

CREATIVEENERGY

May 6, 2015

via e-mail

BC Utilities Commission
Sixth Floor, 900 Howe Street, Box 250
Vancouver, B.C. V6Z 2N3
Attention: Ms. Erica Hamilton, Commission Secretary

Re: Creative Energy Vancouver Platforms Inc. (Creative Energy) Application for a Certificate of Public Convenience and Necessary for a Low Carbon Neighbourhood Energy System (NES) for Northeast False Creek (NEFC) and Chinatown Neighbourhoods of Vancouver

On April 17, 2014 Creative Energy applied to the Commission for a CPCN for Energy Supply Phase 1 of a proposed NES serving the Northeast False Creek and Chinatown neighbourhoods in the City of Vancouver.

On April 28, 2015 the City of Vancouver issued the Neighbourhood Energy By-law for Northeast False Creek and Chinatown – 10907 to implement NES in the NEFC & Chinatown neighbourhoods. Creative Energy is submitting these updates as part of our submission to facilitate review of our application. Also attached is a copy Schedule 8; the Capital Cost breakdown.

If you have any questions, please contact me or Michelle McLarty at 604-688-8584.

Sincerely yours,



Stacey Bernier
President, CEO

CREATIVE ENERGY VANCOUVER
PLATFORMS INC.

Suite 1 – 720 Beatty Street
Vancouver, Canada
V6B 2M1

604 688 9584 TEL
604 688 2213 FAX
creativeenergycanada.com



ADMINISTRATIVE REPORT

Report Date: April 14, 2015
Contact: Brian Crowe
Contact No.: 604.873.7313
RTS No.: 10907
VanRIMS No.: 08-2000-20
Meeting Date: April 28, 2015

TO: Vancouver City Council
FROM: The General Manager of Engineering Services
SUBJECT: Neighbourhood Energy By-law for Northeast False Creek and Chinatown

RECOMMENDATION

THAT Council approve a by-law to compel new buildings, and buildings undergoing major renovations, in Northeast False Creek and Chinatown to connect to a Neighbourhood Energy System (the proposed "Neighbourhood Energy By-law"), as generally described in Appendix A; and

FURTHER THAT the Director of Legal Services be directed to bring the proposed Neighbourhood Energy By-law to Council for enactment following approval of the proposed Northeast False Creek and Chinatown Neighbourhood Energy System by the British Columbia Utilities Commission.

REPORT SUMMARY

This report requests Council approval of the proposed Neighbourhood Energy By-law, which is a necessary step to advance the implementation of a Neighbourhood Energy System ("NES") in Northeast False Creek ("NEFC") and Chinatown. This proposed by-law is consistent with the NES connection policy that already exists for new building developments in these areas, and was written in consultation with the Neighbourhood Energy Expert Panel.

Pending Council approval of this by-law, and subsequent approval of the NES by the British Columbia Utilities Commission ("BCUC"), staff will bring the by-law forward to Council for enactment in late 2015.

COUNCIL AUTHORITY/PREVIOUS DECISIONS

On January 18, 2011, Council approved amendments to the False Creek North Official Development Plan that included requirements that all new NEFC developments subject to rezoning must connect to an NES providing energy for space heating and domestic hot water, and operated by the City's designated neighbourhood energy provider.

On April 19, 2011, Council approved NES connection policy for Chinatown, as embedded in the Rezoning Policy for Chinatown South, and the Design Guidelines for Chinatown and Chinatown South. Under this policy, all new developments in these areas must be compatible with NES, and must connect if an NES is available.

On October 3, 2012, Council approved the Vancouver Neighbourhood Energy Strategy and Energy Centre Guidelines, to address the Greenest City 2020 Action Plan objective of reducing 120,000 tonnes carbon dioxide per year through the deployment of sustainable energy systems for high-density neighbourhoods. The Neighbourhood Energy Strategy identified a range of potential enabling tools to support the establishment of BCUC-regulated NES, including by-laws to secure the customer base for new systems. The use of enabling tools requires approval by Council.

