

# Toolkit for Planning the Eco-Industrial Park

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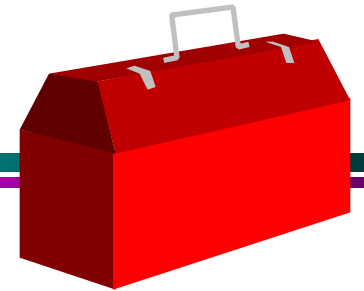
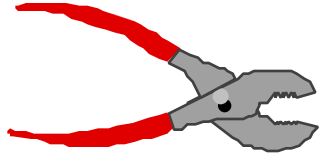
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US EPA

Office of Policy, Planning & Evaluation

# Eco-Industrial Park Toolkit: Overview



- The Eco-Industrial Park concept
  - » How some existing Eco-Industrial Parks work
  - » The ideal eco-industrial park
- Lessons learned
- Some available tools
- Conclusions



# The Eco-Industrial Park Concept

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- **Community** of manufacturing and service businesses
- Cooperate closely to improve their environmental and economic performance by:
  - » *conserving **energy** and **water** resources*
  - » *reducing **transportation** requirements.*
  - » *reducing the use of raw **materials***

# Local community benefits:



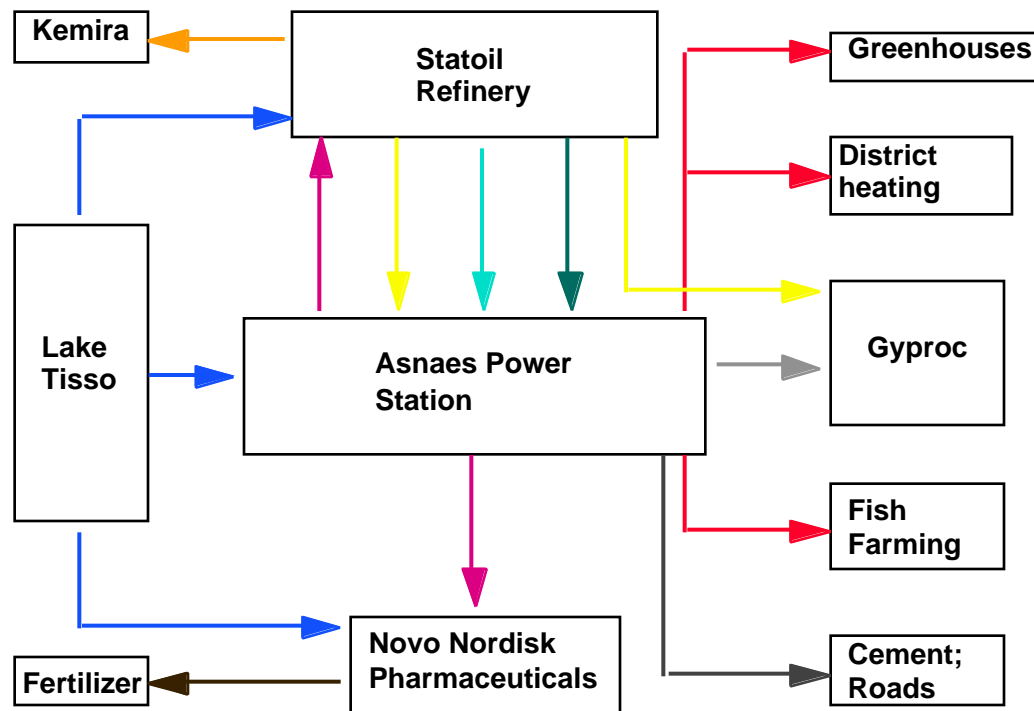
- Return of brownfield to active use
- Improved environmental quality
- Creation of new jobs
- Enhanced tax base



# Example of an Operating Eco-Industrial Park

## Materials & Energy Exchanges:

fresh water  
cooling water  
wastewater  
electricity  
waste heat  
steam  
gypsum  
fly ash  
sludge  
sulfur



