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Energy Efficiency – Industrial Urban Symbiosis

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Energy Efficiency – The Answer to Almost Everything

The Swedish Energy Agency leads the transition to a sustainable energy system. In this transition, energy efficiency is crucial.

- Crucial for energy system transition
- Meets growing electricity demand
- Reduces need for new production and grid expansion
- Promotes fair and socially sustainable transition
- Improves crisis preparedness
- Creates economic benefits and growth
- Reduces greenhouse gas emissions

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How the Swedish Energy Agency Promotes Energy Efficiency

- **Legal requirements and market control**
  - Ensure products meet compliance standards
  - Testing and monitoring of energy labeling and follow-up on eco-design requirements
- **Financial support and advisory services**
  - Distribute state grants for energy efficiency measures
  - Fund national energy and climate advisory services
- **Research, innovation, and knowledge dissemination**
  - Finances research and innovation projects
  - Spread knowledge and information to support transition

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Sweden's National Energy Efficiency Goals

- **National cross-sector goal**: 50% more efficient energy use by 2030 (compared to 2005)
- **20–25 TWh efficiency potential** by 2030
- **Continuous GDP growth** while maintaining relatively stable energy use
- **Sweden is strong in energy efficiency,** but low-hanging fruit is becoming scarce

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Industrial Urban Symbiosis (IUS)

Collaboration through industrial and urban symbiosis is a way to create value from waste products in energy, water, chemicals and materials, but also increased collaboration in areas such as infrastructure, logistics and expertise.

- Energy efficiency is larger than a singular actor/company. System perspective
- **Resource efficiency** for energy efficiency.

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Industrial Urban Symbiosis (IUS) What are we working on

- Still early at the Energy Authority, but academia and market are further forward.
- Starting to study what makes successful symbiosis projects and how to stimulate them to occur more often.
  - Collecting examples of where development have worked out.
  - Residual recourse overview study.
  - Analyzing required actions for market development.
- Multiple challenges/questions require multiple actors working together.
  - Starting closer collaborations with other authorities.

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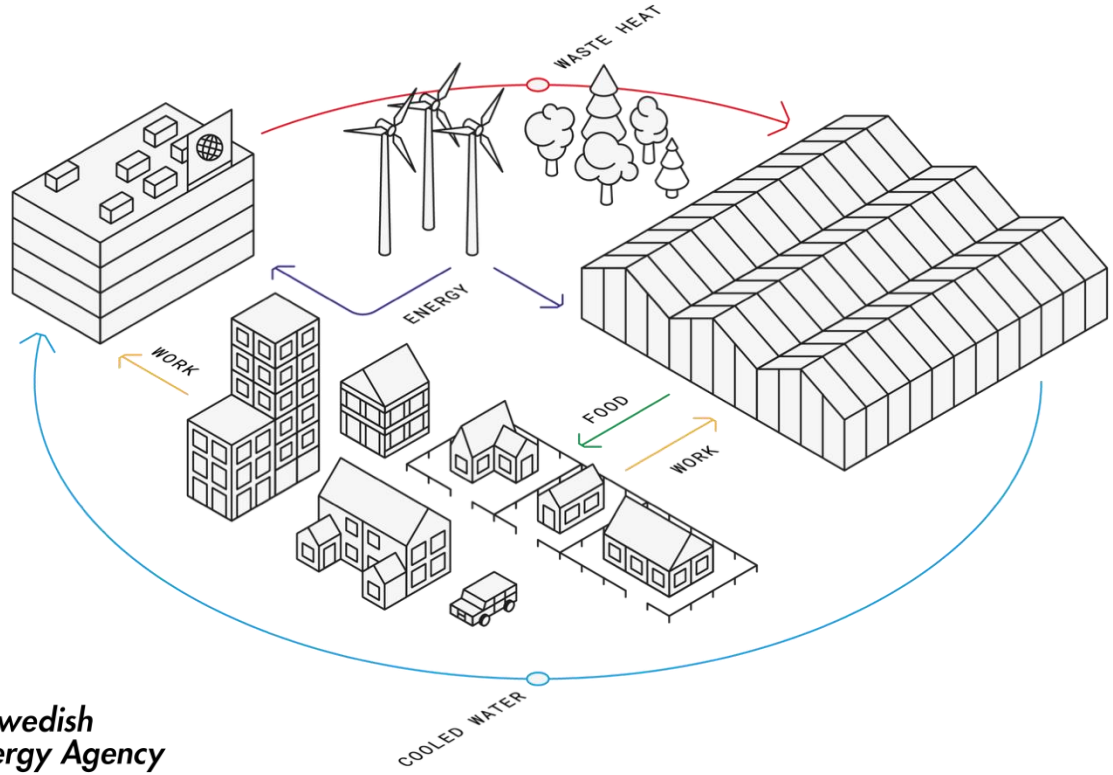
Industrial Urban Symbiosis (IUS) Examples

