

How guided communication can create synergies between Circular Economy and Environmental Assessment



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Outline

1. Background
 1. The main players in the story
 2. Circular Economy and Industrial Symbiosis
 3. The Swedish planning system and Environmental Assessment
 4. Another player -The Hydrogen gas and crayfish project
2. Development of the Industrial symbiosis at site Alby
3. Conclusions and recommendations from a public participatory perspective

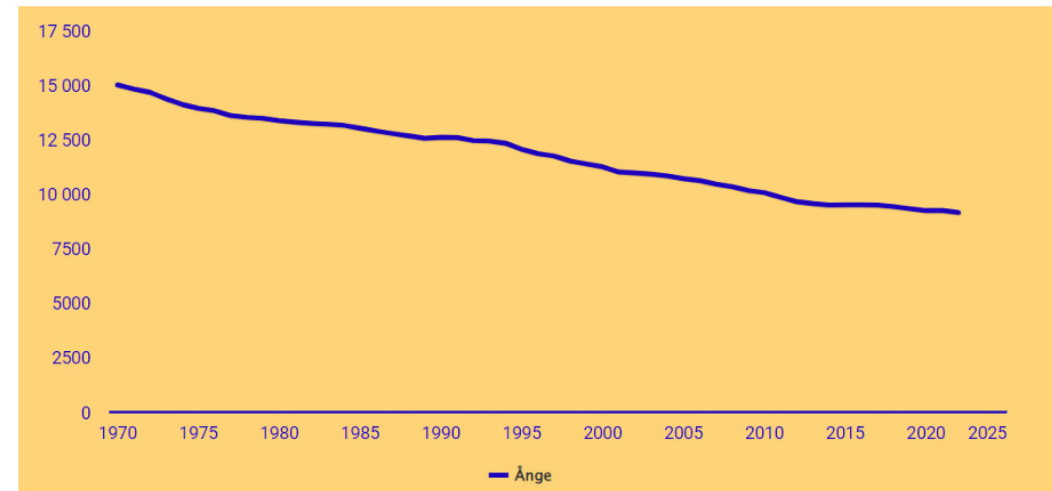
Geographical location



Figure: Kartdata ©2026 Google, INEGI

Ånge municipality

- Population just over 9,000 inhabitants
- Area of 3052 km²
- Population density of ~3 inhabitants/ km²
- Forestry, energy-intensive industry, railway node



The green transition in European Union (EU)

- EU directive promotes energy from renewable resources
- 42,5% until 2030
- Need for storage
- Power to X
 - P=surplus renewable energy
 - X=chemicals, fuel etc.



The noble crayfish (*Astacus astacus*)

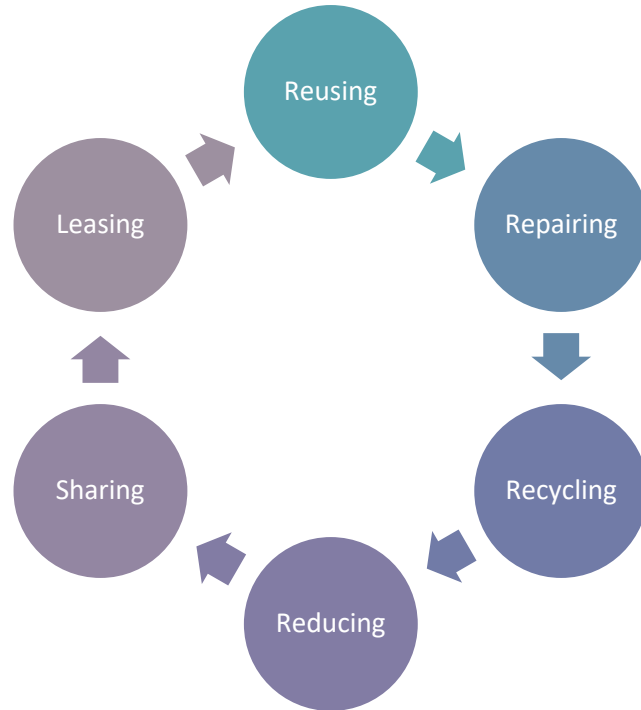
- Critically endangered due to crayfish plague
- Cultural heritage
 - Fishery
 - Parties “Kräftskivan”
 - Described by national artists
 - Carl Larsson (Painter)
 - Astrid Lindgren (Author)