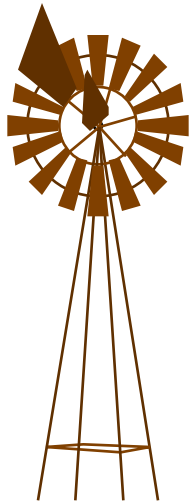
Industrial Ecosystem at Kalundborg

# The Ideal Eco-Industrial Park: Energy Efficiency

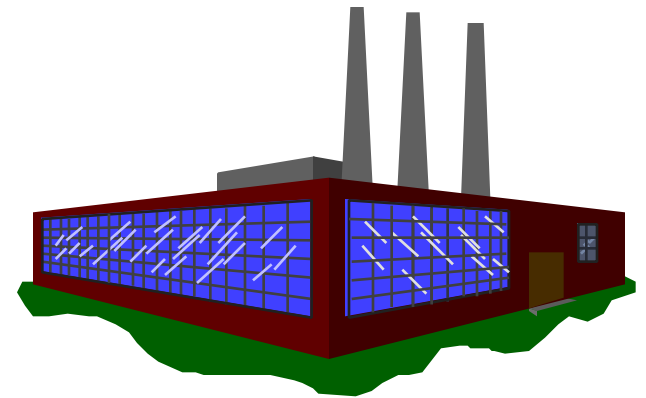
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**Energy-efficient HVAC, lighting and appliances**



**Renewable energy source**



**Cogeneration/heat sharing**

# The Ideal Eco-Industrial Park: Sustainable Built Environment

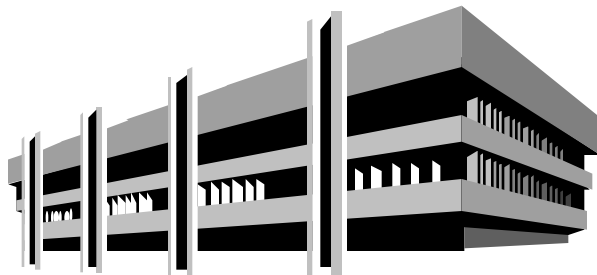
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**Don't demolish -  
deconstruct!**

