“What is the roadmap for community engagement on climate action?”
(Cllr. Carr, Metro Vancouver Sustainability Breakfast)

1. Why we need to mobilize citizens on climate action

2. Challenges and solutions to mobilizing citizens

3. How can we scale-up climate action in our neighbourhoods?

4. Recommendations

Dr. Stephen Sheppard, Collaborative for Advanced Landscape Planning, UBC

www.calp.forestry.ubc.ca
1 Why we need to mobilize citizens & scale up climate action

Now or Never:

• 11 years to cut CO² 45% by 2030

• Everyone needs to be involved

3600 lower density blocks in Vancouver (300 superblocks)

360 blocks per year will need to meet these targets
2 Challenges to mobilizing citizens on climate action

• Citizens are concerned but....

72-100% of residents & youth unaware of carbon or canopy targets

• Engagement efforts underway but....
  - not coordinated, evaluated, or sustained
How to mobilize citizens on climate action?

Research shows: organized collective action that is local, visible, and socially rewarding

• reaches beyond the ‘keeners’
• delivers rapid cuts in carbon emissions
Green Bloc 2018 Outcomes

• Average 16% drop in ecological footprint across all neighbourhoods:
  • 40% reduction in natural gas use
  • 32% reduction in car use
We have ‘cool tools’ & processes.....

Example: Citizen’s Coolkit

- DIY fun visual toolkit
- One-stop-shop for solutions
3 How to scale-up climate action in our communities?

Social Mobilization Strategy
regional or city scale
Place-based Collaborative Framework example

**R.E.A.C.H. program**

*Resilience through Education, Action & Capacity-building in the ‘Hood*

Hub-to-Hood model
4 Recommendations for scaling-up climate action

• Develop a comprehensive **Community Engagement/Mobilization Strategy** in the context of **Climate 2050**

• Support **mapping of community engagement** activities in Metro Vancouver, for coordinating programs & funding through 2030

• Suggest opportunities for collective action through **collaborative frameworks**
Metro Vancouver Climate Action Committee

November 15, 2019

Mark Rabin, CEO
Purpose

- Introduce Portable Electric and demonstrate what the technology can deliver – now and in the future.
- Share city and sector applications.
- Present Portable Electric’s asks to the Climate Action Committee.
Company Overview

- Locally manufactures clean, silent, portable battery-electric VOLTstack® power stations to replace gas and diesel generators.

- Customer and market driven – began renting units in 2016.

- Based in East Vancouver with 25 employees and growing – 20 new hires planned for 2020.

- Accepted to the Canadian Technology Accelerator and IRAP’s Pilot Program. Nominated by Business in Vancouver as Exporter of the Year Finalist.
Product Overview

Enabling the transformation away from gas and diesel generators
City Events & Projects

• City of Vancouver – Bike The Night
• Township of Langley – Canada Day
• BC Hydro Traffic Light Maintenance
• Cities of Surrey and Richmond
City Applications

Maintenance & Construction
- Traffic & street lights
- Equipment & tools
- Labour & logistics
- Communications

Events & Disaster Relief
- Backup power
- Emergency lights
- Security & monitoring
- Heating
- Lighting & sound
- Cameras
- Catering
Metro Van & Members – Leaders in Climate Action

Significant Progress

• BC Climate Action Charter

• Metro Vancouver’s 2030 45% GHG reduction target, 2050 carbon neutral goal and non-road diesel regulation.

• City of Vancouver’s motion to eliminate diesel generators for film, events and food trucks.

• “Electric First” policy adopted by City of Richmond, Township of Langley and others.

PE Targets

• GHG reduction targets of 10,000 tonnes by 2021 and 500,000 tonnes by 2030.
Portable Electric’s Asks

**Climate Action Committee:**

- Assess applications within their jurisdictions to replace generators in short and longer-term, including larger applications.
- Recommend that Metro Vancouver adopt a plan to phase out and eliminate gas and diesel generators starting in 2025 across Film and Entertainment and Construction.
  - Advocate for the BC and Federal governments to also adopt measures.
  - Create incentives to enable clean tech adoption.

