An aerial photograph of a lush green forest. A light-colored, paved road winds through the trees, forming a large, irregular circular loop. The road is surrounded by dense, vibrant green foliage. The overall scene is serene and natural.

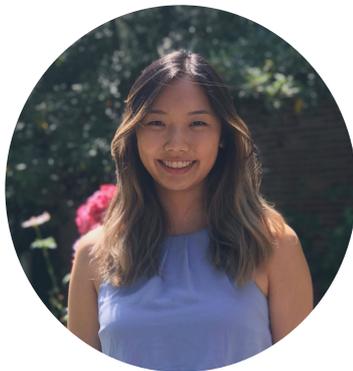
THE LIVING INDUSTRY

Alara Arin, Amber Chau, Alan Maida, Yuuki Tanaka

Meet The Team



Alara Arin



Amber Chau

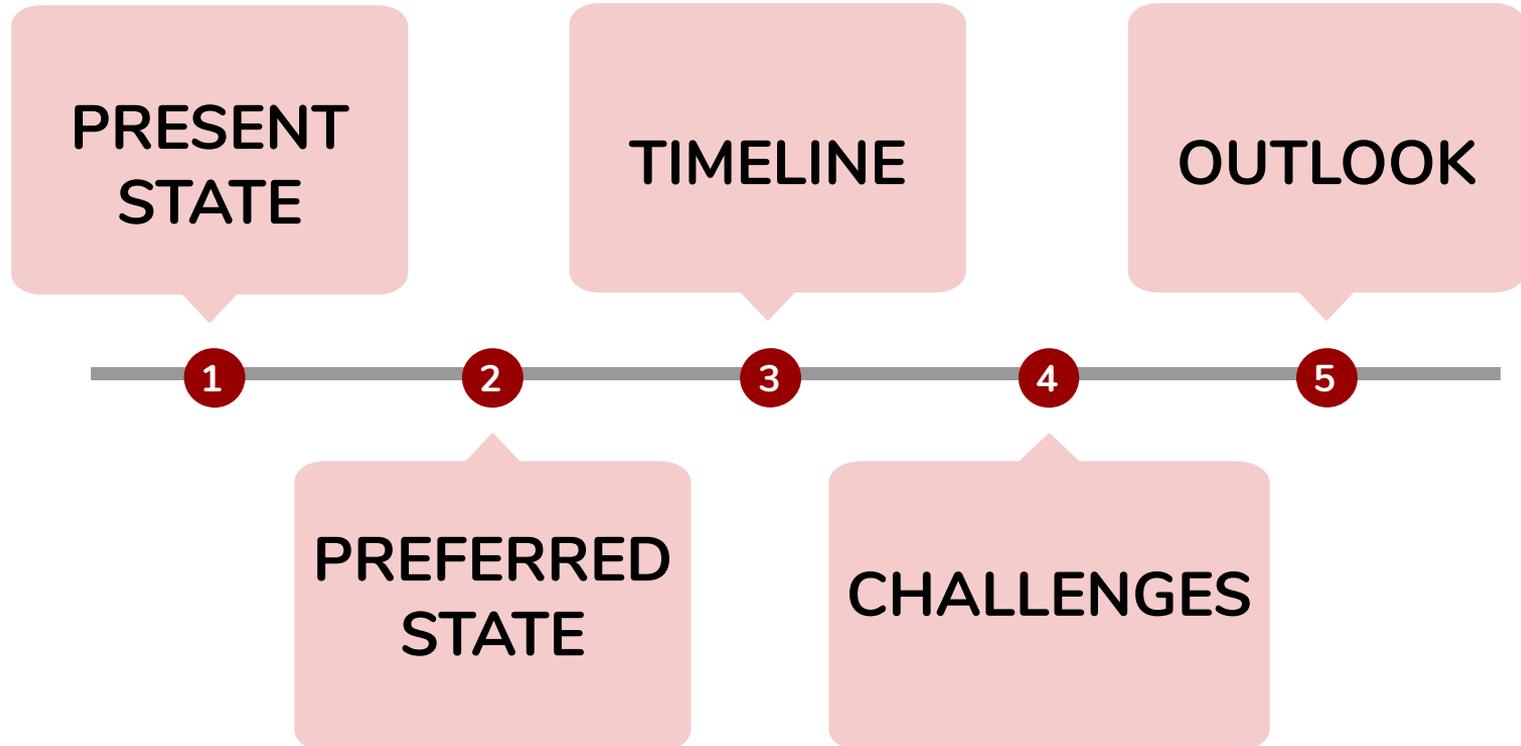


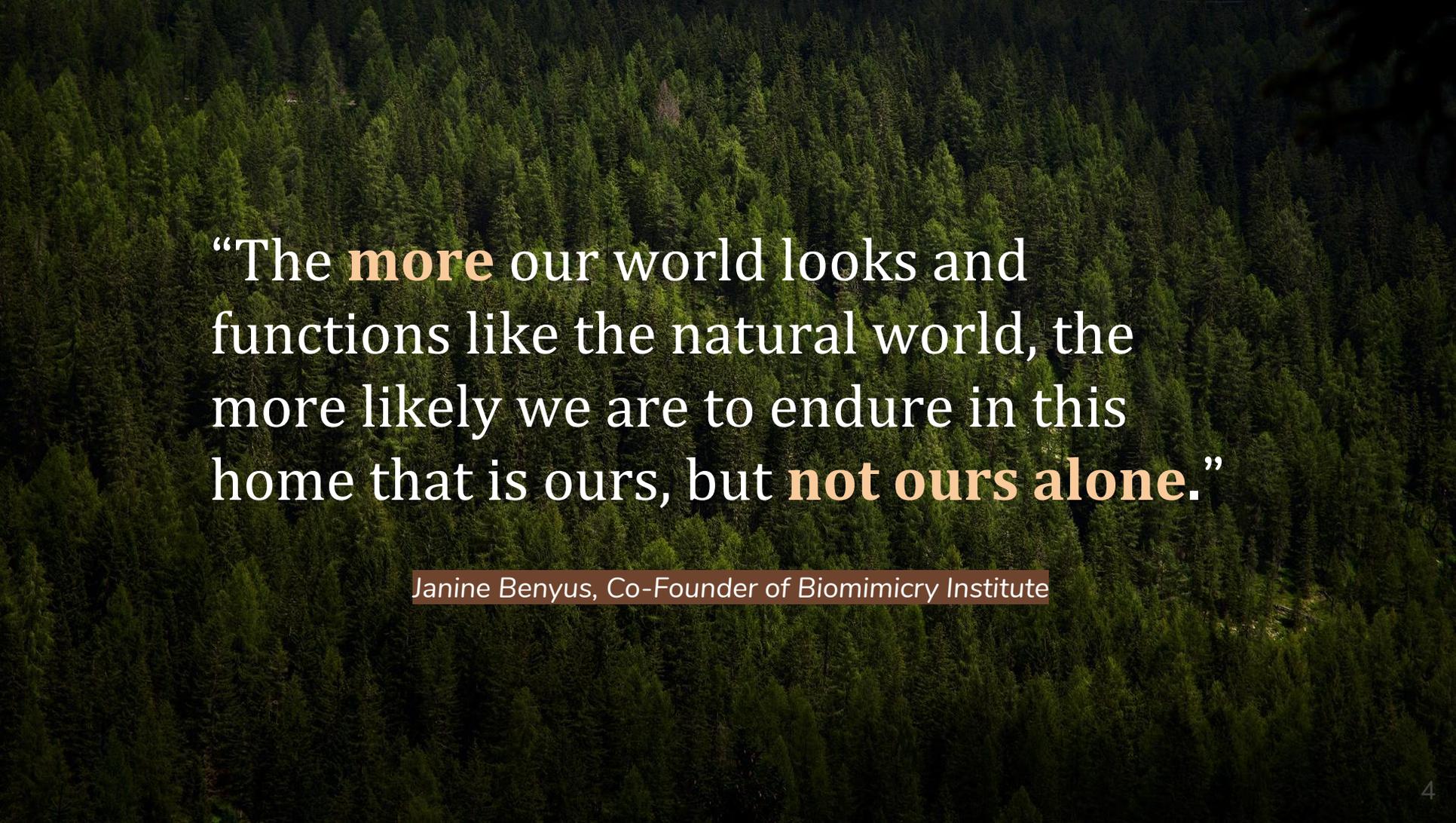
Alan Maida



Yuuki Tanaka

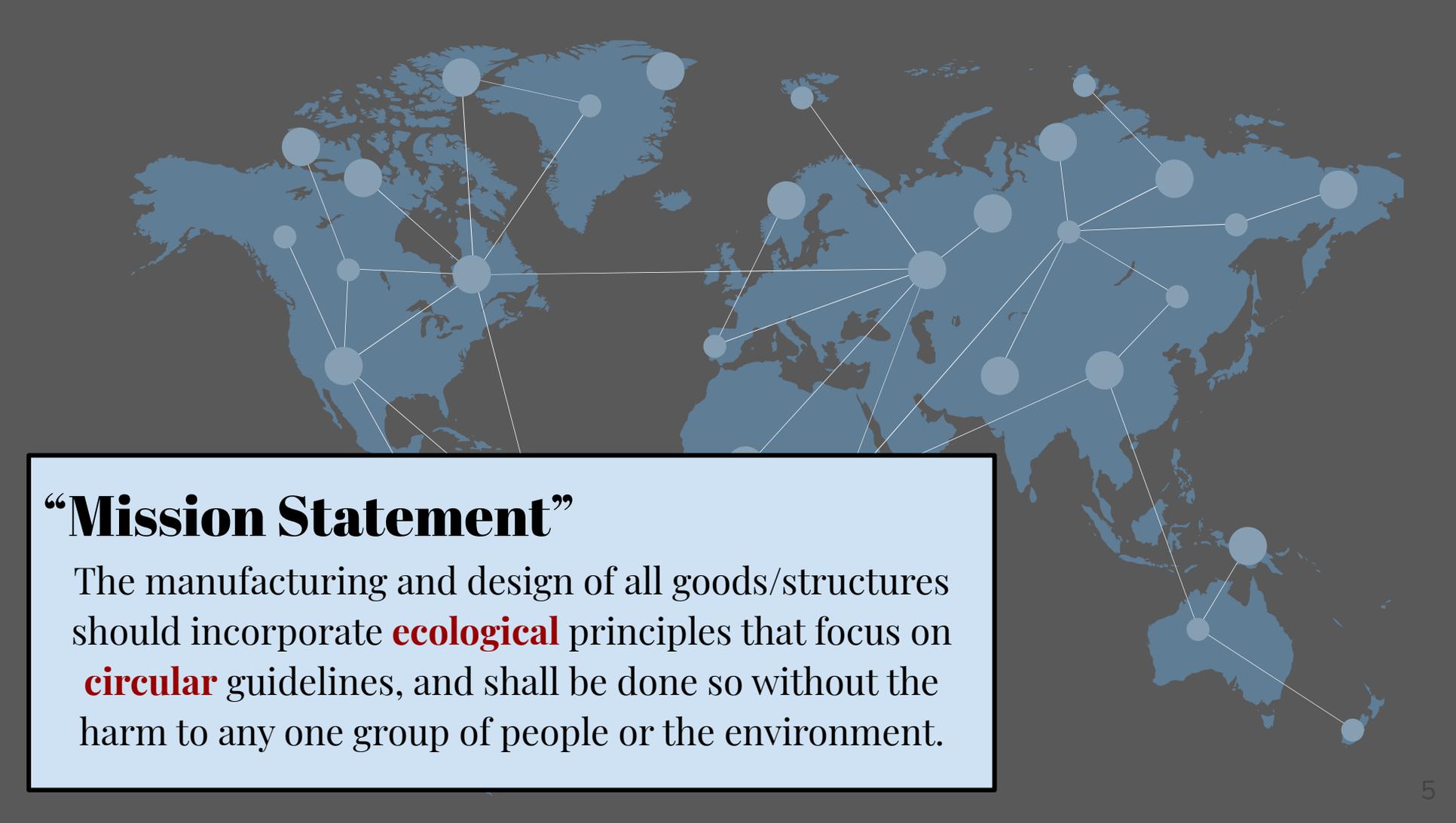
Agenda



An aerial photograph of a vast, dense forest of tall, green trees, likely conifers, covering a hillside. The lighting is bright, creating a rich green color palette with some shadows in the lower parts of the trees.

“The **more** our world looks and functions like the natural world, the more likely we are to endure in this home that is ours, but **not ours alone.**”

Janine Benyus, Co-Founder of Biomimicry Institute



“Mission Statement”

The manufacturing and design of all goods/structures should incorporate **ecological** principles that focus on **circular** guidelines, and shall be done so without the harm to any one group of people or the environment.

