

## ECONOMICS OF ECO-INDUSTRIAL DEVELOPMENT

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## Contents

### *A Market Approach*

- Goals and challenges for eco industrial
- What defines an eco industrial park?
- Accounting problems and market challenges
- Examples
- Local efforts and strategies underway
- Implementation strategies

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## ECONOMICS OF ECO-INDUSTRIAL DEVELOPMENT

### *GOALS AND CHALLENGES*

## Goals and challenges

<h3>Goals</h3> <p>Natural Resource Goals</p> <ul style="list-style-type: none"> <li>• Reduce impacts on natural environment</li> <li>• Reduce waste</li> </ul> <p>Economic Development Goals</p> <ul style="list-style-type: none"> <li>• Serve businesses</li> <li>• Grow revenues and create jobs</li> </ul>	<h3>Challenges</h3> <ul style="list-style-type: none"> <li>• Costs</li> <li>• Perceptions (about costs)</li> <li>• Accounting</li> <li>• Public policies</li> </ul>
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## Natural resource goals and methods

- Reduced impacts
  - Green building
  - Production systems design
  - Clean and sustainable energy sources
  - Regional coordination
- Waste reduction
  - Efficiencies (parkwide and each business)
  - Shared systems
  - Shared resources



Source: Canadian Apta, 2007  
The Bruce Eco Industrial Park, Ontario Canada.

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## Economic development goals


- Reduced operating costs
  - Shared systems
- Co-Branding Benefits




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## ECONOMICS OF ECO-INDUSTRIAL DEVELOPMENT *POTENTIAL CHALLENGES*

### Definition of sustainable



Washington logging industry



Cedar River Reservoir  
Source: Seattle Times

- Sustainable
  - *Sustainability* speaks to the rate of resource replenishment compared to the rate of resource depletion over a given period of time.
  - Resources replenished while they are depleted are more sustainable.
  - Resources used without regard to replenishment are less sustainable.
  - Applies to economic resources
    - Municipal funds, tax dollars, labor and talent, and more
  - Applies to environmental resources
    - water, trees, clean air, and more

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### Accounting problem

- Purpose of accounting:
  - Recognize
  - Measure
  - Disclose
- Required only for financial activities, narrowly defined with direct impacts
- Avoids costs of unsustainable natural resource depletion
  - Energy, water, air, much more
- Easily avoidable without regional strategy and public policy that agrees on the costs
- Lots of permitting and regulation, but not a lot of costs
  - Pricing covers costs of infrastructure (transportation, schools)

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### Public Policy Challenge

- External costs are easily avoidable without public policy that agrees on the costs
- Requires a regional strategy tied to growth scenarios and planning
- Lots of permitting and regulation, but not a lot of costs
  - Pricing covers costs of infrastructure (transportation, schools)



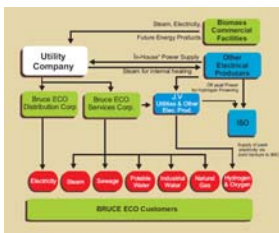
Permitting and Analysis

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## ECONOMICS OF ECO-INDUSTRIAL DEVELOPMENT *BUSINESS ADVANTAGES*

### Shared systems

- Recycling systems
- Solid waste
- Waste water
- Energy auditing and controls



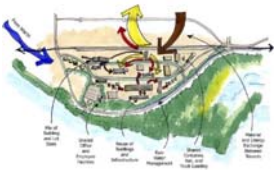
The flowchart illustrates a shared utility system. At the top, 'Steam, Electricity' and 'Business Commercial Facilities' are connected to 'Public Energy Production'. This leads to 'Utility Company', which provides 'Suburban Power Supply' to 'Business Commercial Facilities' and 'Suburban Power Supply' to 'Bruce ECO Distribution Corp.'. 'Bruce ECO Distribution Corp.' is connected to 'Bruce ECO Services Corp.', which in turn connects to 'Water & Sewer'. 'Water & Sewer' provides 'Water' and 'Sewer' to 'Bruce ECO Customers'. 'Water & Sewer' also connects to 'Waste Water Treatment Plant', which provides 'Waste Water' to 'Bruce ECO Customers'. 'Waste Water Treatment Plant' also connects to 'Recycling & Energy', which provides 'Recycling' and 'Energy' to 'Bruce ECO Customers'. 'Recycling & Energy' also connects to 'Waste Water Treatment Plant', which provides 'Waste Water' to 'Bruce ECO Customers'.

Source: Canadian Agra, 2007  
The Bruce Eco Industrial Park, Ontario Canada shared utility system.

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## Shared resources

- Shipping resources
- Vehicle maintenance
- Common buying, customer/supplier (depends on common needs)
- Integrated logistics
- Human capital development (benefits, wellness, recruiting, training, job-sharing)
- Information and communication systems
- Shared subcontractors



Example of Shared Resource Flow

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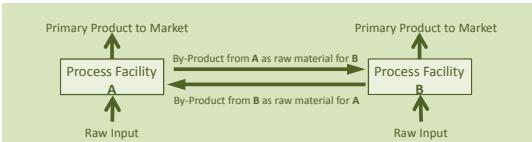
## Reduced operating costs

**Production and Distribution Efficiencies**

- Intra-park transportation, circulation (examples?)