Actions will reduce GHGs, protect human and ecosystem health, incent innovation, create jobs and grow local portable power cluster

**PARTNERS IN CLIMATE ACTION**
Thank you for your leadership

Mark Rabin – Founder & CEO

Julie Strilesky – Government Relations & Sustainability
### CHALLENGES

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Solution</th>
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<tbody>
<tr>
<td>Major GHG reductions are required to meet goals.</td>
<td>Significant GHG reductions could be achieved yearly by replacing generators.</td>
</tr>
<tr>
<td>Generators are inefficient, polluting, harmful to human and ecosystem health and loud, resulting in complaints.</td>
<td>Power stations are efficient, clean and silent and can operate across sectors, including Film, Entertainment and Construction. A study is needed to determine the numbers in use, impacts to human/ecosystems health in high human traffic areas and assess Metro Van and city complaints. Can use existing air quality monitoring tools to prioritize focus areas.</td>
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<tr>
<td>Little information is known about how many generators are in use and operate across Film, Events, Entertainment and Construction sectors.</td>
<td>Implement policies across Metro Van region, including a gas and diesel elimination strategy to reduce GHGs, protect health, incent innovation, create jobs and grow local cluster. Power drops are only one part of the solution.</td>
</tr>
<tr>
<td>Currently the portable power sector is not innovating at a pace to achieve goals.</td>
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<td>No tools in place that target smaller generators.</td>
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</table>
Total cost of ownership is approx. 30% of a gas/diesel generator – payback 1.6 - 3 years. Onsite operational flexibility saves time and labor costs. Zero fuel costs and no mechanical engines to maintain.

Emissions-free with no hazardous fumes or toxic particles.

Silent - enhancing operating flexibility and site operations.

Includes WIFI, wireless GPS and on-board real-time data analytics, contributing to better operating decisions, pre-emptive maintenance and efficiency.

Safer, healthier workplaces, with enhanced communication due to the elimination of noise & emissions.

No liquid fuel component, eliminating fuel spillage and a potential fire hazard. Useful for fire prone areas.

### Appendix B: PE Product Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><strong>REDUCED COSTS</strong></td>
<td>Total cost of ownership is approx. 30% of a gas/diesel generator – payback 1.6 - 3 years. Onsite operational flexibility saves time and labor costs. Zero fuel costs and no mechanical engines to maintain.</td>
</tr>
<tr>
<td><strong>EMISSION FREE</strong></td>
<td>Emissions-free with no hazardous fumes or toxic particles.</td>
</tr>
<tr>
<td><strong>NO NOISE</strong></td>
<td>Silent - enhancing operating flexibility and site operations.</td>
</tr>
<tr>
<td><strong>OFFERS ANALYTICS</strong></td>
<td>Includes WIFI, wireless GPS and on-board real-time data analytics, contributing to better operating decisions, pre-emptive maintenance and efficiency.</td>
</tr>
<tr>
<td><strong>IMPROVED HEALTH &amp; SAFETY</strong></td>
<td>Safer, healthier workplaces, with enhanced communication due to the elimination of noise &amp; emissions.</td>
</tr>
<tr>
<td><strong>REDUCED FIRE &amp; FUEL SPILLAGE RISK</strong></td>
<td>No liquid fuel component, eliminating fuel spillage and a potential fire hazard. Useful for fire prone areas.</td>
</tr>
</tbody>
</table>

Climate Action Committee
Appendix C: Leadership in Construction

Emission Free Construction Sites

• Construction machinery accounts for 30% of Oslo’s traffic emissions. The city established a zero-emissions standard and adopted fossil free construction sites as minimum criteria in all of its public procurement procedures from 2017. As a major developer and owner of buildings, the City can significantly reduce city-wide emissions.

• Almost all emissions could be eliminated by the end of 2025 if all private-and public developers require contractors to use zero-emission construction technology in tenders from 2021 onwards.

• Eliminating emissions by the end of 2025 is also dependent on all construction machinery becoming electric, powered either by batteries or hydrogen.

