

Kalundborg Symbiosis

Surplus from circular production



Kalundborg
SYMBIOSIS



Link to the explainer film

<https://youtu.be/IsM7NdQe94I>



The Kalundborg Symbiosis Secretariat



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Master of Int. Business Communication



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Teacher degree in Science

Mission & Vision



Renew

Strengthening
the partnership



Connect

Full ressource
utilization



Promote

Sharing the
symbiotic mindset



The worlds leading
industrial symbiosis with
a circular approach to
production

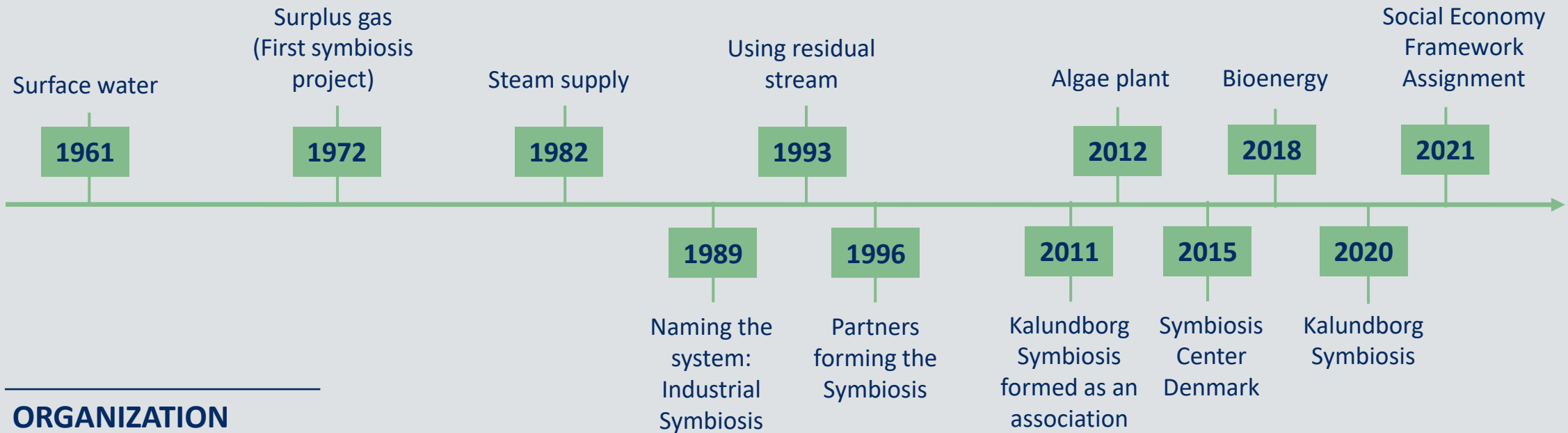


Kalundborg Symbiosis
creates sustainable
development in our
companies through joint
projects

