Photo: Powerhouse

Energy Discussion Paper

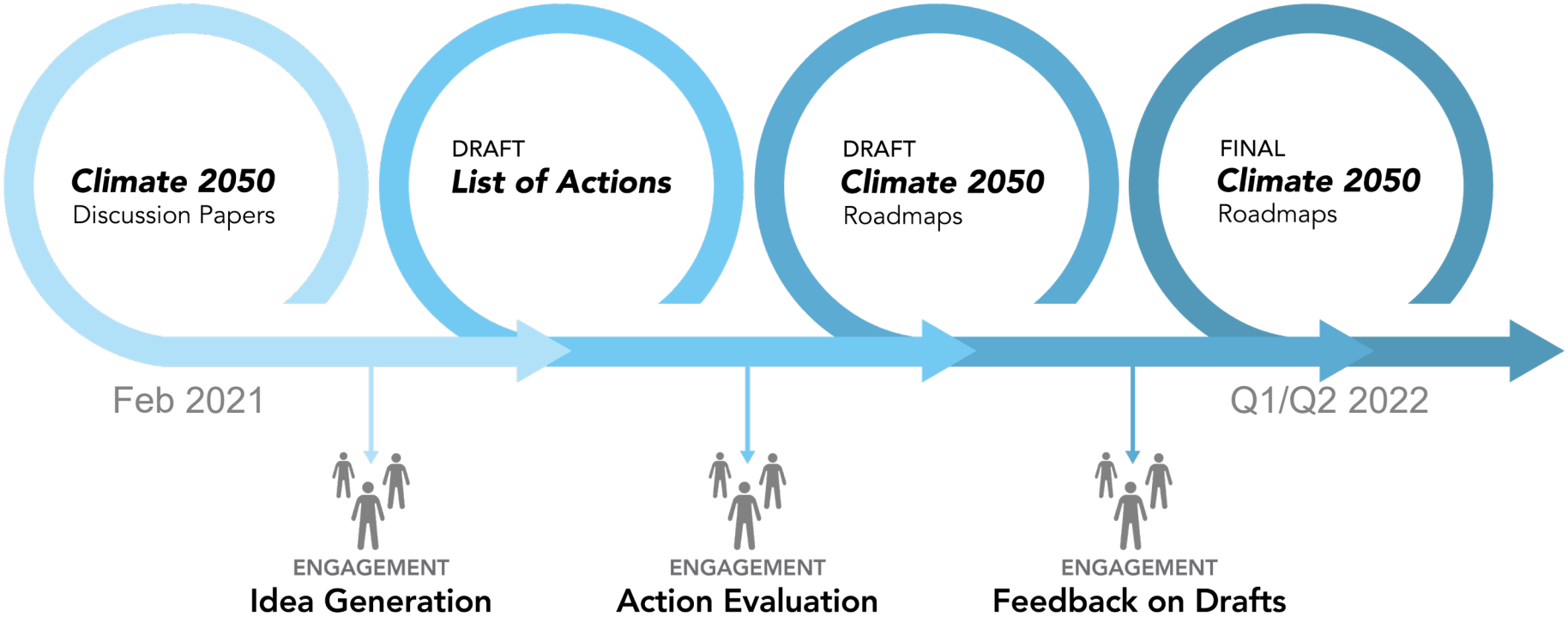
CLIMATE 2050

Nicole Chan
PROJECT ENGINEER, AIR QUALITY & CLIMATE CHANGE

metrovancouver

Climate Action Committee - February 12, 2021

ENERGY ROADMAP DEVELOPMENT PROCESS



PROPOSED LONG-TERM GOAL FOR ENERGY

100% of the energy used in the Metro Vancouver region is derived from clean, renewable sources

PROPOSED BIG IDEAS TO REDUCE EMISSIONS

1. Accelerate electrification

PROPOSED BIG IDEAS TO REDUCE EMISSIONS

1. Accelerate electrification
2. Increase regional supply of renewable gas

PROPOSED BIG IDEAS TO REDUCE EMISSIONS

1. Accelerate electrification
2. Increase supply of renewable gas
3. Expand Metro Vancouver's role in providing clean, renewable energy

PROPOSED BIG IDEAS TO REDUCE EMISSIONS

1. Accelerate electrification
2. Increase supply of renewable gas
3. Expand Metro Vancouver's role in providing clean, renewable energy
4. Limit expansion of fossil fuel supply infrastructure

