



SUCCESSFUL INTERNATIONAL CASE STUDIES ON IP TRANSFORMATION IN EIPS AND ON THE DEVELOPMENT OF INDUSTRIAL SYMBIOSIS

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Kalundborg Eco-Industrial Park

The Kalundborg symbiosis is the world's best-known and oldest example of industrial ecology, functioning as a network of autonomous companies located in the city of Kalundborg.

Description of symbiosis: One of the key exchanges is the use of excess steam and heat from the Asnæs coal-fired power plant (now a CHP plant) by the Statoil oil refinery and the biotechnology company Novo Nordisk for their production processes.

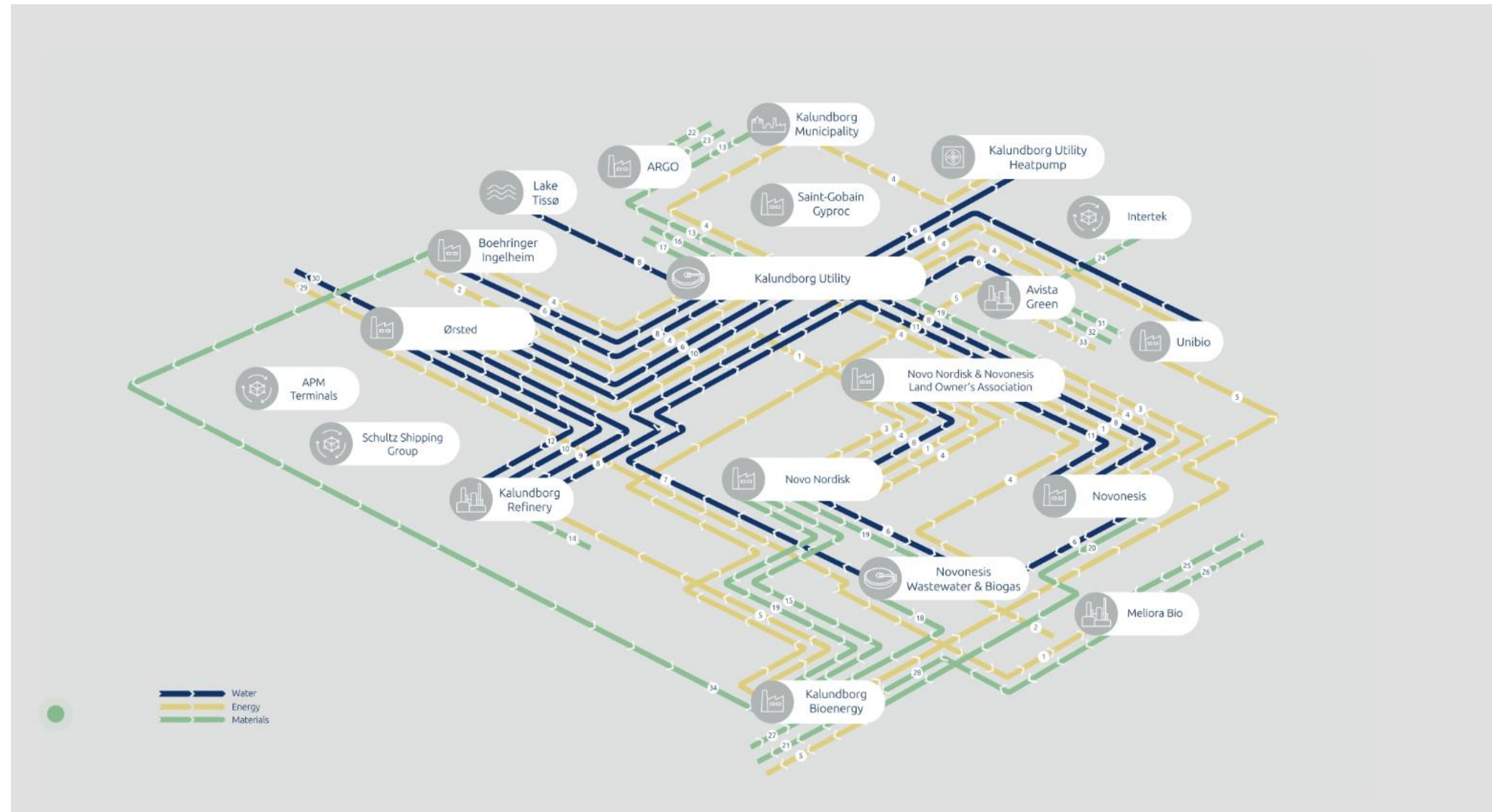
A by-product from the power plant's flue gas cleaning is supplied to plasterboard manufacturer Gyproc, replacing natural gypsum.

