

Pacific Decarbonized Energy Corridor

Building Canada Strong: A Green Energy Transformation for Metro Vancouver

The Pacific Decarbonized Energy Corridor is a dual-site clean energy system that produces hydrogen at the decommissioned Burrard Thermal Generating Station in Port Moody and dispenses it at a centralized fuelling node adjacent to Waterfront Station in downtown Vancouver. Twelve distinct offtaker applications across transit, marine, port operations, and aviation share a common supply infrastructure. Two complementary production pathways provide redundancy: grid-tied electrolysis using BC Hydro's existing high-voltage interconnection at Burrard, and methane pyrolysis using the site's existing FortisBC gas pipeline. The project converts a decommissioned fossil fuel plant into a clean energy campus, creates zero-emission demand for BC's natural gas sector, and positions the Port of Vancouver as a green hydrogen export node for Asia-Pacific markets.

Daily H2 demand 14,590 kg 12 offtaker applications	CO2 displaced / year 84,420 tonnes Well-to-wheel basis	Cars off the road 18,352 Every year, permanently	20-year NPV \$1.12B Savings + externalities
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Why this, why now

U.S. tariffs and trade uncertainty will cost Canada approximately \$50 billion. Ninety percent of Canadian oil exports go to one customer. Energy-importing allies in Asia and Europe are actively seeking stable, democratic-origin clean fuel suppliers. Prime Minister Carney has responded with a mandate to build Canada into the world's leading energy superpower, diversify trade, and enable \$1 trillion in investment over five years. This project implements that mandate directly, satisfying six federal policy instruments:

- Major Projects Office fast-track framework (qualifies as a Project of National Interest)
- \$5B Trade Diversification Corridor Fund (port and rail infrastructure reducing U.S. dependence)
- Budget 2025 Productivity Super-Deduction (immediate expensing for clean energy equipment)
- Canada Infrastructure Bank (\$337M precedent loan to HTEC for hydrogen infrastructure in BC)
- Carbon Border Adjustment Mechanism (hydrogen from the world's cleanest grid)
- One project, one approval (MPO streamlined review recognizing provincial decisions)

Jobs, energy security, and the natural gas sector

The project creates 280+ permanent operations positions (\$70K-\$150K+) and 1,500+ construction jobs during Phase 1. Methane pyrolysis converts Montney formation natural gas from a \$2/GJ commodity into \$7-\$9/kg hydrogen plus solid carbon co-products at \$1,500/t base case (premium carbon black, NA market), delivered through the existing FortisBC pipeline at Burrard Thermal with no new pipeline construction required. Export-ready hydrogen and ammonia shipped through VFPA deep-water berths diversify Canada's trade into Japan, South Korea, and Germany. The Burrard campus restores \$1.6M+ in annual industrial tax revenue to Port Moody.

This model works

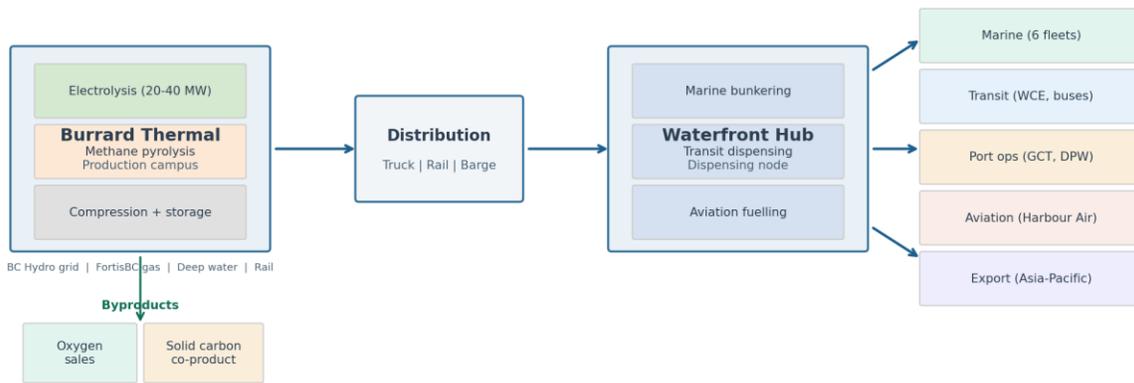
Multi-offtaker hydrogen hubs are already operating in Europe, Asia, and North America. Four projects validate the core PDEC model at smaller scale:

