

TRIUMF/UBC Neighbourhood District Energy System Partnership

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Orion Henderson Director, Energy Planning and Innovation University of British Columbia, Canada Contact: orion.henderson@ubc.ca

Background

University of British Columbia: Vancouver Campus



UBC Vancouver at a Glance 1000 acre campus 50,000 students \$2 billion annual operating budget \$519 million per year in research funding 10,000 student residents 10,000 neighbourhood residents



Background

TRIUMF Canada's National Laboratory for Particle and Nuclear Physics

- TRIUMF is Canada's leader in particle accelerator based research towards understanding of the origins of matter and the advancement of technology for societal benefit.
- TRIUMF is owned & operated by a consortium of 17 Canadian universities and was founded in Vancouver 45 years ago.
- TRIUMF is committed to reducing the carbon footprint of research itself... not just the typical activities associated with a large "industrial" organisation.





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Background

UBC Strategic Planning for Sustainability



GHG reduction targets:

- 33% by 2015
- 67% by 2020
- 100% by 2050

All against a 2007 baseline



NDES Project Context

What is District Energy?



Centralised energy source and distribution system

- Fuel source flexibility
- High energy efficiency
- Simplicity for end users
- Space and cost savings for building developers

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NDES Project Context

Why District Energy?



UBC has operated an Academic DE System since 1920s

Neighbourhood Community Plans called for a low carbon plan for the residential Neighbourhoods

UBC's Community Energy and Emissions Plan identified District Energy (DE) as the most effective option for reducing community GHG emissions

Feasibility studies identified TRIUMF waste heat as the ideal energy source

TRIUMF recognised this as an opportunity to help meet community relationship goals

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Why is District Energy sustainable?

Swedish District Energy Growth and Fuel Sources

(1980 - 2006)





NDES Project Context

UBC Residential Neighbourhoods



The UBC Vancouver campus is home to:

- Academic campus
- 7 student housing precincts
- 5 residential neighbourhoods
- Institutional tenants (e.g. TRIUMF)

Stage 1: Feasibility Analysis (2011 to 2013)







Pre-feasibility study:

- Indicated that the density of residential developments could support DE
- Indicated cost of low carbon energy 30% above conventional energy costs
- Identified TRIUMF waste heat as the preferred low carbon energy source
- Policy requirement that all new residential buildings be "DE Ready"

Feasibility study:

- Indicated that low carbon energy could be delivered at a cost that is competitive with conventional energy costs.
- Letter of Intent agreed by TRIUMF and UBC for access to waste heat free of charge

Stage 1: Feasibility Analysis (pre-feasibility study results)



Stage 1: Feasibility Analysis (feasibility study results)





Stage 1: Feasibility Analysis (environmental benefits)





Stage 2: District Energy Partner Selection (2013)

- UBC considered ownership options and decided to search for a private partner to own, build and operate the NDES
- International call for partners. UBC selected a local DE developer, Corix Utilities
- Evaluation of impact on private developers due to concerns that DE Ready buildings have higher construction costs



Corix District Energy Projects in the Pacific Northwest

VICTORIA:

Dockside Green •Biomass DES •Corix co-owns and operates system

SEATTLE:

First Hill DES •Feasibility Study complete

South Lake Union DES •Feasibility study in development

PORTLAND:

Rose Quarter •Shared Thermal Energy System •Initial phase of Eco-District •Agreements in Negotiation

South Waterfront •Selected by City •Eco-District study underway



BURNABY:

SFU / UniverCity
Biomass DES
Campus and Mixed Use
Development
Phase 1 Operational

VANCOUVER:

Lonsdale Energy Corp: •Natural Gas DES •Corix GenCo, City DisCo •Corix: Operations

RICHMOND:

River Green: •Alternative Energy DES •Study complete, City approval stage •Riverwater, Sewer Heat, Biomass studied

COQUITLAM:

•Alternative Energy DES feasibility study



Stage 3: Due Diligence and Definitive Agreements (2014)

- Corix Utilities confirmed and refined the results of the Feasibility Study
- Franchise agreement between UBC and Corix
- Connection Credit policy developed to keep low rise residential building developers whole



Stage 4: Regulatory approval (2015)

- BC Utilities Commission approval required to develop an energy utility (statutory monopoly)
- Regulator approved Phase 1 of system (2015 to 2023)
- Regulator acknowleged plan to implement a low carbon energy source (TRIUMF) in 2024

Stage 5: Phase 1 Construction (2015 to 2023)



- Phase 1 serviced by two temporary natural gas Energy Centres
- First connected building in August 2015



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