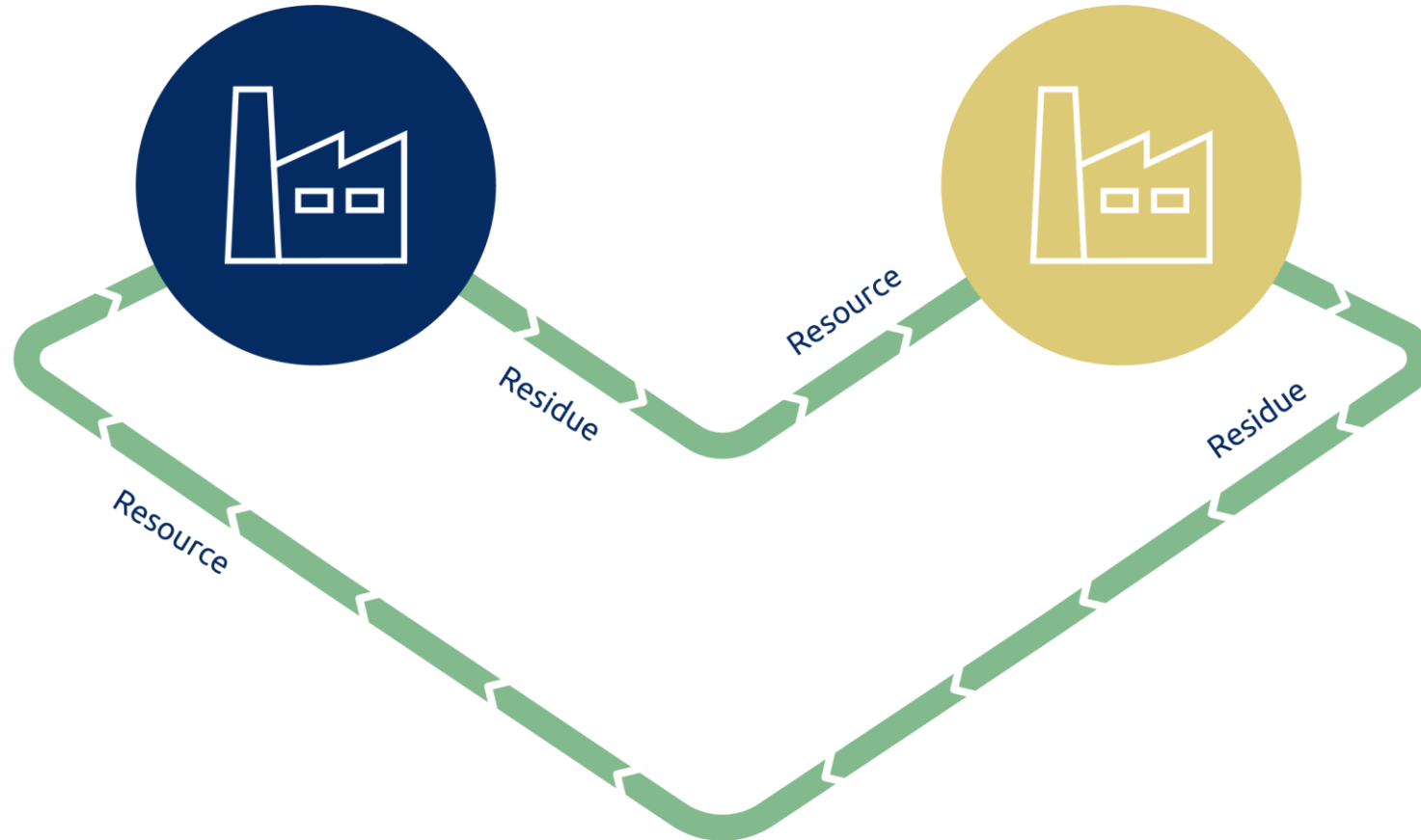


More than 50 years of cooperation

PROJECTS



Industrial Symbiosis

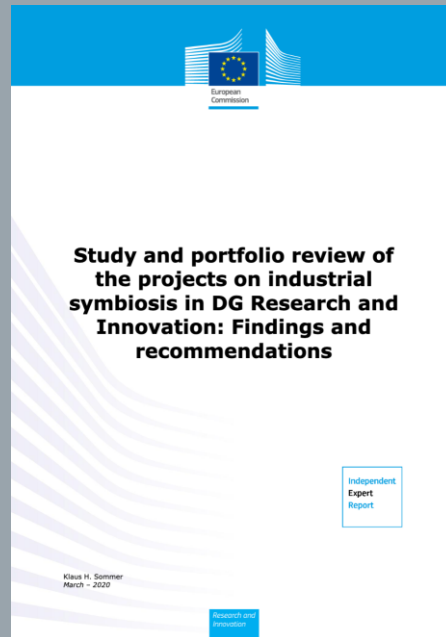








International Attention





Examples of local growth



+18,5 billion DKK
investment
in the next years



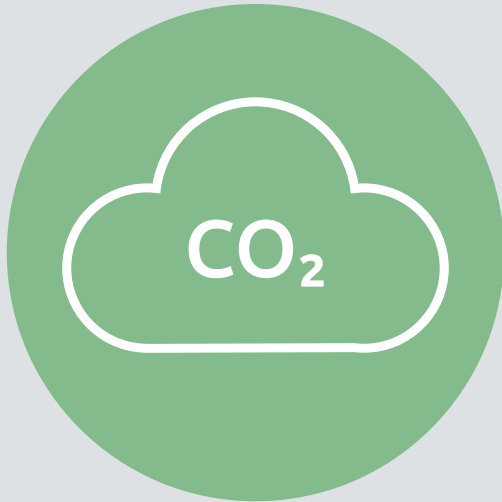
The investment has
created
530 new jobs



5 new educations
in Kalundborg,
and more to come



Annual savings (by LCA)



586t. tons CO₂

The local energy
production has reached
NET-ZERO



4 million m3

of groundwater



62,000 tons

of residual materials
recycled



Case 1 - Watersharing

Surface water



Case 2 - Co-production of steam

Energy



Case 3 - Biogas from fermentation sludge

Materials



Case 4 - Bioethanol

Production in full scale



Case 5 – Social Economy

The triple bottom-line

Kalundborg Symbiosis

Surplus from circular production



For more information please contact:
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SYMBIOSE
NETVÆRK
DANMARK

Symbiose Netværk Danmark





The map displays Denmark with several locations highlighted by pins. Green pins are located at: Aalborg (labeled 'Center For Logistik og...'), Skive (labeled 'Greenlab Skive A/S'), Viborg (labeled 'Lifestyle & Design Clu...'), Billund (labeled 'Billund Kommune'), Esbjerg (labeled 'Esbjerg Kommune'), Middelfart (labeled 'Middelfart Kommune'), Odense (labeled 'Erhvervshus Fyn'), and København (labeled 'København'). Red pins are located at: Hjørring (labeled 'Hjørring Kommune'), Horsens (labeled 'Business Horsens'), Kalundborg (labeled 'Kalundborg Symbiois'), and København (labeled 'København'). The map also shows major roads, water bodies, and other geographical features. A search bar is at the top left, and a Google My Maps logo is at the bottom center.