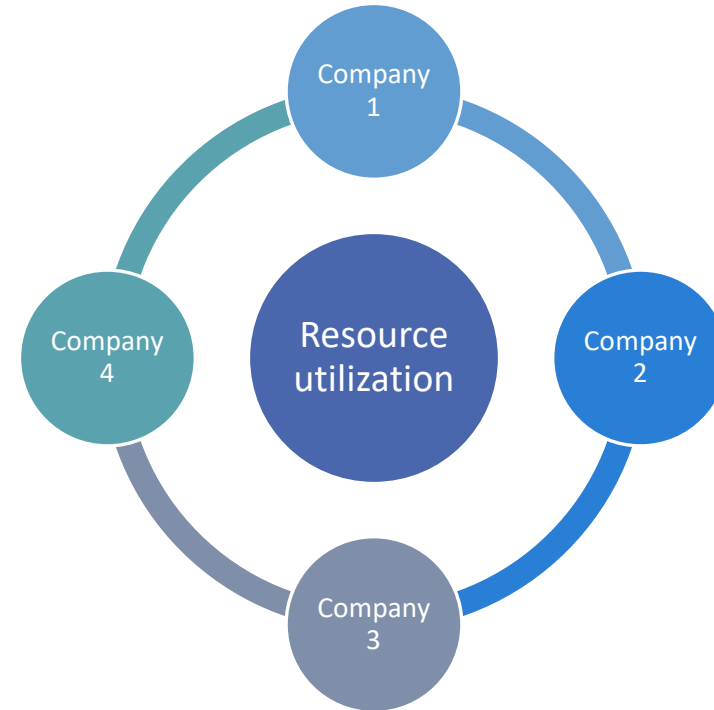
Figure: Carl Larsson, Public domain, via Wikimedia Commons