REPORT

Background/Context

NES are shared infrastructure platforms which provide heating and/or cooling infrastructure for multiple buildings, and are most suitable in dense urban areas. NES provide the utility business model and economy of scale necessary to make use of a variety of renewable energy resources that are often not available or affordable to implement in individual buildings. These district-wide systems are also capable of serving both new development and existing gas-heated buildings. Worldwide, NES are undergoing a renaissance in urban development as a result of growing concerns about climate protection, energy security and economic resiliency.

Energy used by buildings generates 55% of Vancouver's total greenhouse gas emissions. A high priority strategy of the Greenest City 2020 Action Plan is to pursue low-carbon NES for high-density mixed-use neighbourhoods. With a target to achieve a 120,000 tonne/year CO₂ reduction by 2020, the Vancouver Neighbourhood Energy Strategy focuses on high density areas of the City including the Downtown, Cambie Corridor and Central Broadway areas. For the Downtown area, the key Neighbourhood Energy Strategy actions are to:

- convert the Central Heat Distribution Ltd. system (also referred to in this report as the "Downtown steam system") from natural gas to a low carbon energy source (potential reduction of 70,000 tonnes CO₂ per year, making up 60% of the 2020 City-wide neighbourhood energy target); and
- expand neighbourhood energy to new developments and existing gas-heated buildings in high density areas.

Procurement Process for Neighbourhood Energy in Downtown Vancouver

On December 20th, 2012, the City issued *Request for Expressions of Interest PS20121461, Neighbourhood Energy Concepts for Downtown Vancouver (the "RFEOI")*. Six proposals were received by the City from local and international utility vendors.

Following an extensive and comprehensive evaluation process, Creative Energy Canada Platforms Corp. ("Creative Energy") was identified as the lead proponent for the RFEOI due to its acquisition of Central Heat Distribution Ltd. and its proposal which aligned with the City's neighbourhood energy strategy. As the lead proponent in the RFEOI, Creative Energy entered into a non-legally binding MOU with the City on November 29, 2013. The MOU priority activities include:

1. **NEFC and Chinatown:** The negotiations of a Franchise Agreement to establish an NES to serve the NEFC and Chinatown Franchise Area (Figure 1).

Status - Completed: This Franchise Agreement was executed on May 26, 2014 between the City and Central Heat Distribution Ltd¹, which is the established energy provider in NEFC. In this agreement, Central Heat Distribution Ltd. has committed to providing heat to new developments in NEFC and Chinatown, and the heat will be required to be from low-carbon sources by 2020. The City has committed to consider enactment of a by-law compelling connection of new developments to the system. Should Creative Energy default on its key commitments under the Franchise Agreement, the City has a number of remedies, including revoking the proposed Neighbourhood Energy By-law.

2. **Conversion of Downtown Steam System:** Creative Energy will conduct the feasibility analysis and business planning for a low carbon conversion of the existing Downtown steam plant. This is fundamental to understanding the business case for the conversion of the Downtown steam system.

Status - Underway.

3. **South Downtown:** Creative Energy will conduct a feasibility analysis to explore the establishment of an NES for the South Downtown area.

Status - Completed: an NES in this area is feasible and implementation planning is underway.

4. **Other Expansion Areas:** Creative Energy and the City will explore options for neighbourhood energy initiatives in the West End, Downtown Eastside and other potential NES expansion areas.

Status - Pending.