Nordic Circular Hubs

A Nordic network initiative to accelerate
Urban and Industrial Symbiosis

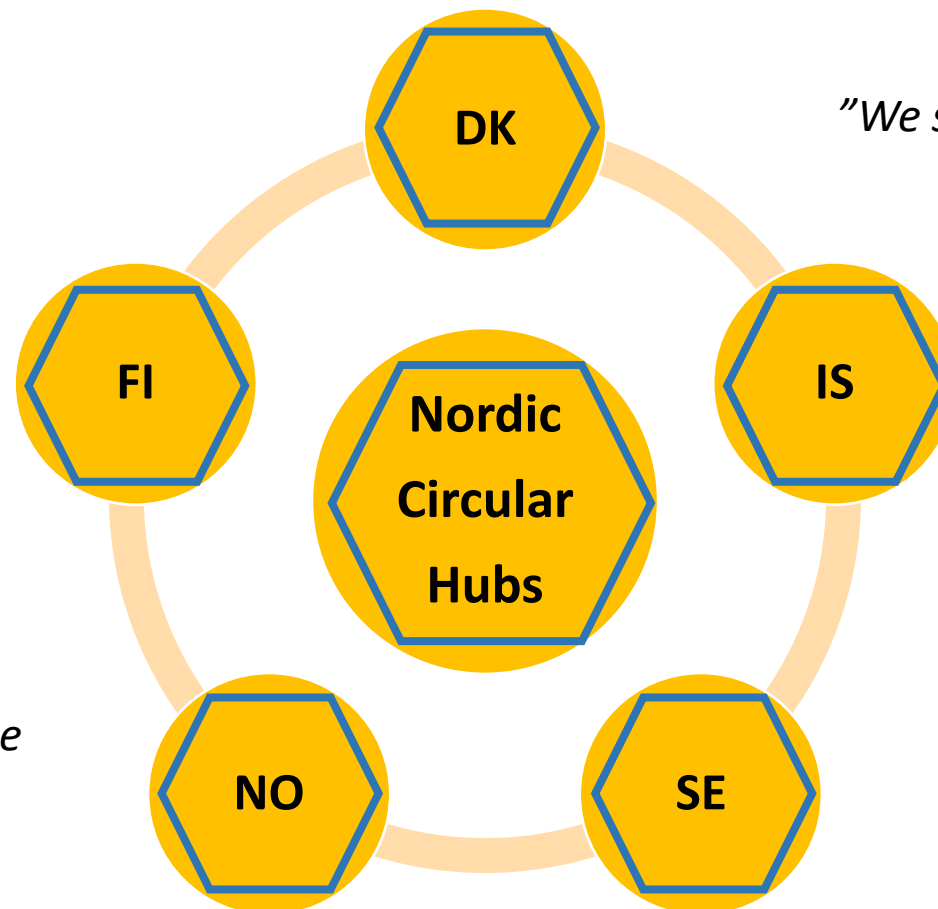


Partner Commitment

"From concept to common practice"

"A systemic approach for a smarter green transition"

"With joint forces the Nordic Circular Hubs will accelerate the transformation to a resource efficient society"



"We seek to fill out the organizational empty space"

"Towards a strong Nordic network for urban and industrial symbiosis"

"Capacity building with no borders"

Nye events

- 50 års fejring af Kalundborg Symbiose (24. oktober 2022) – kun for medlemmer
- SND årsmøde og workshop 2022 (25. oktober 2022) – alle SND interesserede
- Nordic Circular Hubs, slut-konference (25. oktober 2022) – del af årsmøde program



Kalundborg
SYMBIOSIS

Global Leadership Conference

Global leadership within circular economy
Perspectives on Industrial Symbiosis: 50 years of cooperation on resources
Kalundborg Symbiosis invites the world to Kalundborg
on Monday, October 24, 2022, Helix Lab

For 50 years, Kalundborg Symbiosis has been a circular model for the whole world. In Kalundborg Symbiosis, the city's largest industrial companies collaborate across sectors and share their surpluses of energy, water, and materials with each other, so that one company's surplus product can provide value to another. Public and private companies are physically connected to each other in the Symbiosis and together create profits - both the kind we measure on the bottom line, but also what comes from better utilization of resources.

We therefore invite the world to Kalundborg to take stock of the positive changes that Symbiosis has contributed to. A distinguished group of experts from academia and politics as well as international practitioners are invited to give their perspectives on industrial symbiosis as a key driver to reach circular economy. In addition, we will discuss new circular initiatives that are constantly developing the partnership, and you will have a unique chance to meet and visit some of the partners - and not least, to network and celebrate the achievements.

Production companies globally can learn a great deal from the circular model created in a small corner of Denmark, and today Kalundborg Symbiosis is known throughout the world and helps to market Denmark as a green pioneer country. In addition, Symbiosis, as a local partnership with a focus on efficient resource utilization, can contribute to achieving the government's ambitious reduction target of 70% less CO2 emissions by 2030.