- Green Hysland (Mallorca, Spain, 2022): Solar-powered electrolyzer serving transit buses, port operations, commercial heating, and gas grid injection to 115,000 households. Europe's first integrated hydrogen ecosystem. EU-funded.
- Namie Hydrogen Town (Fukushima, Japan, 2020): Single 10 MW electrolyzer serving school buses, delivery vehicles, commercial buildings, residential fuel cells, and industrial boilers. Japanese government economic renewal programme.
- eFarm (North Friesland, Germany, 2020): Wind-powered electrolyzer serving 12 transit buses, private vehicles, and district heating networks. Expanded twice since launch.
- Toyota Tri-Gen (Port of Long Beach, California, 2024): FuelCell Energy biogas-to-hydrogen facility producing 1,200 kg/day H2, 2.3 MW electricity, and 5,300 L/day water. Serves port logistics, Class 8 trucks, and the grid. North America's first multi-output hydrogen system at a major port.

PDEC applies the same shared-infrastructure approach at twelve times the scale of Tri-Gen, with existing grid, gas, port, and rail connections that would cost tens of millions to replicate.

Two sites, one system

System architecture



Burrard Thermal production campus (Port Moody)

Built in 1962 as a 950 MW, six-unit natural gas power plant, the 193-acre BC Hydro-owned waterfront property retains infrastructure that would cost tens of millions and years of permitting to replicate:

- High-voltage grid interconnection rated for hundreds of MW, connected at three points (electrolysis feedstock).
- FortisBC natural gas pipeline already on site (pyrolysis feedstock).
- Deep-water port and CP Rail line along the West Coast Express corridor (distribution by barge, rail, truck).
- 193 acres of industrially zoned Crown land, no residential adjacency, permitted for heavy energy use.

BC Hydro plans to reapply to the BCUC in 2026 for decommissioning. No future use decision has been made. Port Moody council is actively seeking industrial reuse. The site sits in the federal riding of Port Moody-Coquitlam, represented by MP Zoe Royer (Liberal).

Waterfront dispensing hub (downtown Vancouver)

A centralized dispensing facility on VFPA federal land adjacent to Waterfront Station serves all marine, transit, and aviation off-takers within 500 metres: SeaBus terminal, Hullo ferry terminal (Harbour Flight Centre), Harbour Air seaplane terminal, WCE platform, and harbour tug moorage. Street-level 700-bar dispensers serve buses and drayage trucks. A marine bunkering arm on a float structure serves tugs and ferries. Hydrogen arrives from Burrard by tube trailer (25 min), rail, or barge. A satellite node at Burrard serves the WCE at Port Moody station and Tri-Cities transit.

Production pathways

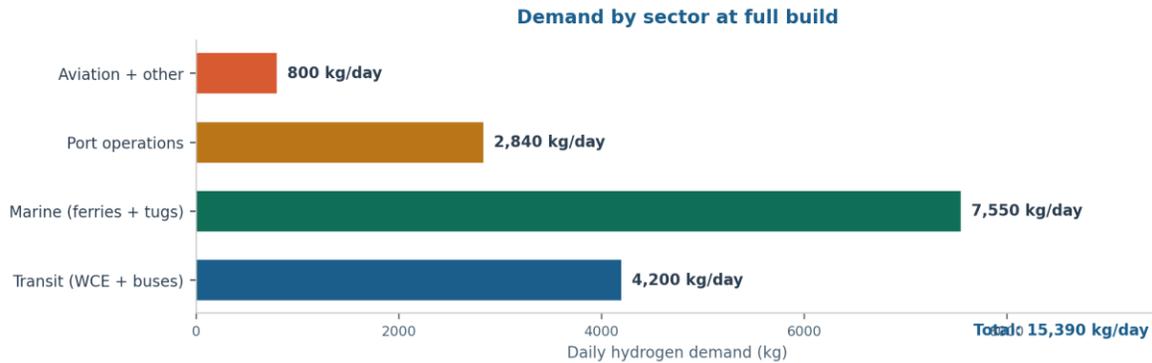
Electrolysis: 20-40 MW PEM electrolyzer at Burrard under BC Hydro Rate 1894 (20% discount). Byproduct oxygen (8 kg per kg H₂) sold to Seaspan, Metro Vancouver wastewater, and medical markets. Waste heat feeds Port Moody district energy. LCOH: \$3.27/kg.