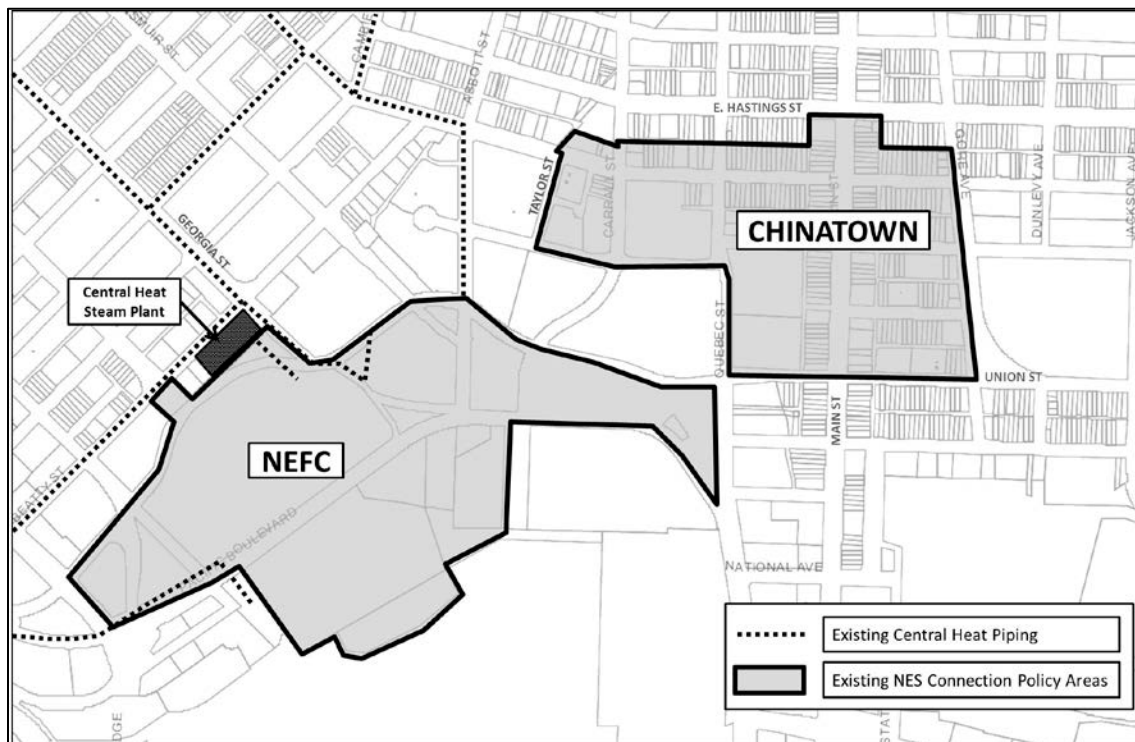
¹ Following acquisition by Creative Energy and execution of the Franchise Agreement, Central Heat Distribution Ltd. was re-named "Creative Energy Vancouver Platforms Inc."

Progress on Establishing an NES for NEFC and Chinatown

Creative Energy is now preparing an application to the BCUC for approval to establish the NEFC and Chinatown NES. Through an open and transparent regulatory review process, the BCUC ensures that: rates charged for energy are fair, just and reasonable; energy utility operations provide safe, adequate and secure service to their customers; shareholders of public utilities under its jurisdiction are allowed to earn a regulated return on their invested capital, similar to other regulated utilities.

Concurrently, development is proceeding within Northeast False Creek and Chinatown, and Creative Energy is actively working with developers to ensure that neighbourhood energy infrastructure is designed to integrate well with the customer buildings as they are constructed. Pending BCUC approval, Creative Energy will begin construction of the NES infrastructure, with the first buildings to receive service prior to occupancy in 2016.

FIGURE 1. MAP OF NEFC AND CHINATOWN NEIGHBOURHOOD ENERGY FRANCHISE AREA



Strategic Analysis

Proposed Neighbourhood Energy By-law

A mandatory connection by-law has been in place in the Southeast False Creek area since 2007, and use of similar by-laws is now a common practice in other Metro Vancouver area municipalities to support NES development. This secures the customer energy demand, creating sufficient economies of scale to cost-effectively establish a low carbon NES.

Development policy requiring compatibility and connection to an NES has been in place for NEFC and Chinatown since 2011, and all new developments approved since that time are committed to connecting to the system. The proposed Neighbourhood Energy By-law reinforces the established rezoning policy, and provides more clarity and certainty on the requirements for developers of buildings in these areas.

To enable connection to the NES, developers are required to utilize a hydronic (hot water based) heating system, which is the standard approach to heating new multi-family and commercial buildings in Vancouver. Heat energy is provided by the NES rather than in-building boilers, thus developers and building owners avoid the installation and maintenance costs and space requirements associated with boiler equipment.

