



PORT METRO
vancouver

portmetrovanancouver.com

RETHINKING ENERGY OPPORTUNITIES AT PORTS

Energy Action Initiative



AAPA Spring Conference
Washington, DC April 20-21, 2015

PMV Overview

- **Largest port in Canada**
- **Most diversified and 4th largest in North America**
- **140 million tonnes of cargo**
- **20% of Canada's goods in trade**





Some perspective:


- Port Metro Vancouver is Canada's largest port and the fourth largest tonnage port in North America, responsible for Canada's trade with more than 160 world economies.
- Located in a naturally beautiful setting on Canada's west coast, Port Metro Vancouver is responsible for the efficient and reliable movement of goods and passengers, and integrates environmental, social and economic sustainability initiatives into all areas of port operations.
- Port Metro Vancouver is committed to meaningful engagement with the communities in which it operates and the shared obligation to improve the quality of life for Canadians. Enabling the trade of approximately \$184 billion in goods annually – or 20% of Canada's entire trade in goods (by value), the port generates an estimated 100,000 jobs, \$6.1 billion in wages, and \$9.7 billion in GDP across Canada.

British Columbia Electricity

- Clean, competitive, renewable hydroelectric energy
- Regulated market utility – BC Hydro – provincial crown corporation
- 90% of energy in BC is hydroelectric



- We have a problem that I suspect most other ports would love to have – our operations are powered by an inexpensive, clean, hydro-electrical energy. Why is that a problem? Well, try to persuade any business operator to give any attention to an issue that does not significantly impact their bottom line.



Port Energy - What's at Stake?

Port-related industries account for a large proportion of the industrial energy consumed in the Vancouver area

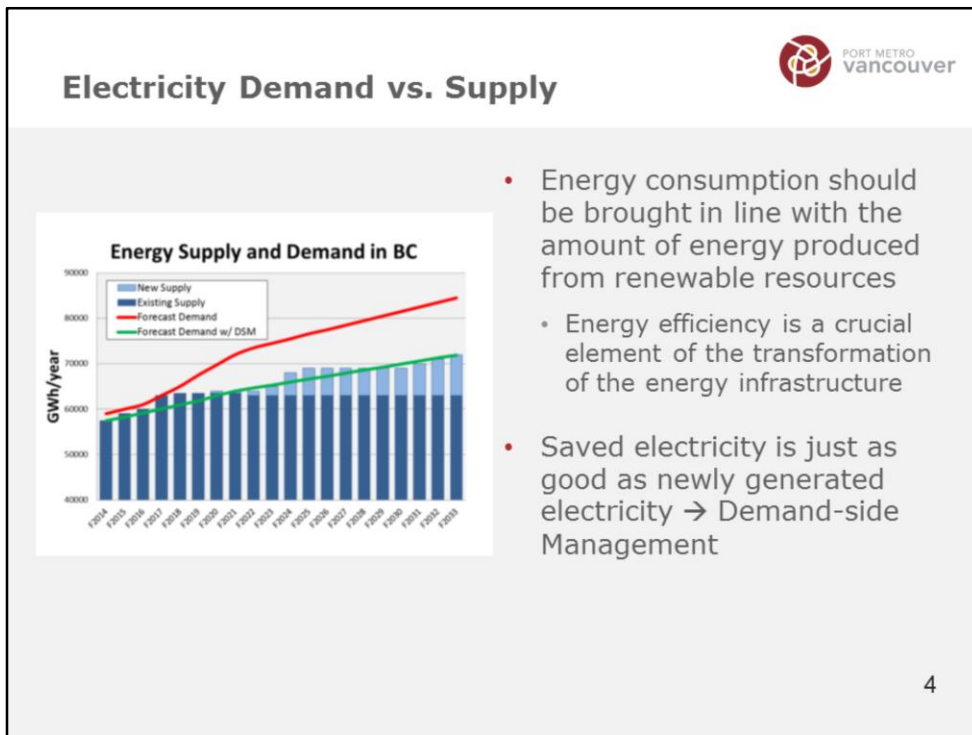
Major tenants - PMV Classification	# Sites /Accounts	Electrical Consumption (Total GWh/y)	Terminals
Major terminals	6	102	GCT (Deltaport & Vanterm); Westshore; DP World; FSD; Western Stevedoring
Medium Terminals	9	131 + 500	Neptune; Viterra (Cascade & Pacific); Alliance; Richardson; Cargill; PCT; WCR; Canexus
Minor terminals	7	46	Kinder Morgan Van. Wharves; Fibreco; Lantic (Rogers Sugar) Suncor – Burrard Terminal); Chevron; Imperial Oil (loco); Shell;
Automobile terminals	3	4	WWL; Fraser Wharves; Adesa Auctions
Main tenants	5	271	Lafarge cement; Lehigh cement; Howe Sound P&P Chip Plant; Seaspan (Ferries, Drydock and Shipyard); Vancouver Pile Driving
TOTAL	30	1054	