Excess heat from the power plant is also used to dry sludge from sewage treatment plants, which is then used as fertilizer on nearby agricultural fields. In addition, wastewater from a pharmaceutical company is treated and used as process water at a nearby oil refinery.





Kalundborg Eco-Industrial Park





Kalundborg Eco-Industrial Park

Benefits	Description
Economic	Significant reduction in costs for participating companies for raw materials, energy, and waste disposal.
Ecological	Reduction of CO ₂ emissions (through combined heat and power generation), conservation of natural resources (e.g., annual savings in groundwater through circulation and reuse), reduction in the volume of waste sent to landfills.
Social	Enhancing the region's image as environmentally responsible, ensuring reliable and stable energy and heat supply for the local community.



Quinana Industrial Zone

The Kwinana Industrial Area is located south of Perth and has been Western Australia's largest hub for heavy industry since the 1950s. It is home to oil refineries, aluminium and nickel plants, chemical and fertiliser companies, as well as cogeneration facilities.

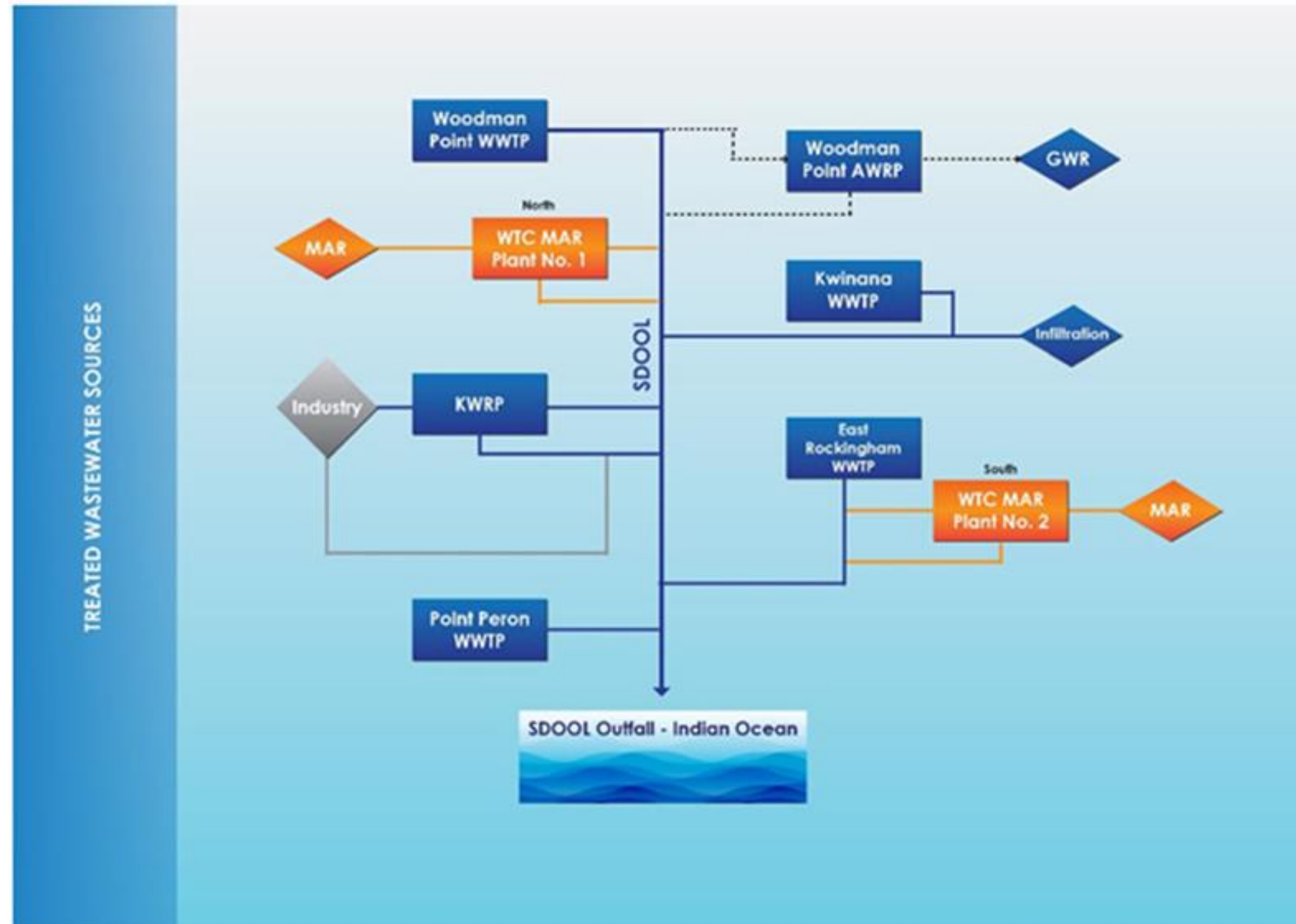
One example is the use of excess CO₂ from chemical and fertilizer manufacturer CSBP (from an ammonia plant) to neutralize the alkalinity in the residues (tails) of the Alcoa alumina plant (bauxite residue carbonization process).