• Norway’s demand for greener construction machinery is causing this market to develop and expand; while fully electrical versions of all machinery aren’t available yet, the market is quickly adapting and sustainable biofuels are also being used rather than diesel. The City of Oslo is developing a 30-tonne battery- and hydrogen-powered digger in collaboration with NASTA, SINTEF, Skanska, Siemens and Bellona. By setting high standards, the City has pushed the industry to change, causing global ripples.

Appendix D: Mobile Micro-grids and Distributed Energy Infrastructure

- VOLTstack® 200kW, 400kWh
- VOLTstack® 500kW, 800kWh (Hybrid)
- VOLTtruck™ 500kW, 800kWh (Hybrid)
- 11kW SUNstack™ Solar Generation
- Rapid Deployment

- 200kW+ Hybrid Mobile Micro-Grids
- Fast Energy Transfer
- Mobile recharge infrastructure
- Autonomous recharge vehicles (ARV)

Climate Action Committee
Air and Odour Management Conference and Technical Showcase

Dylan Kruger
COUNCILLOR, METRO VANCOUVER CLIMATE ACTION COMMITTEE

Climate Action Committee, November 15, 2019

Esther Bérubé, P.Eng.
DIVISION MANAGER, AIR QUALITY BYLAW AND REGULATION DEVELOPMENT, METRO VANCOUVER
Conference Background

• 3rd Bi-annual Air and Odour Management Conference
• Toronto, September 19-20, 2019
• 2019 theme: Air Pollution in the Cloud
  • Transformative Sensing and Data Mining for Cleaner Air
• 180 attendees, 40 presenters
Emerging Air Contaminants

- Declining indoor air quality
- Semi-volatile organic compounds
- Emissions from cannabis production
Air Quality Monitoring

- Mobile monitoring
  - On the ground
  - In the air
- Odour assessment
- Passive monitoring of personal exposure

Climate Action Committee
Treatment of Air Contaminants

- Misting and fogging technologies
- Photocatalytic filters
- Cold plasma injection
- Micro-nutrient addition
Managing Emissions from Transportation

- Effect of traffic on emission concentrations
- Addressing near-road emissions
- Planning for automated vehicles
Questions?
Metro Vancouver Near-Road Monitoring Study

Geoff Doerksen, M.Sc.
AIR QUALITY PLANNER

Ken Reid, M.Sc.
SUPERINTENDENT, ENVIRONMENTAL SAMPLING AND MONITORING

Climate Action Committee Meeting, November 15, 2019
Climate Action Committee
Vehicle emissions have health impacts

- Half of Metro Vancouver residents live near major roads
- Living near major road poses increased health risk
- Diesel emissions most critical
Near-Road Monitoring Study

- Near-road (Clark Drive) and background station
- Monitoring began May 2015
- Toronto sites
- Partners: Environment and Climate Change Canada, Ontario, University of Toronto
Traffic dominates near major roads

Black carbon

<table>
<thead>
<tr>
<th></th>
<th>Background</th>
<th>Near-Road</th>
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<tr>
<td>µg/m³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
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Ultrafine particles

<table>
<thead>
<tr>
<th></th>
<th>Background</th>
<th>Near-Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counts/cm³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>10000</td>
<td>30000</td>
</tr>
</tbody>
</table>
Contribution of traffic emissions

- Nitrogen dioxide: 28%
- Nitric oxide: 71%
- Carbon monoxide: 30%
- Fine particulate matter: 30%
- Black carbon: 64%
- Ultrafine particles: 46%

Climate Action Committee
Large trucks main contributor to near-road air pollution

Black Carbon (µg/m³)

Weekday  Saturday  Sunday

Trucks per day
Next Steps

• Continue monitoring near-road
• Develop program to reduce emissions and exposure to traffic-related air pollutants
  • Land use policy, infrastructure design, and transportation management
• Education and outreach
Clean Air Plan and Climate 2050

- Developing air quality management plan
  - Accelerate emission reductions
  - Help protect human health and the environment by reducing greenhouse gas emissions, through incentives, education and regulations
- Align with Climate 2050
National Industrial Symbiosis Program