The Port uses more than 1000 times the electrical energy consumed by a 20 story high-rise

3


Port Metro Vancouver has currently over 1000 leasing agreements with various tenants – from container to bulk and break-bulk terminals; automotive, distribution centers, and some manufacturing plants. As a collective, we use almost 2000 GWh/y of electrical energy more than half of it being used by 30 major terminals and tenants.

Our challenge is to grow trade while preventing or minimizing our impacts




- Whatever your renewable energy resources are or will be – hydro in our case, might be wind and solar in yours – the consumption should be brought in line with the renewable supply.
- Although we have comfortable amount of hydro energy supply especially in Southern BC where we operate however, our operations grow substantially every year and so does electricity demand.
 - In 4 or 5 years, there is a gap between supply and demand, and that it grows over time. Utility has to address this gap
- Our utility provider, BC Hydro, calculated that the least expensive way for them to create new load is through energy conservation (1/3 of the cost of new load generation). Therefore they provide good incentives for projects that result in energy conservation and that's how we get attention of our terminal operators to energy conservation.
- Our port and probably yours is carrying around a significant amount of belly fat in the form of wasted energy. The biggest opportunity sustainable ports have is to reduce it.
- We're reducing our belly fat to bring the demand in line with available renewable hydro supply.
- Reducing the that belly fat while planning installation of other renewable energy sources like maybe those you guys consider for your ports – wind, solar, biomass, LNG – is even more important. It will enable you to design for capacity you need and reduce the cost of initial investment.

Why Energy Conservation at Ports?



- Energy efficient equipment, buildings, and operational practices are good business decisions that reduce costs and exposure to energy pricing
- Energy conservation culture can be a powerful driver of corporate responsibility that in turn helps grow social acceptance to operate or expand
- Using less energy per tonne of cargo can create competitive advantage for Gateway



Why would the Port tenants be interested in conservation of relatively inexpensive electrical energy?

- It might be relatively inexpensive but ...

BC Hydro rates are up 15% since April 1, 2014 and confirmed to rise by 27% by April 1, 2019

We're in the regulated market – limited opportunity for rate negotiations.



Strategic Energy Management Plan

PMV Energy Action Initiative

PMV Strategic Energy Management Plan

- Port Metro Vancouver believes clean hydroelectric energy is an asset to our Gateway
- Launched in partnership with BC Hydro in 2013
- PMV created position of Energy Specialist (member of BC Industrial Energy Managers Group)




Dorota Kwasnik, P.Eng, MSc, CEM

- Energy Specialist, Port Metro Vancouver
- Chemical (Process) Engineer
- 15 years – Industrial Manufacturing
- Professional Engineer
- Certified Energy Manager

6


PMV focus is strategic – Executives and senior leaders are driving energy efficiency and conservation. That's why they launched Energy Action Initiative in partnership with BC Hydro in 2013 by creating the position of Energy Specialist, or Industrial Energy Manager as identified by the Utility, that incentivizes part of the managers' salary.