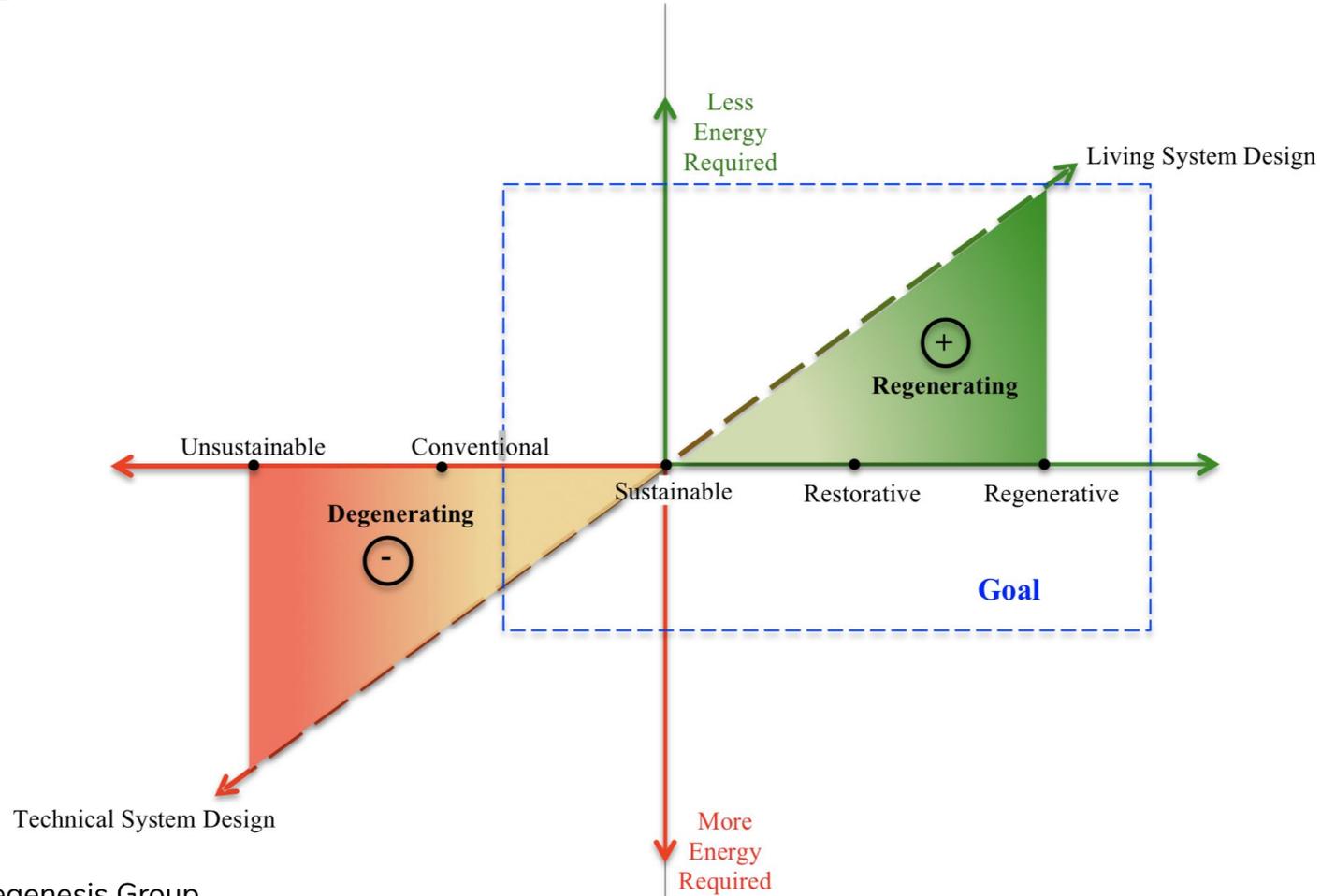
BEFORE



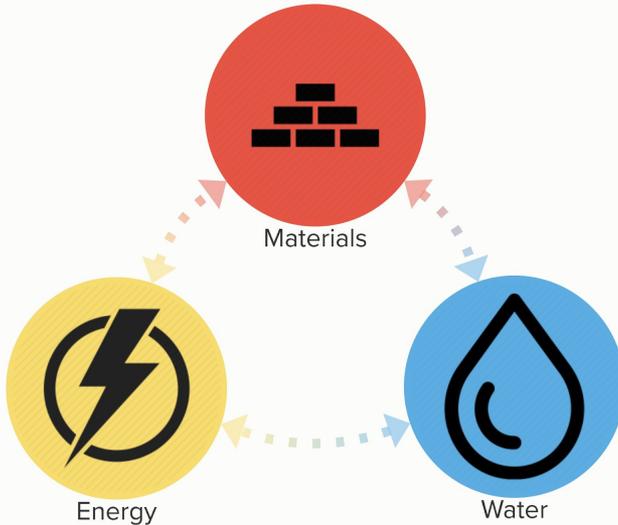
AFTER



Trajectory of Ecological Design



The Living Industry: Industrial Symbiosis



“Industrial symbiosis engages traditionally **separate** industries in a collective approach to competitive advantage involving **physical exchange** of materials, energy, water, and/or by-products”

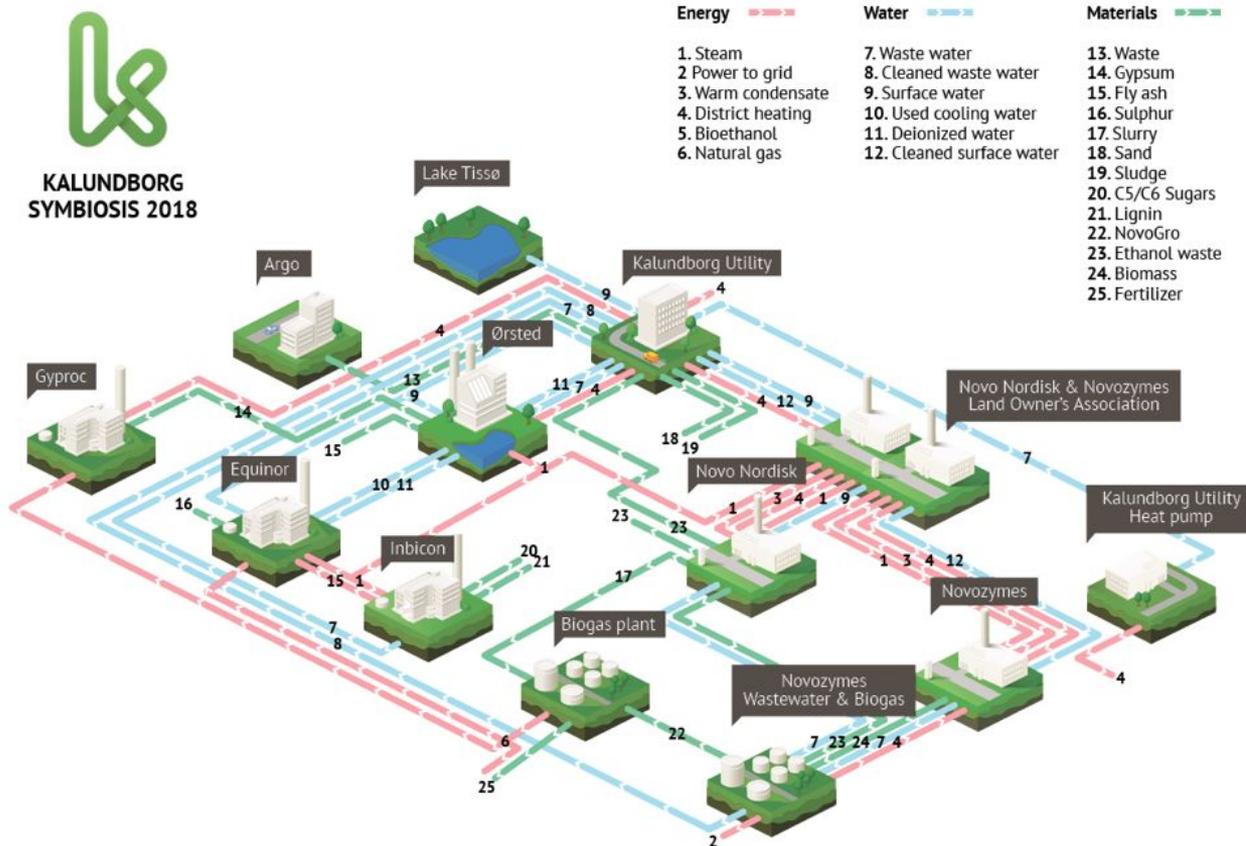
Marian R. Chertow

Kalundborg, Denmark



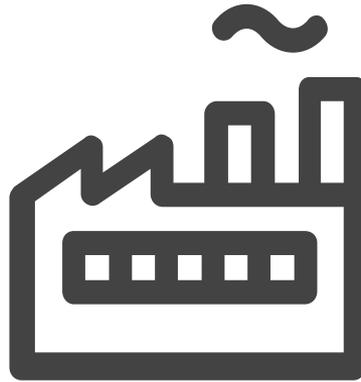


KALUNDBORG
SYMBIOSIS 2018



- Waste exchanges alone amount to **2.9 million tons** of material / year
- Saves around **25%** of water collectively
- **\$15 million** collective annual savings across firms in the park
- Traditional waste products such as **fly ash, sulphur, biological sludge, and gypsum** have been converted into raw materials for production

How can we achieve Industrial Symbiosis on a GLOBAL scale?