NEXT STEPS

- Incorporate feedback from Committee
- Publish finalized Discussion Paper
- Engagement in Q1-Q2 2021
  - Feb 16 Metro Vancouver Webinar on Clean Energy

Thank you

metrovancouver
Together we make our region strong

Colony Farm Regional Park

2021 Sustainability Innovation Fund Applications

REGIONAL DISTRICT AND WATER SERVICES

Megan Gerryts

ADVISOR, REGIONAL ECONOMIC PROSPERITY SERVICE

Climate Action Committee: February 12, 2021

43233266

metrovancouver

Fund Overview

- Three reserve funds created in 2004
  - “Dedicated to funding projects that are based on the principles of sustainability”
- Annual contribution:
  - MVRD: $347,000
  - GVS&DD: $1.127 million
  - GVWD: $723,000
- 2014: Policies to guide the use and management of the funds
  - Internal Steering Committee review
- Opportunity to amend policies to accelerate climate action

Regional District SIF Applications

Roger Quan, Director, Air Quality and Climate Change

Ann Rowan, Division Manager, Collaboration and Engagement, External Relations

Jade Hume, Division Manager, Housing Maintenance and Capital Projects

James Stiver, Division Manager, Growth Management and Transportation, Regional Planning and Electoral Area Services

Mike Redpath, Director, Regional Parks

Belcarra Regional Park

Assessment of Carbon Capture Technology

2021-2022: $200,000

Purpose: To understand the applicability of carbon capture technology in reducing CO_2 emissions from industrial facilities in Metro Vancouver

- Explore the potential applications of technological carbon capture approaches at industrial facilities in the region
- Collaborate with regional partners to develop a technological carbon capture sector pilot to support the regional cleantech economy.

Source: AIChE.org

“Lights, Camera, Climate Action!”

2021-2023: $200,000

Purpose: To identify alternative, clean and modular power sources for portable diesel generators currently used by the film industry

- Complete a feasibility study on the viability of clean energy alternatives for the film industry
- Implement a pilot program to promote their use in the film sector
- Report scalable opportunity for other user groups (e.g. construction, food trucks, events)


Diesel Generator

Sharing Data for Zero Emissions Buildings

2021-2023: $200,000

Purpose: To develop a regional ground-oriented housing database that targets low carbon retrofits in homes across the region and supports effective zero emissions policies and programs.

- Understand the building stock through a climate lens, identify the worst performers and provide solutions
- Develop municipal and regional zero emissions retrofit programs
- Be ready to “plug and play” the regional database into an online homeowner decision software for the region

Responding to the Climate Emergency

2021-2022: $200,000

Purpose: Given the climate emergency, Metro Vancouver needs a public and stakeholder engagement strategy that will build a constituency to champion *Climate 2050* and the actions in it.

- Leverage the reach of Metro Vancouver member jurisdictions and NGOs as well as engage respected members of the community to develop a strong, common message about the importance of achieving regional carbon neutrality; and
- Introduce and engage new audiences, through innovative tools, of the value of *Climate 2050* in addressing the climate emergency.

Housing Retrofit Evolution – Reframed Initiative

2021-2022: $200,000

Purpose: To demonstrate technical and economic feasibility of whole-building deep resiliency retrofits including 50% reduction of energy use intensity.

