

# ROADMAP FOR GREEN INNOVATION AND TECHNOLOGY DEMONSTRATION IN THE FALSE CREEK FLATS

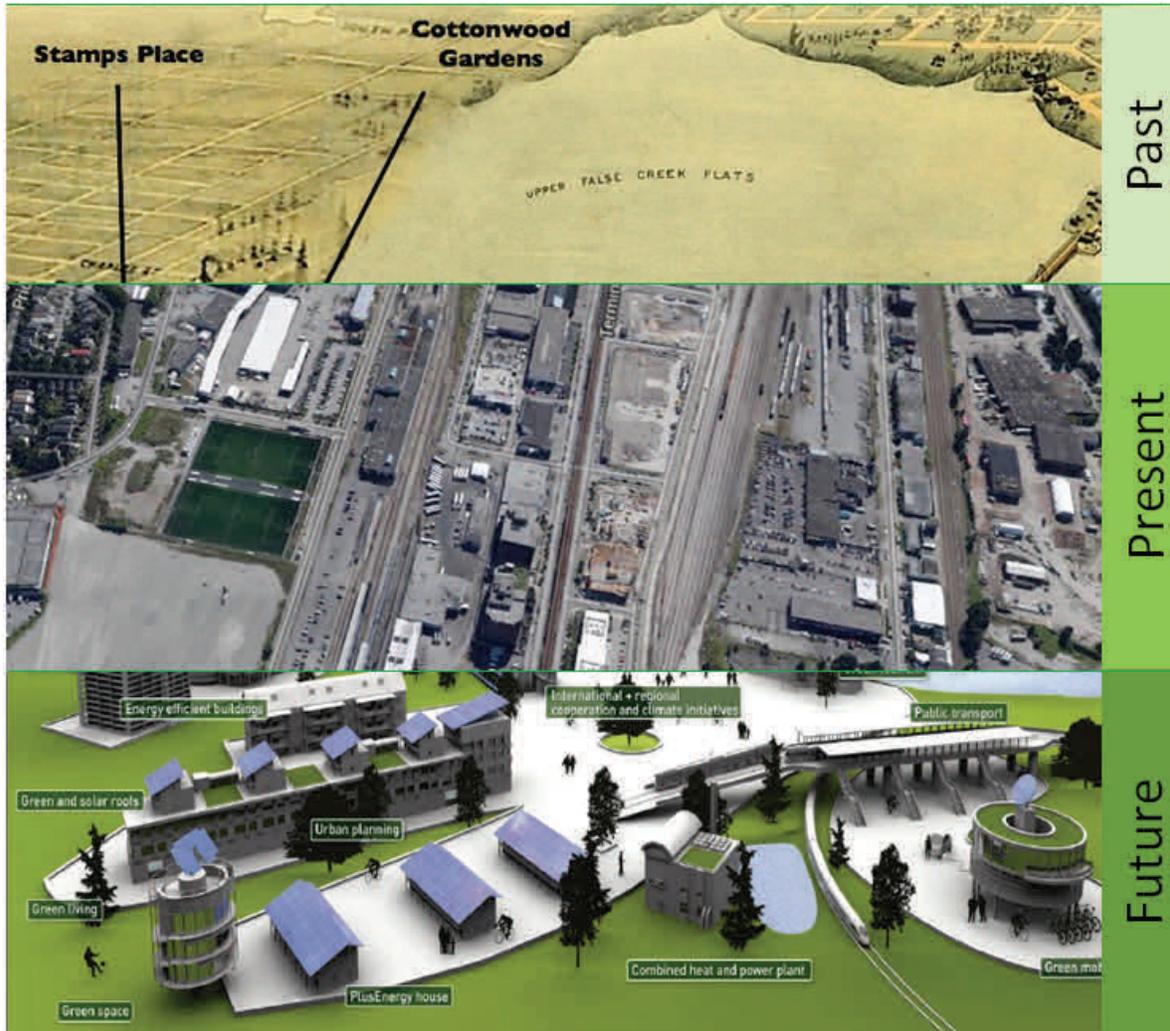


Figure 1: Illustration of the adaptation of the False Creek Flats over time. Images have been adapted from the following sources: (Donald Luxton and Associates Inc. 2013, Vancouver 2013, VEC 2014)

## “SECURING VANCOUVER’S INTERNATIONAL REPUTATION AS A MECCA FOR GREEN ENTERPRISE”

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2014 Greenest City Action Team Scholar Program

## EXECUTIVE SUMMARY

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The City of Vancouver issued the Greenest City Action Plan in 2011, and within this plan are 10 specific goals to guide the development of becoming the greenest city in the world. Among these goals, include securing Vancouver's international reputation as a mecca of green enterprise. The Vancouver Economic Commission (VEC) is helping to achieve this through a variety of methods including attempting to help reduce the amount of time it may take for green technology firms to commercialize their products or services. One of the areas that some firms encounter delays is with locating suitable demonstration sites to prove the effectiveness their technology. This is where the Vancouver Economic Commission is providing assistance as a matchmaker between demonstration sites and technology providers. Within this green technology demonstration program, there are currently two themes for demonstration: demonstration on public assets and demonstration on private assets. Although there is significant overlap between these themes, this research focuses on demonstration on private assets.

As this research shows, there are number of strategic alignments between green technology demonstration and external plans and strategies, and there are a few leading municipal scale entities in the green technology demonstration field from which lessons can be learned. Although there are currently only a handful of technologies and demonstration sites that have been identified, ideas for stim-

ulating demonstration projects have been provided. Additionally, to assist with the start of the demonstration, government funding that could support the research and development, ideas for increasing the amount of demonstration projects, and a filter for evaluating technologies for demonstration are also included.

### ***Research Topic:***

Roadmap for green innovation and technology demonstration in the False Creek Flats.

### ***Research Questions:***

- What opportunities are there for demonstrating green innovation and technologies in the False Creek Flats?
- What types of green technology companies exist in Vancouver that can demonstrate their technology?
- What can the VEC do to stimulate demonstration projects?
- What tools, processes, funding and support and communications approaches should VEC pursue?

### ***Vancouver 2020 Greenest City Goal:***

Securing Vancouver's international reputation as a mecca of green enterprise.

### ***Targets:***

Double the number of green jobs and double the number of companies engaged in greening their operations.

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### LIST OF ABBREVIATIONS

CLL	City as a Living Lab
FCF	False Creek Flats
GHG	Greenhouse Gas
LHSBC	Lighthouse Sustainable Building Centre
SBIA	Strathcona Business Improvement Association

UBC	The University of British Columbia
VEC	Vancouver Economic Commission

### ACKNOWLEDGEMENTS

I would like to thank the following for help with this research.

*The University of British Columbia and the City of Vancouver* for establishing the Greenest City Action Team Scholar program from which this research was funded. It is great to see that the program is growing and will continue on past the five year initial commitment.

*The Vancouver Economic Commission* for collaborating with the Greenest City Action Team Scholar program, providing an opportunity to directly apply some of my Masters research, and sharing with me the great work that the team is contributing towards.

*John McPherson* for continually assisting with various aspects of the report including identifying demonstration sites and collaborating with the development of a filter for evaluating companies.

*Juvarya Veltkamp* for helping develop the initial methodology and providing support along the way.

*Alison Monroe* for supporting so many UBC students through the years with the opportunity to be part of this program.

## 1. BACKGROUND

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The focus of this research is to extend the Campus as a Living Lab concept from the University of British Columbia to a “City as a Living Lab” (CLL).

The CLL is the focus of this research because it is believed by the author, the Vancouver Economic Commission, and the City of Vancouver to be a practical and effective way to advance the development of new sustainable (green) technologies. The CLL concept assists with the need to develop innovative technologies in order to become more sustainable. There are

*“ provide companies with an avenue to test their green technologies within a demonstration area ”*

many steps along this process, including idea creation, R&D, pilot testing, and commercialization. Mainstream commercialization may be delayed or prevented when companies encounter difficulties finding suitable pilot sites to demonstrate their technology.<sup>1</sup> One way to alleviate this is to provide companies with an avenue to test their technologies within a demonstration area. Through this process, barriers to the implementation of these technologies can be identified and solutions can be developed.

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<sup>1</sup> Finding pilot sites requires not only one site, but potentially several in order to develop enough of a portfolio. This portfolio can help bridge the chasm between early adopters (early users in the technology lifecycle) and early majority (mainstream users). This is due to “the only suitable reference for an early majority customer is another member of the early majority” (Moore 1991).

It is partly through these innovative technologies that greater energy conservation, sustainable energy production, water conservation, and larger overall greenhouse gas (GHG) reductions can be realized.

The goal of this first stage of the CLL is to have a platform for sustainable technologies to be implemented and demonstrated within the False Creek Flats (FCF). The result will be a reduction of barriers for implementing

sustainable technologies and an increase in adoption. This technology will have a broad reach including

community gardens, bike installations, recycling, solar installations, bio-reactors, and building retrofits among other opportunities. This will also help support all ten of the goals that emerged from the City of Vancouver’s “Greenest City 2020 Action Plan” developed in 2011.

