



# Smart Growth on the Ground

## FOUNDATION RESEARCH BULLETIN: Squamish

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No. 7  
April, 2005

### ECO-INDUSTRIAL NETWORKING

#### 1.0 Introduction - Issues

Infrastructure planning is often completed using a single media approach e.g. water supply is planned separately from wastewater treatment. Land use planning and economic development are also often planned in isolation, and also separate from infrastructure planning. All of this planning and design are in turn completed outside of the context of the surrounding ecosystem. As a result of this fragmented approach, community and business costs and environmental impacts increase. Many opportunities for collaboration, integration, and more ecological design are missed.

Eco-industrial networking (EIN) is helping communities, including their businesses, to address these issues by looking for resource collaboration or networking opportunities.

This bulletin will provide an introduction to EIN, including a brief review of case studies. This bulletin will also provide some suggestions to illustrate how EIN can support and enhance Squamish's *existing* plans and policies, and can support the Smart Growth on the Ground objectives.

#### 2.0 What Is EIN?

Eco-Industrial Networking (EIN) is a process that creates collaborative networks between businesses, governments, and communities to more efficiently and effectively use resources. In practice, this results in:

- Recovery and cycling of “wastes” for use by another organization;
- Efficient and ecological infrastructure systems
- Increased economic diversification and value-added manufacturing opportunities;
- Leveraged partnership opportunities between a variety of private and public organizations; and
- Integral consideration of ecological, social, and economic impacts

By co-operating strategically, partners accrue greater financial and environmental benefits than they would by operating alone.

EIN can be applied at a small scale, such as a multi-tenant building, or on a large scale, such as a neighbourhood or even a region. EIN can be applied to new developments, or to retrofit existing developments.

Breaking down the EIN definition:

- Eco - ecology and economy.
- Industrial - all sizes and types of operations in which materials, water, and energy are utilized or transformed.
- Networking - building relationships that are *physical* (e.g., pipes or trucks) or *virtual* (e.g., common procurement).
- Resources - materials, energy, water, land, infrastructure, and people.

Some examples of the components and potential benefits of EIN include:

<p><b>People (Social) Networking</b></p> <ul style="list-style-type: none"> <li>• Early, sustained stakeholder engagement &amp; capacity building</li> <li>• Collaborative relationships and “bridge-building”</li> <li>• Learning By Doing</li> </ul>	<p><b>Business Networking</b></p> <ul style="list-style-type: none"> <li>• Resource synergies</li> <li>• Shared services</li> <li>• Reduced infrastructure demand or shared infrastructure</li> <li>• Partnerships for green technologies</li> </ul>
<p><b>Green Planning, Design, Products</b></p> <ul style="list-style-type: none"> <li>• Ecological protection</li> <li>• Better, more efficient land use (integrated land use planning)</li> <li>• Green buildings, products, processes</li> </ul>	<p><b>Municipal Networking</b></p> <ul style="list-style-type: none"> <li>• Support/integrate current plans and strategies</li> <li>• Shared, distributed, ecological infrastructure</li> <li>• Reduced demand for infrastructure</li> </ul>

### The Ecosystem Analogy

EIN represents an application of the principles of industrial ecology. Industrial ecology is based on two main premises:

- Nature can serve as a model (e.g. nothing is a “wasted”): By applying nature’s lessons, we can create diverse, stable, resilient, and efficient economic systems.
- “Systems” perspectives are key. Communities need to be examined in the context of the broader natural ecosystems on which they depend.

Sustainable communities should mimic the symbiotic and synergistic relationships and exchanges that occur in natural ecosystems. In nature, ecosystems are powered by renewable, solar energy, and organisms fill niches, forming mutually beneficial symbiotic relationships with other organisms. This facilitates the cycling of materials and energy, as opposed to the traditional one use / once through resource flows common in traditional communities. Natural ecosystems also support diversity and redundancy, which leads to more stable and resilient systems.

## 3.0 EIN Case Studies

### Greater Vancouver Regional District

The GVRD anticipates that EIN will support demand side management (DSM) objectives by reducing infrastructure demand and costs, and improving environmental quality.