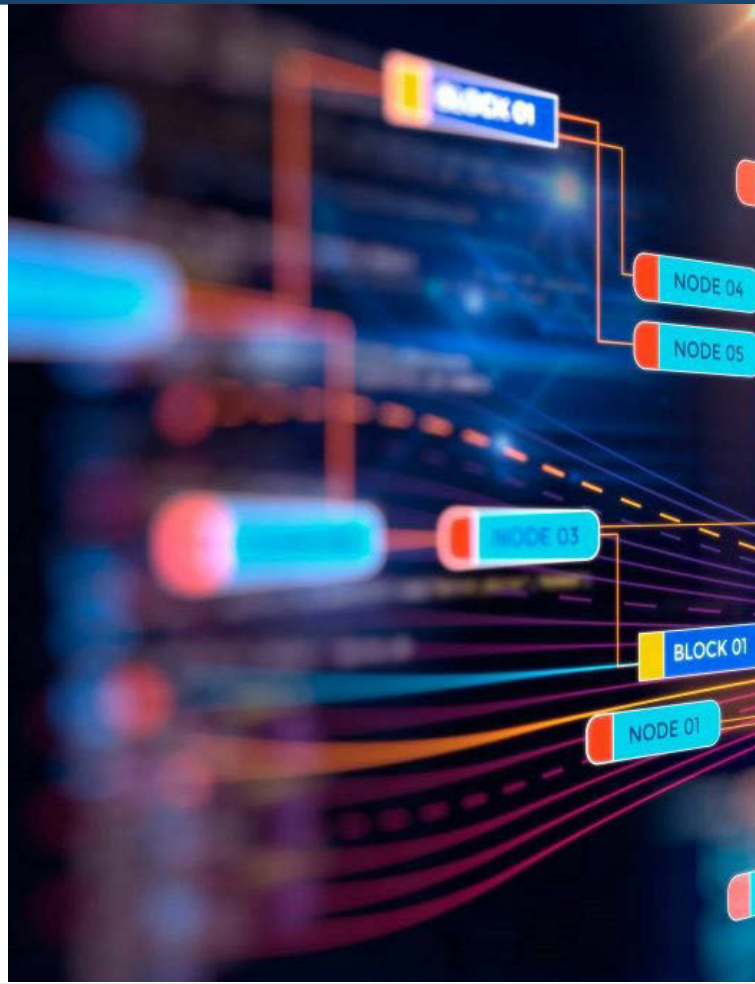
- Develop assemblies/products that provide repeatable, predictable energy performance
- Accelerate development and adoption of emergent retrofit technologies
- Improve tenant comfort, well-being and safety, extend the life of the asset, and reduce operational cost.

Social and Community Data Land Use Model

2021-2022: $60,000 (future phases)

Purpose: To classify current data and prepare a gap analysis of the data needed to develop a future model on how people choose their city and neighbourhood

- Collect data for classification to prepare for next phase of model development
- Review current available data to understand gaps between our region and the data

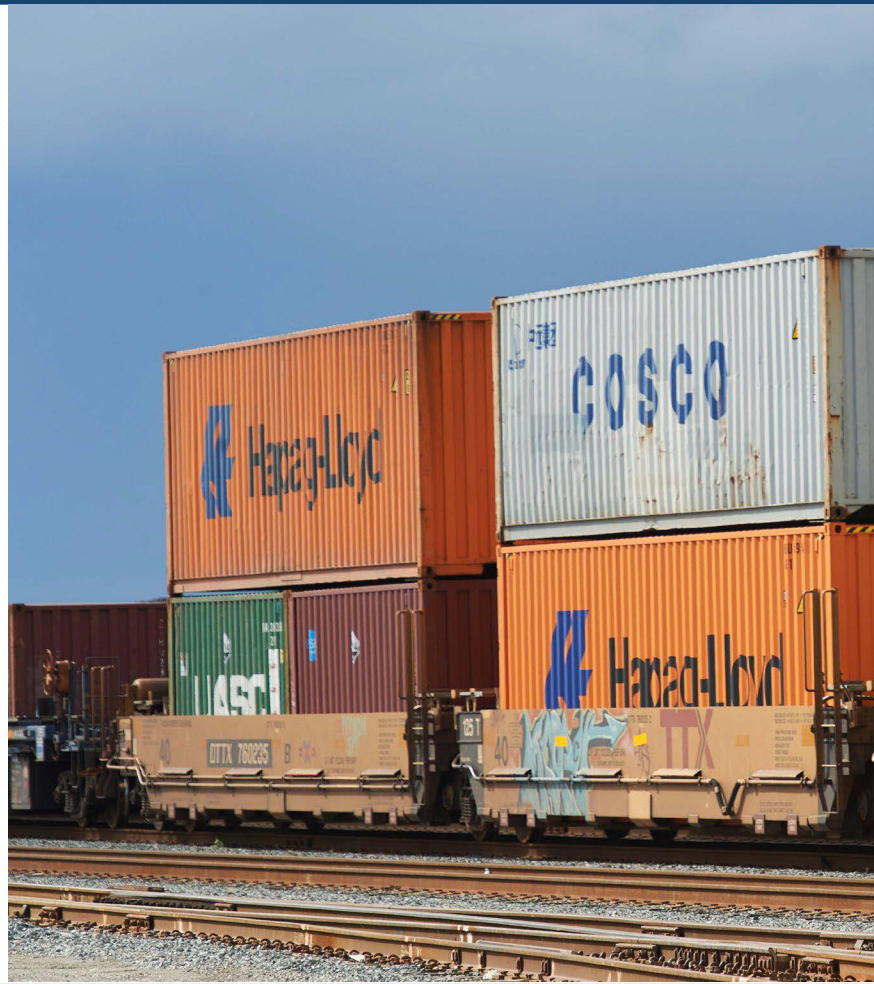


Regional Land Use Assessment

2021-2023: $200,000

Purpose: To prepare a land budget to understand land use capacities and future needs across the region.