1972 - 2022
50 years
OF CIRCULAR PRODUCTION

Sign up for the conference here
Deadline: no later than by October 3, 2022



NORDIC CIRCULAR HUBS

NCH Conference program October 25 - 26, 2022 in Kalundborg

Tuesday, October 25

09.00 - 10.00 NCH network meeting
10.00 - 10.30 Coffee chat
10.40 - 12.00 Network session between NCH network and Symbiosis Network Denmark
12.00 - 13.00 Lunch
13.15 - 15.15 Nordic seminar/workshop
Introduction to NCH and SND
Workshop case and facilitation (Marian Chertow)
Dialogue
15.30 - 18.00 Industrial case on cascading synergies:
Novozymes: from production to residual biomass
Kalundborg Bioenergy: from residual biomass to bio-methane
Unibio: from bio-methane to unicellular protein production
18.30 - 21.00 Dinner

Wednesday, October 26

09.00 - 10.30 NCH consortium meeting
Nordic Network - next step
11.00 - 12.00 Guided city tour
Guide: Palle Bruun Olsen
12.30 - 17.00 Social event for NCH project group:
Lunch at Green House Reapies
Walk-and-talk to local vineyard - tasting local wines
Resnæs Lighthouse - hiking in local area

Venue: Helix Lab, Campus Kalundborg, 3,
4400 Kalundborg, Denmark



SYMBIOSE
NETVÆRK
DANMARK

Program for SND årsmøde og workshop 25. oktober, 2022 i Kalundborg

09.00 - 10.00 SND netværksmøde
10.00 - 10.30 Kaffepause
10.40 - 12.00 Netværkssession mellem nordisk og dansk symbiose netværk
12.00 - 13.00 Frokost
13.15 - 15.15 Nordisk seminar/workshop
Introduktion til NCH og SND
Workshop case og facilitering (Marian Chertow)
Dialog
15.30 - 18.00 Industriel case af koblede synergier:
Novozymes: fra produktion til biomasse rest
Kalundborg Bioenergi: fra biomasse rest til biometan
Unibio: fra biometan til produktion af mikrobiel protein
18.30 - 21.00 Fælles aftenmad

Adresse: Helix Lab, Campus Kalundborg 3, 4400 Kalundborg

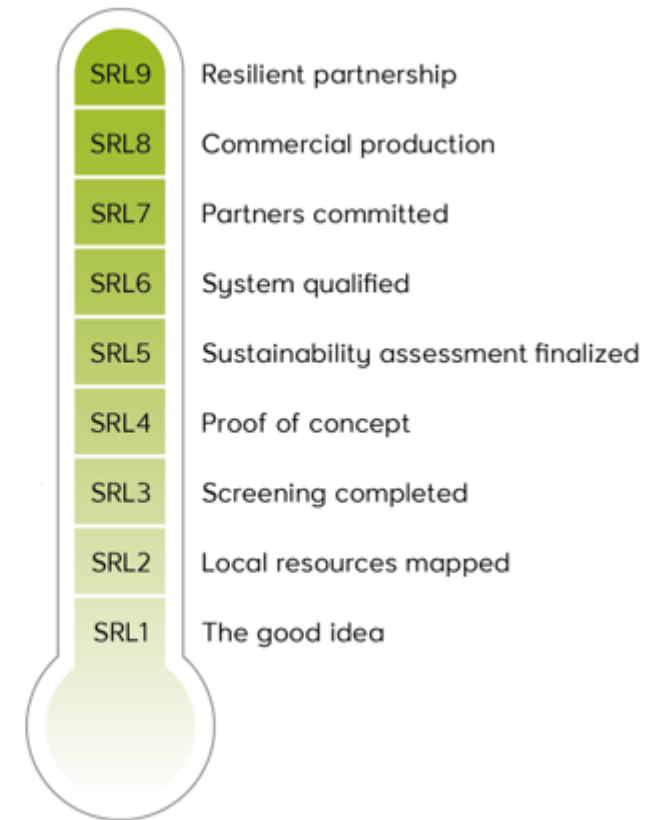
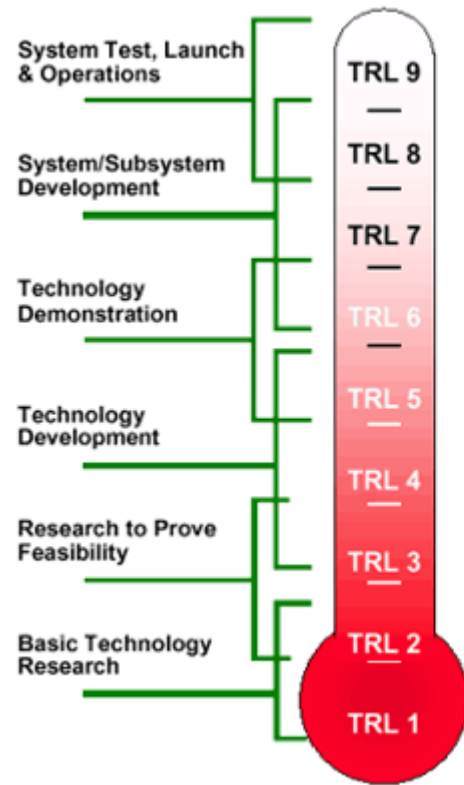
Symbiosis Readiness