### THE FALSE CREEK FLATS

The FCF have come a long way since the tidal-flats were filled in 1915 as part of negotiation between the City of Vancouver and Canadian Northern Railway to convert 147 acres into a railway and supporting facilities (Donald Luxton and Associates Inc. 2013). Although the site still has railway lines dividing north and south FCF, it has grown to be home to approximately 780 businesses spanning a spectrum of textile and fashion, arts and culture, food, construction,

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computer, automotive, educational institutions, and public services (Centre et al. 2013).

As illustrated in Figure 1, the majority of FCF falls between Prior Street, Great Northern Way, Main Street and Clark Drive. The area has 325 buildings with 50% being more than 50 years old and potential retrofit candidates (Lighthouse Sustainable Building Centre et al. 2012).

Currently the City of Vancouver is developing a local area plan (stimulus). Implied in this is redevelopment including investment in infrastructure and public realm, remediation, and building retrofits. The VEC is endeavoring to demonstrate local solutions through

investing in, developing, and applying local expertise.

Public engagements in the False Creek Flats started as early as 2005 and have ranged from data collection through workshops. To date there has been at least 11 public engagements with 10 of them occurring in the past two years. The most recent engagement has been with the Vancouver Economic Commission (as part of this report), Lighthouse (hosting workshops), and with the Strathcona Business Improvement Association (business survey).

A list of the past, current and future engagements can be found in [Appendix A](#).



**Figure 2: False Creek Flats delineation. Image adapted from Basilij 2013**

## 2. OBJECTIVES, SCOPE AND METHODOLOGY

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### OBJECTIVES

The goal of this research is to develop a roadmap for green innovation and technology demonstration in the False Creek Flats (FCF). From a distillation of the research questions, the objectives of this research have been simplified to the following:

1. Identify demonstration sites and green technology ready to be demonstrated; and
2. make recommendations for improvements on the current matching process.

### SCOPE

The scope of this research is limited to demonstration sites within the FCF, privately owned demonstration sites, and green technology companies located in Vancouver.

### METHODOLOGY

In order to answer the research questions posed, the following methodology was used.

1. Literature Review
  - a. Provide a background of the FCF as well as past, current, and future engagement plans.
  - b. Identify and highlight strategic alignment between this research and related City of Vancouver and Vancouver Economic Commission (VEC) plans, and strategies.
2. Demonstration Opportunities
  - a. Identify best candidates (sites) for green tech demonstration opportunities in FCF and hold in-person interviews.
  - b. Gather on FCF properties and companies, identify key missing pieces, and determine strategy to obtain these key missing pieces.
  - c. Identify green tech clusters and conduct interviews to identify minimum requirements for demonstration sites.
3. Roadmap Forward
  - a. Provide ideas to increase participation in green technology demonstration.
  - b. Develop business process models on how demonstration sites in FCF and technology providers can interact.
  - c. Develop a filter for evaluating green technology companies and their technology or service.
  - e. Identify potential external funding sources that could support green technology companies and how it could play a role.
  - f. Identify a series of recommendations to move the program forward.
- c. Identify best practices for facilitating green technology demonstration in other leading jurisdictions.

### 3. STRATEGIC ALIGNMENT

With the number of plans and strategies that have been published for Vancouver and the region, it can be helpful to understand where this research aligns and why it is useful. In order to provide this clarity, a summary of how technology demonstration aligns with other plans and strategies follows.

#### ***Greenest City 2020 Action Plan***

This plan encompasses 10 goals that guide the city to becoming the greenest city in the world. These goals are provided in Figure 3 below along with numbered headings. The

goals have also been grouped into how they fall into either ecological or social sustainability and are listed in Figure 3.

#### ***Regional Growth Strategy***

This strategy consists of five factors with the two most relevant to this research being the following.

1. Supporting a sustainable economy
2. Protecting the environment and respond to climate change impacts

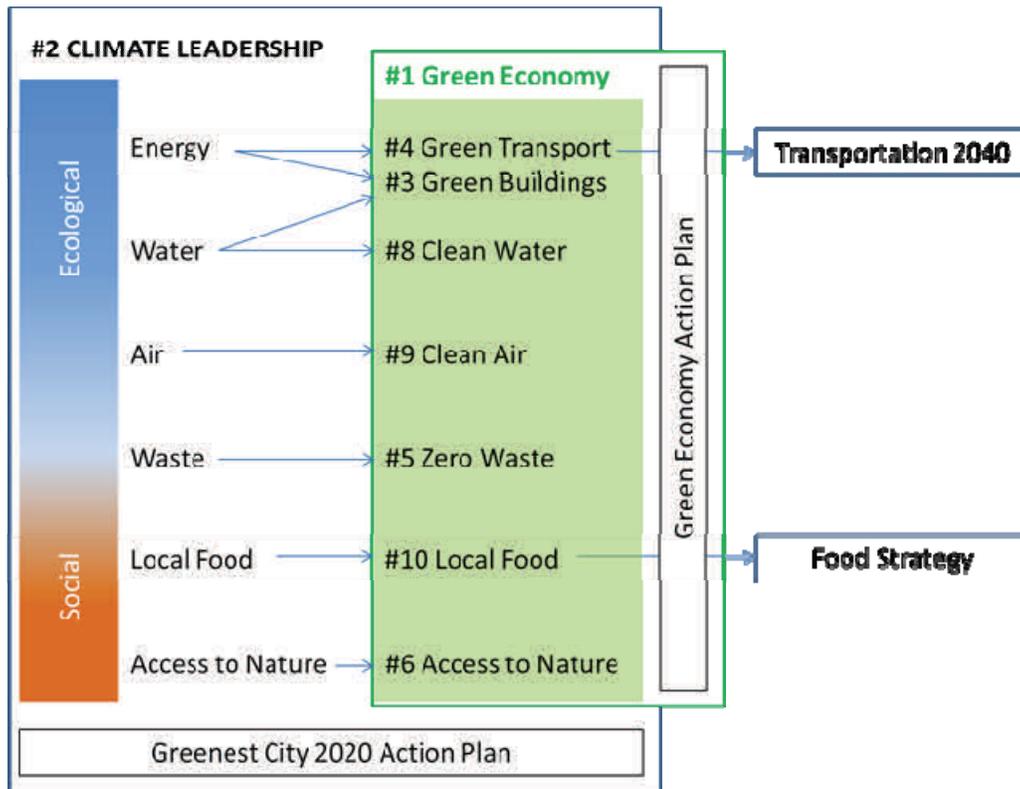


Figure 3: Strategic Alignment of Plans Connected to the Green Economy

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### ***Economic Action Strategy (2011)***

Two out of three of the three main aspects for managing the economy are aligned with this research and are listed below.

1. A healthy climate for growth and prosperity
  - a. Leverage opportunities to promote local innovation and innovators (green enterprise zones and strategies for early adoption)
2. Support for local business, new investment and global trade
  - a. Target opportunities in the green and creative economies, to improve employment expansion and business performance. (fully execute the ‘jobs and economy’ programs in the Greenest City Action Plan – double green jobs and businesses engaged in green business practices.)

### ***Green Economy Action Plan (2011)***

This plan addresses the Greenest City 2020 Action Plan goal “to secure Vancouver’s international reputation as a mecca of green enterprise” (Vancouver 2012). This research overlaps with the main components of the plan which are to bolster clean tech, green buildings, waste management & recycling, local food economy, and sustainability services & education.

### ***Digital Strategy***

Although the digital strategy does not have a specific green technology section, it does provide a strategy for the City of Vancouver to advance to a “level 4 digital maturity (“connected”) across all 4 capabilities (i.e. online, mobile, social, infrastructure & assets and organization) (Pye 2013). Given the possibility of expansion of a green technology demonstration program, it is helpful to understand the link to related digital strategies.

### ***Sustainable Development of Communities (ISO 37120-2014)***

While evaluating where this research aligns with other local plans and strategies, an emerging concept of various metrics came to light and led to the discovery of an ISO standard for measuring success. Details of this standard are provided in [Appendix B](#) and could provide new methods for evaluating the City of Vancouver’s progress with stimulating a green economy. Additionally, with these standards “cities can now consistently apply these indicators and accurately benchmark their city services and quality of life against other cities (Berst 2014).

***“ cities can now consistently apply these indicators and accurately benchmark their city services and quality of life ”***

*~ Jesse Berst, Smart Cities Council Chairman*

## 4. BEST PRACTICES

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A total of 14 cities were reviewed for best practices pertaining to green technology demonstration. These cities included Boston, Denver, New York City, Palo Alto, Portland, Los Angeles, Sacramento, San Diego, San Francisco, San Jose, Washington DC, Seattle, Melbourne, and Copenhagen.

The process of identifying which cities to review was based on their potential to be matching test sites with technology demonstration. Developing the list of cities involved referring to colleagues as well as the Siemens 2012 Green City Index Report and the 2013 U.S. Clean Tech Leadership Index.<sup>3,4</sup> Once cities were identified, information was collected by reviewing the local municipal and economic commission websites as well as their strategy documents if available. The questions to be answered included the following.