**By-product connections**

- Cogeneration (e.g., capturing and using heat generated by power sources)
- By-product connections



October 11, 2012 Source: Canadian Agra, 2007 Washington APA 2012 Conference 14

## Collaborative branding and marketing

- Green branding
- Market development (customers that value sustainability)
- Partner development
- Collaborative promotion




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## ECONOMICS OF ECO-INDUSTRIAL DEVELOPMENT

### EXAMPLES


## Bruce Eco Industrial Park, Ontario



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## Devens Eco Industrial Park, MA


- 1,800 acres
- Eco-industrial park and mixed use community
- \$2.1 billion of private investment
- Public investment of \$300 million for cleanup and new infrastructure
- Largest construction and demolition recycling site in the US
- 98 companies at the eco-industrial park with 5,000 employees
- Bristol Meyers Squibb (97 acre campus)
- Evergreen Solar uses a 350,000 sf plant for the manufacture of photovoltaic panels
- Magnum Motion
  - Maglev equipment



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## Devens Eco Industrial Park, MA

- Environmental programs
  - Awards program with 25 standards for company environmental performance
  - Supports business collaboration to utilize by-products, share costs of joint training, share transportation resources, and more.
  - Eco-Efficiency guidance services to tenants.



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## Kalundborg Denmark

- Resource savings:
  - Ground water: 1,9 mill. m3/year
  - Surface water: 1,0 mill. m3/year
  - Oil: 20,000 ton/year
  - Gypsum: 200,000 ton/year
- Investment
  - Total investments in 19 Projects: ~ \$75 million
  - Annual savings: > \$15 million
  - Total savings until 1998: ~ \$160 million



Source: Andreas W. Koenig, ReTem Corp, 2012

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## ECONOMICS OF ECO-INDUSTRIAL DEVELOPMENT *REGIONAL EFFORTS AND STRATEGIES*

## Seattle's Industrial Development Pilot Program

**Industrial Development Pilot Program**

- Partnership between the City of Seattle, King County and the State of Washington
- RFP for pilot projects that will result in public and private sector investment in new or rehabilitated industrial facilities
- Increased economic and environmental performance by industrial firms

- Incentivize industrial investment through regulatory and policy flexibility, and financial incentives
  - New Markets Tax Credits Loan Program, Grow Seattle Fund Loan Program, workforce training, others
- Seeks to support up to 10 pilot projects that demonstrate a new model for the region's industrial economy

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## Industrial Development Pilot Program

Potential Site Cited

- Port of Seattle 90/01
- Vigor Industrial
- NOAA Site



Terminals 90/91



Former NOAA Site



Vigor Industrial

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## Puget Sound Regional Council

### Vision 2040

- Tied to regional PSRC growth forecasts for 2010 - 2040
- Includes a Climate Change Action Plan
  - address state climate change initiatives;
  - reduce greenhouse gas emissions;
  - specific mitigation steps to address climate change impacts

### Transportation 2040

- Tied to PSRC regional growth forecasts for 2010-2040
- Includes the Regional Transportation Improvement Program
  - Contains a four part Greenhouse Gas Strategy
  - Tied to EPA and state mandates on air quality

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## Washington State

### Washington Clean Energy Leadership Program

- Regulatory and Clean Energy Policy Alignment
  - Align Clean Energy Policy and Regulation
  - Accelerate High Profile Clean Energy Development
  - Create a Focal Point for Clean Energy Economic Development
- Time frame of 2012 -2020
- Progress measured through job growth in clean energy jobs

### Department of Ecology Beyond Waste Plan

- Began November 2004 and updated in 2009
- 30 year plan for eliminating wastes and the use of toxic substances
- Industries progress is benchmarked by the volume of hazardous substances used in commerce

Source: Washington Dept. of Ecology, 2012

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## King County

- 2012 King County Strategic Climate Action Plan (SCAP)
  - Synthesizes King County's goals, objectives, and strategies to reduce greenhouse gas emissions and prepare for the effects of climate change
  - Level of GHG's is used as benchmark with reduction goals set for 2015, 2020, 2030 and 2050

## Federal

- Environmental Protection Agency Greenhouse Gas Reporting Program
  - Mission to understand where greenhouse gas emissions are coming from in order to inform policy decisions

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## Eco Industrial Market Challenge

- Eco industrial parks try to account for environmental costs
- Businesses bear those costs on-site
  - Rent, shared infrastructure costs, internal operations
- Traditional industrial parks offer lower out-of-pocket costs as a cheaper alternative
- Shifts willingness to pay to owners' personal values for resource management

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## Planning and implementation strategies

- Analyze and make the business case for tenants
  - Higher rents, but lower operating costs
- Match business needs with partners and customers
- Make public case for infrastructure investments
- Recognize, measure, disclose natural resource depletion costs
- Regional strategies for water, energy

Sino-Singapore Tianjin Eco-city

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