- Build database to better understand growth needs relative to Regional Growth Strategy's (RGS) land use designations
- Data will assist with future RGS policy development and land use designations (i.e. Urban Containment Boundary Adjustments)

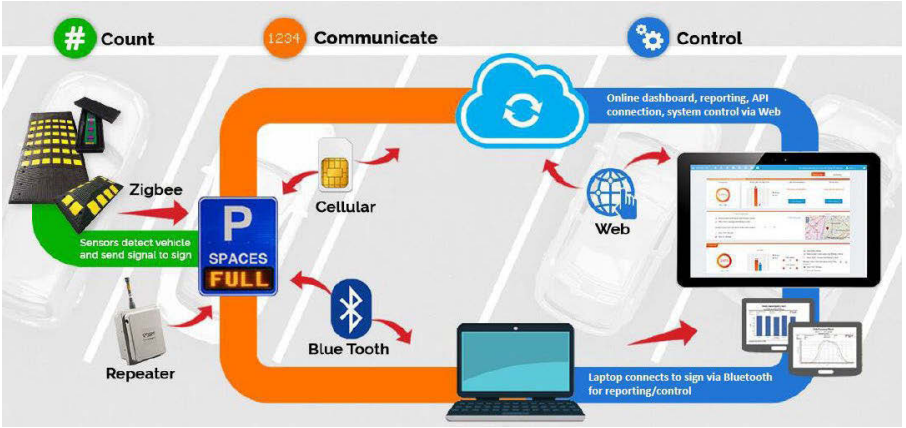


Managing Capacity and Reducing Emissions: Real-time Parking Availability in Regional Parks

2021-2023: $300,000

Purpose: To design and implement a real-time parking availability system for regional parks.

- Provide information on lot capacity before visitors leave home.
- Allow decisions on when, how and which parks to access.



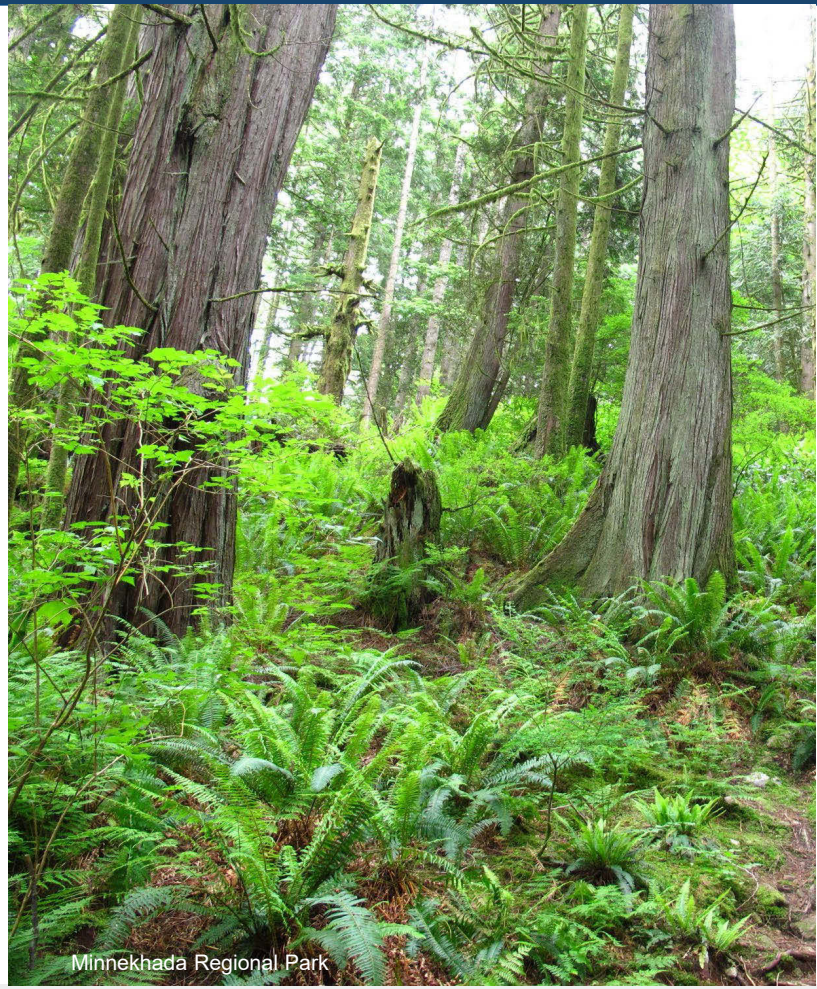
Real-time parking availability hardware/software platform