The proposed by-law, a draft of which is attached in Appendix A, has been developed in consultation with the Neighbourhood Energy Expert Panel. While initially only applicable to NEFC and Chinatown, the proposed by-law has been written such that it can apply to future NES service areas. City staff will seek Council approval to expand the by-law to other NES service areas at appropriate times to support the establishment of new systems. The by-law contemplates two types of service areas:

- **Mandatory Service Area:** this type of area is characterized by high density development of significant scale, and includes Northeast False Creek. This area will be served via a hot-water expansion of the Downtown steam system, with commitment to low carbon by 2020. The proposed by-law makes connection mandatory for all new developments and significant building renovations in this type of area.
- **Conditional Service Area:** this type of area is characterized by infill development of modest scale, and includes Chinatown. Creative Energy will be providing initial service to this area via a natural gas boiler system located in a development at 611 Main Street, with commitment to low carbon by 2020. Creative Energy, in its Franchise Agreement with the City, is compelled to provide NES service to buildings in this area that are economically viable to serve. When new developments or significant building renovations are proposed in this area, connection viability will be determined using a BCUC-approved economic test. If the building passes this test, it is generally understood that the City Engineer will require the building to connect to the system.

Under the proposed by-law, certain types of developments will not be required to utilize the NES, including:

1. Developments smaller than 2,000 square metres (22,000 square feet) floor area, which are generally uneconomical to be served by an NES.
2. Renovations of heritage buildings, which in some cases may be difficult to connect to an NES. However, any new floor area, in excess of 2,000 square metres (22,000 square feet) added to heritage buildings will not be exempted.

3. Renovations of existing buildings where the value of the renovation does not exceed the greater of (a) assessed value of the property, or (b) \$1,000,000.

In such cases, the owners of such buildings may choose to connect to the NES, provided that it is economically viable for the utility to provide service.

BCUC Oversight and Utility Rates

The NES will be regulated by the BCUC, which serves the purpose of protecting customers that are served by utilities that are not owned and operated by municipalities. The BCUC conducts a rigorous and comprehensive evaluation and public hearing process to ensure that utility services and rates are fair, just and reasonable. BCUC-regulated utilities are required to provide all cost information in an open and transparent manner, and are limited to recovering their capital and operating costs, and a regulated return on their investment. The BCUC also has a rigorous investigative process in place to address any complaints or issues customers have with the utility service.

Creative Energy has provided staff with preliminary rate information for the NEFC and Chinatown NES, which is subject to change as part of the BCUC review process. To assess the competitiveness of the NEFC and Chinatown NES, staff examined what a typical customer would pay compared with other energy providers (see Table 1).

Because the rate structure and type of service of these energy providers vary, an “effective rate” is calculated for the purposes of comparison. This rate illustrates what customers will pay per megawatt-hour for heating. The preliminary estimated effective rate for the NEFC and Chinatown NES is \$84 per MW.h. This effective rate is lower than all of the other benchmarks listed, with the exception of the existing Creative Energy Downtown steam system. This low cost is due to the very high development densities in NEFC, and the use of the established Creative Energy system for supply of initial heat to the new NES.

TABLE 1. PROPOSED NEFC EFFECTIVE RATES, COMPARED TO OTHER PROVIDERS

Energy Provider	GHG Emission Intensity (kg CO ₂ /MW.h)	Estimated Effective Rate ¹ (\$/MW.h)	Year of Effective Rate	Notes
Creative Energy for NEFC and Chinatown	230 (Initial) 70 (2020 onwards)	\$84	2016	The estimated NEFC and Chinatown rate is subject to change based on: (1) adjustments that may occur during the BCUC rate review process and (2) future natural gas price fluctuations.
Southeast False Creek NEU (Hot Water)	66	\$100	2015	The NEU bills strata corporations, not individual suites; any incremental strata sub-metering costs incurred by NEU consumers are not included here.