Methane pyrolysis: On-site using existing gas pipeline. Zero CO₂ emissions. Solid carbon co-product at \$1,500/t base case (premium carbon black, NA market; Ekona Power benchmark \$800-\$1,500/t). Gross LCOH: \$2.50/kg. Net LCOH after carbon credit: -\$2.00/kg. Blended LCOH across both pathways: \$2.12/kg. UBC Chemical Engineering has designed a reference plant at 18,250 t H₂/year. As FortisBC increases its renewable natural gas blend under CleanBC mandates, the pyrolysis pathway becomes carbon-negative on a lifecycle basis, locking biogenic carbon into solid products.

Twelve off-takers from a single hub

Offtaker application	H2 (kg/day)	CO2 displaced (t/yr)
West Coast Express	600	4,020
SeaBus (4 vessels)	700	1,340
Hullo Ferries (4 vessels)	2,400	14,470
BC Ferries (2 routes)	1,500	5,360
Harbour tugs + Seaspan (15+)	2,150	20,100
Transit buses (80 FCEBs)	3,600	19,300
Port cranes + mobile equip	1,840	8,840
Drayage trucks (25)	1,000	4,820

Harbour Air seaplanes	300	2,410
Film + construction gensets	500	3,760



Shared infrastructure costs amortized across twelve high-utilization demand applications eliminate the single-use economics problem that has constrained every previous hydrogen project in Canada.

Why hydrogen for these applications

Battery-electric vehicles are the right solution for short-range, light-duty transport. PDEC deliberately targets the six application categories where batteries cannot compete: marine vessels requiring 8-16 hour operating days at megawatt-scale power, heavy rail covering 80 km routes where catenary electrification is uneconomic, port cranes operating 24/7 with extreme duty cycles, transit buses on steep grades requiring 400+ km cold-weather range, seaplanes where battery weight eliminates payload, and Class 7/8 drayage trucks penalized 2-3 tonnes by battery mass. In every case, hydrogen's 3x energy density advantage by weight, 10-15 minute refuelling, and weather-independent performance are the determining factors.

Proven technology, proven team

Vincent Royer (PMP) served as Electrical Project Manager for Canada's first hydrogen fuel cell RTG crane at DP World's Centerm terminal, Port of Vancouver. During factory acceptance testing, the crane operated for 16 continuous hours, lifting 40-tonne containers 105 consecutive times, producing only water vapour and eliminating approximately 400 kg of CO2 per equivalent diesel cycle. The sole limitation was hydrogen supply: HTEC could not deliver adequate gaseous hydrogen from an undersized off-site facility. The Burrard production campus permanently solves that constraint at commercial scale. Mr. Royer is an MBA candidate in Sustainable Innovation at UVic Gustavson (2025-2027) and has completed methane pyrolysis technical due diligence for NorthX Climate Tech.

Economics (\$CAD, annual at full build)

Direct Revenue and Savings

Revenue stream	Annual value
Avoided diesel fuel cost (31.5M L at \$1.60/L)	\$50.4M
Solid carbon co-product (\$1,500/t base case)	\$8.4M
Electrolysis oxygen byproduct	\$4.2M
District heat (Creative Energy + Port Moody)	\$2.6M
Grid services / BC Hydro demand response	\$1.5M
FortisBC hydrogen blending offtake	\$1.5M
Subtotal - Direct	\$68.6M

Social and Externality Value

Value stream	Annual value
Social cost of carbon (84,420 t at \$294/t SCC)	\$24.8M
Healthcare cost avoidance (PM2.5 + NOx)	\$11.4M
Subtotal - Social	\$36.2M

Total annual value created: \$104.8M

PDEC Operator Financials

PDEC sells hydrogen at \$7.50/kg, competitive against diesel-equivalent cost of \$10-12/kg for heavy-duty applications. Blended production cost: \$2.12/kg. Gross margin: \$5.38/kg.

PDEC revenue	Annual value
Hydrogen sales (5.3M kg at \$7.50/kg)	\$39.9M
Solid carbon co-product	\$8.4M
Oxygen + heat + grid + blending	\$9.8M
Total PDEC Revenue	\$58.1M

Operating costs	Annual value
Production cost (LCOH x volume)	\$11.3M
Staffing (280 staff)	\$26.6M
Maintenance, insurance, lease, admin	\$11.3M
Total OpEx	\$49.2M

EBITDA: \$9.0M (15.4% margin). Simple payback: 23.7 years before grants and escalation. With federal grants covering 30-50% of CapEx and 2%/yr CPI + 5%/yr carbon price escalation, effective payback falls to 8-12 years.