Regenergy Frövi



- 100,000 m² state-of-the-art greenhouse
- 8,000 tonnes of tomatoes produced annually
- 100+ new jobs created
- 35 GWh of residual heat reused from Billerud paper mill each year

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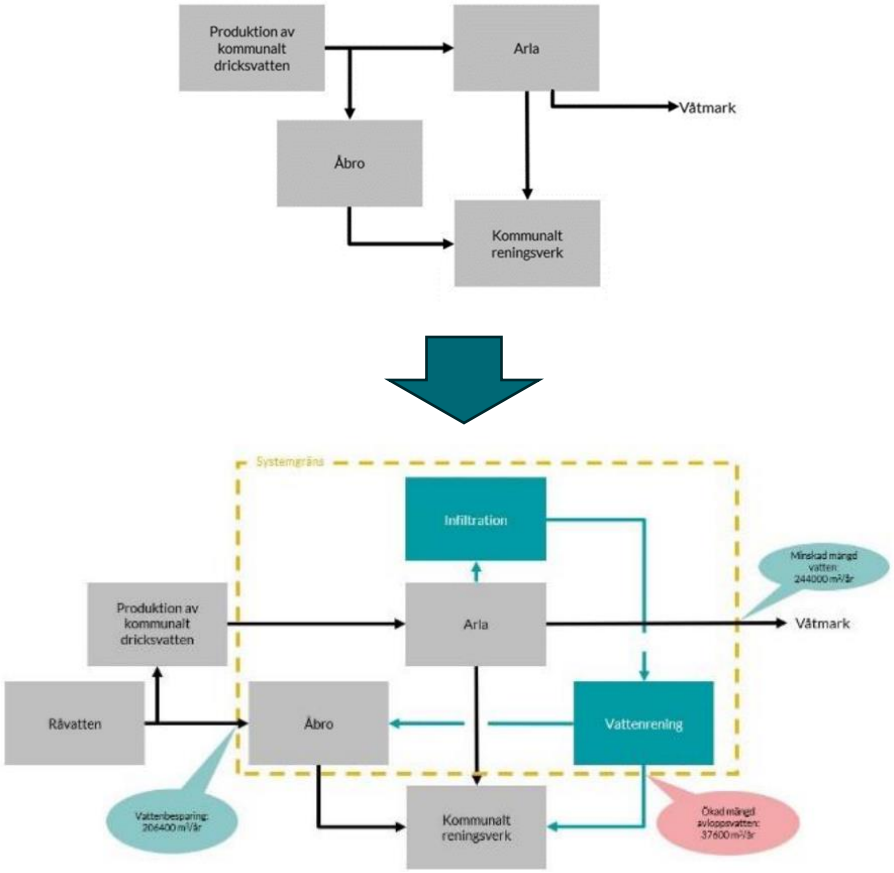
Industrial Urban Symbiosis (IUS) Examples

Water symbiosis Visby-Vimmerby

- **Water scarcity** is a major challenge for securing drinking water supplies and maintaining good water quality.
- **Water symbiosis** is a systematic collaboration between industries, municipalities, agriculture, and other actors to optimize water use and minimize waste through exchange and reuse of water, by-products, and resources.
- **Example:** Treated industrial wastewater can be reused for agricultural irrigation or as cooling water in nearby industries, reducing demand for drinking water.



