Recommendations on Policies, guidelines, and legislation to facilitate the transformation of existing industrial zones into Eco Industrial Parks: Devens, USA Case Study

Devens Overview: leading by example

- Planning and regulatory framework supporting EIP
- Devens Eco Efficiency Center operational assistance from park management
- Devens Sustainability Framework supported by Sustainable Indicators program & Commitment to continuous environmental improvement
Devens Overview

- Convert Army base into EIP
- 35 miles outside Boston
- 4400 ac. former base
- Superfund Site
- 1993 Sustainable redevelopment theme adopted with ReUse Plan.

Planning Charrette to Establish Vision for Devens Future

- sustainability as an integral part of the base redevelopment;
- focus on industrial ecology and a zero-emissions, no waste systems, similar to a biological community;
- protect aquifer, remediation, sustainable agriculture, comprehensive recycling strategy
Devens Overview

1994 Reuse Plan
- Focus on job creation
- Created large industrial/R&D districts (8.5 msf buildout)
- Emphasis on open space, conservation and sustainability
- Provided for up to 282 housing units (the “cap”)
- Basis for Devens Bylaws

1994: Devens By-Laws

Principles of sustainability incorporated through:
- Zoning
- Density
- Dimensional requirements
- Floodplain
- Groundwater resource protection
- Historic district
- Signage
- Wetland and watercourse protection provisions.
Devens Overview

- 5.4mil. sq.ft. of development.
- 4,977+/- jobs created
- 4,400 ac developable/1800 ac. Open Space
- 400 residents
- Contribute $2.5 billion annually
- MassDevelopment - Landowner
- DEC – Regulatory Authority
Devens Today

- ~102 businesses
  - 70% small-medium sized (< 300 employees)
  - Mostly light industrial – manufacturing, distribution
  - Pharmaceutical cluster, almost no retail
  - 76% private, 18% nonprofit, 6% government

Devens: lead by example

- Significant infrastructure upgrades to support existing and future businesses
- LEED certified, green building projects supported by incentives
- Significant building re-use
- Low-Impact Development Techniques and guidelines
- Additional housing
- More focus on eco-industrial park concepts as they occur
- Devens Eco Efficiency Center
Devens Eco-Efficiency Center

- Staff assists businesses to green their operations
- Facilitates by-product exchanges
- Hosts network meetings of businesses to further park goals
- Occupational health and safety roundtable
- Green energy roundtable
- Building Facility managers roundtable
- Annual review of environmental laws applying to industries

Bristol-Myers Squibb

- $1 Billion investment
- Collaboration with MWCC (job training)
- Waste exchange: Microbial exchange with Veryfine
- Exploring mining phosphorous from waste water
- TDM ridesharing, van pooling, subsidize transit to limit single occupancy vehicle use
BMS New $250M expansion:

- 231,000 sf Biologics Development Building (BD-B)
- 131,500 sf Clinical Man. Building (CMB)
- New space for developing and manufacturing biotechnology drugs for clinical trials.
- 350 to 380 new employees.

Adaptive Reuse:

- Former Gillette packaging facility.
- New tenants: SMC and Instrumentation Laboratory – Medical Device Man.
- New Loading Docks
- Owner installing over 3.5 MW solar PV on roof and adjacent roof of 66 Saratoga Blvd.
Devens Recycling

- Construction & Demolition Debris recycling
- Food Waste diversion law and policy
- On-site processing into new material/ feedstocks
- Opportunities for synergistic co-location

Sustainable Infrastructure

- Redevelopment of WWTP and RIB’s
- LID road drainage
- Bike lanes
- TDM
- Multi-purpose trails
- Renewable energy
- Over 10 MW Solar PV, wind energy (10% of total energy)
Devens EIPS Sustainability
Framework addresses:

• Economic and business sustainability
• Social matters
• Governance
• Public health
• Transportation
• Natural resources
• Environmental quality

The framework is supported by a number of goals and the goals are supported by indicators

Cote and Liu 2016

Economic and Business Sustainability
category (Economic Gains)

• This category has a number of goals:
• Attraction and retention of companies within the carrying capacity of the park
• Maintain unemployment rate below Mass. Average
• Increase in number of jobs especially high paying jobs
• Increase in participation in DEEC events
• Increase in firms that purchase collaboratively, share equipment or personnel and by product exchanges
Devens Overview 2016

Sustainable Indicators

- Attraction and retention: number of companies and nonprofit organizations
- Unemployment: Rate compared to Mass. Average
- Jobs: number of jobs / employees; annual mean wage vs Mass. Average
- Participation: Percent of organizations involved with DEEC (Devens Eco-Efficiency Center)
- Purchasing and sharing: Percent of firms that do joint purchasing or share equipment or personnel and tons of by-product exchanged