Circular Economy and Industrial Symbiosis

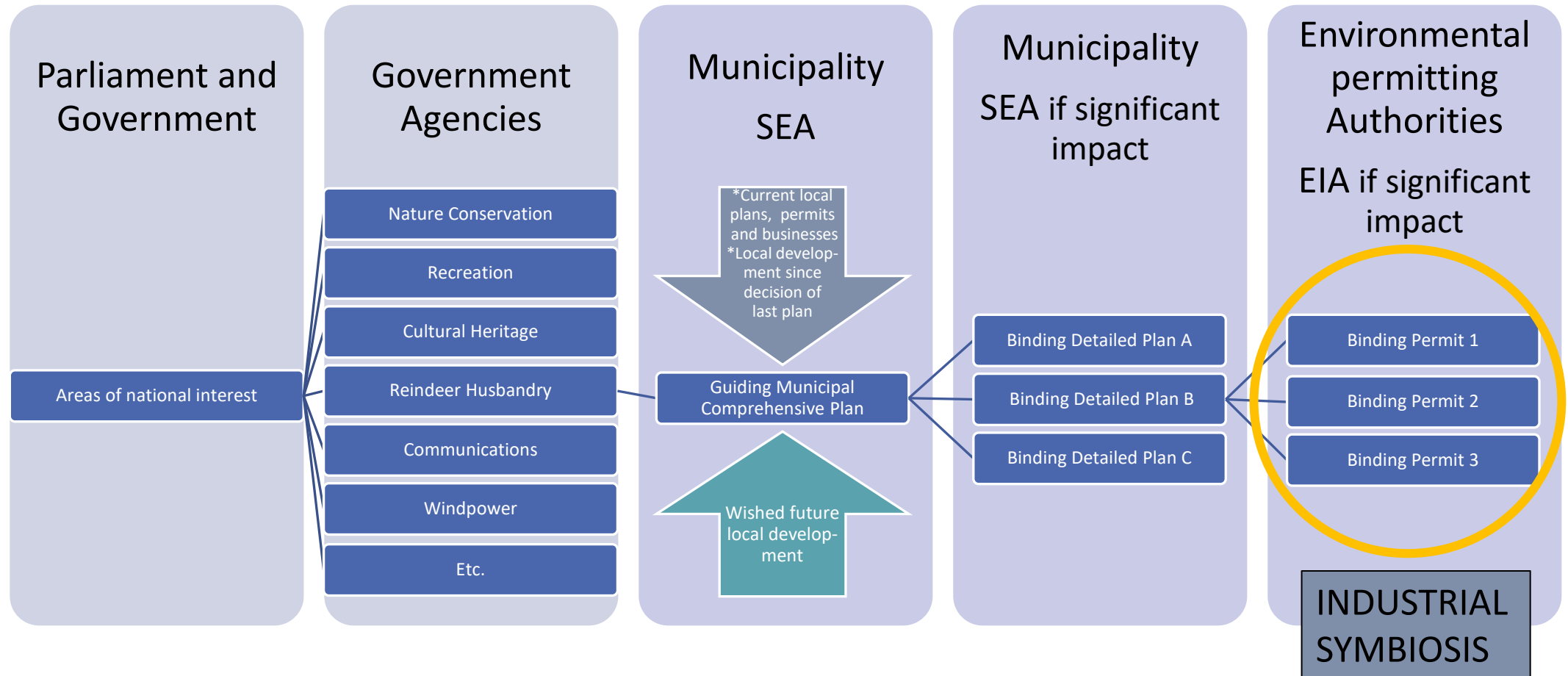
CIRCULAR ECONOMY



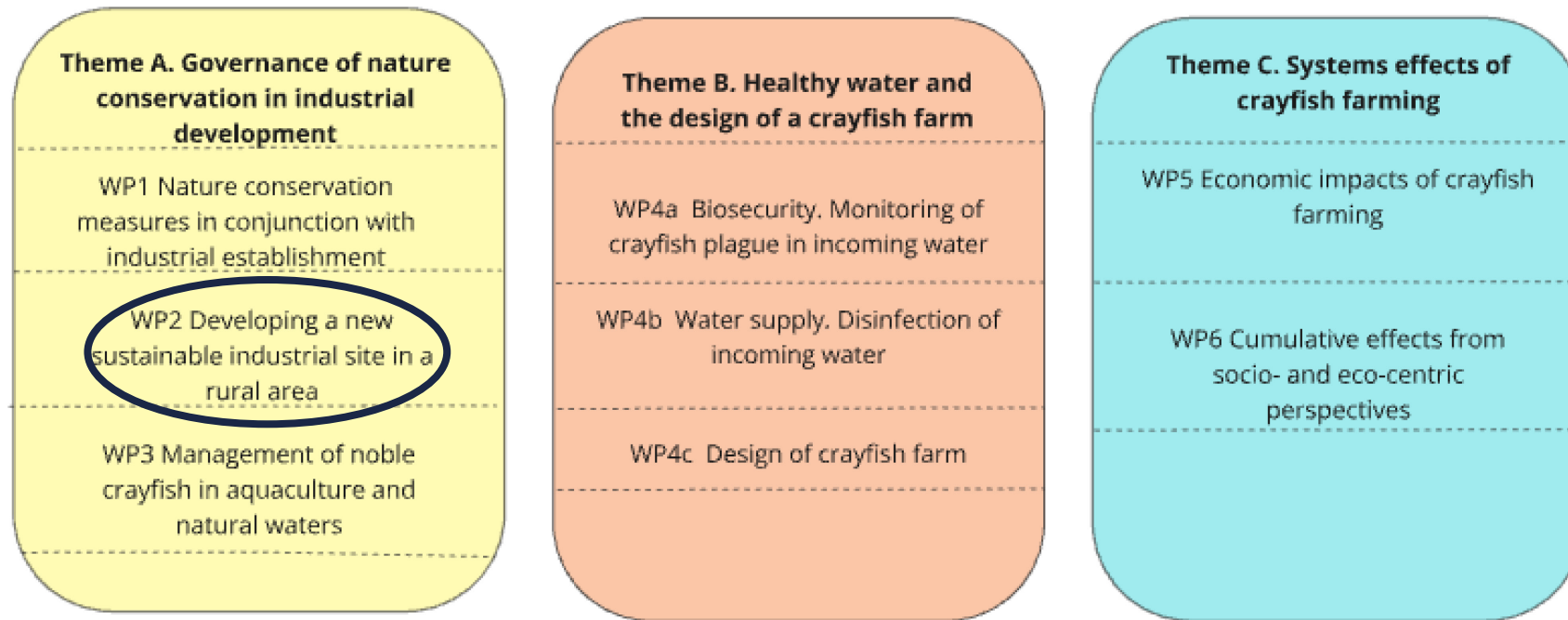
INDUSTRIAL SYMBIOSIS



The Swedish planning system for land use and environmental hazardous operations



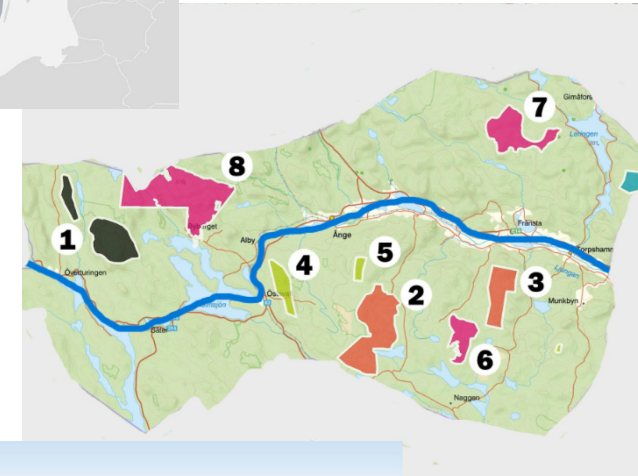
The Hydrogen gas and crayfish project



The aim of the project is to ensure noble crayfish fishery and crayfish parties to future generations along the River Ljungan