- 1) Is there a website to connect technology with demonstration sites?
- 2) Are the demonstration sites on public and/or private land?
- 3) What resources do they have for the program?
- 4) What challenges have arisen?

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<sup>3</sup> Due to time constraints, only cities in the Siemens 2012 Greenest City Report with ratings over 70 were reviewed.

<sup>4</sup> Only the top 10 cities were reviewed. The index can be found at the following link: <http://cleanedge.com/indexes/u.s.-clean-tech-leadership-index>

- 5) How much success have they had?
- 6) What opportunities are there for Vancouver?

Although there were a number of cities reviewed, there were only a few that emerged as leaders in this field. These included San Jose, Palo Alto, Copenhagen, New York City, and the University of British Columbia.

### SAN JOSE – PROSPECT SILICON VALLEY

*“Prospect Silicon Valley will deliver unprecedented access to [City of San Jose] resources”*

“Prospect Silicon Valley is the first non-profit, Silicon Valley-based commercialization catalyst created to support next generation urban systems. With the City of San Jose as lead partner, Prospect Silicon Valley will deliver unprecedented access to city resources, infrastructure, and data for demonstration, validation and commercialization of innovative solutions that create a more efficient and effective public infrastructure (Valley 2014a).”

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## CITY OF PALO ALTO

The City of Palo Alto has been offering technology demonstration opportunities with City assets since 2012 (Palo Alto 2013). Companies interested in participating in the program are required to fill out a three page application form available on their website that asks a variety of questions including “Describe how this product will promote conservation and sustainability”, “Describe the top 3 market barriers”, and “Describe how this technology will benefit the City of Palo Alto”.<sup>1</sup> A full copy of this form is also provided in [Appendix C](#) for reference.

**Resources:** In the first 15 months of operation, the program consumed approximately 400 hours of staff time. The program also has an approved budget of \$200,000; however, “it is anticipated that most of the \$200,000 funding provided will be used to hire consultants who will evaluate the performance of the technologies after they have been installed (Palo Alto 2013).

*“the \$200,000 funding provided will be used to hire consultants who will evaluate the performance of the technologies”*

**Challenges:** The first year of implementation saw projects managed in an ad-hoc manner and processes to evaluate projects on a clear and consistent basis were developed

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<sup>1</sup> A link to their website is provided here: [http://www.cityofpaloalto.org/gov/depts/utl/projects/innovation\\_program/default.asp](http://www.cityofpaloalto.org/gov/depts/utl/projects/innovation_program/default.asp)

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throughout the year. “A large increase in applicants would require additional staffing resources to implement, but there is no indication that this will happen in the coming year” (Palo Alto 2013).

**Success:** As of December 2013, eight projects had been submitted with three being accepted and one still under review. Projects accepted included distributed grid optimization, a solar PV sensor system for smart grid applications, and measurement of electrical consumption of residential plug loads.<sup>1</sup> Some of this success is attributable to the City of Palo Alto offering assets for testing of technology and providing assistance with grant applications.

**Opportunity for Vancouver:** May be able to collaborate on information sharing as both of our demonstration programs are in early stages.

## **THE UNIVERSITY OF BRITISH COLUMBIA - CAMPUS AS A LIVING LAB PROGRAM**

The Campus as a Living Lab at the University of British Columbia (UBC) provides a process for simultaneously meeting increasing infrastructure capacity requirements

while achieving sustainability goals. The Campus as Living Lab accomplishes this by collaborating with industry partners, operations, and researchers to utilize the campus as a test bed for commercialization of sustainable technologies. The Campus as a Living Lab operates within the University Sustainability Initiative and has a dedicated Working Group and Steering Committee to maintain momentum and provide oversight. The working group includes many senior people and project managers from campus operations, as well as members from the Strategic Partnerships Office, and the University Sustainability Initiative. The Steering Committee contains all of the same members from the Working Group, as well as people from Campus and Community Planning and external groups; such as, BC Hydro and the University Neighborhood Association.

**Resources:** There could be up to 400 (or even more) hours dedicated to Campus as Living Lab activities every month. This includes group meetings, time to develop partnerships with companies, and the additional time that implementing and commissioning new technology requires.

**Challenges:** Some of the challenges include identifying a project champion who has enough extra time to oversee a project on behalf of UBC. Additionally, new technology implementations bring with them inherent risk associated time delays and increased costs. There is extra due diligence required with construction, commissioning, and oper-

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<sup>1</sup> More details are available here: <http://www.cityofpaloalto.org/civicax/filebank/documents/33809>

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ation.

**Success:** Risks have been minimized due to having many experienced people including managers and people with specific technical expertise related to each technology. UBC is also becoming known as a destination to demonstrate new technology in the Campus as a Living Lab. In turn, researchers are both lending their expertise and gaining valuable industry relevant knowledge in the process. There have been numerous projects implemented to date including three signature projects: the Centre for Interactive Research for Sustainability, the Academic District Energy System, and the Bio-energy Research and Diversification Facility. The Academic District Energy system itself is estimated to reduce campus greenhouse gas emissions by 22% (Save 2014, pg1).

**Opportunity for Vancouver:** There are many opportunities for collaboration including the following:

- 1) Building a connection to local colleges and campuses and the green technology companies that are being created on campus. This includes maintaining a connection with the accelerators on campus, the University Industry Liaison Offices, and demonstration programs such as the Campus as a Living Lab.
- 2) Developing agreements with departments and professors to provide expertise as subject matter experts as part of

the technology and company review process.

## OTHER LOCATIONS

### *Copenhagen*

Matching services for green technology and demonstration sites are provided not only for Copenhagen, but for all of Denmark. A website provides search functionality and mapping to match technology with demonstration sites. It is unclear if public assets are listed.<sup>2</sup>

### *New York City*

The New York City Economic Development Corporation had created the NYC Urban Technology Innovation Center which is “a partnership between New York City and local universities connecting building owners and technology companies to drive clean technology innovation and commercialization” (New York City, Economic Development Corporation 2014). The Center was created with \$750,000 of cash and in-kind funding from New York City Economic Development Corporation and local universities (NYCEDC 2014). The amount of success is to date is unknown.

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<sup>2</sup> See the following websites for more information on Copenhagen: <http://www.cphcleantech.com/services/test--demonstration> , <http://www.cleantechfacilitator.com/>

## 5. DEMONSTRATION SITE IDENTIFICATION

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Data on businesses within the False Creek Flats (FCF) with potential for greening operations or as a demonstration site was collected through the following methodology:

- Car-pooling around the flats and locating large polluters / old buildings ripe for retrofit / vacant lots / for sale or lease sitting empty
- Collecting data on the owners and renters of the property
- Asking colleagues about companies that may be interested in becoming a demonstration site
- Contacting the owners and renters to see if they are interested in implementing green technologies

From this initial data collection, some of the following opportunities were uncovered.

### THE ARTS FACTORY

**Background:** The Arts Factory is in a City of Vancouver owned building located at 281 Industrial Avenue that contains 21,000 square feet of industrial warehouse across a main floor and a smaller office space above. The City of Vancouver has just begun a retrofitting of the exterior and the Arts Factory will be responsible for the retrofit of the interior. Although the building has a 10,000 square foot flat roof, there may be limitations with its use due to potentially hazardous ventilation from a machine and paint shop.

**Progress:** The Arts Factory has been introduced to a local service provider by the Vancouver Economic Commission (VEC) to assist with valuating what options are available for making their operations more sustainable.

**Opportunities:** There are still potential opportunities for technology to be demonstrated. The President at the Arts Factory, Elia Kirby, has stated “[they] would like to showcase sustainability”.

“we would like to showcase sustainability”  
~ Elia Kirby, President @ The Arts Factory

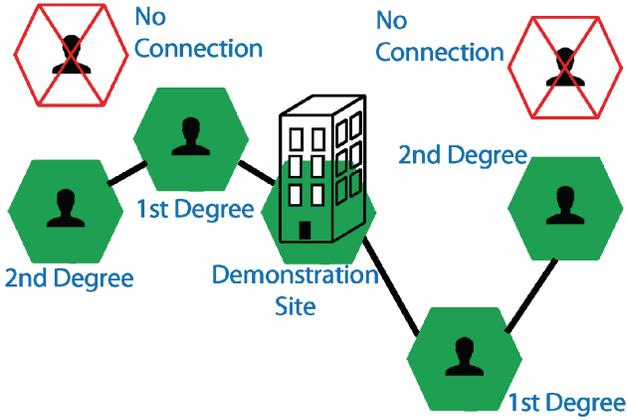
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**OTHER COMPANIES CONTACTED**

There were a number of other groups contacted for demonstration opportunities, but they proved to be unresponsive. The sites most responsive were from connections that were one or two degrees of contacts away as illustrated in Figure 4.



**Figure 4: Success rate of engaging demonstration sites was highest from up to 2-degrees of separation**

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## **OTHER OPPORTUNITIES TO EXPLORE**

On June 13<sup>th</sup>, a driving tour of the flats was conducted and some of the information that was collected follows.

### ***New Construction***

#### **MEC Head Office**

- Construction is underway at 1077 Great Northern Way on a 112,000 square foot facility aiming for LEED certification (MEC 2014).