Devens Overview 2016

Devens Sustainable Indicators Report

- 2000 Report on progress toward SD Reuse Plan goal
- 2012 update DEC, MD, DEEC and UMASS
- Continue to further the goal of SD within DREZ
- Survey of Businesses
- Presentations to businesses, residents
- In-person interview with businesses (survey follow-up)
- 2017 next Indicators report
Eco-industrial park key characteristics:

- planning with the ecological capacity of the area in mind;
- energy production focusing on renewable resources;
- green building design (optimize conservation of materials and energy);
- webs of businesses (producers and consumers, scavengers and decomposers);
- water/wastewater infrastructure that recovers and reuses;
- information management system which facilitates networking;

The formula:

Cooperation + Collaboration + Efficiency/Sharing Economy (information, materials, water, energy, infrastructure and the local habitat)

Triple-bottom-line benefits for all.
Education:

- Fact Sheets - Composting, reuse & recycling guidance
- Benefits of Street Trees
- EPA LID Fact Sheets and MA Smart Growth Toolkit, UNH
- Case Studies - GI and ZNE (seeing is believing!)
- Devens Eco-Efficiency Center

Devens LID Case Study: 27 Jackson Road

<table>
<thead>
<tr>
<th>Item</th>
<th>Estimated Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced site paving</td>
<td>-$32,000</td>
</tr>
<tr>
<td>Reduced curbing</td>
<td>-$50,000</td>
</tr>
<tr>
<td>Reduced stormwater piping</td>
<td>-$14,000</td>
</tr>
<tr>
<td>Reduced stormwater structures</td>
<td>-$68,000</td>
</tr>
<tr>
<td>Increased landscaping</td>
<td>+$12,000</td>
</tr>
<tr>
<td>Increased site preparation</td>
<td>+$10,000</td>
</tr>
<tr>
<td>Increased soil mix</td>
<td>+$18,000</td>
</tr>
</tbody>
</table>

Total Estimated Savings: -$124,000
Devens Sustainable Housing Pilot Case Study

- Showcase EE & WE, sustainable & affordable construction ($225-$350K)
- LID components (reduced pavement widths, porous walkways, on-site roof runoff infiltration (no gutters) and bio-filtration rain gardens)
- IAQ/GHG reduction
- Cluster/OS protection, smart loc.
- Climate adaptation - more resilient buildings & infrastructure

Incentives:

- Green Building Incentive Program (USGBC’s LEED Suite):
  - Sustainable Sites
  - Materials and Resources
  - Energy and Atmosphere
  - Indoor Environmental Quality
  - Water Efficiency
- Projects receiving LEED® certification - 15% fee refund
- LEED by Example: MassDevelopment build to LEED Plus
- Devens Eco-Efficiency Center
Incentives cont...

- Expedited permitting (75 days new; 30 days reuse)
- SWM credit for LID and green roofs
- Relaxed frontage requirements for more EE & WE dev.
- RE Building and Electrical Permit Fee Reductions
- Net Metering & demand response (municipal utility)

Regulations to facilitate EIP:

Site Plan
- Green Roof & Green Wall Requirements (GHG)
- EV & carpool parking, parking maximums, anti-idling (UHI, GHG/TDM)
- Tree Protection/Planting and Steep Slope Overlay (ecological connectivity)

Subdivision
- Complete Streets Standards (street trees, LID drainage, reduced pavement widths, pedestrian scale design, bike lanes, traffic calming)
- Additional street types (neighborhood, parkway – more green, less grey)

General Regulations
- LID stormwater standards (DEP & UNH)
- RE standards EE, water efficiency
- GHG mitigation standards (Stretch Code, green roofs, inventory)

http://www.devensec.com/devserv.html
Devens – An Eco-Industrial Park

- Concept to achieve original reuse plan objectives
- Ecological Systems Approach (System of Industries – Circular Economy)
- Value Added for facilities locating to Devens
- Devens Eco-Efficiency Center as tool to facilitate eco-industrial development

The changing value of waste

- Michael J. Coren reports: “For at least a decade, investors poured money into technologies to turn garbage into electricity by burning it. That proved profitable enough. But in the last five years, the economics have changed.”
- Investors are convinced, according to Coren, “that waste streams, if efficiently processed, could unlock a profitable new source of materials. Wang says the emerging vision for waste management is using software, analytics, and robotics to better catalogue and process trash at the source in homes and businesses. Companies can stream this data to processors who efficiently acquire, refine, and resell the materials back into the supply chain.”
- Coren provides additional details about the shifting flows of capital, as waste management goes from energy production to recycling.
- Tech investors bet they’ll make more money mining garbage than burning it

- Published on Wednesday, September 7, 2016 in Quartz
Current EIP Sites in Canada and the US 2013