Natural Asset Management in Regional Parks

2021-2022: $160,000

Purpose: To advance the integration of natural assets into an asset management system

- Complete a high-level ecosystem services assessment and valuation
- Conduct a detailed pilot study to ascertain maintenance and monitoring needs
- Develop a prioritization framework for management actions


Minnekhada Regional Park

Promoting Peatland Recovery in Areas Affected by Wildfire

2021-2022: $199,000

- **Purpose: To research post-fire management of forested peatlands in Burns Bog Ecological Conservancy Area**
- Removal of pine seedlings from burn zone to promote restoration of peatlands
- Monitor ecological response (vegetation, water table, greenhouse gas exchange)
- Inform future management actions


Burns Bog

Thank you

metrovancouver
Together we make our region strong

Water SIF Applications

Aby Sharma, Program Manager, Water Systems, Model and Data Analysis, Water Services

Seymour Falls Dam

Building Information Modeling (BIM): Transforming Utilities Information Management

2021-2022: $800,000

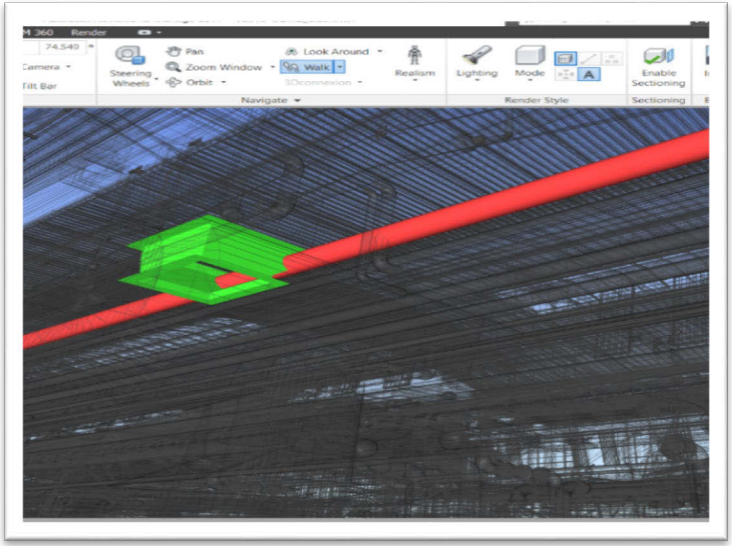
Purpose: To research, develop and build BIM standards and applications in support of 3D design and use in water and liquid waste infrastructure (Phase I – Design Stage)

- To review existing procedures to incorporate 3D review standards / processes / tools for the infrastructure lifecycle
- To incorporate laser scanning standards and capabilities to enable creation of BIM models for existing infrastructure

Note: If successful, future Phases / Requests will cover Construction, Commissioning and Ops. / Maint. Lifecycle

'Using BIM data generated during design and build over the whole project lifecycle enables faster, safer, less wasteful construction and more cost-effective, sustainable operation, maintenance and eventual decommissioning.'

~ Mott Macdonald



3D clash detection example: Sustainability via improved pre construction design validation

Microplastics in Source Waters

2022-2023: $150,000

Purpose: To evaluate the presence and concentration of microplastics in Metro Vancouver's source waters, treatment residuals from the SCFP and within the water treatment train at SCFP and the Coquitlam treatment plant.

- Provide understanding of microplastics in source waters to allow for adjustments to existing and future treatment processes.