Energy Provider	GHG Emission Intensity (kg CO ₂ /MW.h)	Estimated Effective Rate ¹ (\$/MW.h)	Year of Effective Rate	Notes
BC Hydro (Electricity)	24 ²	\$109 ²	2015	BC Hydro effective rate calculation is based on 50% of consumption at BC Hydro's Residential Step 1 Rate and 50% at Step 2, and includes a rate rider.
FortisBC (Natural Gas)	220 ³	\$89 ³	2015	Fuel costs, based on FortisBC Lower Mainland Rate 3, with high efficiency boiler and factoring in conversion losses = \$39 per MW.h. Installation and replacement of boiler equipment plus maintenance = \$50 per MW.h. Total effective cost = \$89 per MW.h
Creative Energy Ltd. (Steam)	300 ³	\$64	2015	Actual effective rate for this Downtown steam system varies depending on size of building and building efficiency of converting steam to energy. Rates fluctuate with the commodity price of natural gas.
SFU UniverCity Energy (Hot Water)	220 (Existing) 43 (2017)	\$149 ⁴	2015	SFU UniverCity Energy operations began 2012, using a temporary natural gas boiler. This system will utilize a biomass facility for low carbon energy supply once customer base is sufficiently established (forecast 2017).
River District Energy (Hot Water)	220 (Existing) 32 (2017)	\$104 ⁴	2015	River District Energy operations began 2012, using a temporary natural gas boiler, and plans to use waste heat from the existing Metro Vancouver Waste to Energy Facility (Burnaby) once customer base is sufficiently established (forecast 2017, as per BCUC application in 2011).
PCI Marine Gateway (Heating & Cooling)	58	\$109 ⁴	2015	The PCI Marine Gateway development will utilize a geo-exchange heating and cooling system, which will be provided by FortisBC Alternative Energy Services. Development is expected to be completed in 2015.

NOTES TO TABLE

1. Effective rate estimates are based on a reference building with an annual energy demand of 109 KW.hr per m² of floor area. Actual effective rates for customers will vary due to differences in energy performance from building to building.
2. Although B.C. Hydro's electricity is on-average a low carbon energy source, new electricity demand is largely served from high-carbon imported electricity, or new high-cost low carbon

sources (e.g. proposed Peace River Site "C" project). Also, electric baseboard heat is generally used in conjunction with natural gas for ventilation air and hot water, and that natural gas typically supplies more than 50% of the building heat demand.

3. FortisBC and Creative Energy Steam rates are largely dependent on the commodity cost of natural gas, which is currently at a historical low and subject to natural gas commodity price volatility. The GHG emission intensity as reported in Table 1 reflects provincial standard methods for calculating GHG emissions, and does not include upstream emissions associated with the extraction and transportation of natural gas.
4. Estimated effective rates sourced from BCUC rate filings, which are based on modeled energy performance of buildings served by the reference systems. A high estimated effective rate does not necessarily imply that the customer's total cost of heating will be high, because some new developments consume significantly less energy than others.

Next Steps

Table 2 outlines the next steps for establishment of an NES to serve NEFC and Chinatown:

TABLE 2. NEXT STEPS

TIMING	ACTIVITY
Q2, 2015	BCUC review of Creative Energy's application to establish an NES to serve NEFC and Chinatown
Q4, 2015	The Director of Legal Services to bring By-law forward to Council for enactment, following BCUC approval of the NES
Q4, 2015 to Q1, 2016	Creative Energy to construct NES infrastructure to serve initial developments
Q2, 2016	First NEFC development targeted for occupancy
Jan 1, 2020	Creative Energy required by Franchise Agreement to provide heat from low carbon energy sources

Implications/Related Issues/Risk (if applicable)

Financial

The NEFC and Chinatown NES is a privately owned commercial utility that is regulated by the BCUC. As the owner of the NES, Creative Energy will finance, construct and operate the NES infrastructure in accordance with the Franchise Agreement and BCUC regulation. To enable the viability of the NES business case, a key support from the City at this stage is enactment of the Neighbourhood Energy By-law which requires new buildings and significantly renovated buildings in the Franchise Area to connect to the NES.