This contributes to safer and more stable waste management. Another example is the shared use of treated wastewater through the Kwinana Water Recovery Plant (KWRP), which treats water to industrial standards.





Quinana Industrial Zone





Quinana Industrial Zone

Benefits	Description
Economic	Reduced costs for waste treatment and disposal for CSBP and for purchasing fresh water for other companies. Capital cost savings through shared use of infrastructure, such as a cogeneration plant.
Ecological	Reduction of greenhouse gas emissions (CO ₂) by 70,000 tons per year (from CO ₂ use at Alcoa), reduction of industrial wastewater discharges into the sensitive marine environment of Cockburn Sound, significant savings in fresh water.
Social	Reducing emissions and the impact of industrial waste on the local community, improving the sustainability of water supply in an arid region.



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



Gondelo Eco-Industrial Park

Park info: Gändelo Park is near Norrköping, Sweden, and focuses on the bioeconomy and synergies between energy companies and the processing industry.

The center of the symbiosis is E.ON's waste incineration plant, which burns combustible waste from Norrköping, producing electricity and heat for the city's district heating system.

Excess steam from this plant is supplied to the neighboring Lantmännen Agroetanol biorefinery, which produces bioethanol from grain. A by-product of bioethanol production, carbon dioxide (CO₂), is used by a neighboring plant to produce carbon dioxide suitable for the food and beverage industry.





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Gondelo Eco-Industrial Park





Gondelo Eco-Industrial Park

Benefits	Description
Economic	Reduced energy and raw material costs for Lantmännen Agroetanol and other companies. Creation of new revenue streams from the sale of by-products.
Ecological	Using waste to produce energy and fuel (closed biomass cycle), reducing dependence on fossil fuels, converting waste into valuable resources.
Social	Ensuring stable heat supply to the local community and creating new jobs in the bioeconomy sector.