Case: A facilitation setup using a Readiness Level approach



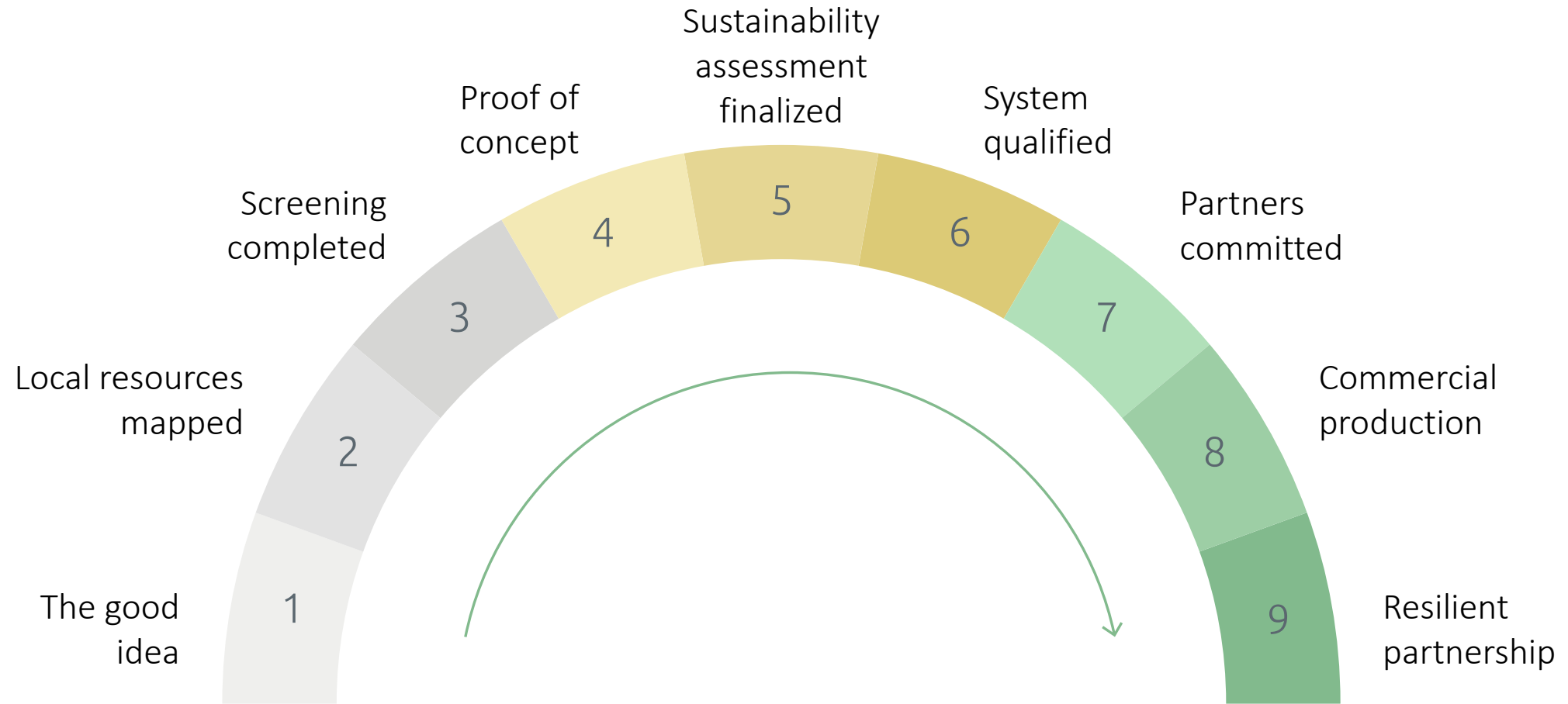
Kalundborg
SYMBIOSIS

From TRL to SRL





Symbiosis Readiness Level

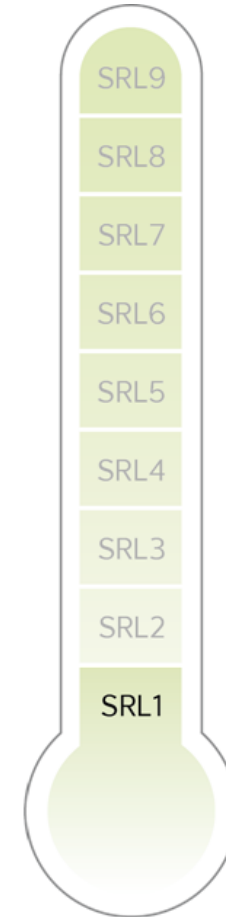




SRL 1 – The good idea

Pre-feasibility

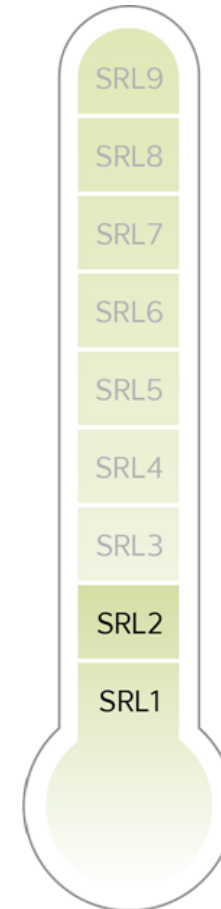
Good idea is based on knowledge of BAT, local knowledge and conditions and understanding key concept of Industrial Symbiosis