#### **Red Truck Beer Company**

- Construction is nearing completion at 295 East 1<sup>st</sup> Avenue.

#### **Columbia College**

- Construction has not yet begun at Columbia College's new 438 Terminal location. The college will have the 2-5 floors on the first phase of this Rize development. See 438 Terminal for more information.



### ***For Sale / Lease***

#### **375 East 1st Avenue**

- 2.5 Acres – Great Northern Way Campus Trust placed a call for expression of interest from developers for a residential development opportunity with a submission deadline of June 1st, 2014 (Urban Development Institute 2014).

#### **438 Terminal**

- Rize Alliance will be developing the currently empty lot at 438 Terminal. This will be completed in two phases: Phase 1 will host Columbia College on the top 2-5 floors and the ground floor of 5,900 square feet will provide retail space. Phase 2 will be a 7-story building with 140,000 square feet of office space (Colliers International 2014).

#### **675 Evans Avenue**

- 2.5 Acres – Colliers International is facilitating the sale.

### ***Vacant Buildings***

310 Prior Street. PID # 008126780. Ownership is unknown.

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## **BUSINESS CATEGORIES AND TECHNOLOGY OPPORTUNITIES**

From taking time to view the False Creek Flats (FCF), it became apparent that there are a few types of business where there could be significant impact and are included in the following lists.

### ***Buildings***

- There are a variety of building types and uses in the FCF that may be able to benefit from energy retrofits.

### ***Food Wholesalers***

In addition to benefits listed under buildings, this group could benefit from technology involved with cooling for refrigerators and freezers, and reducing spoilage of produce.<sup>1</sup> Some of the companies in this category are listed below.

- Fresh Point
- Pacific Produce
- Fresh Direct Produce Ltd.
- Can-Am Produce and Trading Ltd.
- H.Y. Louie Cash and Carry Wholesale
- Van Whole Produce Ltd.
- The Produce Terminal
- Trimpac

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<sup>1</sup> Some of these companies had energy assessments last year.

### ***Vehicle fleets***

This group could potentially benefit from installing energy efficient vehicle conversion kits, route optimization programs, and integrating clean fuel into their systems such as bio diesel.

- Yellow Cab
  - 249 Taxi cabs including over 200 that are hybrid electric vehicles (Yellow Cab 2014).
- Busters Towing
- Star Limousine
- Shaw
- Telus
- Recycling Alternatives
- Mills Office Productivity
- Pacific Coach Bus lines
- The Greater Vancouver Food Bank Society
- All the fleets listed under Food Wholesalers

### ***Recycling / Waste Management***

This group could leverage opportunities for assisting local companies by providing additional services, such as access to a cardboard bailer. There are also opportunities for creatively re-using organics (i.e. aquaponics).

- Regional Recycling
- Recycling Alternatives

## 6. VANCOUVER GREEN TECHNOLOGIES

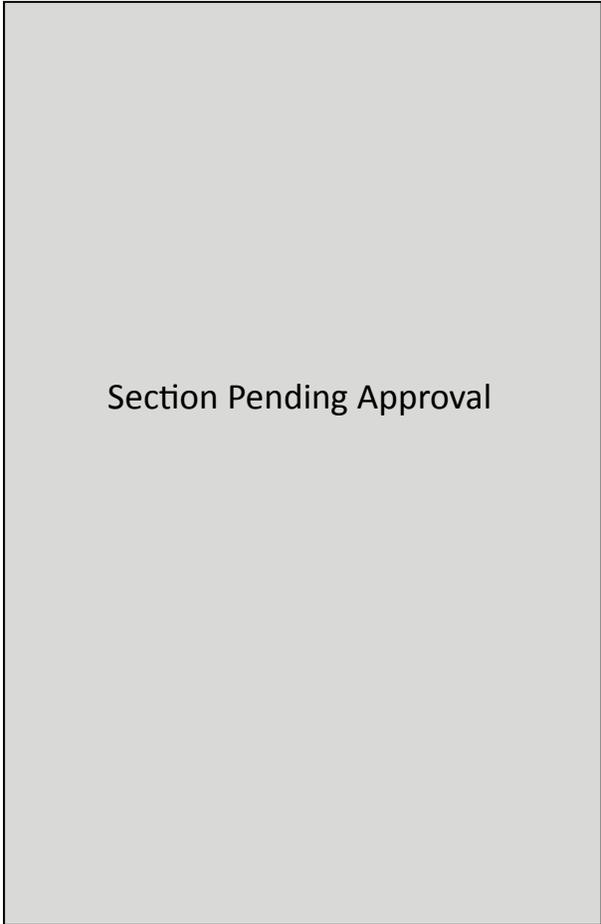
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As “Green Technologies” can spread many sectors, a categorization of green technologies according to green economy sectors in the 2014 Green Jobs Report is provided below (Veltkamp 2014).

1. Local food
2. Green building design and construction
3. Clean technology, alternative energy and green building products
4. Green infrastructure, transportation and planning
5. Sustainability services and education
6. Land and water remediation and environmental consulting
7. Materials management and recycling

As time was limited with contacting companies, the following methodology was used in determining who to contact. First, a list from KPMG with 68 green technology companies located in Vancouver was supplemented with additional firms as recommended by colleagues. Then this list was reduced to those who were located in Vancouver and showed the greatest potential for scalability and impact based upon an initial rough estimate. In the end, there were 38 companies on the list with only a handful of standouts. The companies all fell into the categories listed in the Green Jobs Report with the largest groups of companies landing in the Green Building design and Construction with 17 companies, and Green Infrastructure, Transportation and

Planning with 10 companies. Building upon these categories, some of the companies contacted included Etalim, Hydra, and BuiltSpace Technologies. From these early



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Given this, the next step will be to monitor start-ups in order to assist them when they are ready for demonstration. Obtaining monthly or quarterly contact updates from accelerators such as Foresight Cleantech Accelerator Centre, Highline, and e@UBC could help with this link to new and up and coming companies.

## 7. STIMULATING DEMONSTRATION PROJECTS AND THE ADOPTION OF GREEN TECHNOLOGIES

As the Vancouver Economic Commission’s list of green technology grows, it becomes increasingly important to be able to succinctly relay what technology is available to people who have interest. These people include building owners, renters, and service providers who recommend technology to their clients. Although the building owners and renters may be the final customers, service providers could potentially have the largest impact on the proliferation of a new technology. Even though a renter may be renting a few spaces and a building owner may rent multiple buildings, it is the service provider

*“it is the service provider that has the opportunity to interact with multiple clients”*

that has the opportunity to interact with multiple clients and could advocate for various green technologies. An illustration of this is provided in Figure 5: Service Provider Network of Influence. Being in the position of having expert knowledge also carries weight when recommending technology to others and provides a great opportunity for sharing information on new technologies.

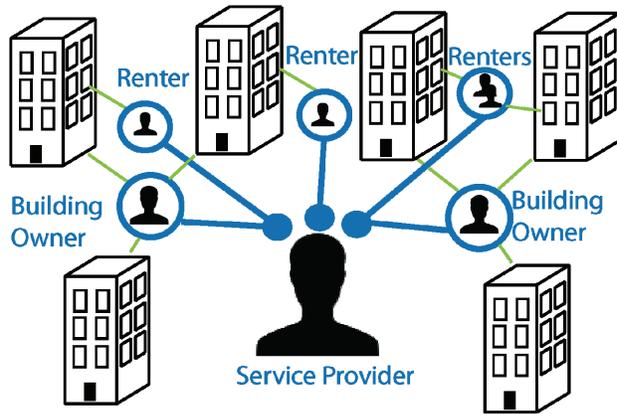


Figure 5: Service Provider Network of Influence

This form of sharing information was attempted by the Vancouver Economic Commission with one service provider. However, the format of the Excel list that was provided proved to almost be an “information overload” and that a more succinct format of providing information was recommended. The most important items to be included in this information sharing included the following: company name, technology involved, value proposition, minimum installation size, and most importantly the payback period for the building owner or renter. An example of how this could be formatted for either PDF or web presence is provided in Figure 6: Technology Summary.

Lighting	NEW CO.	2 year payback
	<b>Technology: Lighting Controls</b>	
	<i>Value Proposition: Easily integrates with existing systems and provides continuous optimization through real-time data analysis on a web based platform.</i>	
	Minimum install: 60,000 kWh / yr	

Figure 6: Technology Summary

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In addition to collaborating with service providers, there are a number of other methods that could assist with attracting demonstration sites to the program. From a preliminary evaluation of options, some of the following emerged.

### **ONLINE PRESENCE**

This refers to not only displaying information on a website, but leveraging social media along with search engine optimization to guide people to the relevant information. Here are some initial ideas:

1. Utilize the high website and page rankings from both the City of Vancouver and the Vancouver Economic Commissions (VEC) websites to list useful and strategic links to the intended demonstration site webpage
2. Align social media with the demonstration program and provide a steady stream of related content and links.
3. Become a source of information that green technology companies refer to first. This will help drive companies to the VEC website first and will provide an avenue for promoting programs,

such as the demonstration program. This information could include, identifying funding sources, how to conduct customer discovery, strategies to evaluate market size, and writing business plans.

