

Classification of Industrial Symbiosis Synergies: Application in the Biofuels Industry

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Background

“Synergies for improved environmental and economic performance of first generation biofuels for transport”

Identify

Case studies and literature studies

- Inventory of existing technologies and synergies
- Identification of possible new synergies

Develop

Conditions for implementation

- Interviews and theoretical framework (power, risk)
- Innovation needed

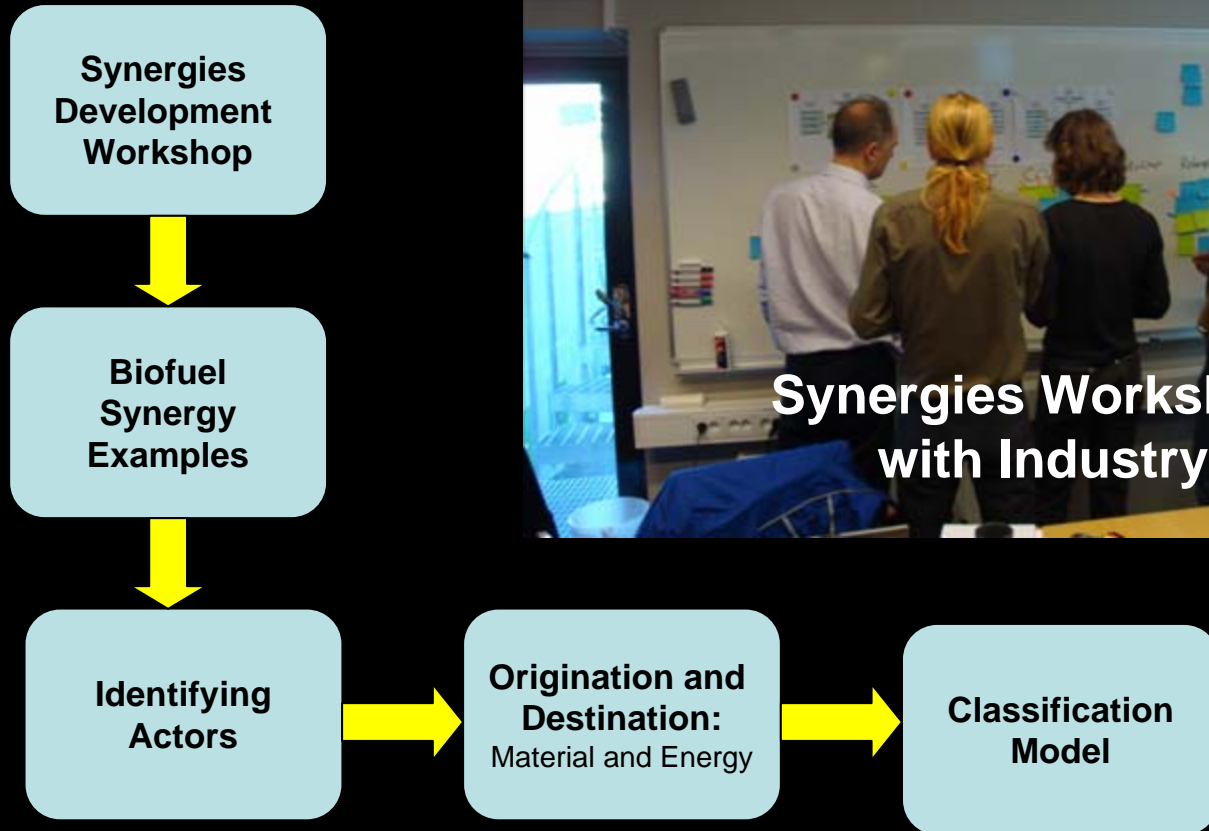
Evaluate

Environmental performance of production systems

- Environmental Systems Analysis



Methodology

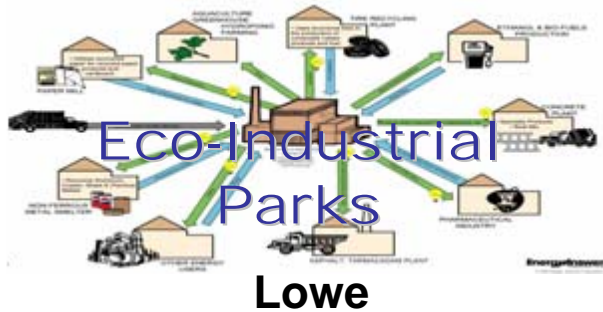


- Over 60 Synergies Produced
- Analysis → Trends and a need for Classification



Why a new classification method?