SRL 2 – Local resources mapped

Mapped local resources, existing interactions(collaboration), stakeholders (PP), environmental issues, PR. qualitative and quantitative

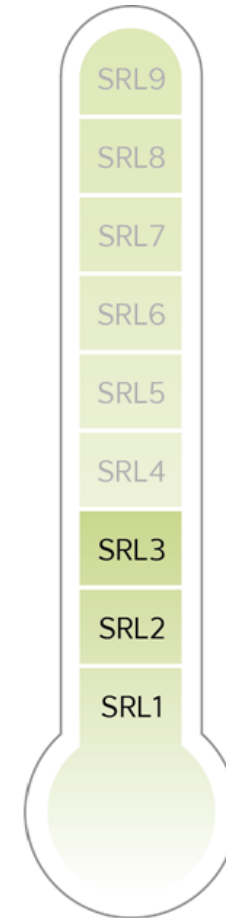




SRL 3 – Screening completed

Screened for partner specific resources and motivation

Qualitative and quantitative





SRL 4 – Proof of Concept

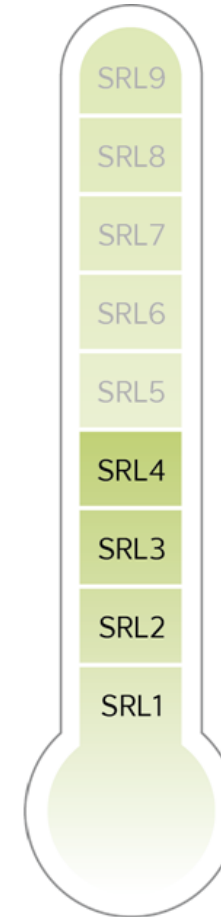
Have performed feasibility

Applicable local implementation

Green business model validated

Legislation, taxes, policy

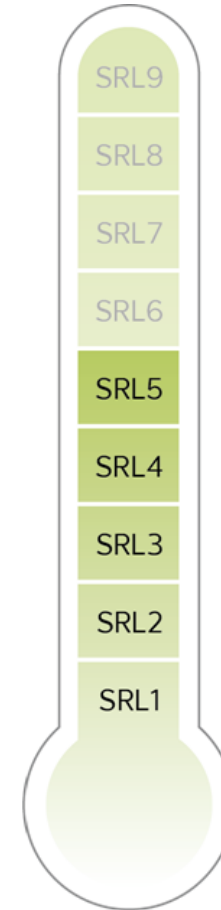
Test and demonstration, pilot (pre-commercial agreement)





SRL 5 – Sustainability Assessment finalized

SDG's, resource and environmental impact
(local and global)



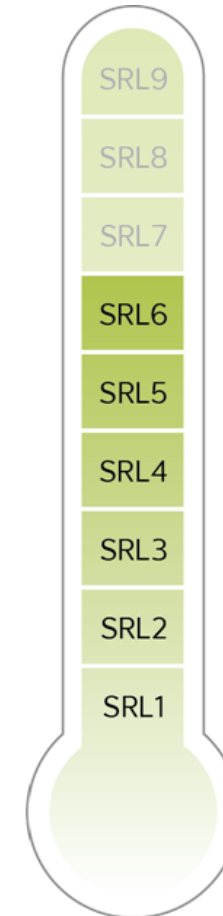


SRL 6 – System qualified

In experimental deployment conditions,
stable enough for low-rate production

Training documents

Full compliance with obligations,
certifications and standards of the
addressed market/partner

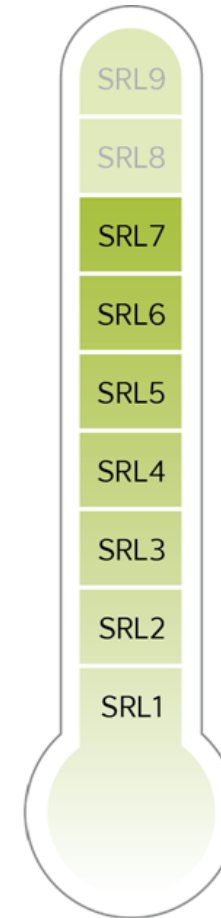




SRL 7 – Partners committed

Trust based relationship

Common communication strategy





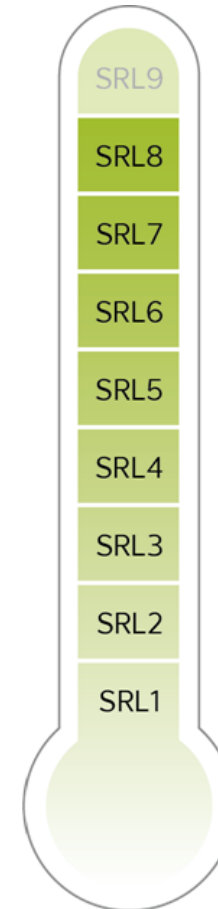
SRL 8 – Commercial production

Commercial agreement

Symbiosis project is up and running on commercial scale and terms

Full production chain is in place and all materials are available

System optimized for full rate production.