4. Leverage the contacts that the VEC already has with existing technology groups and funders to guide people to the VEC website by exchanging relevant and useful information on each others websites.

### **CONTACTS**

Utilize current meetings with developers and land owners to promote the program and ask for assistance in locating demonstration sites. Providing a specific “ask” can develop leads that may not have otherwise come forward.

### **THE CHICKEN OR THE EGG**

Have a list of available technologies before approaching demonstration sites, but do not worry if there is a match before approaching the demonstration site. You never know what a company may be contemplating or may benefit from being provided assistance with. At least this was the case with the majority of the interviews conducted with demonstration sites.

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1 The City of Vancouver’s website has a google pagerank of 6/10 and Alexa ranking of 40,963, and The Vancouver Economic Commissions website has Google pagerank of 6/10 and an Alexa ranking of 1,475,876.

---

## **ACQUIRE FUNDING FROM LARGE TECHNOLOGY COMPANIES**

This strategy has worked for at least one leading city involved with technology demonstration since the companies that they acquire funding from are also interested in demonstrating technology. This could open doors for multiple companies to be demonstrating complementary technologies at the same demonstration site. From an example at the University of British Columbia, these closer connections between companies through demonstration can also lead to collaboration and growth with the help of the right strategic support. Large companies also tend to have significant R&D budgets and could make attractive offers for demonstration sites as well as for smaller companies that could potentially partner with them.

## **ADVERTISING**

Companies could be further attracted to demonstration opportunities by advertising their services and the potential for free potential media attention. Being displayed on a website is one thing, but having a story written in a newspaper and appearing during the news hour brings potential exposure of companies to another level. Developing synergies with media outlets to help convey these demonstration stories could prove to be mutually beneficial.

## 8. DEMONSTRATION PROCESS MAP

The process flow for demonstration on private sites could follow a very similar process as with a public site. One difference is the reduction of the amount of time consumed with evaluating projects by replacing a working group or steering committee with a subject matter expert. The other parts of the process would remain somewhat identical. The flow of this process contains the following 10 steps and is illustrated in Figure 7.

1. Call for applications: This stage formally solicits applications and may also accept unsolicited request for applications.
2. Initial screening: This provides a rough filter to determine if the product or service should be further explored.
3. Spider chart review: This process provides a more thorough quantitative and qualitative analysis of the project. More details are provided in Appendix E.
4. Subject matter expert: This person would have intimate knowledge of the type of project and would assist with the evaluation and refining details for the spider chart. They could be sought out from a local

university.

5. Approval: Given the project passes the previous stages, it is then approved.
6. Explore funding: Options for federal, provincial and other funding would be explored with the company at this stage.
7. Match with demonstration: The company would be matched with a demonstration site.
8. Legal agreement: The solution provider would form a contract with the demonstration site.
9. Installation: The technology would be installed
10. Measurement: The success of the technology would be measured.

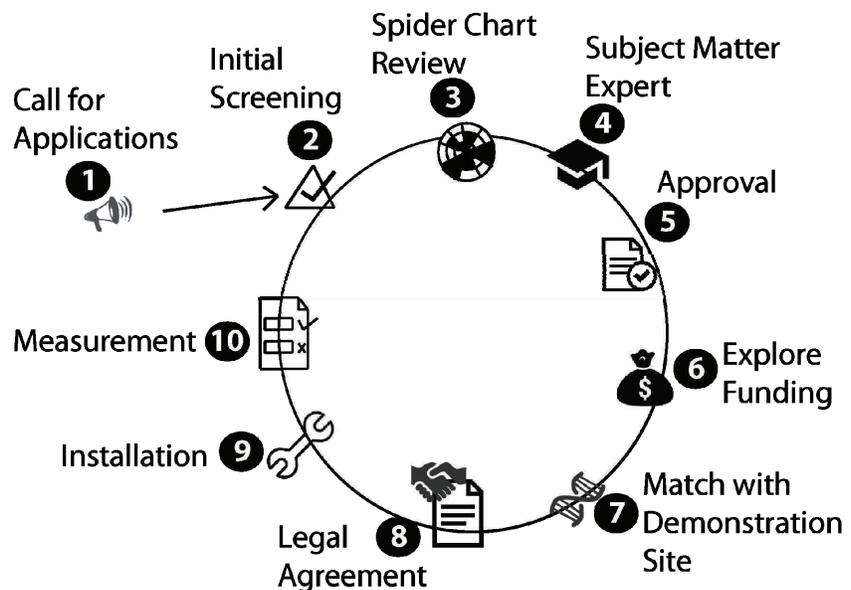


Figure 7: Demonstration Process Map

## 9. TECHNOLOGY AND COMPANY EVALUATION

As resources such as demonstration sites and staff time are limited, it is important to have an unbiased tool for determining which technologies are most promising and should have more staff time allocated to assisting them. The following tool provides assistance with this. It is divided into four core categories (Impact, Product / Solution, Execution, and Company Profile) and 15 sub-categories for providing a rounded evaluation. Each of these sub-categories has three rankings available: -1, 0, and 1 to determine how well of a fit the company and technology are. In order to reduce subjectivity with the rankings, the

majority of the sub-categories have quantitative measurements for evaluation and the remaining qualitative measurements were designed to reduce ambiguity. The goal of this tool is to provide a quick method for viewing strengths and weaknesses while providing the capacity to also dig deeper. An example evaluation is below and [Appendix E: Technology and Company Evaluation Tool](#) contains a full overview. An example of the quick overview is provided in the spider chart in [Figure 8](#).

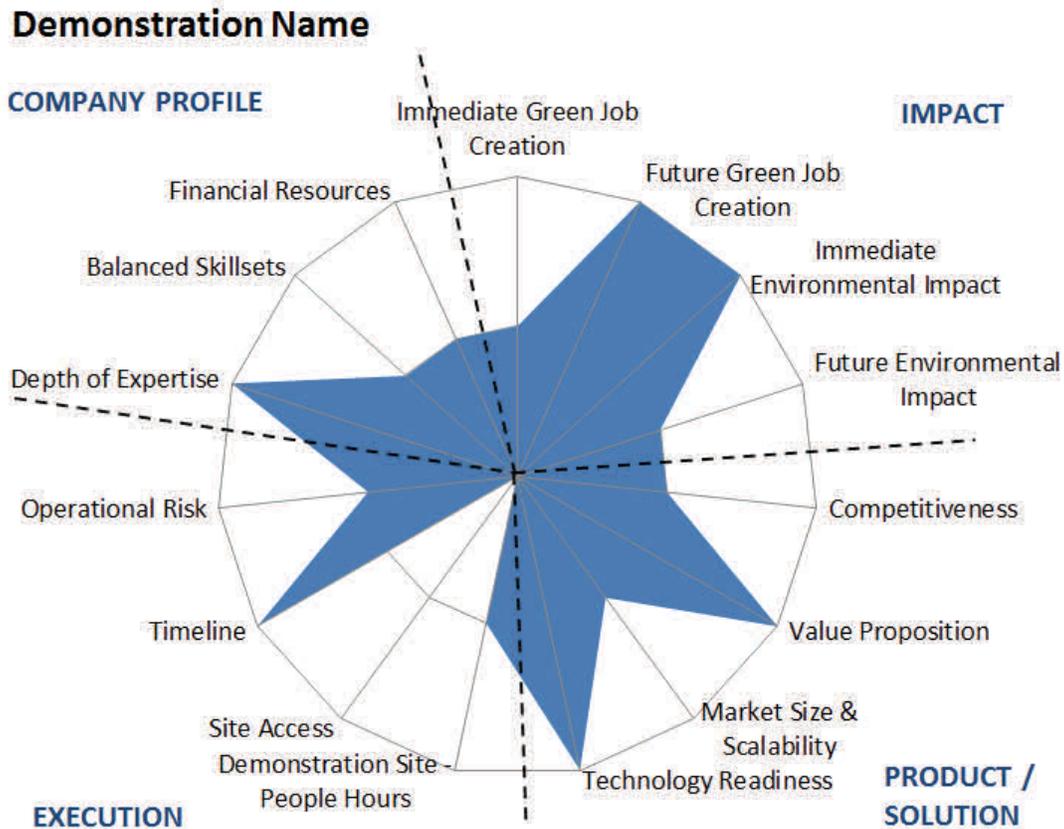


Figure 8: Technology and Company Evaluation Tool

## 10. FUNDING SOURCES

Although this is not meant to be an exhaustive list, it does provide some guidance to funding sources currently available.<sup>1</sup>

These options for funding sources would plug into item 6 in the Demonstration Process Map on page 23.