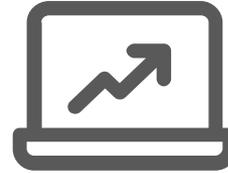


Implementation Key Points through Time

2020-2021
PREPARATION



2025-2028
SCALING UP



2021-2025
PILOT



2028-2030
SYSTEMS
CHANGE





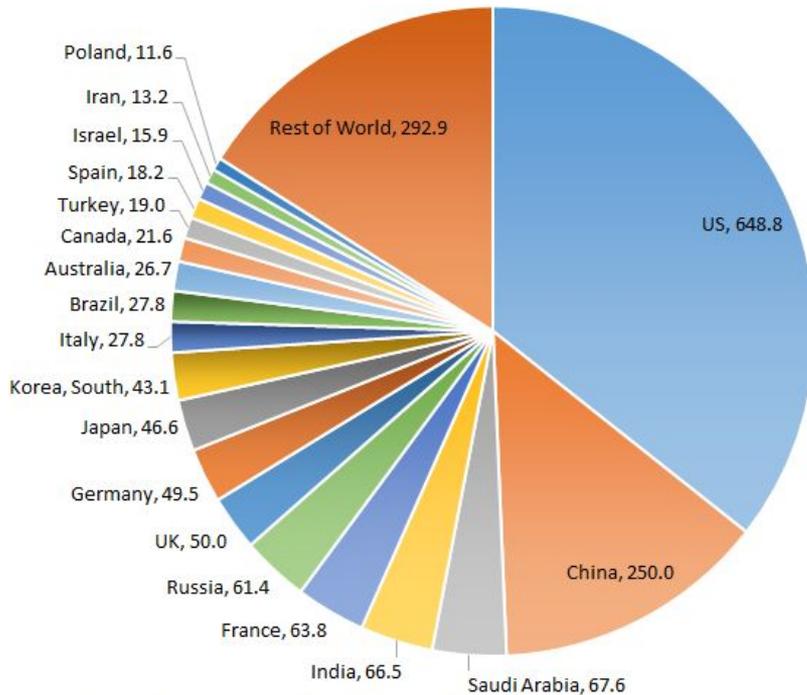
PREPARATION PHASE

2020-2021

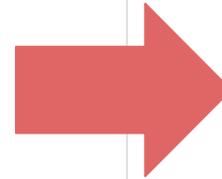


NEW BUDGET PRIORITIES

Military Expenditures by Country
(in US\$ billions) 2018



Source: Stockholm International Peace Research Institute



Re-prioritize funding to support industries in learning about and engaging in **industrial symbiosis**

Eco-Industrial Park Sustainable Systems Feasibility Study

Mary Ortendahl
(510) 272-3889
mortenda@edab.org

Economic Development Alliance for Business
(EDAB)



LEARN ABOUT OTHERS, AND YOURSELF



“...98 percent of the industrial solid waste in the [Rhizao] park is recycled”

GreenBiz, 2017

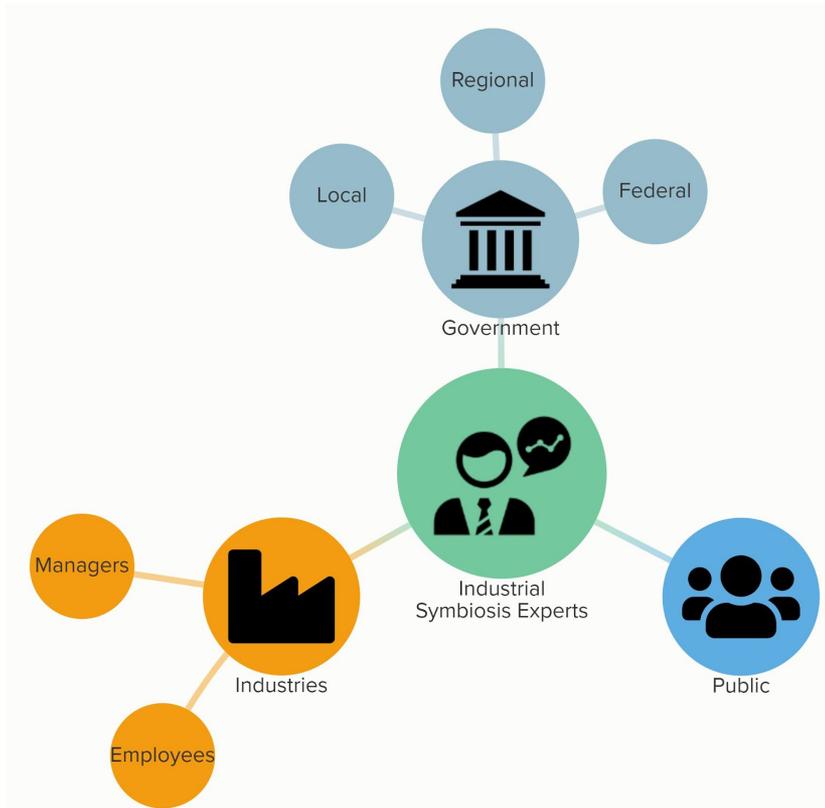
- REVIEW **BEST PRACTICES**
- DEVELOP YOUR **OWN TIMELINE**
- ENSURE **MEASURABLE GOALS**