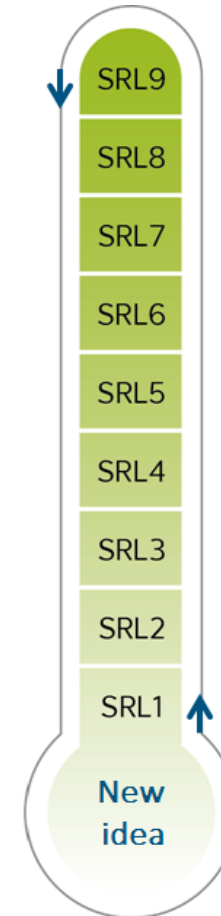




SRL 9 – A resilient partnership

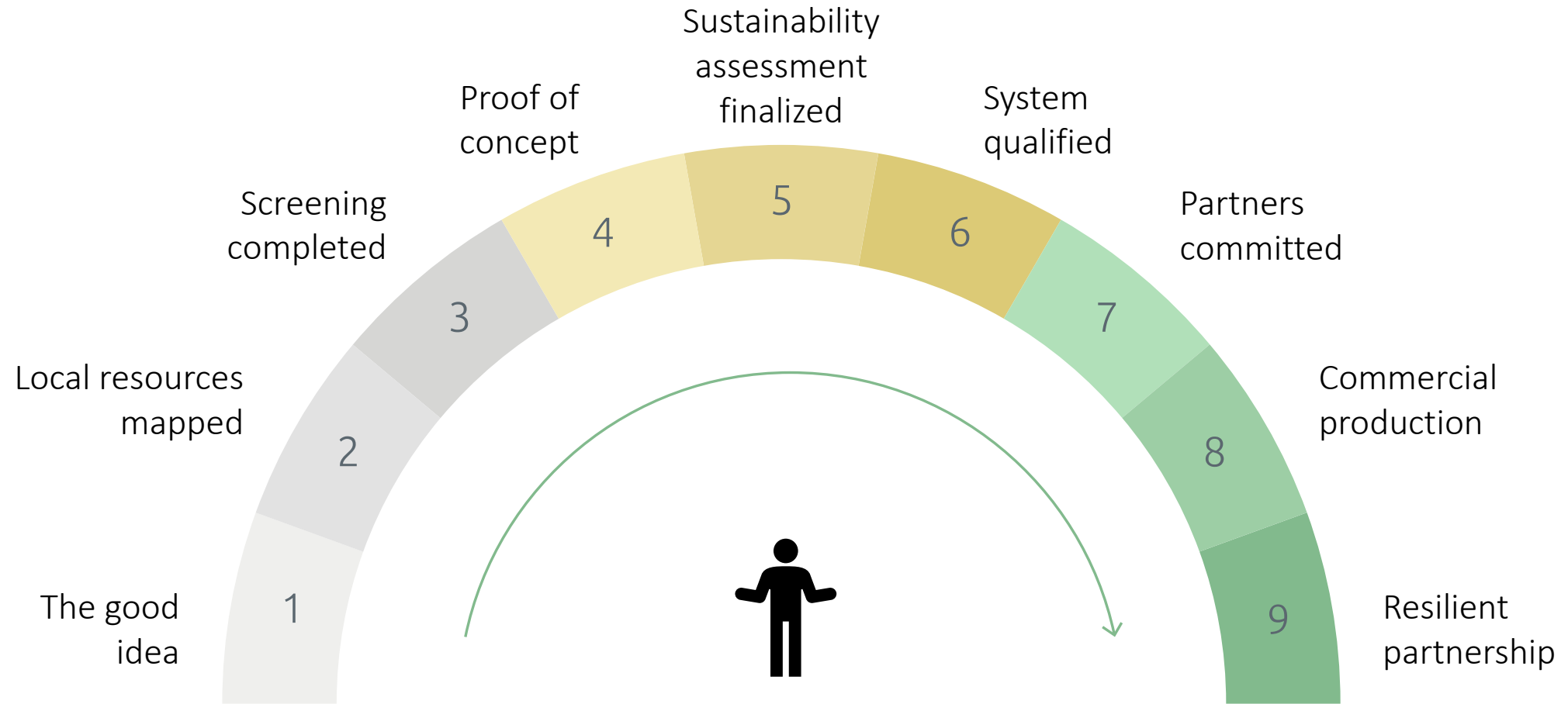
Robust, dynamic, and "organic" network over time, with more symbiosis projects (commercial productions)

The ecosystem will sustain despite of changes in specific conditions and changes in policy/legal framework, individual partners falling out