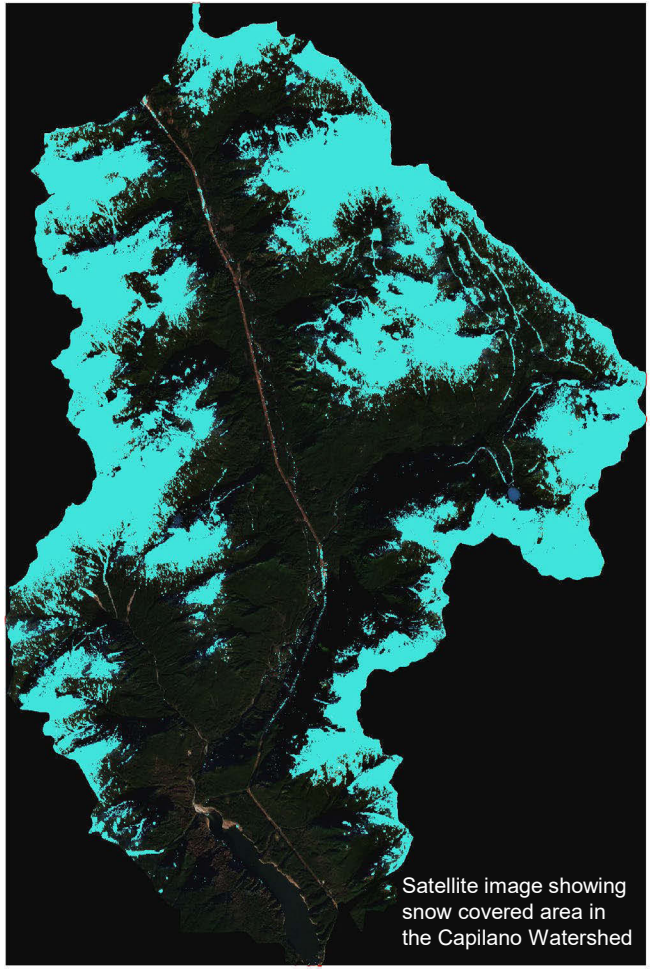
Plastic Bags

Next Generation Snowpack Monitoring, Phase 2

2021-2022: $400,000

Purpose: To investigate emerging remote sensing technologies and find opportunities to integrate them into the existing watershed snowpack monitoring program.

- Increase the spatial and temporal density of snow observations;
- Use remote sensing data to improve estimates of stored water volume in the snowpack for water supply planning, research, climate change monitoring, and education;
- Reduce the reliance on manual observations.



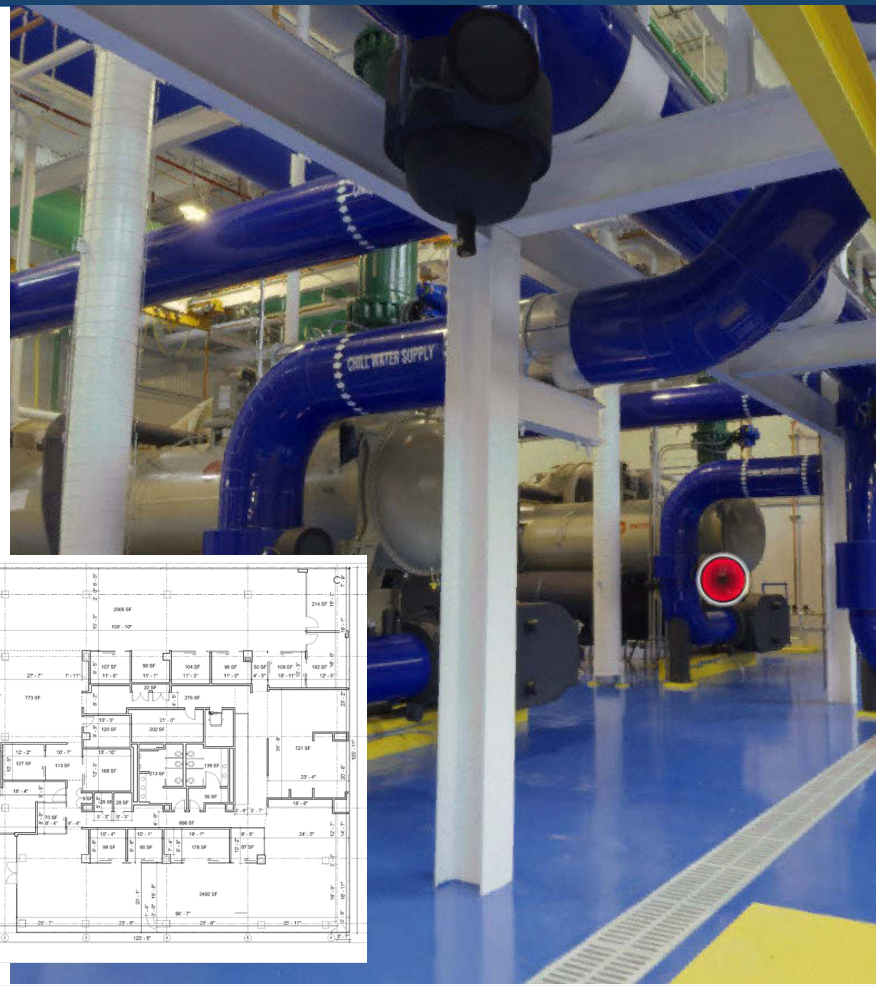
Satellite image showing snow covered area in the Capilano Watershed