Past Classification Initiatives



Van Berkel



Chertow

Detail of Synergies and Exchanges

New Classification Method

- Provide further details
- Resource and Energy Flows
- Nature of Synergies
- Trends and Conditions for Implementation of synergies
- Benefit organizational aspects of synergies
- Provide information for economic and environmental benefits from synergies

Interaction with Industries

Biofuel
Industries

Other
Industries

Core Industry
(Biofuel Industry)

External Industry

CO₂

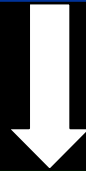


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Material, Resource and Energy Flows

- Major input/output
- Core materials and outputs

Main
Resource



Product/Process

- Not primary to production process
- For “optimal” conditions

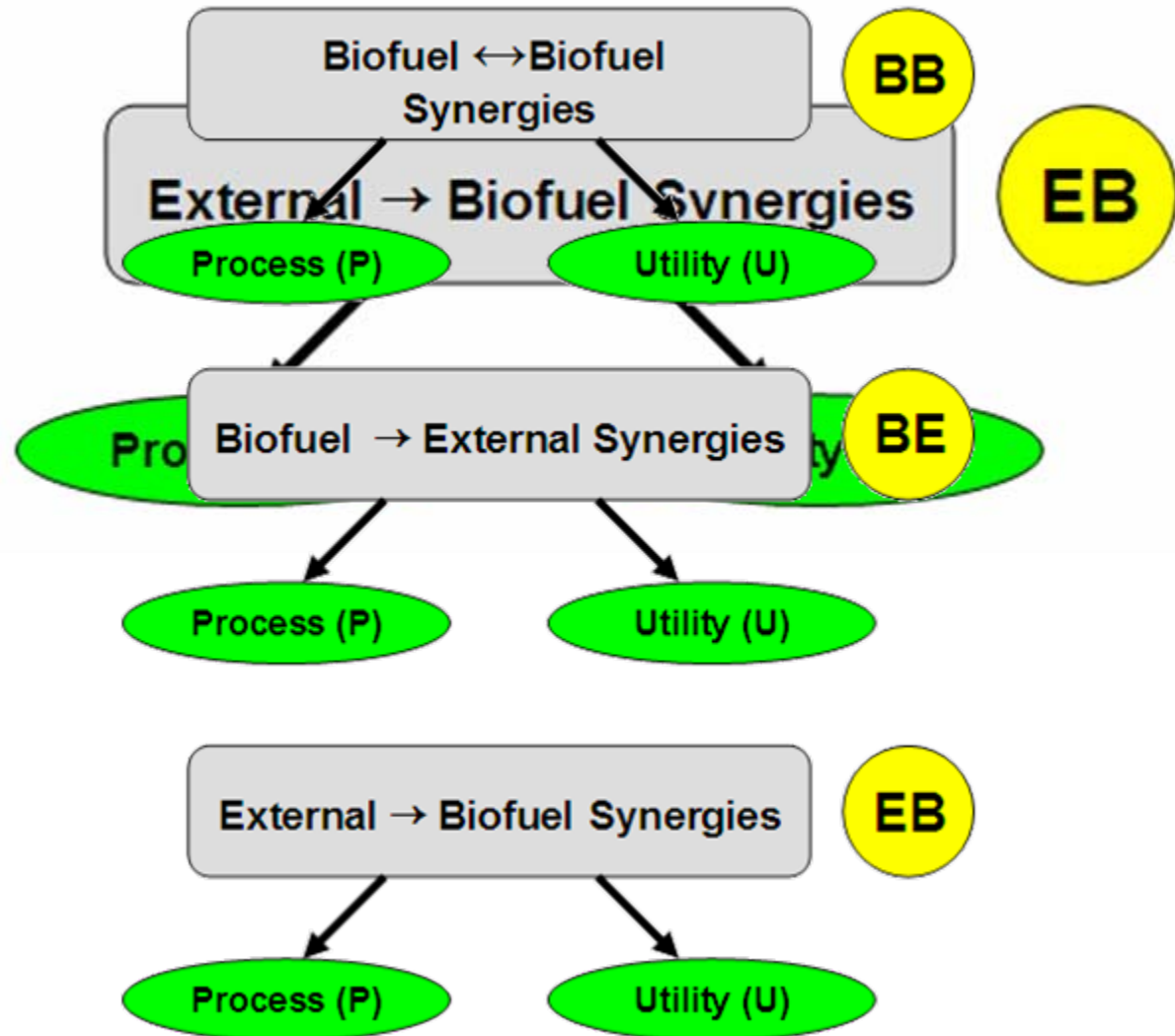
Optimizing
Resource



Utility



Classification Model



CO₂



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EXAMPLE: Potato Chip WVO → Biodiesel

EB-PP

Type of Synergy (Relation)

Origin

Destination

External



P



P



Biofuel





Employment of the Classification Model

- Forest Industry
- Eco-Industrial Parks
- Other Core to External Industries
- Industrial Symbiosis Literature & Classification



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