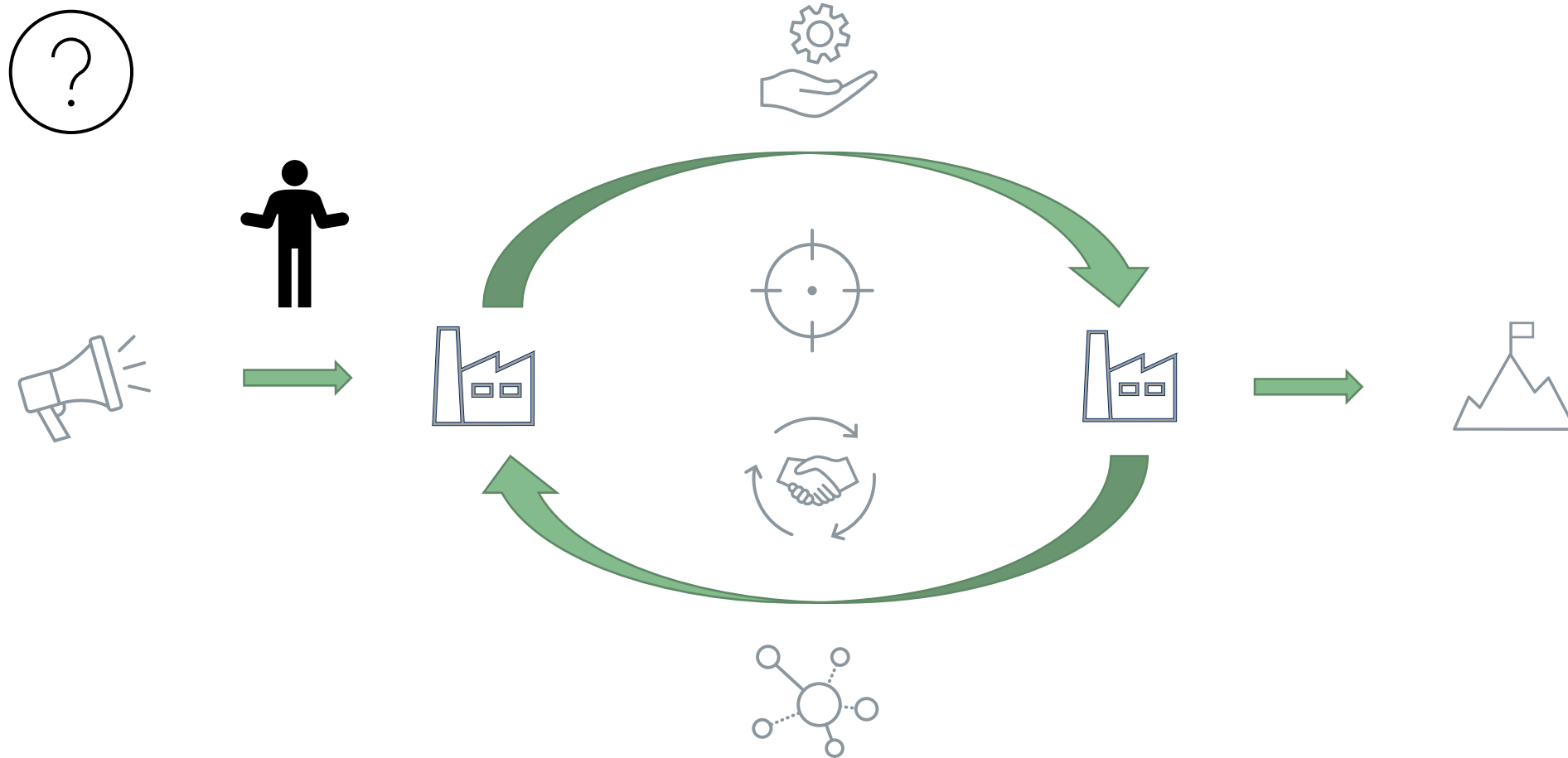


Symbiosis Readiness Level





Partnership facilitation: From idea to implementation





Symbiosis Readiness Level

MANAGEMENT -RL

9. Continuous monitoring, service and support
8. Workforce trained, synergy operational
7. Shared responsibilities, risk mgt and contingency plan
6. Definition of the Joint mgt and governance structure
5. Identification of models for data sharing and harmonisation of metrics
4. Establishment of internal communication flows
3. Mobilisation and engagement of stakeholders of the ecosystem
2. Analyses of industries' flows
1. Potential synergy identified

ECONOMIC -RL

9. Final sustainable business model
8. Validate value delivery
7. Validate revenue model
6. Identification of public acceptance and long-term policy influences
5. First version of revenue model including pricing.
4. First draft of business model
3. Mapping of the influencing policy framework
2. Selection of a possible business concept
1. Formulation of potential business concepts



Case: A facilitation setup using the SRL approach

- You are a team of facilitators
- You work in the secretariat of a private association
- Member of the association are public and private organizations and industry
- Your team is responsible for activities and progress as a support function to the board of directors (BoD) representing the members
- The BoD are supporting a new PtX initiative aiming to advance the local symbiosis partnership.
- The aim is to have a PtX site in commercial operation by 2028, and your team is assigned to facilitate this process

Your team needs to identify and describe what phases of the projects you can contribute to and in what way – how and at what level you can facilitate



Group work organization

- Relocate into groups of 4-5

TASK 1:

Discuss which of the 9 levels you as a team can best facilitate and why

TASK 2:

For 3-5 selected levels, discuss in detail how you can facilitate to achieve what

For each task: take notes and prepare for a 2-3min pitch !

Group pitches & wrap up



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BBC on visit in Kalundborg

[Earthshot-Waste-KALUNDBORG
SYMBIOSIS.mp4 \(dropbox.com\)](#)