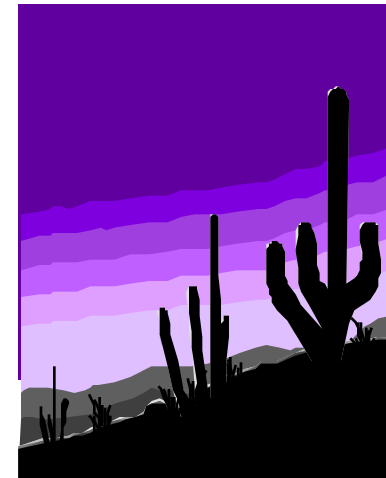


**Climate-  
sensitive  
design**

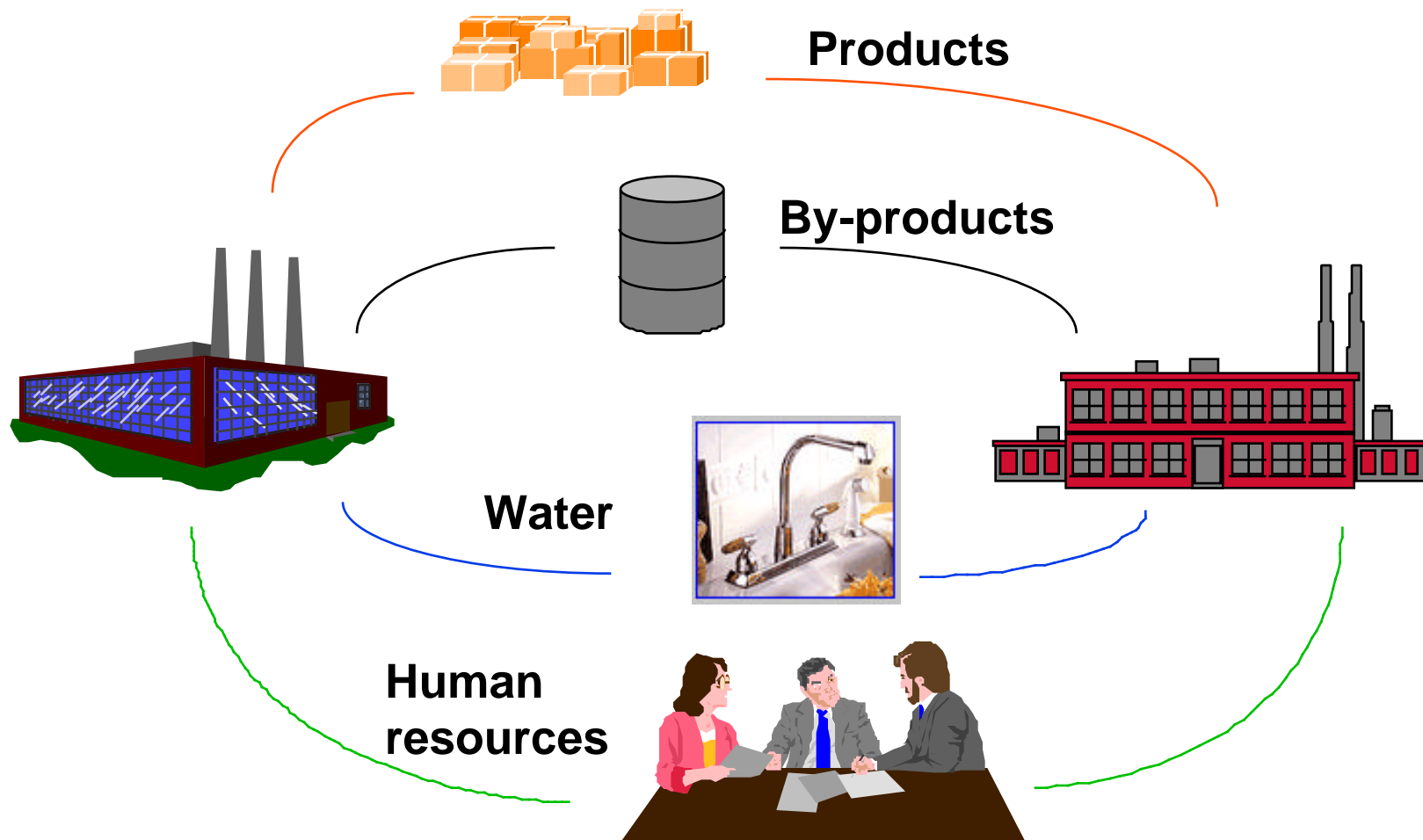


**Design for re-use with  
sustainable materials**

**Landscaping  
with native  
plants**



# The Ideal Eco-Industrial Park: Resource-Efficient

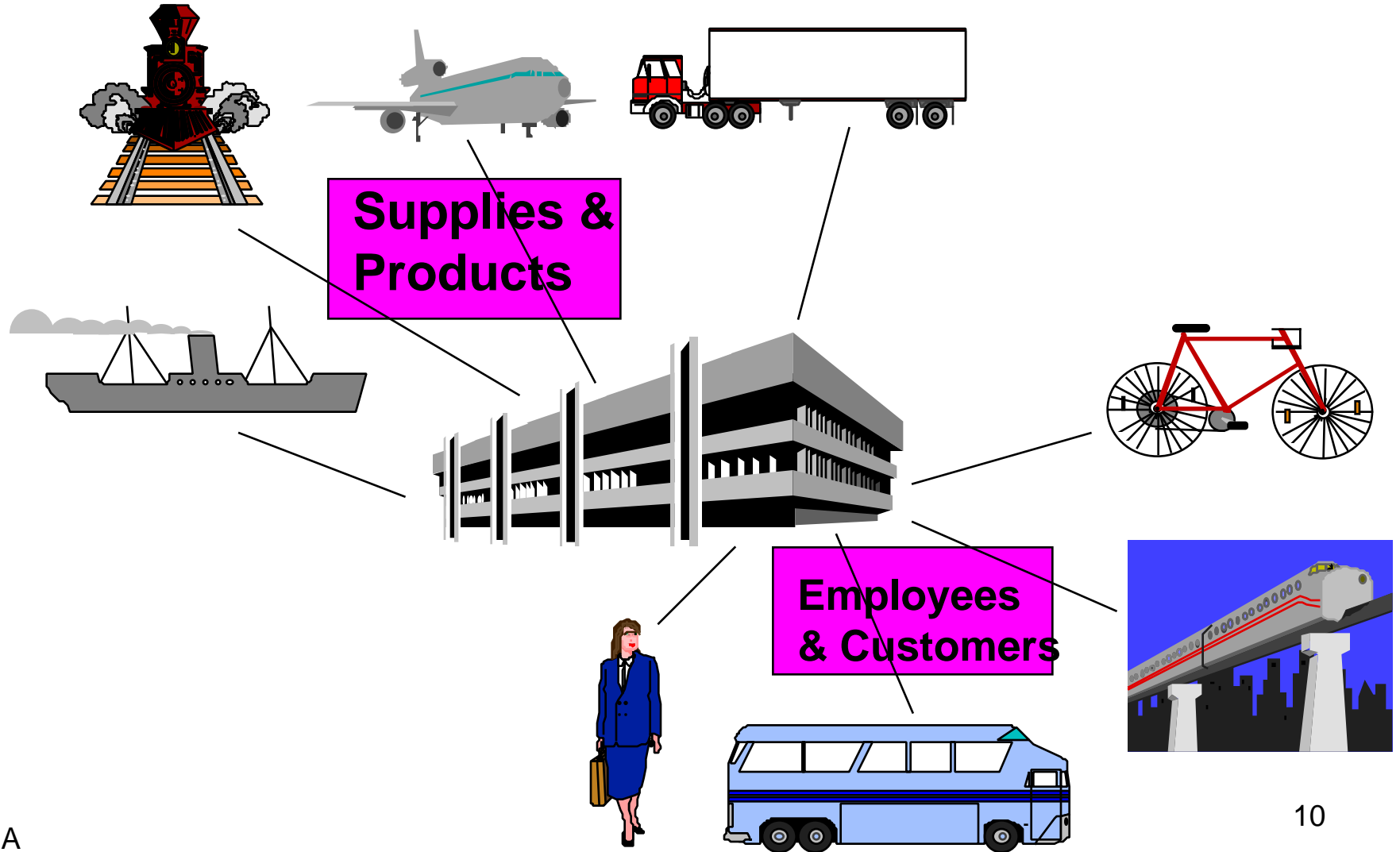


# The Ideal Eco-Industrial Park: Environmentally Proactive Firms

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- Design for Environment
- Design for Disassembly
- Pollution Prevention
- Green (Total Cost) Accounting
- Environmental Management System

# The Ideal Eco-Industrial Park: Multi-modal Transportation



# Lessons Learned: What's needed to get started

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- **A champion**
  - **Local economic analysis**
  - **An honest process**

# Lessons Learned: People are the key!

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- All agree that early community involvement is a must
- Funding for initial scoping exercises - tap different sources
- Creating industrial linkages requires many people's input



# Tools available for planning the Eco-Industrial Park

- US EPA

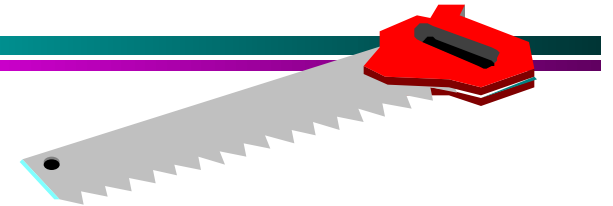
- » Developing Industrial Ecosystems Tool (DIET)
- » Handbook of Financial Resources
- » EIP Webpage on Smart Growth Network website:  
<<http://www.smartgrowth.org>>