Our Strategic Energy Management Plan, which is a working document that evolves with time and information availability, outlines the Port approach to supporting our tenants in advancing their energy conservation efforts.

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PMV Energy Action Initiative

- Potential for saving energy within the Port jurisdiction is considerable
- Port-based companies receive consulting and financial (utility) support to:
 - Implement energy-saving measures
 - Install energy measurement and control strategy
 - Introduce Energy Management Systems



Amongst other things, measures are supported which relate to electric-powered motors, compressed air, lighting, production technology and information technology

BC Hydro incentivizes up to 75% of a project cost if the project results in energy consumption reduction. Most incentives are available directly to the Electricity Account holder but some that require higher level of accountability and follow-up are available through a designated energy manager. PMV energy manager is available to all tenants at no additional cost to them.

How Do We Help?

- Facilitate exchange of tenant experiences and knowledge, e.g. workshops, training sessions, resources portal
- Perform energy assessments and facilitate energy studies
- Assist tenants in to development of business case for energy conservation measures (e.g. life cycle cost analysis of a project)
- Support applications for financial incentives from BC Hydro




8



What do we do?

Sometimes there is a need for somebody to nag you to make things happen.

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Business Case for Energy Conservation

- Can you afford not to invest in energy conservation?
E.g. Quay crane lighting – Metal-Halide vs LED

Life Cycle Cost		\$117,514
Initial Cost		\$10,822
Energy Cost		\$73,381
Annual Energy Use (kWh)		143,654
Annual Operating Cost		\$13,508
Annual Operation Savings		
Simple Payback (years)		
Discounted Payback (years)		
Life Cycle Return On Investment		
Net Present Value		
Internal Rate Return		
Life Cycle Cost Details - 20 years		[-]

Life Cycle Cost		\$61,000
Initial Cost		\$42,533
Energy Cost		\$18,467
Annual Energy Use (kWh)		36,152
Annual Operating Cost		\$2,169
Annual Operation Savings		\$11,338
Simple Payback (years)		3.24
Discounted Payback (years)		4.78
Life Cycle Return On Investment		132.9 %
Net Present Value		\$56,514
Internal Rate Return		29.1 %
Life Cycle Cost Details - 20 years		[-]

Project data

	Demand (kW)		Energy (kWh)	
Existing system		41.0		143,640
Proposed system		10.3		36,148

Demand (kW)		Energy (kWh)	
Site	BC Hydro Peak	Site	Potentially incentable
Projected savings	30.7	-	107,492

- Utility Incentives of \$30K covered total product cost.
Terminal operators provided installation.

PMV / Terminal cooperation – Quay crane lighting retrofit

- PMV assisted all the way from initial RFP, selection of a vendor, review of the lighting design and safety requirements, to incentives application.

Energy Conservation Forum

edit | select feedback tools | add picture | archive | activity report | comment analysis

The Vancouver Gateway moves more than 120 million tonnes of cargo annually – and moving cargo requires energy. Our Gateway is growing to meet Canada's future trade demand, and this means more energy will be needed.

Our Energy Action Initiative is helping the Gateway plan for the future by advancing efficient, reliable, competitive and clean energy systems. We want to leverage clean hydroelectric energy and maximize electrical energy efficiency. Our Energy Action Initiative can help your business identify and seize opportunities to reduce energy costs and support increased productivity.