Canada – 19 Eco-Parks
US – 45 Eco-Parks

Listing of Canadian Eco-Industrial Parks 2013

1. Partners in Project Green - Pearson Eco-Business Zone (Pearson Airport- Canada's largest industrial concentration
2. Alberta Industrial Heartland – Edmonton, Alberta
3. EIP - Olds, Alberta
4. Dundalk Eco Park - Southgate, Ontario
5. Ontario East Wood Centre Eco Industrial Park - Johnstown, Ontario
7. Ross Eco Industrial Park REINA (Eco Industrial Network) - Regina, Saskatchewan
8. Taiga Nova Eco Industrial Park - Fort McMurray Alberta
9. Tilbury Eco Industrial Park - North Vancouver Regional District, British Columbia
10. Eco-Industrial Park Valoris - Sherbrooke, Quebec
11. EIP - City of Prince Albert, Saskatchewan
12. Debert Air Force Base (CoRDA) - Truro, Nova Scotia
13. Chester Eco Industrial Park – Chester, Nova Scotia
14. Horsehill Energy and Technology Park - Edmonton, Alberta
15. Exploring Eco Districts - Vancouver, British Columbia
16. Spruce Grove Eco Industrial Park project – Spruce Grove, Alberta
17. Bruce Eco Park (Ontario Power) - Kincardine, Ontario
18. The Sandstone Eco Industrial Park - Nanaimo Regional District, British Columbia
Devens Overview 2016

Listing of US Eco-Industrial Parks
November 2013

1. Devens Eco-Industrial Park, Devens, MA
2. Camden Eco Industrial Park, Camden, NC
3. ReVenture Park, Charlotte, NC
4. Catawba Eco Complex, Piedmont, NC
5. Infinus Renewable Energy Eco-Industrial Park, Hilburn Co. FL
6. Tiverton Eco Industrial Park, Tiverton, RI
7. Noisette Companies, North Charleston, SC
8. Star Eco Industrial Park, Star, NC
9. Fairfield Eco Industrial Park, Baltimore, MD
10. NewMarket District, Boston, MA
11. New Bedford initiative, New Bedford, MA
12. USBCSD Mobile, AL
13. Hudson Eco Industrial Park, Hudson, OH
14. Port Townsend Eco Industrial Park, Port Townsend, WA
15. Eco Industrial Districts, King County, WA
16. USBCSD Puget Sound, WA
17. Port of Portland Eco Industrial Project, Portland, OR
18. City Initiative, Reno, NV
19. Forsyth Co Eco Industrial Park, Forsyth Co, GA
20. Silver Bay Eco Industrial Park, Silver Bay, MN
21. Green Institute, MNPULS, MN
22. Itasca Eco Industrial Park, Grand Rapids, MN
23. Gaylord Eco Industrial Park, Gaylord, MI
24. USBCSD Detroit, Lansing MI
25. Anderson Eco Industrial Park, Anderson, IN
26. USBCSD Kansas City, MO
27. USBCSD Chicago, IL
28. The Factory, Chicago, IL
29. Sustainable South Bronx EIP, Bronx, NY
30. Central NY Agri-Business Park, NY
31. Campbell Industrial Park, Honolulu, HI
32. Keystone Eco Industrial Port Complex, Bucks Co., PA
33. Spiritwood, ND
34. New Belgium Brewery, Fort Collins, CO
35. Houston Ship Channel, Houston, TX
36. USBCSD Austin, TX
37. Industrial Park, Fort Dodge, IA
38. Industrial Park, Blair, NE
39. Stonegate Eco Industrial Park, Anderson, CA
40. EcoMaine EIP, Portland, ME
41. Rialto Eco Industrial Park CA
42. Intervale Food Center, Burlington, VT
43. Londonderry Eco Industrial Park, Londonderry, NH

Devens Overview 2016

EIP themes and trends

- Chemical and BioFuel Parks
- USBCSD projects
- Local government supported parks as part of a economic development strategy
- Agricultural based EIPs
- PALME ISO14001 parks in Canada and France
- Parks built around a single business and its by-products
- Energy parks
USFWS Visitor Contact Sta.

- Parking and meeting pavilion
- Outdoor Education including discussion of Eco Industrial Development
- Connection to Oxbow NWR and Devens trail system
- Amphitheater
- Canoe launch/ parking (not open)
- River/Wildlife viewing Platform

Grant Road Neighborhood Redevelopment

- Former military housing neighborhood
- 124 unit mix of 1,2,3,4 unit NZE homes and townhomes & 2x20 apts
- Affordable (25% deed restricted low-moderate)
- Higher density (7-20 UPA)
- Energy Efficient & Water Efficient
- Connected/accessible, walkable
- Live, work, play community