Getting Serious about Sustainability: Exploring the Potential for One-Planet Living in Vancouver

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One-Planet U Vic., Bateman Centre for the Arts January 23, 2017
Vancouver

• Reputation as a sustainable city
• Ecological footprint on par with most high-consuming cities
• Schism between perceptions and facts?
Urban Living in the Anthropocene

50% of net primary production in service of human population

50% of global population lives in cities
Our Planet

Bio-Capacity

Urban Impact

Economy
Built Environment
Consumption
Lifestyles
Understanding Urban Ecosystems

City

the health of the city's hinterland affects local BIODIVERSITY, ECOLOGICAL INTEGRITY and Earth's CARRYING CAPACITY

Ability to Measure Impact on Urban Ecosystems
Natural Capital only source of true production

• Natural capital refers to a stock of ecosystem assets that yield ecological goods and services (Neumayer 2003).

• e.g., photosynthesis and pollination to produce food, fuel and fibre
• e.g., evaporation and transpiration to produce rain and fresh water
The Ecological Footprint

Courtesy: Mathis Wackernagel, Global Footprint Network
Biocapacity = Net Primary Production

11.96 billion hectares of ecologically productive land and sea area (WWF 2014)

Approximately 1.7 gha/ca

7.3 billion people
Definition of One-Planet Living

• One-planet living refers to a lifestyle that, if adopted by everyone, could be supported indefinitely by the regenerative capacity of Earth’s ecosystems (Wackernagel and Rees 1996).

• It uses the ecological footprint as a metric, and is currently estimated at 1.8 gha/ca (James and Desai 2003).
## Vancouver Greenest City 2020 Action Plan

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<th>Zero Waste</th>
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<th>Lighter Footprint</th>
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<td>Green Transportation</td>
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<td>Clean Water</td>
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<td>Local Food</td>
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<td>Access to Nature</td>
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Lighter Footprint Goal

Vancouver leadership in working with Ecofootprint and committing to reducing it!

**KEY STRATEGIES TO 2020**

**Measure and report**
Report on the progress and highlight the successes from implementing the other nine Greenest City 2020 Action Plan goals. This will help to maximize the potential footprint reductions.

**Engage, encourage, and enable**
Engage and support residents, businesses, non-profits, and other community members to work together to create diverse lighter footprint solutions.

**Exemplify**
Demonstrate lighter footprint actions and choices in City operations such as parks and community centres and in City services such as garbage collection, street maintenance, and special events.

Footprint data encompasses consumption-based emissions inventory equivalent to scope 3.
Why Measure Consumption

Tell the whole truth about lifestyle impacts

Inspire people to act on what they can change.

Link policy to footprint outcomes

Leverage city initiatives through engaged citizenry.

Report on Scope 3 emissions
Two Methods

**COMPOUND Method**
- Top-down
- National data
- Input-Output economic tables
  - [http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/trade26-eng.htm](http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/trade26-eng.htm)
  - [http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/met01/met130-eng.htm](http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/met01/met130-eng.htm)
- Comparable
- Comprehensive
- Not locally responsive

**COMPONENT Method**
- Bottom-up
- Local data
- Municipal and Regional reports
  - [http://www2.gov.bc.ca/gov/content/environment/climate-change/reports-data/community-energy-emissions-inventory](http://www2.gov.bc.ca/gov/content/environment/climate-change/reports-data/community-energy-emissions-inventory)
- Not comparable (as a rule)
- Significant data gaps
- Locally responsive/relevant
Component Method: *integrated urban metabolism, consumption-based inventory, eco-footprint*

- Residential Urban Metabolism
  - Tonnes and litres of materials
  - Gigajoules/kilowatt hours energy
  - Kilometres, hectares of land

- Consumption-Based Emissions Inventory
  - Greenhouse gas emissions (operating and embodied)

- Energy footprint
  - Materials footprint

Ecological Footprint

Jennie Moore © 2015
Vancouver’s Ecological Footprint

• Vancouver ecological footprint 2,430,476 gha (an area 212 times larger than City itself)

• Vancouver per capita footprint = 4.21 gha/ca (with senior government services = 4.97 gha/ca)

• Need to reduce EF by 58% to close sustainability gap
Vancouver’s Ecological Footprint
By LAND USE

Total: 4.21 gha/ca

- Built Area: 0.06 gha/ca
- Energy: 2.21 gha/ca
- Forest: 0.18 gha/ca
- Fishing: 0.12 gha/ca
- Pasture: 0.13 gha/ca
- Crop: 1.51 gha/ca

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Vancouver’s Ecological Footprint
By ACTIVITY