Environmental

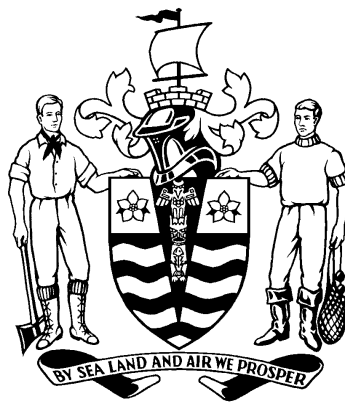
The NEFC and Chinatown NES is a high priority Neighbourhood Energy Strategy action, and is forecast to eliminate 7,200 tonnes per year of CO₂ emissions by time of neighbourhood build-out. This will achieve a similar CO₂ reduction as that for buildings served by the City's NES service to Southeast False Creek.

CONCLUSION

This report recommends approval of a Neighbourhood Energy By-law, to be initially established for the Northeast False Creek and Chinatown areas. This by-law is an evolutionary step in the implementation of the Neighbourhood Energy Strategy, and securing the Greenest City Action Plan carbon emission reduction outcomes.

* * * * *

**CITY OF VANCOUVER
BRITISH COLUMBIA**



**NEIGHBOURHOOD ENERGY
BY-LAW NO.**

This By-law is printed under and
by authority of the Council of
the City of Vancouver

NEIGHBOURHOOD ENERGY BY-LAW

TABLE OF CONTENTS

SECTION 1 INTERPRETATION

- 1.1 Name of By-law
- 1.2 Definitions
- 1.3 Application of and conflict with other by-laws
- 1.4 Table of contents
- 1.5 Schedules
- 1.6 Severability

SECTION 2 OPERATION OF UTILITY AND CONNECTION OF ENERGY UTILITY SYSTEM

- 2.1 Compulsory use in mandatory service area
- 2.2 Compulsory use in conditional service area
- 2.3 Compulsory use for significant additions of new floor area to heritage buildings
- 2.4 Statement of determination by B.C.U.C.
- 2.5 Permissive use of energy utility system outside service area
- 2.6 Permissive use of energy utility system inside service area
- 2.7 Operator to comply

SECTION 3 OPERATOR'S PERMITS

- 3.1 Application for operator's permit
- 3.2 Permit issuance
- 3.3 Term of permit
- 3.4 Application to renew
- 3.5 Permit renewal
- 3.6 Permit revocation

SECTION 4 BUILDING PERMIT REQUIREMENTS FOR BUILDING MECHANICAL SYSTEM

- 4.1 Building permit application
- 4.2 Submission of copy of application
- 4.3 Approval of locations
- 4.4 Approval of building permit
- 4.5 No work before permit issuance
- 4.6 Notice of development permit application

**SECTION 5
DESIGN AND INSTALLATION OR ALTERATION
OF BUILDING MECHANICAL SYSTEM**

- 5.1 Design and technical requirements
- 5.2 Approval of building mechanical system
- 5.3 Approval of installation or alteration of work
- 5.4 No occupancy permit

**SECTION 6
ENTRY ONTO REAL PROPERTY**

- 6.1 Entry with respect to building mechanical system
- 6.2 Work on entry

**SECTION 7
APPLICATIONS**

- 7.1 Form of application

**SECTION 8
OFFENCES AND PENALTIES AND ENFORCEMENT**

- 8.1 Tampering with energy utility system
- 8.2 Notice of violation
- 8.3 Service of notice
- 8.4 Offences under By-law
- 8.5 Fine for offence
- 8.6 Fine for continuing offence

**SECTION 9
ENACTMENT**

- 9.1 Force and effect

SCHEDULES

- Schedule A Boundaries Of Service Areas For Franchise Agreement
Dated May 26, 2014
- Schedule B Design Requirements

BY-LAW NO.