P2X and Crayfish in Ljungan

- Windpower and Hydrogen production industries are developing in the region.
- River Ljungan has suffered from crayfish plague (*Aphanomyces astacii*)
- Extinction of noble crayfish (*Astacus astacus*) in 2000 (not confirmed) and 2017.



Is P2X and industrial symbiosis a possibility for crayfish farming?

Noble crayfish need

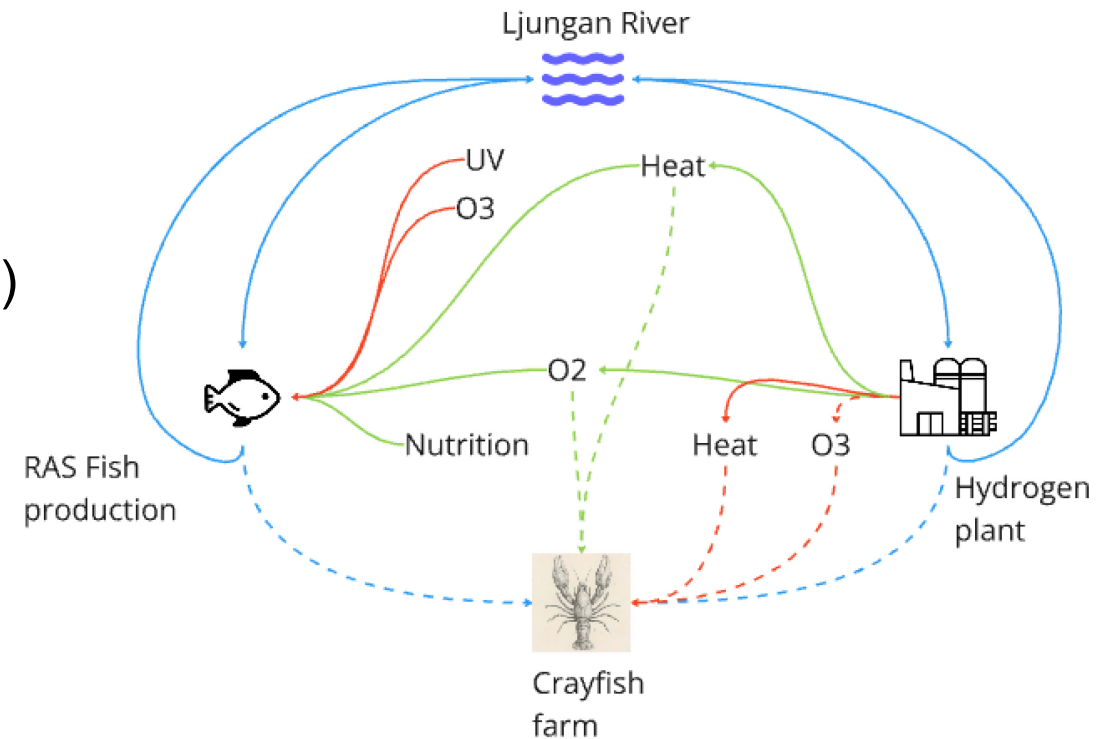
- Water free from crayfish plague
- Environment like their natural habitat