**Table 1: Funding Overview**

Level of government			
Funding source	Level of government	Type of funding	Current status
Sustainable Development Technology Canada (SDTC)	Federal	Venture capital	In budget 2013, committed: ·Recapitalized SDTC with \$13M over 2 years
Scientific Research and Experimental Development (SR&ED)	Federal & Provincial	Tax credits - funding is focused on R&D	In budget 2013, committed: ·\$20M over two years to the Canada Revenue Agency to improve the predictability and enhance enforcement
Industrial Research Assistance Program (NRC-IRAP)	Federal	Grant funding	In budget 2013, committed: ·\$121M over 2 years to IRAP ·\$20M over 2 years to a pilot project: Business Innovation Access Program
Natural Resources Canada (NRCan)	Federal	Several programs for grants and incentives	·These appear to be either fully allocated or closed
Innovative Clean Energy Fund (ICE Fund)	Provincial	Grant funding	·Is not currently accepting applications
BC Renaissance Capital Fund	Crown Corporation owned by the Province but funded by the federal Immigrant Investor Program	Venture capital	·Currently does not have any calls for proposals
First Nations Clean Energy Business Fund	Provincial	Grant funding for First Nations	·Currently the fund is \$5M with a maximum funding of \$500,000
MITACS	Federal	Several programs for grants and incentives	·Continuous intake, some programs with deadlines.

<sup>1</sup> Source: Majority from the Pembina Institute with some contributed by the author

## 11. CONCLUSIONS

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The False Creek Flats (FCF) has seen a number of changes over the years and has grown to encompass an array of companies. It is now positioned to become a home to green technology demonstration through an initiative led by the Vancouver Economic Commission to match Vancouver based green technology companies and demonstration sites. There are a number of plans and strategies that align with this initiative including the Greenest City 2020 Action Plan, the Regional Growth Strategy, the Economic Action Strategy, and the Green Economy Action Plan. There are now also a set of metrics that can be compared across cities to evaluate progress as developed by the Sustainable Development of Communities (ISO 37120-2014).

Although the matching of green technology companies and demonstration sites is already underway in Vancouver, there is still a learning curve ahead and some strategies to reduce this learning curve can be gleaned from other leading jurisdictions. Some other places to learn from include San Jose, Palo Alto, Copenhagen, New York City, and the University of British Columbia. Some of these lessons include the importance of having adequate staffing to run a program, a large network of contacts to find demonstration sites, having partners who want to demonstrate technologies provide leads, having experts and project managers review the technology and implementation plan to reduce risk.

Hopefully these lessons can be integrated into current demonstration sites as well as future ones. Although there are only a handful of demonstration sites and potentially matching technologies currently identified, there are some strategies to increase these numbers. One of these strategies is to develop closer relationships with service providers who could be a conduit to connecting with potential demonstration sites and recommending green technologies. Other strategies to increase uptake in the program include optimizing VEC's online presence and leveraging the current wealth of contacts available.

Additionally, a process is suggested in this research on how a technology/service company would flow through the demonstration system with a private demonstration site. To help with this process, a company and technology/service evaluation tool is already in place to assist in providing a structured format for deciding which technologies or services should be matched to demonstration sites. Potential government funding options are also provided to give companies a chance to leverage their research and development spending.

To help with some of the next steps, a summary of recommendations is provided in the following section.

## 12. SUMMARY OF RECOMMENDATIONS

Action #	ACTION	MILESTONE / GOAL
<b>INDUSTRY RELATIONS &amp; OPPORTUNITIES</b>		
1.1	Further conversations with other leaders facilitating demonstration of new technologies. These include Prospect Silicon Valley, City of Palo Alto, and the University of British Columbia Campus as a Living Lab program. (Page 11-13)	Start September 2014 - Ongoing
1.2	Match demonstration sites with demonstration projects. Examples include a vehicle conversion to bio-diesel or hydrogen, linking with another company for green fleet training or introducing a cardboard bailer in the FCF. (Page 15)	Start October 2014 - Ongoing
1.3	Develop connections to local accelerators, such as foresight. (Page 19)	Start October 2014 - Ongoing
1.4	Share information on new and already commercialized green technologies in a succinct manner to people in companies that recommend technology to others; such as, service providers. (Page 20)	Start October 2014 - Ongoing
1.5	Continuously improve method that information is shared with service providers. (Page 20)	Start September 2014 - Ongoing
1.6	Develop a connection with media outlets for covering stories related to green technology demonstration on private demonstration sites. (Page 22)	Start November 2014 - Ongoing

## 13. SUMMARY OF RECOMMENDATIONS

Action #	ACTION	MILESTONE / GOAL
<b>UNIVERSITY RELATIONS &amp; OPPORTUNITIES</b>		
2.1	Build connections to local colleges and campuses and the green technology companies that are being created on campus. (campus accelerators, University Industry Liaison Offices, and demonstration programs.) (Page 14)	Start November - Ongoing
2.2	Develop agreements with departments and professors to provide expertise as subject matter experts as part of the technology and company review process. (Page 14)	Start January - Ongoing
<b>VANCOUVER ECONOMIC COMMISSION INTERNAL PROCESSES</b>		
3.1	Evaluate metrics for assessing green job growth and include a standardized protocol as identified Sustainable Development of Communities (ISO 37120-2014) (Page 10, 31)	Start January
3.2	Strengthen VEC's online presence and employ strategies provided in Section 8: STIMULATING DEMONSTRATION PROJECTS AND THE ADOPTION OF GREEN TECHNOLOGIES. (Page 22-23)	Start December - Ongoing
3.3	Test the technology evaluation filter on actual projects and refine the metrics accordingly. (Page 24, 40-43)	Start September - Ongoing

## BIBLIOGRAPHY

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- Basilij, P., 2013. *False Creek Flats Quick-Start Roadmap*,
- Berst, J., 2014. Dissecting ISO 37120: Why this new smart city standard is good news for cities. Available at: <http://smartcitiescouncil.com/article/dissecting-iso-37120-why-new-smart-city-standard-good-news-cities> [Accessed August 1, 2014].
- Centre, L.H.S.B. et al., 2013. *False Creek Flats Green Enterprise Initiative*,
- Colliers International, 2014. Brand New Retail Space - Columbia College on Terminal. Available at: <https://www.collierscanada.com/6432#.U58tCvldWSo> [Accessed June 16, 2014].
- Donald Luxton and Associates Inc., 2013. *Eastern Core Statement of Significance*,
- ISO, 2014. Sustainable Development of Communities - Indicators for City Services and Quality of Life. , 05.
- Lighthouse Sustainable Building Centre et al., 2012. *Characterization of the False Creek Flats*,
- MEC, 2014. MEC Head Office. Available at: <http://www.mec.ca/AST/ContentPrimary/AboutMEC/ContactUs/HeadOffice.jsp> [Accessed June 16, 2014].
- Mills, 2014. About us. Available at: <http://mills.ca/about-us/> [Accessed August 8, 2014].
- Moore, G.A., 1991. *Crossing The Chasm*, Harper Business Essentials.
- New York City, Economic Development Corporation, N.Y.C., 2014. NYC Urban Technology Innovation Center. Available at: <http://www.nycedc.com/program/nyc-urban-technology-innovation-center> [Accessed July 9, 2014].
- NYCEDC, 2014. Mayor Bloomberg Launches NYC Urban Technology Innovation Center. Available at: <http://www.nycedc.com/press-release/mayor-bloomberg-launches-nyc-urban-technology-innovation-center> [Accessed July 9, 2014].
- Palo Alto, C. of, 2013. *Policy and Services Committee and Staff Report 2013-04-09*,
- Pye, M., 2013. Digital Strategy Summary Report. To Council
- Reid, M., 2014. Meeting with Michelle Reid.
- Save, P.W., 2014. *UBC Living Lab: Innovation in Accelerating the Adoption of Sustainable Technologies for Campus Infrastructure*.
- Thody, K., 2014. Meeting with The Greater Vancouver Food Bank Society.
- UKTI, 2014. Benefits of Registering. Available at: <http://www.businessopportunities.ukti.gov.uk/uktihome/benefitsofjoining.html> [Accessed July 28, 2014].
- Urban Development Institute, 2014. Residential Development Opportunity - 375 East 1st Avenue, Vancouver. Available at: <http://www.udi.bc.ca/opportunities/residential-development-opportunity-375-east-1st-avenue-vancouver> [Accessed June 16, 2014].
- Valley, P.S., 2014a. Prospect Silicon Valley. Available at: <http://prospectsv.org/about/> [Accessed August 27, 2014].
- Valley, P.S., 2014b. Silicon Valley 2030 Program. Available at: <http://prospectsv.org/programs/> [Accessed July 9, 2014].
- Vancouver, C. of, 2014. City of Vancouver Council Minutes 2014-07-23.
- Vancouver, C. of, 2013. False Creek Flats Arial Photography.
- Vancouver, C. of, 2012. *Greenest City 2020 Action Plan*,
- VEC, 2014. Green Technology Showcasing Slides.
- Veltkamp, J., 2014. *Green Jobs and Local Food*,
- Yellow Cab, 2014. Yellow Cab. Available at: <http://www.yellowcabonline.com/about-us.php> [Accessed June 16, 2014].

## APPENDIX A - Past, Current and Future Engagement in the False Creek Flats

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### PAST ENGAGEMENT

There has been a series of public engagements to date in the False Creek Flats beginning in 2005 ranging from data collection through workshops. The following list provides an insight to the number of engagements that has occurred. This is important to understand for future engagements in order not to overwhelm owners and tenants in the area with surveys or repeated contact of a similar nature.