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Burnside Park

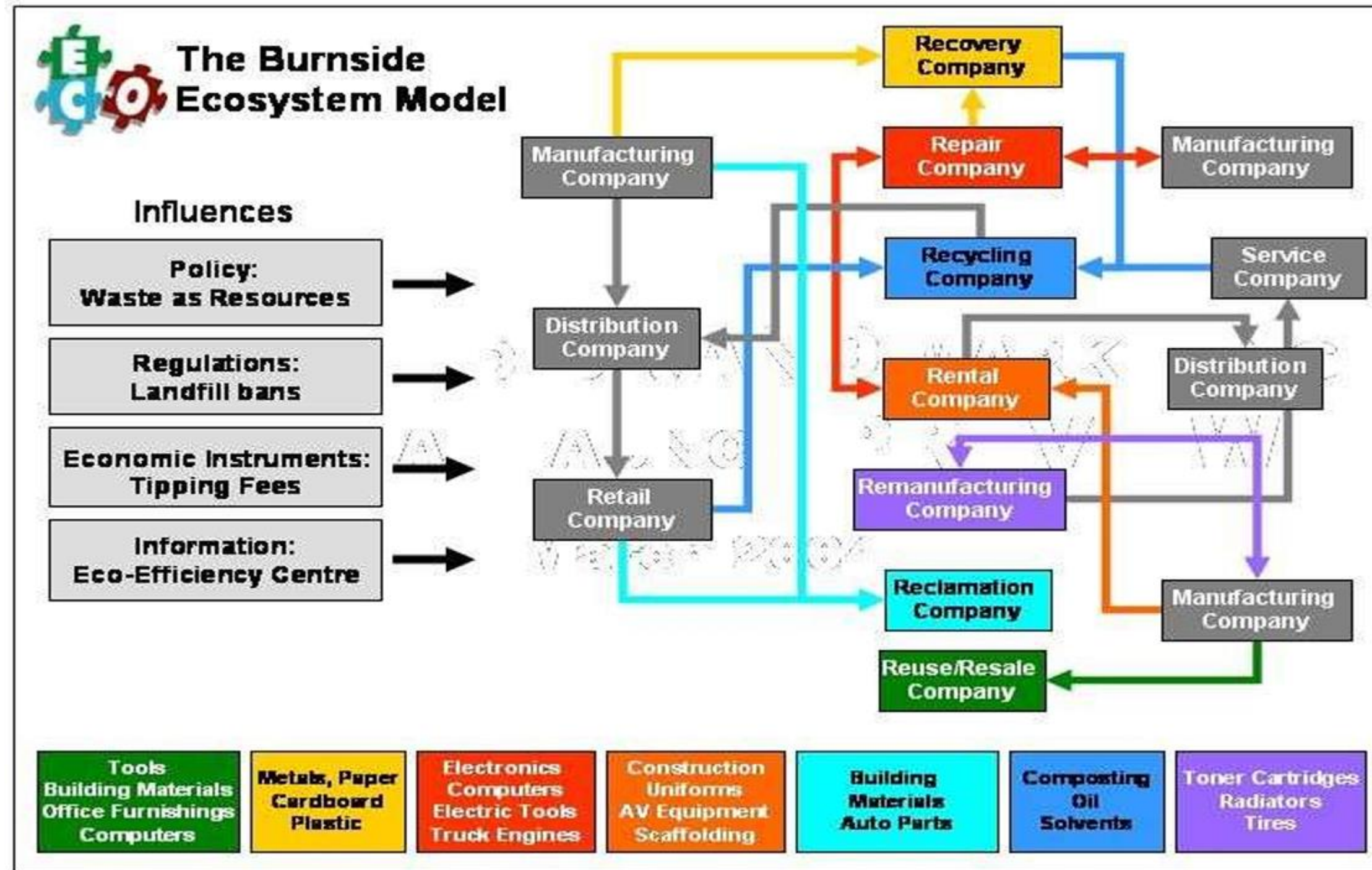
Burnside Park in Halifax, Nova Scotia, is the largest commercial and industrial park east of Montreal, with nearly 2,000 businesses operating there.

The symbiosis at Burnside is largely based on the exchange of waste and by-products between various small and medium-sized enterprises, as well as on shared services.

For example, wood waste from woodworking companies is exchanged and used by other businesses for heating or mulch production. There are also examples of the exchange of used oils and packaging. The park has a network of “collectors” and “recyclers” that allows resource cycles to be closed.



Burnside Park





Burnside Park

Benefits	Description
Economic	Reduced waste disposal costs for some companies and lower raw material costs for others. Encouragement to create new businesses (e.g., recyclers).
Ecological	Reducing the amount of waste going to landfills and decreasing the consumption of primary raw materials.
Social	Supporting local businesses and increasing the competitiveness of SMEs, as well as involving the academic community (Dalhousie University) in supporting enterprises.



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Thank you

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