We Can Help

Our Energy Management Specialist can help you in a variety of ways including:

- Raising awareness of energy
- Facilitating electrical energy and reduce costs
- Facilitating electrical energy incentives
- Facilitating information sharing

We're here to help Port Metro Vancouver's business is new to energy management resources, technical expertise:

Forum **Q&A** **News**

Information Center

Reorder folders | New folder | New document

- ✚ **Energy Management Information System** (web link) edit | delete | demote | mark as overview
- ✚ **Energy Efficient Equipment** edit
- ✚ **Workshop & Meeting documents** edit
- ✚ **Illumination safety regs.** edit
- ✚ **LED large outdoor flood pricing Q1 2014** edit
- ✚ **Training** edit

Forum

Add new topic

1 Are there energy efficient options being considered for currently executed and planned projects?

edit | make it sticky | close topic

There are numerous ongoing expansion and/or upgrade projects being planned or already executed at our tenant's sites - FSD Direct Coal Transfer facility; Neptune Terminal Upgrade; Richardson Grain Storage Capacity; Westshore Terminal Infrastructure Reinvestment; PCT Canola Handling and Wastewater Treatment Facility; to name a few. Permit application details are available for review on PMV website.

We're glad to see our Gateway growing!

Manage widgets ? Layout ? Preview ?

INFORMATION CENTER

- ✚ **Energy Management Information System** (web link)
- ✚ **Industrial Equipment reference guide** (web link)
- ✚ **Permanent Magnet Adjustable Speed Drive** (web link)
- ✚ **Energy Efficient Dust Collection** (370 KB) (docx)

more...

KEY LINKS

- Canadian Electricity Association - Vision 2050
- PMV Energy Forum - Port 2050
- Port 2050
- Tenant-Led projects

PROJECT TEAM

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Environmental Specialist – Energy
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- Ronan Chester, M.Sc, PMP, CEM, LEED AP BD+C
Manager, Strategic Environmental Initiatives
Phone: 604.665.9311

RELATED PROJECTS

- Energy Action Initiative
- Non-Road Diesel Emissions (NRDE) Initiative
- Deltaport Terminal, Road and Rail Improvement Project
- Habitat Enhancement Program
- Land Use Plan Update
- Sustainable Gateway Initiative
- Roberts Bank Terminal 2 Project
- South Shore Corridor Project
- Welcome to PortTalk
- Northwest Ports Clean Air Strategy (NWPAS)

more...


Our online forum is member (tenant) only web site that allows for information exchange in comfortable environment.

Members can post their project description / challenges and seek feedback

Information Center contains:

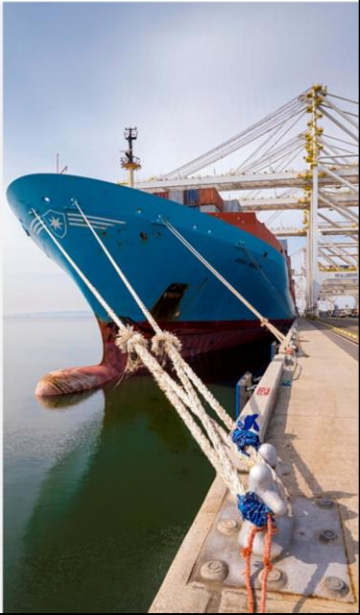
- Workshop and meetings documentation
- Results of research on port terminals related energy efficient equipment including lighting products / vendors prequalification for marine industrial outdoor environment.
- We post negotiated pricing on suitable product (primarily lights)
- Provide research on applicable safety regulations, etc.

Energy Conservation in Project Permit Application



Energy efficiency study included in Project and Environmental Review

- An assessment of how the proposed development (buildings, motorized equipment, and lights) will affect electrical energy consumption levels
- Include energy modeling, demonstrate consideration of BATNEC (Best Available Technology Not Entailing Excessive Cost) energy efficient equipment



New projects taking place on land, water and air space administered by PMV are subject to our [Project Review Process](#), which involves a rigorous evaluation of development and building plans and an environmental review.