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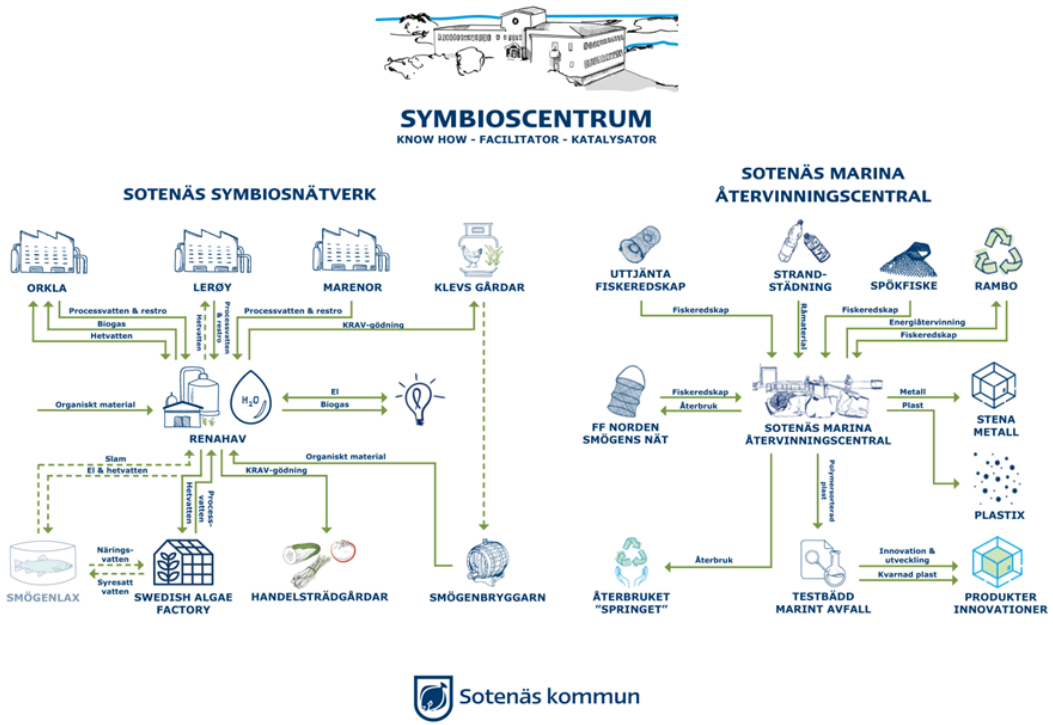
Industrial Urban Symbiosis (IUS) Examples



Initiative Sotenäs Symbiosis Network

- **Food industry waste → Biogas plant**
  - Organic waste is converted into biogas, which is reused as energy in local industries.
- **Industry process water → Shared purification facility**
  - Residual products from purification become biogas and KRAV-certified biofertilizer for local agriculture.
- **Land-based salmon farming & diatom farming**
  - Farms exchange water to utilize nutrients and improve purification.
- **Circular exchange with biogas plant**
  - Salmon farm delivers sludge to biogas plant and receives energy in return.

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Industrial Urban Symbiosis (IUS) Examples

RiK Symbios, Bengtsfors

- Starting from local circumstances.
- Strong connection to forestry industry and wood working, skills cluster
- Higher education in art, design, and crafts.
- Example of circular innovation:
  - Reuse of wood cut-offs: leftover pieces from round tables transformed into new tables
  - Used entrance mats from Rikstvätt repurposed into sound-absorbing screen walls, giving them new function and form

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