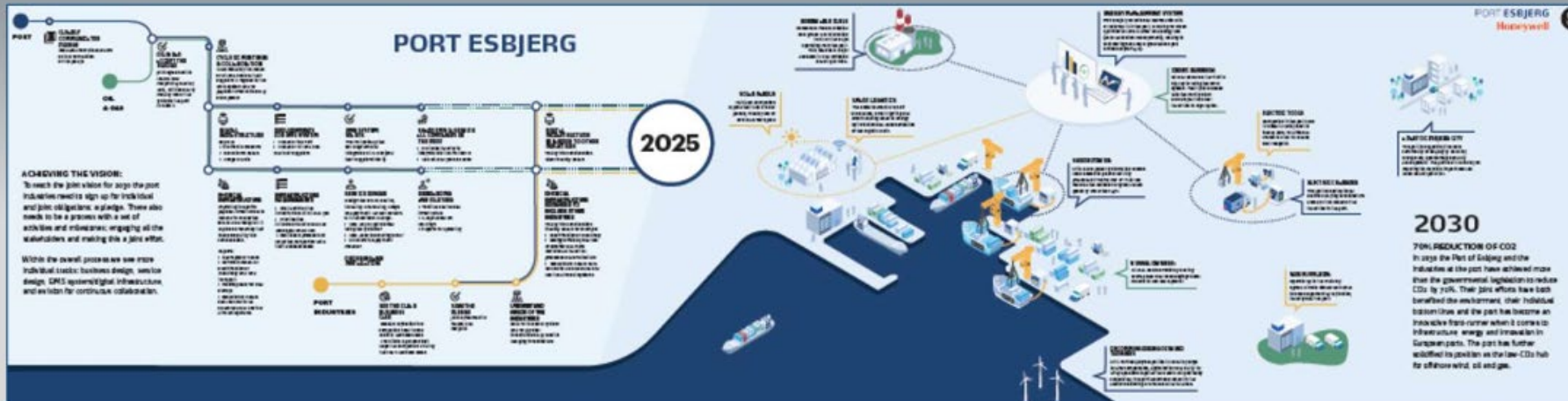


The workshop... it was not easy.



Port of Esbjerg

WIND ENERGY – SHORE POWER – FUEL CELLS
POWER2X – EXCESS HEAT – CITY HEATING -
ALTERNATIVE VESSEL FUELS - E-VESSELS – GREEN
BUNKERING - E-CARS - BIOMASS - HEAT PUMPS –
SOLAR POWER – LNG – HYDROGEN





PORT **ESBJERG**





Arla Food Ingredients Site Visit

Innovation!



Challenges and Opportunity!

- Cost competitive
- Cost of electricity
- Sector led planning
- External efficiencies and dependencies
- Meeting WA energy goals
- Ability to move projects quickly and expansions to support the goals
- Facilitation
- Technology, scalability
- Emission reduction goals
- Economic development tool
- Synergies around infrastructure
- This is something ports do!
- Already projects at Port of Pasco, Cowlitz Co., Vancouver





Port of Pasco

Industrial symbiosis Park – Pre-study





Questions?

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Washington Public Ports Association
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