#### *EIN & Storm- and Wastewater Management*

Opportunities include:

- On-site stormwater recovery and reuse to displace potable water
- Co-ordinated collection, treatment and conveyance of stormwater from one or more industrial areas to other industrial users, displacing potable water.
- Use of “clean” wastewater from one or more businesses (or municipal wastewater treatment plants) by other businesses

Use of ecological treatment methods (e.g., solar aquatics™ or constructed wetlands) were especially suitable for wastewater with high biological oxygen demand, such as from food processors, laundries, or municipal sewage. Industries with human health issues, such as food or cosmetics producers, are unlikely to be able to use non-potable water, even if it’s high quality.



widely, located closer to and within buildings.

- Resource Sharing With Other Sectors - connecting green housing developments to ICI and agricultural sectors (with respect to land, materials, energy, water, etc).

### **Small-Scale EIN**

The potential for smaller scale opportunities have been examined a) among micro and small businesses within a downtown core; and b) within community town centres that are participating in a community learning network. Small-scale EIN opportunities include:

- Joint performance (eco-efficiency) audits
- Joint and/or shared logistics; training and green marketing
- Shared infrastructure e.g. rainwater capture
- Downtown employee trip reduction programs
- Small business engagement in assets mapping
- Green procurement policy for downtown businesses
- Targeted 'green' economic development
- Nodes of recycling / remanufacturing activity
- By-product synergies
- Communication and information exchanges via online, information technologies

## **4.0 EIN & Municipal Strategic Objectives**

EIN encourages communities to build off their strengths and particular resource base, and to leverage existing programs and initiatives. Rather than starting from scratch, EIN can support and enhance existing plans and policies. For example, communities can work with local businesses to help co-ordinate transportation and logistics thereby meeting transportation demand management and greenhouse gas emission reduction objectives. At the same time this strategy will improve business efficiency and therefore, competitiveness, as promoted by economic development strategies.

It should be noted that EIN, like SmartGrowth and sustainability in general, is not very effective as an add-on strategy or stand-alone initiative. It should affect the design and planning approach right from the start. The same work, e.g. establishing a transportation framework, needs to be completed, but the terms of reference shift slightly. An EIN approach can also help to integrate infrastructure planning and a variety of municipal programs.

Table 4: Potential EIN Opportunities Addressing Multiple Municipal Objectives, Including the Smart Growth On The Ground Design / Planning Process

Sample Squamish Municipal Objectives							
Potential EIN Component	Example	Sustainable Community Design / Planning (SGoG Process)	Transportation	Liquid Waste	Energy / Greenhouse Gases	Economic Development	Sustainable Development
Green, Efficient Energy	Businesses jointly purchase green energy certificates.	New developments include renewable energy facilities; mixed use neighborhoods share distributed green energy infrastructure.	Support alternative fuel (H2; biofuel) pilot projects (e.g. municipal bus fleet).	Recover heat from hot wastewater streams; use "clean" wastewater to displace non-potable uses.	Co-ordinated energy audits, green building retrofits, joint renewable energy pilots; retrofit projects target energy efficiency.	New micro-utility businesses in Squamish (e.g. Alternative Energy Initiative)	
Shared / Green Wastewater or Stormwater Management	Treated wastewater from multiple businesses displaces other business's potable water needs.	EIN approach increases industrial density (e.g. in Squamish business park), makes wastewater cascading easier & more cost effective; distributed infrastructure; green roof technologies.	Transportation infrastructure designed to reduce stormwater runoff (e.g. porous pavers).	Wastewater cascading reduces discharged volumes. Distributed eco-WWTs in neighbourhoods; commercial centres; business parks.	Decentralized treatment reduces pumping costs; potential for microhydro	New micro-utility business in Squamish	All EIN opportunities would help the District of Squamish to demonstrate leadership in implementing sustainable environmental planning, design, and practices!
Integrated & Ecological Land Use	Developers of a new business park find ways to protect sensitive areas AND meet \$ objectives.	Businesses incorporating sites' ecological features, natural landscaping, smoothing the commercial / residential interface; building massing; shared facilities.	EIN supports urban infill / densification, which supports more transit and shared commuting.	Co-ordinated efforts to xeriscape can reduce initial costs to businesses, and reduce water consumption.	Better planning reduces building energy consumption, facilitates energy cascading, and allows businesses to support micro-utilities.	EIN helps to identify infill and redevelopment opportunities (e.g. business incubator for small wood products manufacturers)	
Niche and Green Economic Development	Municipality's Ec. Dev. officer attracts progressive businesses by promoting the EIN approach.	Attract businesses that fit Squamish sustainable community / EIN vision; encourage re-devmt to avoid sprawl; accommodate mixed uses; seek marketable opportunities from resource synergies.	District participation in B.C.'s Hydrogen Highway; or Fleet Challenge B.C. (biofuels), attracts related sustainable transportation industry.	Opportunities for micro-wastewater treatment plants; marketability of fertilizer/plant products of a solar aquatics™ facility.	Attract bio-fuel co-gen facility; fuel cell refueling station (H2 Highway); boost competitiveness of existing green energy companies.	marketing initiatives; attract "scavenger/decomposers" (e.g. recycling; re-manuf; rental & repair firms).	