SPM, a sustainability key performance indicator developed by Solvay



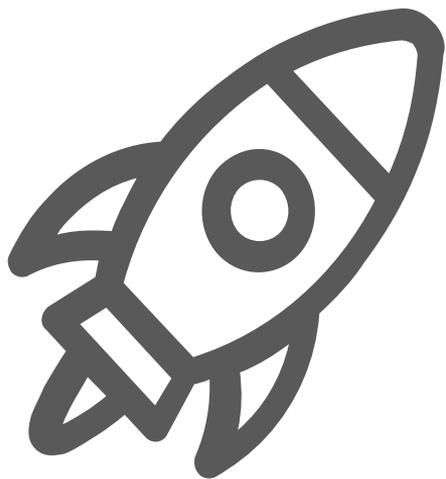
FACILITATE RELATIONSHIPS



Example of a Industrial Symbiosis network diagram

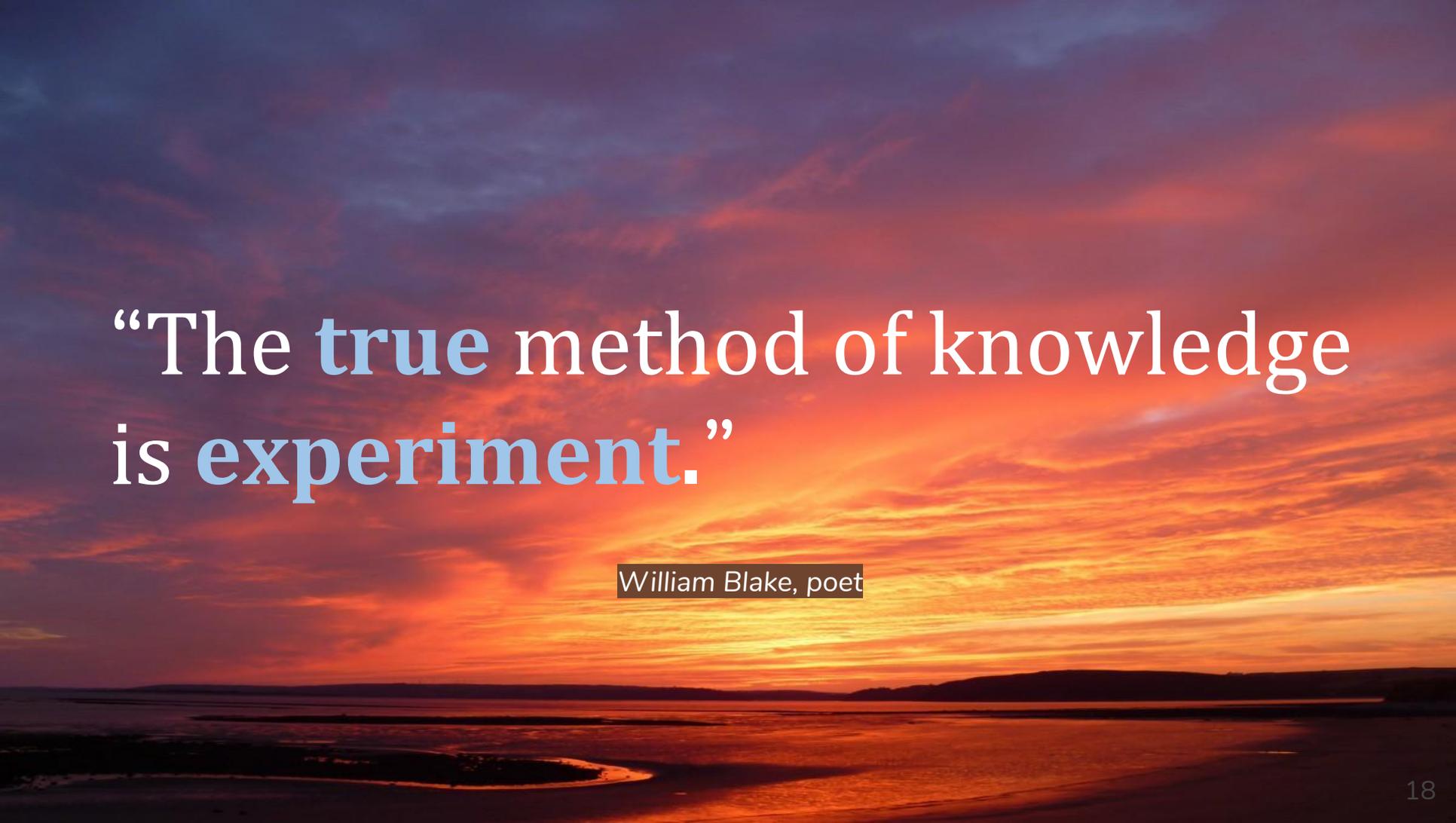
Develop teams that are **experts** on Industrial Symbiosis that can

- Collect data
- Educate key stakeholders
- Nurture trust and cooperation between inter-industry organizations
- Hold seminars, conferences, design sessions



PILOT PHASE

2021-2025

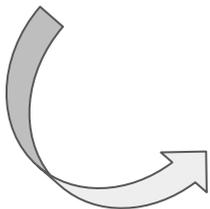
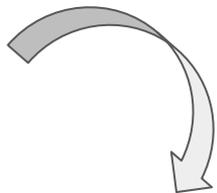
A sunset over a body of water with a small island in the foreground. The sky is filled with vibrant orange and red clouds, transitioning to a deep blue at the top. The water reflects the warm colors of the sunset. In the foreground, a small, dark island with some vegetation is visible. The overall scene is serene and beautiful.