#### *City of Vancouver*

2005 – False Creek Flats Industry Survey<sup>1</sup>

#### *Light House Sustainable Building Centre*

2013 – LHSBC Green Enterprise Initiative Workshops<sup>1</sup>

2013 – Industrial Profiling, FCF Baseline Analysis<sup>1</sup>

#### *Vancouver Economic Commission*

2013 (ongoing) – Business Retention Interviews<sup>1</sup>

### CURRENT AND FUTURE ENGAGEMENT

#### *Strathcona Business Improvement Association*

2014 – Strathcona Business Improvement Association (SBIA) Survey. This survey is currently underway to gauge the interest of the 105 businesses within the green enterprise initiative area for joining SBIA and is estimated to be completed by the fall of 2014.

#### *City of Vancouver*

2014 – False Creek Flats Industry Survey

#### *Light House*

2014 – Retrofit Workshop

2014 – Zero Waste Workshop

2014 – Green Purchasing

#### *Vancouver Economic Commission*

2014 – Storytelling

2014 – Demonstration Site Interviews

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<sup>1</sup> Information on these engagements can be found in the 2013 Greenest City Scholars Report by Pietra Basilij titled “Green Enterprise Zone Quick Start Roadmap”.

## APPENDIX B - Metrics for Assessment



### METRICS

In May, 2014 the Sustainable Development of Communities released a new ISO standard. This new standard allows for communities to compare metrics and some of the ISO standards that could be supported by green innovation are listed below. Following a standard such as this will help to generate reference points that could be compared to other cities following the same standard. This standard is also supported by Smart Cities Council Chairman Jesse Berst, who stated that this “new

ISO standard gives cities a common performance yardstick” (Berst 2014). As there is a clear mandate from the Greenest City Action Plan to be creating new green jobs and greening the economy, each of the metrics listed in the following table can be used to assess this criteria. For example, the number of green businesses per 100,000 population could become a segment of number 5.6 in the table. In this way, as the economy grows this performance metric could be used to evaluate if the proportion of green businesses is also increasing.

*“ new ISO standard gives cities a common performance yardstick ”*  
*~ Jesse Berst, Smart Cities Council Chairman*

Table 2: Metrics for sustainable development of communities related to this research

Sustainable Development of Communities (ISO 37120-2014) <sup>1</sup>	
5. Economy	5.1 City’s unemployment rate
	5.4 Percentage of persons in full-time employment
	5.6 Number of businesses per 100,000 population
	5.7 Number of new patents per 100,000 population per year
7. Energy	7.3 Energy consumption of public buildings per year (KWh/m <sup>2</sup> )
	7.4 The percentage of total energy derived from renewable resources, as a share of the city’s total energy consumption
	7.5 Total electricity use per capita (kWh/year)
8. Environment	8.3 Greenhouse gas emissions measured in tonnes per capita
16. Solid Waste	16.3 Percentage of city’s solid waste that is recycled
	16.10 Percentage of city’s hazardous waste that is recycled

<sup>1</sup> Details obtained directly from the ISO standard (ISO 2014)

## APPENDIX C - PALO ALTO TECHNOLOGY DEMONSTRATION QUESTIONS

The following pages provide the application to the City of Palo Alto demonstration program. This has been used as a reference model along with the University of British Columbia's project evaluation filter for the Vancouver Economic Commission application form. As you will note, the questionnaire is fairly short, but it does require the applicant to know their technology and market quite thoroughly. The questions also address how the product will benefit the City of

Palo Alto.

	<h3>City of Palo Alto Utilities</h3> <p>Innovation Test Bed Program</p> <p><a href="mailto:utl.innovation@cityofpaloalto.org">utl.innovation@cityofpaloalto.org</a></p>		
<b>Applicant Contact Information</b>			
<b>Name/Title</b>	<b>Organization</b>		
<b>Telephone Number</b>	<b>E-mail Address</b>		
<b>Project Overview</b>			
<b>Project Title</b>			
<i>Please place an "X" next to all applicable items</i>			
<b>Project Type</b> <input type="checkbox"/> Utility Operation <input type="checkbox"/> Efficiency <input type="checkbox"/> Renewable Energy <input type="checkbox"/> Other	<b>Utility</b> <input type="checkbox"/> Electric <input type="checkbox"/> Natural Gas <input type="checkbox"/> Water <input type="checkbox"/> Wastewater	<b>Technology Stage</b> <input type="checkbox"/> Concept <input type="checkbox"/> Pilot <input type="checkbox"/> Case study <input type="checkbox"/> Beta test	<b>Target Sectors</b> <input type="checkbox"/> Residential <input type="checkbox"/> Small Commercial <input type="checkbox"/> Med/Lg Commercial <input type="checkbox"/> All
<b>Summary</b>			

<b>Technology Opportunity</b>
<i>Describe the product and its applications</i>
<i>Describe how this product is innovative</i>
<i>Describe how this product will promote conservation and sustainability</i>
<i>Describe the primary technical challenges and barriers</i>
<b>Market Opportunity</b>
<i>Describe the current market status of the product both within and outside the U.S.</i>
<i>Describe the top three market barriers</i>
<i>Estimate the near-term market uptake in Palo Alto (1-5 years)</i>
<i>Describe factors that limit the size of the target market (e.g. climate zone, retrofit only)</i>
<b>Outcomes</b>
<i>Describe how this product will benefit the City of Palo Alto</i>
<i>Describe how a partnership with the City will benefit your organization</i>

<b>Customer Privacy Issues</b>	
<i>Discuss whether you would require customer data and how you would address customer data confidentiality.</i>	
<b>Signature</b>	
<b>Name/Title (Print)</b>	
<b>Signature</b>	<b>Date</b>
<i>Provision of this form and information attached herein is offered only for review by the City of Palo Alto, and in no way constitutes the City of Palo Alto's acceptance, adoption, support or inclusion of said technology or idea in any way whatsoever. All submittals are the property of the City of Palo Alto. All information provided herein will be kept confidential unless the City of Palo Alto notifies the party submitting this proposal to the contrary.</i>	
<b>Submission Instructions</b>	
Please send completed applications to: <a href="mailto:uti.innovation@cityofpaloalto.org">uti.innovation@cityofpaloalto.org</a> .	

## APPENDIX D - Vancouver Economic Commission Technology Demonstration Questionnaire

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The following provides a guide for initial screening of technology providers as well as demonstration sites. As opposed to being utilized for applicants to fill out and send in to the Vancouver Economic Commission, this version was used as more of a guide for discussion. It was meant to be a simplified version of the full application form devel-

oped by John McPherson. Some improvements that could be made include extending the time scale for testing of technology in section 2A, and adding an general comments section at the end.



### GREEN TECHNOLOGY DEMONSTRATION OPPORTUNITY QUESTIONNAIRE

**Preface:**

The purpose of this survey is to be able to match green technology companies with potential demonstration sites. Information from green technology companies will flow through the Vancouver Economic Commission (VEC) to demonstration sites and service providers. Likewise, information about demonstration sites can also flow through the VEC to technology companies.

---

**INTERVIEW QUESTIONS FOR GREEN TECHNOLOGY  
DEMONSTRATION OPPORTUNITIES**

You have a:  Demonstration Site  
 Green Technology

Date: 

Y	Y	Y	Y	M	M	D	D	D	D

**1A. Company Information**

Company Name:   
  
  
Address:   
  
  
  
Website:

**1.B Interviewee Information**

Interviewee:   
  
  
Position:   
  
Phone:   
  
E-mail:

**1C. Business Description**

Product / Service & Activities:

Sector:

- Automotive (e.g., retail, repair, rental, service)
- Arts & Culture (e.g., performance, studios, set design, film)
- Buildings & Construction (e.g., building supply, contractor)
- Digital Communications (e.g., software development, animation, computer servicing)
- Food (e.g., catering, distribution, restaurants)
- Textiles (e.g., garment manufacturing, clothing wholesale)

- Waste Management (e.g., recycling, salvage, reprocessing)
- Environmental Services and Technology Development (e.g. Clean-tech, life sciences, R&D)
- Manufacturing (e.g. production, processing, building)
- Educational Institutions, Non-profits, & Professional Services
- Other:

---

2A. Demonstration / Site Opportunity

What assets do you have available for demonstrating technology? / What assets are required to demonstrate your technology? (Provide some examples)

Land:  Sq.Ft. /Acres:   
Building:  Sq.Ft.   
Other:

Details:

How soon can you implement a new technology on your site? / How soon can you test your technology? ASAP:  Within 1 Month:  Within 2 Months:

Within 3-6 Months:  Within 6-12 Months:  Not sure:

2B. Financial Commitment

If you have funding to invest, how much do you have available? \$

Are you currently working with any funding agencies? (I.e. SDTC, FCM, etc.)

Yes:

If yes, please list:

No:

---

3A. Technology Provider Section ONLY - Site Access

(Demonstration Sites proceed to section 4.0)

What infrastructure access is required for your technology? (I.e. electrical hook up)

How long would your technology be installed for?