**A By-law to provide for the establishment
and operation of neighbourhood energy utility systems
in the City of Vancouver**

(Consolidated for convenience only)

THE COUNCIL OF THE CITY OF VANCOUVER, in public meeting, enacts as follows:

**SECTION 1
INTERPRETATION**

Name of By-law

1.1 The name of this By-law, for citation, is the "Neighbourhood Energy By-law".

Definitions

1.2 In this By-law:

"applicant" means an applicant for a building permit under section 4.1;

"building" means any structure used or intended for supporting or sheltering any use or occupancy, and includes a new building and an existing building described under subsections (a) and (b) of sections 2.1 and 2.2 of this By-law, but does not include a building less than 2,000 square meters in floor area;

"building mechanical system" includes the internal space heat energy and domestic hot water distribution system for a designated building;

"Chief Building Official" means the City Building Inspector, and any person authorized to act on behalf of the City Building Inspector;

"City Engineer" means the individual appointed by Council to be the General Manager of Engineering Services or a person duly authorized to carry out the powers and duties of the General Manager of Engineering Services;

"conditional service area" means the land within an area marked as such in dashed black lines on Schedule A that is an area exclusively to be serviced by an operator in accordance with a franchise agreement and this By-law, and within which all designated buildings make use of the energy utility system serving that area in accordance with section 2.2 of this By-law;

"connection agreement" means a written agreement between an owner and an operator establishing the terms and conditions of connection of a designated building to a distribution system;

“designated building” means a building to which an operator shall provide service in accordance with sections 2.1, 2.2 or 2.3 of this By-law;

“distribution system” means a heat energy distribution network within a mandatory service area or conditional service area that links an energy source with the energy transfer station in each designated building, and may include separate loops for the supply and return of heat energy in the form of hot water;

“energy source” means one or more energy supply facilities and other infrastructure that generate and provide heat energy through a distribution system to designated buildings in a specified area;

“energy transfer station” means equipment owned by an operator and used to meter, for billing purposes, the amount of heat energy consumed in a designated building, and to transfer heat energy from the distribution system to the building mechanical system in a designated building, and includes pipes for the supply and return of hot water or steam, valves, controls, meters, and separate heat exchangers for domestic hot water and space heating;

“energy utility system” means a heat energy distribution and generation system that consists collectively of an energy source, distribution system, and energy transfer station in each designated building, and all ancillary appliances and equipment but excludes all heat energy distribution and generation systems that exist prior to May 26, 2014;

“entry points” means openings in a designated building for the passage of the distribution system pipes that connect to the energy transfer station;

“existing building” means any building lawfully constructed and completed under a permit or a building constructed or completed that would require a permit under the Building By-law;

“franchise agreement” means an agreement entered into with the City under sections 153A and 300.1(3)(h) of the Vancouver Charter, S.B.C. 1953, c.55, and approved by the B.C. Utilities Commission;

“heat energy” means heat distributed or delivered by hot water or steam via a distribution system;

“heritage building” means a building designated as protected heritage property under the Vancouver Charter or the Heritage Conservation Act, or a building listed on the Vancouver Heritage Register;

“mandatory service area” means the land within an area marked as such in bold black line on Schedule A that is an area exclusively to be serviced by one operator in accordance with a franchise agreement and this By-law, and within which all designated buildings must make use of the energy utility system serving that area in accordance with section 2.1 of this By-law;

“meter” means a heat energy meter at an energy transfer station;

“operator” means any person or organization granted a franchise by the City under a franchise agreement to own and operate an energy utility system in a mandatory service area, a conditional service area, or both;

“owner” means a person who owns, occupies, or controls a parcel of real property, and includes a registered owner, an owner under agreement, an occupier of Crown land, a cooperative association incorporated or continued under the Cooperative Association Act of British Columbia, and a strata corporation established or continued under the Strata Property Act of British Columbia, and, if appropriate in the context of this By-law, refers to an owner in respect of which the real property so owned, occupied, or controlled includes a designated building; and

“service” means the provision of heat energy to a designated building by way of an energy utility system.

Application of and conflict with other by-laws

1.3 The requirements of this By-law are in addition to the requirements of the Building By-law and Certification of Professionals By-law, except that, despite Sentence 1.5.1.2.(1) of the Building By-law, in case of conflict between the Building By-law or Certification of Professionals By-law and this By-law, this By-law is to prevail.