“The **true** method of knowledge
is **experiment.**”

William Blake, poet

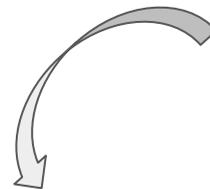


SMALL STEPS LEAD TO BIG CHANGES



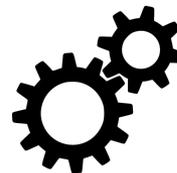
Västra Götaland, Sweden

POLICY

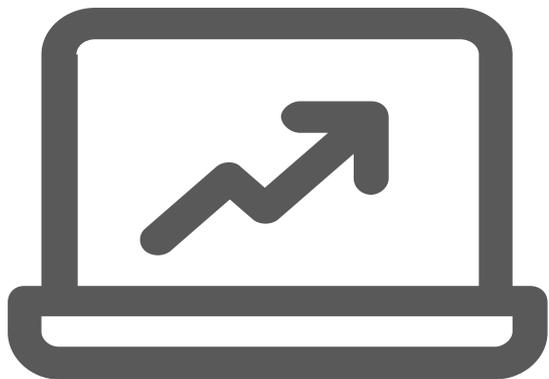


Oahu, Hawaii

TECHNOLOGY



EVERY AREA, EVERY INDUSTRY, IS UNIQUE,
SO TRY OUT DIFFERENT THINGS!

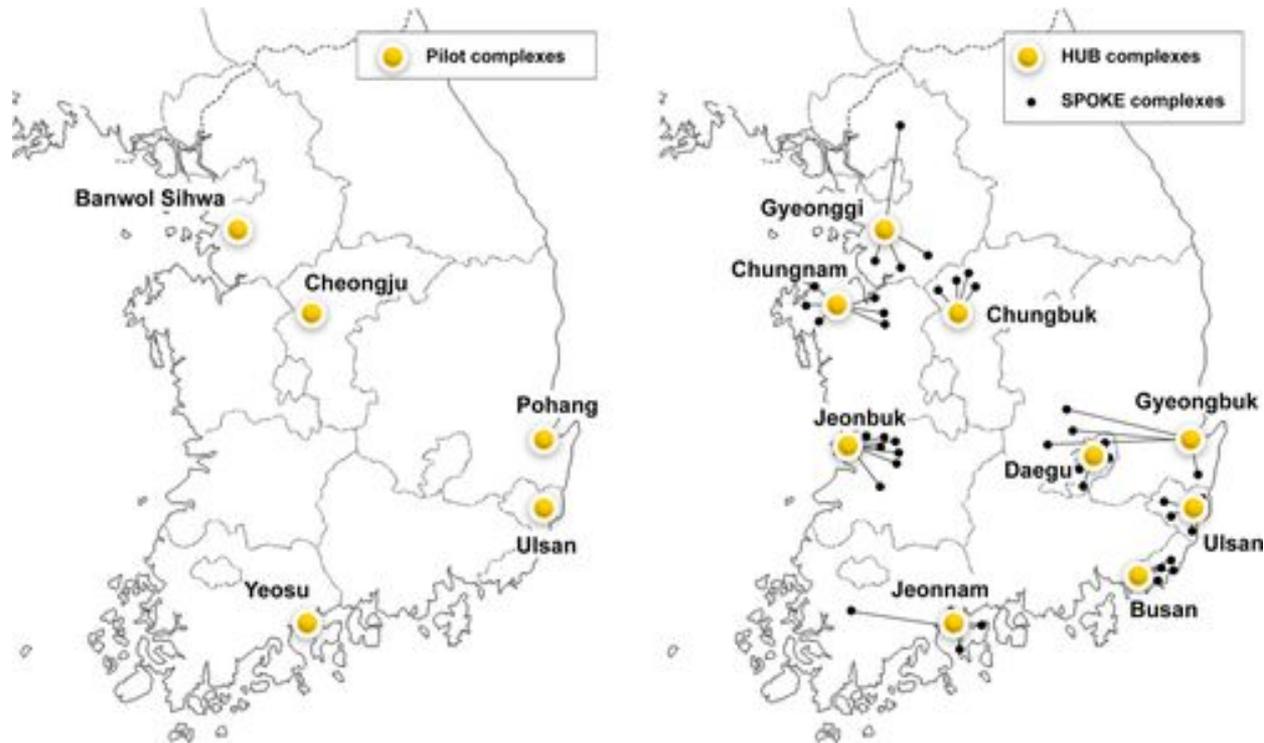


EXPANSION PHASE

2025-2028



GROWING REGIONAL CAPABILITY



Target industrial complexes in the first phase (left, 2005) and the second phase (right, 2010)
Korean National Eco-Industrial Park Project 2005-2016



EXPANDING PUBLIC AWARENESS

Prop. 65 Warning for California Residents



WARNING: This product may contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