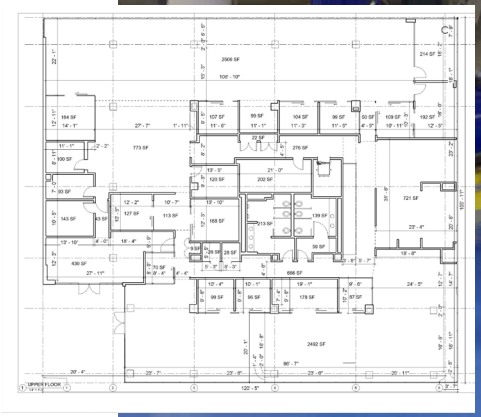
Visual Documentation of Key Water Services Infrastructure

2022-2023: $700,000

Purpose: To construct a visual database of Metro Vancouver's key pieces of water infrastructure to promote resilient design and innovations as well as better asset management.

- Constructs virtual walk-throughs, 3D-models, and accurate floor plans.
- Develops a foundation for modelling software such as BIM



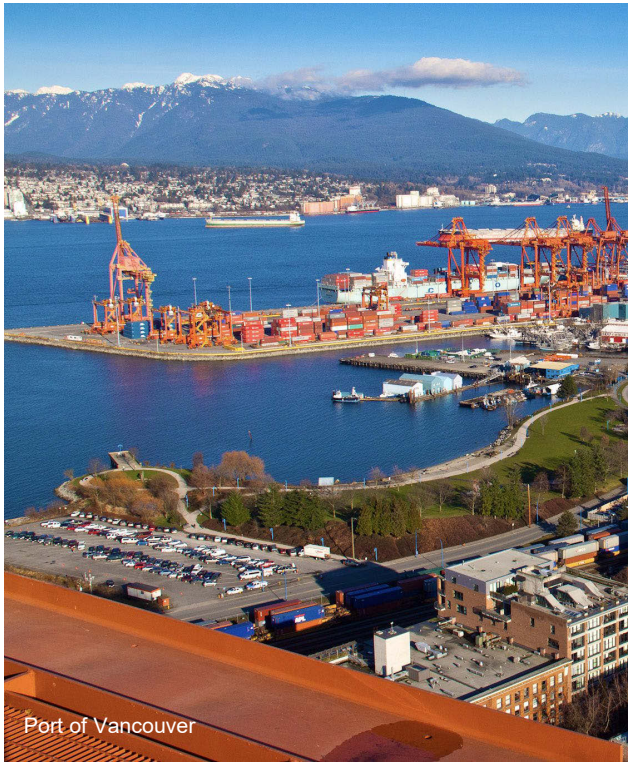


Industrial, Commercial & Institutional Sector Migration – Impact on Water Demand

2021-2022: $150,000

Purpose: To assess how Industrial, Commercial & Institutional (ICI) sector migration and development in the future may impact water demand.