- Cornell Work and Environment Initiative

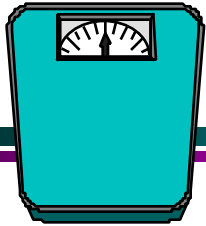
 <<http://www.cfe.cornell.edu/wei>>

- DOE - Center of Excellence for Sustainable Development

<<http://www.sustainable.doe.gov>>



# DIET can help community representatives weigh multiple Planning Objectives



- **Economic objectives:**
  - » maximizing total revenue
  - » minimizing total costs
  - » maximizing net revenue
- **Employment objectives:**
  - » job creation
  - » targeting mix of labor types
- **Environmental objectives:**
  - » maximizing waste re-use
  - » minimizing waste generated
  - » minimizing net waste generated

**Modify Objective Function Weights**

Case: none

**Environment**

wzMAXWSTUSE	1.00
wzMINWSTGEN	
wzMINNETGEN	

1 Overall weight on objective function M

**Economy**

wzREVENUE	
wzCOST	
wzNETREVENUE	1.00

0 Overall weight on objective function MAX

**Employment**

wzEMPLOYMENT	1.00
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1 Overall weight on objective function I

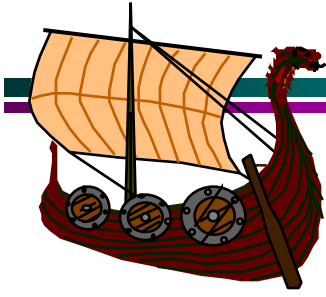
To set weights by waste type, select this button: ↓  
Waste Type

To set weights by employment type, select this button: ↓  
Employment Type

Select this button to return to the Output Menu: → Main Menu

Select this button to EXECUTE the model: → Execute Model

# DIET can help Economic and Park Developers explore scenarios:



- What happens if one of the facilities you have identified for recruitment decides not to be involved in the eco-park?
- Which of the facilities are most crucial to the economic health of the eco-park?
- How does it change the make up of the park when your priorities or planning objectives shift?

# DIET can help businesses project Economic Performance & Labor Needs

- Activity levels
- Facility size
- Expected revenue
- Employment levels
- Cost of using virgin materials vs. byproducts (wastes) as material inputs

Individual Facility Summary Information

Case: none

### Summary Information

Index box #1:

Click on the arrows in the index button to select the facility that you would like to display. Index box #1 controls the first display table. Index box #2 controls the bottom display table.

Index Box#2:

Select this button to investigate the flows of re-usable waste into and out of each facility:

	ACTGEN	SIZE_AT	EMP_AT_FACILITY			REV
			Managerial	Skilled	Unskilled	
Manufac_B	25000	1000000	3	25	25	4560000

4.56e6 The revenue at 'Manufac\_B'

	ACTREC	CST_IMPORT_FAC	CST_WST_FAC	Manufac_B	
				IMPORT	WASTEUSE
Manufac_B	25000	39589	309810		
ChemWste_1					125000
ChemWste_2				43988	156012
ChemWste_3					175000

39589.3 The cost of all material inputs imported to 'Manufac\_B'

Select this button to return to the Output Menu:

Select this button to EXECUTE the model:

# The Virtual Eco-Industrial Park

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- Not a physical park
- Network of regional companies
- Achieve economies of scale
- Participate in waste exchanges
- Reduce transportation costs

*Examples: Brownsville TX, Trenton NJ*

# The Zero-Emission Eco-Industrial Park

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- Goal: Total elimination of waste
- Co-location of facilities is a requirement
- Close coordination of production processes
- Heat and energy sharing
- Wastewater cascading
- Recycling low-value byproducts

*Example: Cape Charles VA*

# Conclusions

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- Eco-industrial parks are an option for sustainable brownfield redevelopment
- Several tools are now available to help in planning
- Experienced communities have valuable lessons to share