- Less that 3 Months    3 - 6 Months    6 - 12 Months    Over 1 Year  
 Permanent

How often do you require access to the potential demonstration site for tests and maintenance?

What security requirements are needed to protect your product? (I.e. Fence or other barrier)

3B. Technology Provider Section ONLY - Regulations

Does your product require certification for demonstration purposes?

If known, what permits at each government level may be required to undertake a demonstration?

---

4A. Demonstration Site Tenant/Owner Section ONLY - Site Access

How frequently could you provide access to your site if required? (For maintenance etc..)

## CONTACTS

Vancouver Economic Commission

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John McPherson, Sector Development Manager - Cleantech, [JMcPherson@vancouvereconomic.com](mailto:JMcPherson@vancouvereconomic.com)



## APPENDIX E - TECHNOLOGY AND COMPANY EVALUATION TOOL

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As previously mentioned in section 10. Technology and Company Evaluation, there are four main categories for evaluating a company and their technology: Impact, Product / Solution, Execution, and Company Profile. Each of these sections contain sub-sections, each with a number of metrics in order to evaluate an applicant in each sub-category. Each of these sub-categories have three values for evaluation : “-1”, “0”, and “1”. “-1” indicates a ranking below standard, “0” indicates something satisfactory, and “1” indicates above par. Once these are ranked, the spider chart (Figure 8, page 24), provides a quick visual for evaluation. If a technology happens to be deficient in an area, then options to help bring the ranking up can be brainstormed with the company. Given that the rankings are linear, a weighting scheme has been employed and can be viewed on Figure 9 on page 43. As you will note, emphasis is placed on “Immediate Green Job Creation”, “Future Green Job Creation”, “Market Size and Scalability”, “Operational Risk”, and “Financial Resources” and more details on these follow.

**Immediate Green Job Creation:** This helps to identify how many jobs could be created in the near term and provides a secondary assessment for evaluating future job growth.

**Future Green Job Creation:** As one of the most important items for the Vancouver Economic Commission this was highly weighted as well. After evaluating this scoring through a couple demonstrations, it may prove to be

necessary to adjust the amount of jobs listed under each of the “-1”, “0”, and “1” values to a higher limit than for the immediate green job creation category.

**Market Size and Scalability:** It is important that the technology should have the potential for a sizeable impact. Since it would be not very interesting to low impact, such as saving 10 kWh of electricity per month, metrics are provided to gauge this range.

**Operational Risk:** To a certain extent, this could be weighted even higher. As the impact of stopping operations could be detrimental to a business, the potential for this occur needs to be carefully evaluated.

**Financial Resources:** If a company has everything aligned except funds to execute, this could be a deal-breaker. Guidance could be provided to matching government funds or to venture capitalists, but without skin in the game, it makes for a less likely success.

Additionally, all of the categories have been created in such a way that it would be very easy to adjust evaluation criteria and corresponding weightings. A test of this tool with a few projects will be necessary in order to fine tune the current evaluation criteria.

		Score		
		Potential	Actual	
Impact	<i>Immediate Green Job Creation</i>			
		Unknown, or will take several years	-1	0
		> 0.1 < 1 FTE position ( created within 1 year from start of demonstration)	0	
		> 1 FTE position ( created within 1 year from start of demonstration)	1	
	<i>Future Green Job Creation</i>			
		Unknown, or will take several years	-1	1
		> 1 < 3 FTE position (created within 2 years from completion demonstration)	0	
		> 3 FTE position (created within 2 years from completion demonstration)	1	
	<i>Immediate Environmental Impact</i>			
		GHG Reduction: Unknown, or < 10 metric tonnes / yr; and/or Electricity Reduction: Unknown, or < 2000 kWh / yr; and/or Water Reduction: Unknown, or < 300 M <sup>3</sup> / yr; and/or Waste Reduction: Unknown, or < 5 tonnes /yr; and/or Land Improvement: Unknown, or < 1km <sup>2</sup> / yr	-1	1
		GHG Reduction: > 10 < 100 metric tonnes / yr; and/or Electricity Reduction: > 2000 < 4000 kWh / yr; and/or Water Reduction: > 300 < 600 M <sup>3</sup> / yr; and/or Waste Reduction: > 5 < 20 tonnes / yr; and/or Land Improvement: > 1 < 5 km <sup>2</sup> / yr	0	
		GHG Reduction: > 100 metric tonnes / yr; and/or Electricity Reduction: > 4000 kWh / yr; and/or Water Reduction: > 600 M <sup>3</sup> / yr; and/or Waste Reduction: > 20 tonnes /yr; and/or Land Improvement: > 5 km <sup>2</sup> /yr	1	
	<i>Future Environmental Impact</i>			
		GHG Reduction: Unknown, or < 10 metric tonnes / yr; and/or Electricity Reduction: Unknown, or < 2000 kWh / yr; and/or Water Reduction: Unknown, or < 300 M <sup>3</sup> / yr; and/or Waste Reduction: Unknown, or < 2 tonnes /yr; and/or Land Improvement: Unknown, or < 1km <sup>2</sup> / yr	-1	0
		GHG Reduction: > 10 < 100 metric tonnes / yr; and/or Electricity Reduction: > 2000 < 4000 kWh / yr; and/or Water Reduction: > 300 < 600 M <sup>3</sup> / yr; and/or Waste Reduction: > 2 < 10 tonnes / yr; and/or Land Improvement: > 1 < 5 km <sup>2</sup> / yr	0	
	GHG Reduction: > 100 metric tonnes / yr; and/or Electricity Reduction: > 4000 kWh / yr; and/or Water Reduction: > 600 M <sup>3</sup> / yr; and/or Waste Reduction: > 10 tonnes /yr; and/or Land Improvement: > 5 km <sup>2</sup> /yr	1		

Product / Solution	<i>Competitiveness</i>			
		No barrier to entry for others and/or other similar technologies exist	-1	0
		Some barrier of entry to others and/or no exact other technology exists	0	
		Significant barrier of entry to others and/or 1st technology of its kind	1	
	<i>Value Proposition</i> (Based on NPV on operational expenditures)			
		Negative 10yr NPV	-1	1
		Neutral 10 yr NPV	0	
		Positive 10 yr NPV	1	
	<i>Market Size &amp; Scalability</i>			
		Market Size: < \$1M target market	-1	0
		Scalability: < 10X growth over current operations		
		Market Size: \$1M - \$10M target market	0	
		Scalability: > 10X < 50X growth over current operations		
		Market Size: \$10M + target market	1	
	Scalability: > 50X growth over current operations			
<i>Technology Readiness</i>				
	Not ready to demonstrate or product/service already commercially available	-1	1	
	Ready to demonstrate within 1 year and product/service not commercially available	0		
	Ready to demonstrate now and product/service not commercially available	1		
Execution	<i>Demonstration Site - People Hours (Combined City and demonstration site staff time)</i>			
		> 60 / yr	-1	0
		> 20 < 60 yr	0	
		< 20 /yr	1	
	<i>Site Access</i>			
		Hours the technology provider would need to be onsite		
		> 60 / mo	-1	-1
		> 20 < 60 mo	0	
		< 20 / mo	1	
	<i>Timeline</i>			
		Will take more than 12 months to implement the technology	-1	1
		Will take between 6-12 months to implement the technology	0	
		Will take less than 6 months to implement the technology	1	
	<i>Operational Risk</i>			
	High potential impact (something that could stop operations and has moderate potential impact)	-1	0	
	Moderate potential impact (something that could affect operations)	0		
	Very low potential impact (Nothing that will stop/affect operations)	1		

Company Profile	<i>Depth of Expertise</i>			
		No experts with research experience in sector	-1	1
		At least one person with research experience in sector	0	
		Multiple people with deep research experience in sector	1	
	<i>Balanced Skillsets</i>			
		Team is currently seeking the skills required for execution	-1	0
		Team has some of the skills required for execution	0	
		Team has all the skills required for execution (Business + technology + other)	1	
	<i>Financial Resources</i>			
		< \$100K available	-1	0
		> \$100K < 1M available	0	
		> \$1M available	1	

	Impact	Product / Solution					Execution					Company Profile				
	Immediate Green Job Creation	Future Green Job Creation	Immediate Environmental Impact	Future Environmental Impact	Competitiveness	Value Proposition	Market Size & Scalability	Technology Readiness	Demonstration Site - People Hours (Combined City)	Site Access	Timeline	Operational Risk	Depth of Expertise	Balanced Skillsets	Financial Resources	
Score	0	1	1	0	0	1	0	1	0	-1	1	0	1	0	0	
Weighting	5	10	5	2.5	2.5	5	5	5	2.5	0	5	5	5	2.5	5	
-1 Weight	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0 Weight	5	5	2.5	2.5	2.5	2.5	5	2.5	2.5	2.5	2.5	5	2.5	2.5	5	
1 Weight	10	10	5	5	5	5	10	5	5	5	5	10	5	5	10	
Min Score Required =	60															
Max =	100															

Figure 9: Sub-category weighting for evaluation of technology