## 5.0 EIN & Smart Growth on the Ground in Squamish

Squamish Smart Growth on the Ground (SGOG) is focusing on the Downtown Core, including a portion of the highway and new development projects such as the Adventure Centre. It will be important for SGOG to consider the study area in the context of surrounding commercial and industrial activities on which this community depends. While SGOG will seek to ‘green’ the Squamish downtown core, this study area will nonetheless continue to consume a lot of resources. The question then becomes, how can we identify potential resource synergies within the downtown core that will maximize triple bottom line benefits for the downtown *and* surrounding community?

EIN applies a systems approach by incorporating Squamish’s existing resource base (both within and outside of the study area), municipal initiatives and objectives (e.g. Squamish Wood Product Initiative; Alternative Energy Initiative; Shared Use Manufacturing Facilities; Downtown Revitalization) and both large and small scale opportunities for resource synergies. To encourage an EIN approach to the conceptual planning, Squamish SGOG charrette teams, could consider the following questions:

### **Water: Potable, Storm, and Waste**

- How can stormwater management support stormwater recovery and re-use e.g., in Maplewood, it was proposed that all stormwater generated in a future business park would be collected then polished and stored in a constructed wetland for re-use by local industries. The wetland would also support much needed green space.
- How can utility corridor design support other objectives such as provision of green space?

### **Transportation**

- How can transportation infrastructure design address both transportation and stormwater management objectives? e.g., reducing impervious surface.
- How can transportation infrastructure requirements of more than one company/facility be addressed with less paved surfaces? E.g. shared parking; shared shipping/receiving facilities, etc.
- How can businesses be situated to take advantage of *and* co-ordinate multi-modal transportation opportunities?

### **Materials Management**

- How can the collection and aggregation of small amounts of waste, e.g. restaurant food waste, be facilitated?
- How can building and site design utilize locally available new or “waste” resources e.g., off-spec concrete blocks?

### **Open Space**

- How can materials management support open space requirements? E.g. combining small amounts of compostable food waste could lead to creation of a community garden, which has both habitat and potential economic development value.
- How can designs for transportation infrastructure and stormwater management address greenspace objectives?

### **Economic Development**

- What are some of the potential niche or waste-utilizing new business opportunities, and where can they be accommodated?
- How can businesses be clustered or co-located to promote cost-saving (and profit and competitiveness enhancing) opportunities such as sharing of facilities and services e.g., truck washes?



## 6.0 Additional Sources of Information

### Canadian Eco-Industrial Network

[www.cein.ca](http://www.cein.ca)

### Eco-Industrial Solutions Ltd

[www.ecoindustrial.ca](http://www.ecoindustrial.ca)

### The Maplewood Project

[www.maplewoodproject.org](http://www.maplewoodproject.org)

### Tilbury Eco-Industrial Partnership Project

<http://www.corp.delta.bc.ca/eco-industrialpartnership/>

### Eco-Industrial Development Council

[www.eco-industry.org](http://www.eco-industry.org)

### International Society for Industrial Ecology

[www.yale.edu/is4ie](http://www.yale.edu/is4ie)

LeBreton, W., Côté, R., and Casavant, T. (2004). Small Scale Eco-Industrial Networking: Inter-Organizational Collaboration to Yield System-Wide Benefits in Communities. *Progress in Industrial Ecology - An International Journal*. 1(4): 432-453.

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