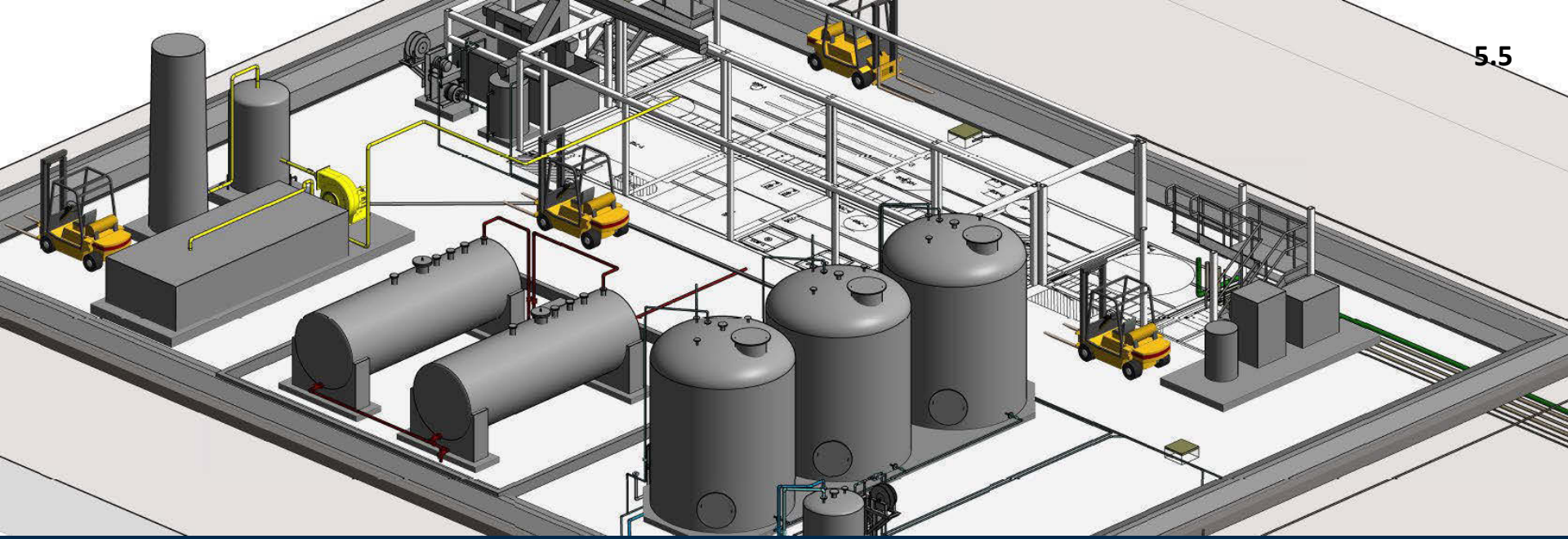
- Study the potential changes in land-use - what type of business will it support.
- Develop ICI sector future buildout scenarios.
- Develop a water demand forecasting tool for the ICI sector.


Port of Vancouver

Annacis Wastewater Treatment Plant Laboratory

Thank You

metrovancouver
Together we make our region strong



3D Layout View

Hydrothermal Processing Demonstration Facility

ADDITIONAL FUNDING REQUEST

Paul Kadota, MASc, MPA, PEng.

Collaborative Innovations Manager, Liquid Waste Services

Climate Action Committee, February 12, 2021

metrovancouver

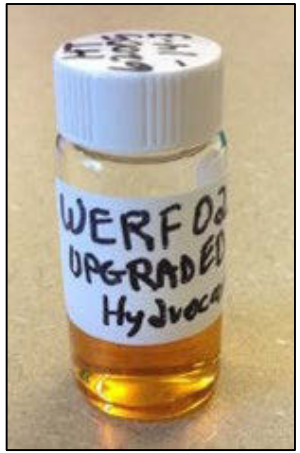
CONVERSION TO TRANSPORTATION FUELS

Wastewater biomass

Hydro-Thermal Process

Biocrude

Refining



Low carbon fuel

UPDATE

Background

- $8.25 Mil. SIF funding approved Sep. 2018
- $5 Mil. Partnership funding secured

New Information

- $19.38 Mil. revised cost estimate
- $6.13 Mil. funding shortfall

BUSINESS CASE

Anaerobic Digestion (AD) vs. Hydrothermal Processing (HTP)

Attribute	AD	HTP	Benefit
Speed	20 – 30 days	1 hour	Less real estate
Costs	~$7 Mil/yr	~$4 Mil/yr	$60 Mil in NPV* savings
Credits tCO_2e/yr	~5,000	~16,000	Scalable to other biomass
Risk profile	Low; increasing	High; decreasing	Opens future opportunities

Comparison based on full scale systems at the Iona Island Treatment Facility

*Net Present Value savings on CapEx + OpEx over 20 years

IMPLICATIONS

Financial

- $14.38 Mil. total allocation over 6 years
- Sufficient balances in LW-SIF; no impact to sewer levy
- Salvage value potential

Other

- HTP better prepares for future challenges
- Decarbonizes transportation fuels

RECOMMENDATION

That the GVS&DD Board approve additional funding of $6.13 million from the Liquid Waste Sustainability Innovation Fund for the Hydrothermal Processing Biofuel Demonstration Facility.


WASTEWATER TREATMENT
COLLECTION
WASTEWATER
HYDROTHERMAL PROCESSING
BIOCRUDE
UPGRADING/REFINING
DISTRIBUTION
UTILIZATION

Questions