Hydrogen production generates

- Heated process water (temperature 48-73°C)
- Oxygen

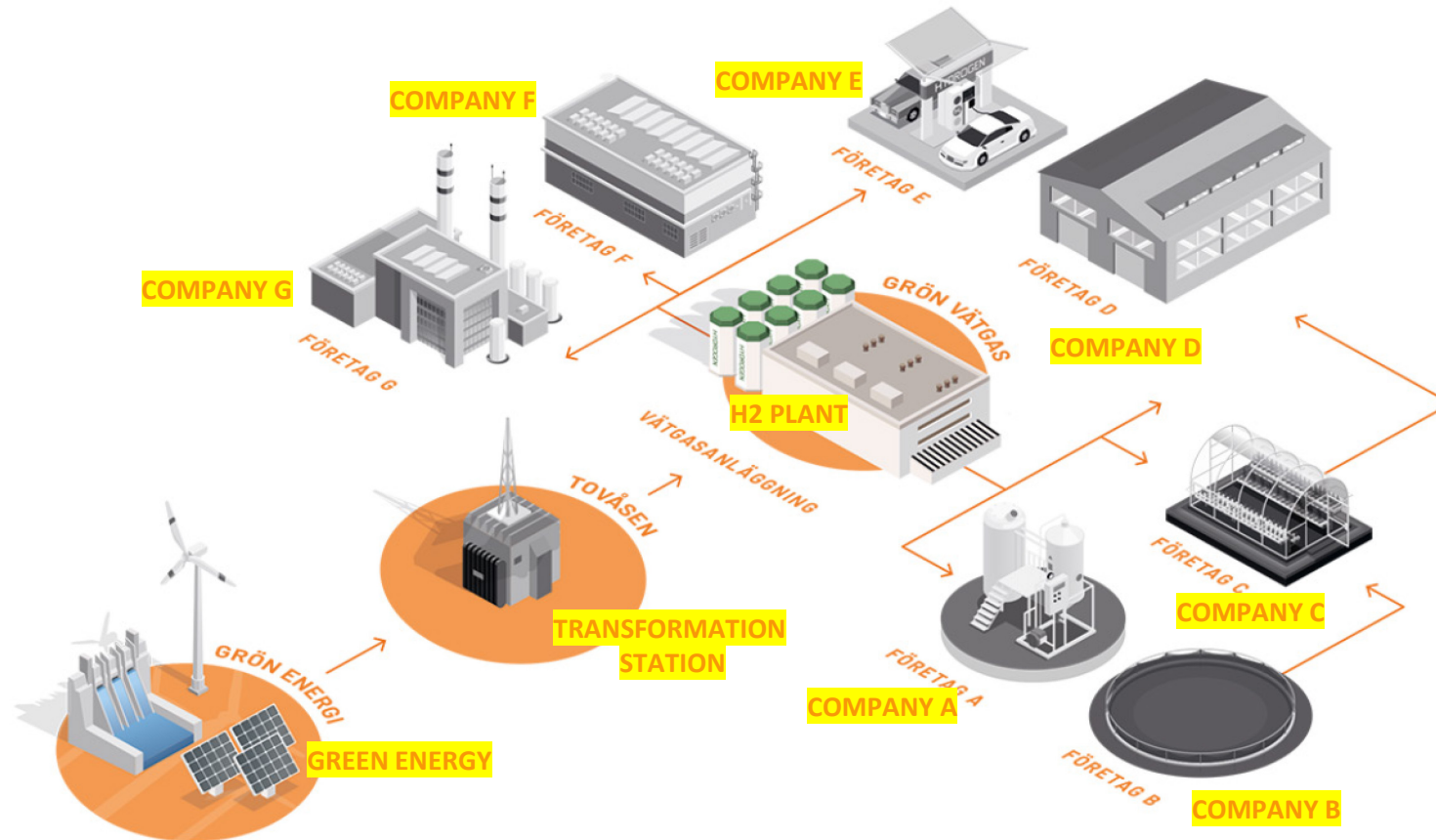
Fish production generates process water

- 16 °C
- UV-irradiation and ozone treatment
- additional nutrients

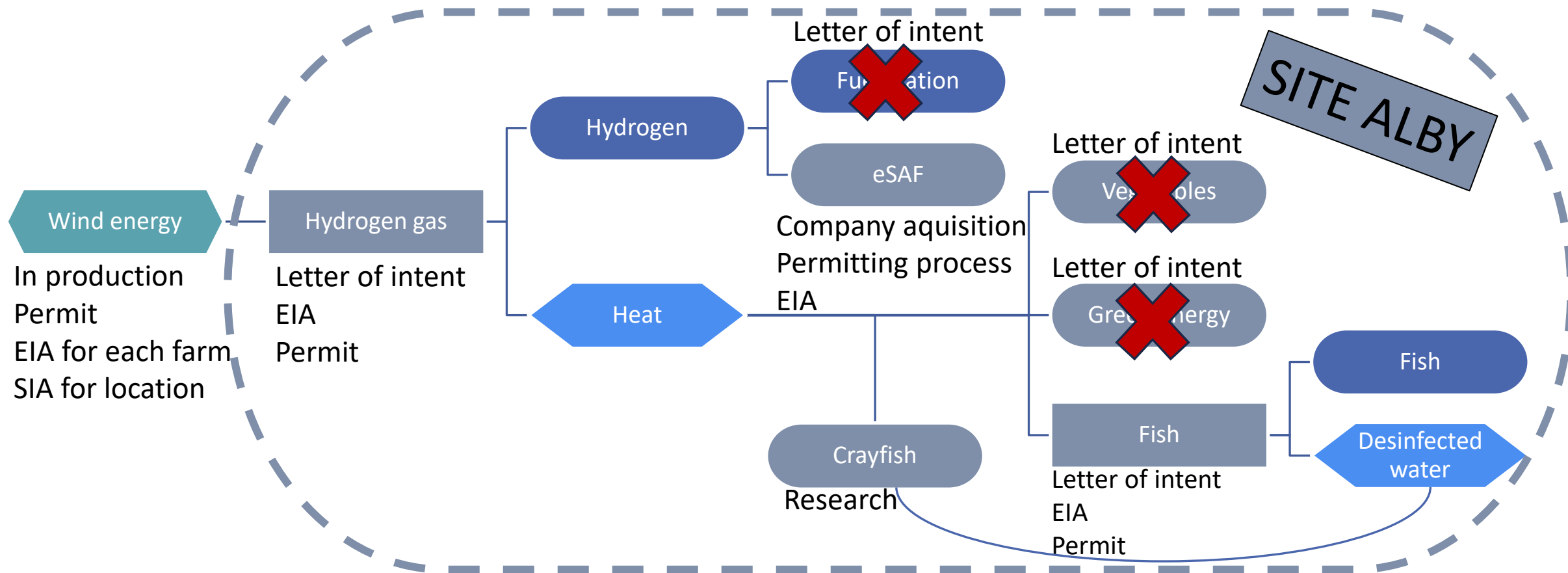


Current and Planned and Industrial symbiosis at site Alby

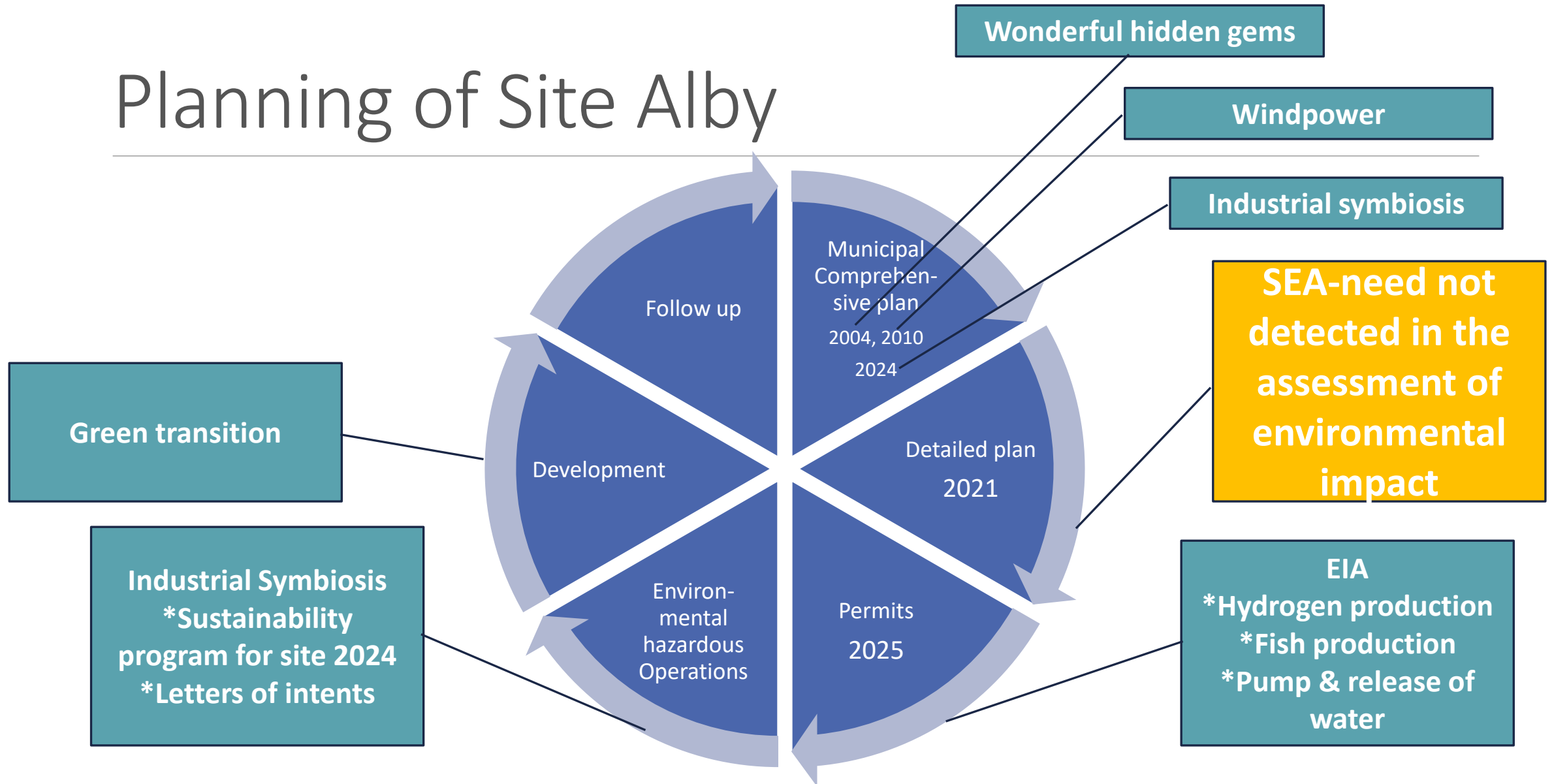
Vision



Development of the Industrial symbiosis



Planning of Site Alby



Conclusions & recommendation

- SEA did not play a role in the planned industrial symbiosis
- Industrial symbiosis was governed by letters of intent, company acquisition and the sustainability program
- The choice of industrial symbiosis at site Alby is a process without public participation
- Company acquisitions and business closures are risks for industrial symbiosis
- Industrial symbiosis is a strategic issue that should be included in SEA
- Include industrial symbiosis in standard protocols for initial assessment of significant environmental impact from detailed plans

Thank you!

**Fiskevårdsgruppen
i Ånge**





Let's continue the conversation!

Message me your questions or comments in the IAIA26 app.

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