- Food: 2.13 gha/ca
- Buildings: 0.67 gha/ca
- Consumables & Waste: 0.58 gha/ca
- Transportation: 0.81 gha/ca
- Water: 0.02 gha/ca

TOTAL: 4.21 gha/ca

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Food Footprint
(2.13 gha/ca)

- Materials (Cropland): 75%
- Materials (Pastureland): 18%
- Embodied Energy (Production): 1%
- Operating Energy (Food Miles): 0%
- Built Area (n/a): 6%

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Food Footprint by TYPE
(2.13 gha/ca)

- 16% Oils, Nuts & Legumes
- 14% Dairy Products
- 10% Fish, Meat & Eggs
- 10% Grains
- 48% Stimulants (coffee, tea, sugar)
- 10% Fruit & Vegetables
- 1% Beverages

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Buildings Footprint
(0.67 gha/ca)

- Commercial / Institutional operating energy: 40%
- Built Area: 3%
- >0.5%: 5%
- Materials: 12%
- Residential embodied energy: 1%
- Residential operating energy: 39%
Consumables and Waste Footprint (0.58 gha/ca)

- Materials Disposed: 0%
- Embodied Materials Disposed: 1%
- Embodied Energy of Materials Disposed: 7%
- Embodied Energy of Materials Recycled: 0%
- Solid Waste Operations: 0%
- Liquid Waste Operations: 0%
- Solid Waste Built Area: 20%
- Liquid Waste Built Area: 33%
- 39%

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Assumptions vs. Analysis

Vancouver 2020
- Reduce GHGs 20%
- Improve building energy efficiency 20%
- Over 50% of trips by walking, cycling, transit
- Reduce waste to landfill by 40%

One Planet
- Reduce GHGs by 80%
- Improve building energy efficiency 60% and triple density
- 100% trips by walking, cycling, transit
- Reduce consumption by 45%
Assumptions vs. Analysis cont.

Vancouver 2020

• Plant 150,000 trees
• Reduce Ecological Footprint by 33%
• Reduce water consumption by 33%
• Meet or beat WHO air quality guidelines
• Reduce carbon content of food 33%

One Planet

• Plant 750,000 (more?)
• Reduce Ecological Footprint by 61%
• N/A
• N/A
• Reduce carbon content of food 50% and change diet
One-Planet Baseline
Top five actions include:

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<tr>
<th></th>
<th>Action</th>
<th>Impact (gha/ca)</th>
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<tbody>
<tr>
<td>1</td>
<td>Make 86% of trips by walking, cycling and transit</td>
<td>0.38</td>
</tr>
<tr>
<td>2</td>
<td>Reduce food waste post-purchase by 50%</td>
<td>0.37</td>
</tr>
<tr>
<td>3</td>
<td>Reduce red meat consumption 50% by substituting with white meat or legumes</td>
<td>0.34</td>
</tr>
<tr>
<td>4</td>
<td>Improve energy efficiency in buildings by 40%</td>
<td>0.21</td>
</tr>
<tr>
<td>5</td>
<td>Reduce paper consumption by 50%</td>
<td>0.12</td>
</tr>
</tbody>
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One-Planet Lifestyle?

• Repurpose, fix and share belongings
• Avoid consumption of paper, red meat and bottled beverages
• Roads, roofs, and walls used for urban agriculture
• Most trips (86%) are by walking, cycling and transit, vehicles are zero emissions
• Most people don’t fly and very few own cars
• Buildings are energy efficient and zero emissions
Getting Serious About Sustainability
ecoCITY Footprint Tool
designed to integrate with
International Ecocity Standards

- **Urban Metabolism**
  - Resource inputs
  - Flows of energy and materials
  - Waste outputs
  - Consumption patterns
    - Food and dietary choices
    - Dwelling size
    - Consumable goods
    - Vehicle ownership
    - Recycling rates
    - Lifecycle analysis

- **Consumption Based Emissions Inventory**
  - Scope three compatible
  - Facilitates embodied energy assessment
  - Capacity for scenario analysis

- **Ecological Footprint Analysis**
  - Evaluation and policy analysis capacity
  - Achieving One-Planet Living
Timeline for Pilot Project with City of Victoria

- **February 2017**: Introductory Workshop (webinar)
- **Spring 2017**: Workshop to review populated database
- **Fall 2017**: Feedback Report to Pilots
- **Winter-Spring 2017**: Populate database
- **Summer 2017**: Scenario Development
- **Fall/Winter 2017**: Wrap up presentation
Concerned with the natural environment, the built environment, and the relationship between them.

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