CapEx: \$160M-\$265M (Phase 1), comparable to a single SkyTrain station. Burrard's existing infrastructure saves \$10M-\$20M vs. greenfield. 20-year gross NPV: \$1.12B. Net NPV (after CapEx): \$0.92B at 5% discount rate. CIB precedent: \$337M to HTEC. Budget 2025 Super-Deduction: immediate expensing for all clean energy capital.

Scenario modelling

Scenario	Demand (kg/day)	Annual value	20-yr NPV
Phase 1 only	2,700	\$21.7M	\$231M
Conservative (50%)	7,300	\$55.2M	\$588M
Full build (base case)	14,590	\$104.8M	\$1.12B
Optimistic (+20% export)	17,500	\$124.6M	\$1.33B

Sensitivity: The model is robust across parameter ranges. Diesel at \$1.20/L (25% below base): NPV \$981M. Social cost of carbon at \$200/t (32% below federal rate): NPV \$1.03B. Carbon co-product at \$1,000/t (33% below base): NPV \$1.09B. The project remains strongly NPV-positive under every tested scenario.

Partnership ecosystem

Technology and production

- Ballard Power Systems (Burnaby): FCwave marine + FCmove-HD+ heavy-duty fuel cells. DNV Type Approved. 10-year SFU partnership.
- Corvus Energy (Richmond): Marine BESS global leader. 1,300+ vessels. BC Ferries electric ferry contract (2025).
- HTEC (Vancouver): Burnaby 1.8 t/day + North Van 15 t/day liquid H2 facility (\$140M, ERCO byproduct capture, permits granted). \$337M CIB + \$49M SIF. North Van site across Burrard Inlet from Waterfront hub enables third-party supply integration.
- Quantum Technology (Squamish): Canada's first large-scale hydrogen liquefier manufacturer. 40 years in cryogenic systems. Multi-ton-per-day liquefiers and fuel-cell-quality purification.
- BC Hydro: Existing Burrard grid. Rate 1894. Site C + renewables. FortisBC: Existing Burrard gas pipeline. 15% H2 blending.
- NorthX Climate Tech: \$46M across 74 projects. 10:1 capital multiplier. Potential Phase 0 seed funder.

Offtakers

- TransLink (SeaBus, WCE, buses), Hullo Ferries (14 daily sailings, 2 new vessels, Victoria expansion), BC Ferries (4 Corvus electric ferries, H2 for long routes), Harbour Air (200+ daily flights, H2-hybrid Twin Otter), Seaspan (NSS shipbuilder, HaiSea electric tugs, Marine Petrobulk bunkering).
- GCT (45% emission target 2030, Net Zero Challenge, first battery RTG), DP World Centerm (H2 RTG precedent), VFPA (harbour decarbonization).

Academic consortium

- UVic IESVic (hydrogen systems TEA) + PICS (carbon economics) + Gustavson MBA. SFU FCREL (PEM fuel cell R&D, co-located with Ballard/PowerTech). UBC CERC + SHED (\$23M H2 district, electrolyzer, methane pyrolysis design). UBCO H2LAB (FortisBC blending). BCIT (trades + H2 safety certification).

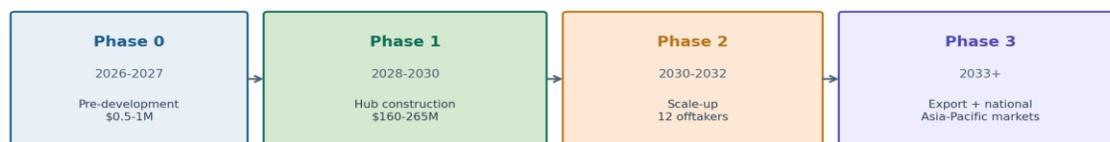
Reconciliation and Indigenous economic partnership

The project structures Indigenous equity participation, employment targets, procurement commitments, and revenue sharing from inception, aligned with TRC Call to Action #92 and UNDRIP. Existing partnerships provide a foundation: Tsleil-Waututh Nation (GCT renewable fuel via SPAL Corp; Burrard within Tsleil-Waututh territory), Squamish Nation (UBC CERC clean energy partnership), Haisla Nation (HaiSea Marine electric tugs with Seaspan, a template for hydrogen tug fleet co-ownership), and Musqueam (UBC SHED and Waterfront hub within shared territories).