- We plan to encourage our tenants to consider Energy Conservation Measures in their new projects

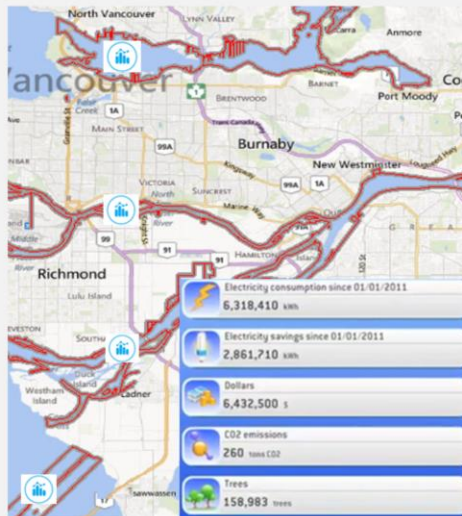
- Currently, the energy efficiency study is to be performed on voluntary basis. PMV Planners and Environmental Dept. reviewers encourage energy modeling to proponent and provide PMV energy manager contact information to support with the requirement.

Gateway Energy Monitoring System



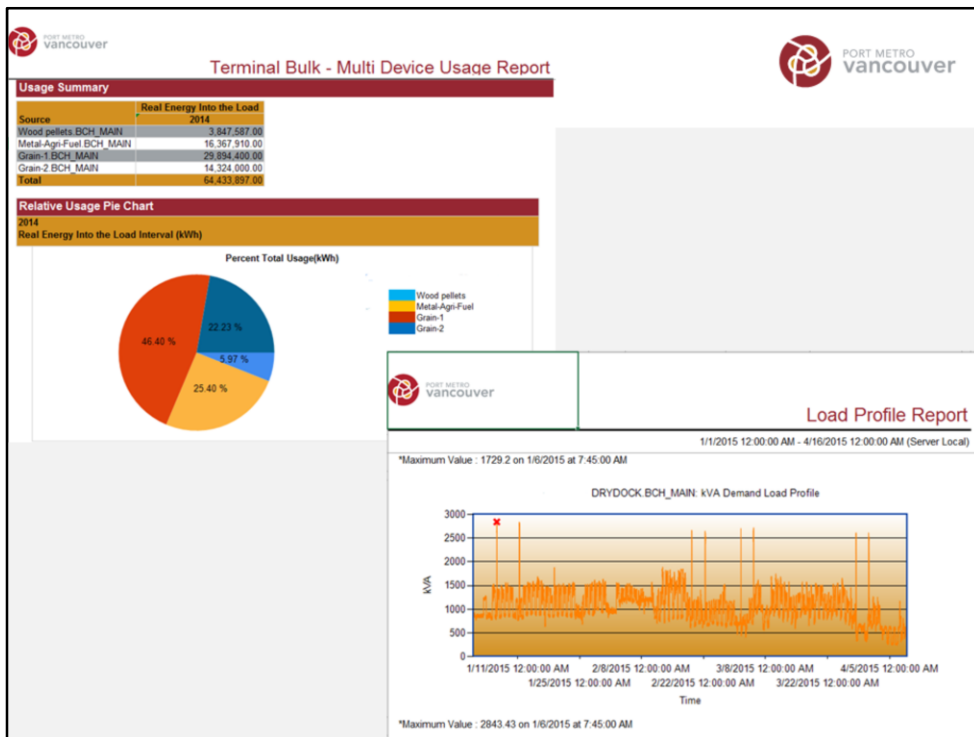
You can only manage what you can measure!

- Connecting all PMV and available tenant electricity consumption data into the **Gateway Power Monitoring Expert**
- Benchmarking
- Improvement targets
- Report on sector specific and overall Gateway performance



12

Utility incentives available to PMV energy mgr. for tenants to install metering and EMIS.



Example of preliminary reports from PMV Power Monitoring Expert.



Balancing economic, environmental
and social performance

We have a mandate to
facilitate Canada's trade,
to safeguard the
environment and
respond to local needs
and interests.

Thank you!

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Environmental Strategic Initiatives
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Wrapping up I just wanted to highlight our port's mission and overlaying reason why we care about energy conservation – We do that because we recognize the need to balance port operations with community concerns and environmental protection.



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Our Gateway is growing to meet Canada's future trade demand – more energy will be needed