NISP CANADA PILOT RESULTS

Jason Emmert
REGIONAL PLANNER II
AIR QUALITY & CLIMATE CHANGE

Joshua Power
SENIOR POLICY & PLANNING ANALYST
AIR QUALITY & CLIMATE CHANGE

Tracy Casavant
MANAGING DIRECTOR, NISP® CANADA & CIRCULAR ECONOMY, LIGHT HOUSE

Climate Action Committee | November 15, 2019

Climate Action Committee
NISP SIF Application

- MVRD Board approved $100k to pilot NISP Canada in Metro Vancouver
- Program advances local circular economy approaches
- Reduces GHG emissions and waste sent to landfill
Corporate Examples

• Converting biosolids to fertilizer

• Using liquid waste as a resource through effluent heat recovery
Alignment with MV Strategies

• Supports goals in the *Integrated Solid Waste and Resource Management Plan*

• Transitioning to a low carbon, circular economy expected to be a cross-cutting theme in new Solid Waste and *Climate 2050* strategies
“Putting in place a circular economy is a fundamental step towards achieving climate targets”

“The circular economy has the potential to increase resilience to the physical effects of climate change”
Advancing a Circular Economy in Canada: NISP® Canada Pilot Results

Metro Vancouver Climate Action Committee
November 15, 2019

Tracy Casavant, Managing Director, NISP® Canada & Circular Economy
Light House Society, Vancouver, Canada tracy@light-house.org
NISP IS THE
BEST GLOBAL MODEL
FOR ACHIEVING
INDUSTRIAL SYMBIOSIS
NISP® Canada 20-Month Pilot

Structure:
• Metro Vancouver & Greater Edmonton
• 2 FTE Facilitators (each region)
• 6 Workshops (each region)

Funding:
• $1M from 4 levels of government
• Metro Vancouver leverage 9:1
NISP® Canada Pilot Results

- > 350 participants
- > 1,900 specific resources discussed
- ~ 3,500 resource matches – “synergies”
- > 160 synergies progressing / progressed
Fashion-Friendly Tissue

**Fabcycle** wanted heavy duty tubes to help organize the textiles. A NISP® Practitioner noticed cardboard tubes in the waste bin at **Kruger Products**. A match was made!

Climate Action Committee
NISP® Canada Pilot Results

253,800 t waste diverted from landfill

23,800 t CO2e emissions avoided
≈ more than 5,000 cars driven for one year

$6.3 M in savings + cost reductions
ROI ~7:1 on government investment
NISP® Canada Pilot Results

253,800 t waste diverted from landfill
   2,600 t Metro Vancouver

23,800 t CO2e emissions avoided
   12,800 t Metro Vancouver

$6.3 M in savings + cost reductions
   $410,000 Metro Vancouver
**NISP® Canada Results**

**Barriers to Implementing Symbiosis**

- **Time!** Canadian businesses are really busy…
  - Fewer workshops to focus on synergy implementation
  - Longer lag to symbiosis completion

- Not really regulations (except uncertainty in new industries like microalgae, cannabis)

- Some technical (but led to RD&D potential)

- Just because it’s hauled away doesn’t mean it’s not waste

- Data quality control is important
NISP® Canada Results
Funding is the biggest challenge.

- Model addresses market failures
- Proven regional econ- and eco-benefits but individual benefits are unique
- Main cost is people: professional, knowledgeable facilitators and support
- Government investment supports programs globally → future? green bonds, etc.
NISP® Canada Status

- Lower Columbia NISP® & CE Study
- Washington Industrial Symbiosis Program Plan
- VEC-Partnered Workshop, Vancouver
- CWMA-Partnered Workshop, Victoria
- City of Calgary seed funding
- City of Edmonton seed funding

Climate Action Committee
“Overall industrial symbiosis is expected to grow significantly. Moving towards a low carbon resource efficient industry and society implies that more industrial symbiosis solutions will be required and implemented”

* Call for Tender: European Network of Businesses and SMEs for Industrial Symbiosis, 2019
Thank you