Prop. 66 Warning for EVERY Resident



WARNING: THIS PRODUCT IS KNOWN TO HURT THE ENVIRONMENT

Warning labels can **deter** consumers from purchasing unsustainable goods



Environmental Product Declaration should be a **mandatory** practice for industry



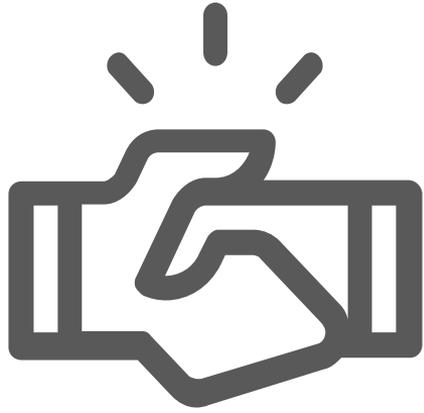
SCALING UP PROMISING TECHNOLOGY

CO₂-Sequestered Aggregate



Every ton of Blue Planet, Ltd.'s synthetic limestone captures nearly **500 kg of CO₂**





SYSTEMS CHANGE PHASE

2028-2030

“Systems **don't change easily**. Systems try to maintain themselves, and seek equilibrium. To change a system, you need to **shake it up**, disrupt the equilibrium.”

Starhawk

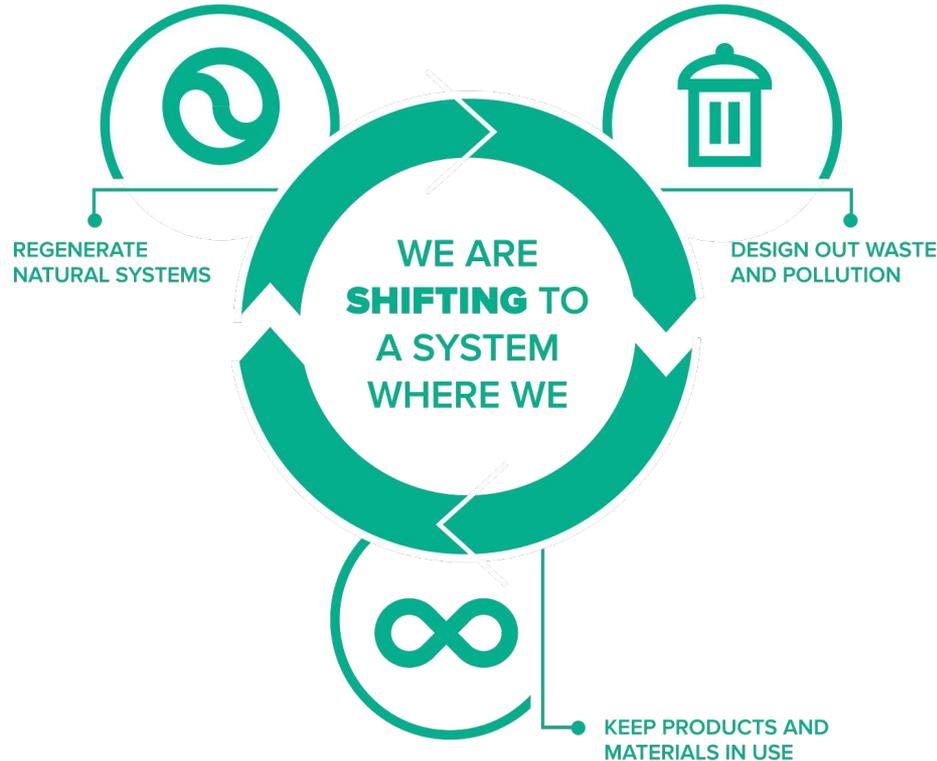


A CIRCULAR SYSTEM

Tesla semi-truck



Carbon neutral transportation can eradicate **geographic limitations** for **resource sharing**



Wind Farm



Reducing **cost** and **environmental impact** of **energy sector** can make recycling, reusing, reclamation more promising

Key Principles of Circular Economy
Ellen MacArthur Foundation, 2017



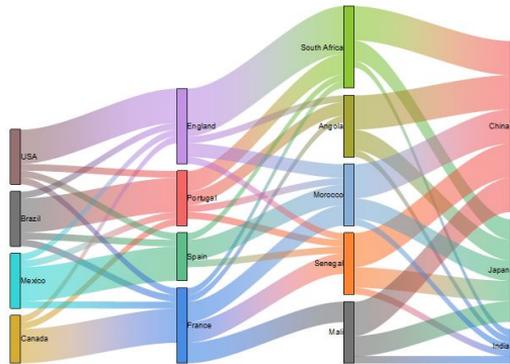
GLOBAL INPUT-OUTPUT MATCHING



Territorial Modeling – Resource mapping (industries, agriculture, urban area)



Analysis – Creation of synergies, territorial integration



Simulation and KPIs



BeCircle is a tool developed by ENGIE that fosters the development of circular models

Apply what already exists on **LOCAL** scale to the **GLOBAL** scale



ZERO WASTE WORLD



Kamikatsu, Japan, where there are **34** unique waste categories

Overcoming Challenges



Education. Proof.
Growth.



Adapt regenerative
principles at all
scales

Moving Beyond Sustainable Development Goal 12



An aerial photograph of a circular pond surrounded by a dense, lush green forest. The pond is the central focus, with a small boat visible on its surface. The surrounding forest is thick and vibrant green, with some darker patches of trees. The overall scene is serene and natural.

THANK YOU!

Huge Shout-out to Tina Chow, Kirk Bergstrom and Bavisha Kalyan