The federal Indigenous Loan Guarantee Program, doubled to \$10 billion in March 2025, provides the financing mechanism for equity acquisition. The program's first guarantee (\$400M to 36 BC First Nations for a 12.5% stake in Enbridge's Westcoast pipeline) demonstrates the scale of Indigenous ownership the federal government is prepared to back. PDEC's eligibility is strengthened by the program's expanded scope, which now covers infrastructure, transportation, and trade projects.

Implementation plan

Implementation phasing



Burrard Thermal BCUC reapplication (2026) → First H2 dispensed (2028) → Full build (2032) → Export (2033+)

Phase 0: Pre-development (2026-2027, \$500K-\$1M)

- Secure BC Hydro letter of interest for Burrard Thermal site lease and Rate 1894 eligibility.
- Engage VFPA for Waterfront dispensing hub federal land lease.
- Commission UVic IESVic feasibility study (techno-economic analysis, demand modelling, capacity sizing).
- Submit NRCAN Clean Fuels Fund and ISED SIF applications, co-sponsored by BC Hydro, VFPA, TransLink.
- Apply to NorthX Climate Tech for non-dilutive seed funding.
- Request Major Projects Office referral as a candidate Project of National Interest.
- Initiate environmental assessment for Burrard reuse. Execute Ballard and Corvus LOIs.
- Begin First Nations economic partnership framework with Tsleil-Waututh, Squamish, Musqueam, and Haisla Nations.
- Conduct Burrard site condition assessment: contamination, structural survey, interconnection verification.

Phase 1: Construction and pilot (2028-2030, \$160M-\$265M)

- Burrard: 5-10 MW electrolyzer (existing grid), first pyrolysis unit (existing gas), compression, storage, tube trailer and barge loading.
- Waterfront: CSD infrastructure, marine bunkering arm, 700-bar street dispenser on VFPA land.
- Retrofit one SeaBus (Ballard FCwave + Corvus BESS). Fabricate WCE H2 power car and 600-bar tube car.
- Satellite dispensing at Burrard for WCE (Port Moody station) and Tri-Cities transit.
- Begin DP World and GCT port equipment supply. Procure 20 FCEB transit buses.
- Establish oxygen sales (Seaspan, Metro Van wastewater, medical). Hire and train ops team.
- Financing: CIB loan (\$337M HTEC precedent), LCFS Agreements (\$133M HTEC precedent), ZETF/SIF grants, industry equity.

Phase 2: Scale-up (2030-2032)

- Expand electrolyzer to 20-40 MW. Add pyrolysis units. Retrofit remaining SeaBus vessels.
- Commission Hullo hydrogen vessels. Expand tug fleet to 15 units. Scale FCEB to 80 buses.
- Full GCT + DP World port mobile equipment conversion. Harbour Air H2-hybrid Twin Otter.
- BC Ferries partnership (Horseshoe Bay-Nanaimo). Carbon processing for battery-grade solid carbon.

Phase 3: Export and national scale (2033+)

- LH2 or ammonia export via VFPA deep-water berth to Japan, South Korea, Germany. Aligned with the North Pacific Green Corridor Consortium (NPGCC), a nine-member alliance including VFPA, CN, and Teck working to decarbonize the Canada-Japan-South Korea shipping corridor.
- Mid-route dispensing nodes along CP Rail corridor. FCEB fleet to 100+ buses.
- Publish open interface standards (CSA Group, ISO TC197) for multi-OEM interoperability. Position Vancouver as the global reference deployment for multi-modal urban hydrogen.

Key risks and mitigations

Ten project risks have been assessed across site, regulatory, market, financial, environmental, and social dimensions. The five highest-rated:

Risk	Rating	Mitigation
BC Hydro site lease	Med / Critical	Alternative brownfield sites identified. Port Moody council actively supports reuse. MPO designation may override provincial process.
Offtaker commitment	Med / High	12 applications, no single >25% of demand. Phase 1 viable with 4 offtakers. Economics improve with each addition.
Federal funding	Med / High	Multiple pathways (CIB, LCFS, ZETF, SIF, Budget 2025). HTEC precedent: \$337M CIB + \$49M SIF for H2 in BC.
Construction overruns	Med / High	\$160M-\$265M range spans 65% variance. Fixed-price EPC. Existing infrastructure saves \$10-20M vs. greenfield.
BEV displacement	Med / Med	PDEC targets applications where battery-electric is technically infeasible: marine, rail, port, aviation, heavy truck.

Vincent Royer, PMP

MBA Candidate, Sustainable Innovation, UVic Gustavson (2025-2027)

Project Manager, Canada's first hydrogen fuel cell RTG crane (DP World, Port of Vancouver)

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