Table of contents

1.4 The table of contents for this By-law is for convenient reference only, and is not for use in interpreting or enforcing this By-law.

Schedules

1.5 Schedules attached to this By-law form part of this By-law.

Severability

1.6 A decision by a court that any part of this By-law is illegal, void, or unenforceable severs that part from this By-law, and is not to affect the balance of this By-law.

SECTION 2 OPERATION OF UTILITY AND CONNECTION

Compulsory use in mandatory service area

2.1 Each owner of real property in a mandatory service area of:

- (a) a new building proposed for construction or under construction which requires submission of a building permit or development permit application under the Building By-law or Zoning and Development By-law, and issuance of an occupancy permit to which the owner, as at the date of enactment of this By-law, is not yet entitled; or

- (b) an existing building, other than a heritage building, where the estimated value of any proposed work exceeds the greater of \$1,000,000 or 100% of the building's latest assessed value according to the records of the British Columbia Assessment Authority and requires a building permit or development permit application under the Building By-law or Zoning and Development By-law

must make use of the energy utility system provided in that mandatory service area by connecting the building to that energy utility system.

Compulsory use in conditional service area

2.2 Each owner of real property in a conditional service area of:

- (a) a new building proposed for construction or under construction which requires submission of a building permit or development permit application and issuance of an occupancy permit to which the owner, as at the date of enactment of this By-law, is not yet entitled; or
- (b) an existing building, other than a heritage building, where the estimated value of any proposed work exceeds the greater of \$1,000,000 or 100% of the building's latest assessed value according to the records of the British Columbia Assessment Authority and requires a building permit or development permit application,

must make use of the energy utility system provided in that conditional service area by connecting the building to that energy utility system unless the City Engineer, after referencing a determination of the B.C. Utilities Commission, determines the proposed connection will place an undue financial hardship on the future occupants of the building because provision of the service will not be economically feasible without a significant contribution in aid of construction by the owner to the operator.

Compulsory use for significant additions of new floor area to heritage buildings

2.3 Each owner of a heritage building in either a conditional service area or mandatory service area must make use of the energy utility system provided in that conditional service area or mandatory service area for new floor area added to the heritage building, if:

- (a) the estimated value of any proposed work to the heritage building exceeds the greater of \$1,000,000 or 100% of the building's latest assessed value according to the records of the British Columbia Assessment Authority and requires a building permit or development permit application under the Building By-law or Zoning and Development By-law; and
- (b) the proposed work results in an increase in new floor area of greater than 2,000 square meters; unless

the City Engineer, after referencing a determination of the B.C. Utilities Commission, determines the proposed connection will place an undue financial hardship on the future

occupants of the building because provision of the service will not be economically feasible without a significant contribution in aid of construction by the owner to the operator.

Statement of determination by B.C.U.C

2.4 No owner will be required to make use of an energy utility system under section 2.2 or 2.3 unless the operator in the relevant conditional service area or mandatory service area provides the City Engineer with a statement from that operator confirming that a determination has been made that the proposed connection is in accordance with the requirements of the B.C. Utilities Commission, whenever such a determination is required.

Permissive use of energy utility system outside service area

2.5 An owner of real property located outside the boundaries of all mandatory service areas or conditional service areas may apply to an operator to make use of an energy utility system.

Permissive use of energy utility system inside service area

2.6 An owner of real property located inside the boundaries of a mandatory service areas or conditional service areas may apply to an operator to make use of the energy utility system provided in the area, even if connection to that energy utility system is not mandatory.

Operator to comply

2.7 Every operator that constructs, installs, operates, maintains and manages an energy utility system in a mandatory service area or conditional service area associated with the operator as set out in Schedule A, must do so in accordance with this By-law and other enactments.

SECTION 3 OPERATOR'S PERMIT

Application for operator's permit

3.1 Every operator must apply for and obtain an operator's permit from the City Engineer before commencing or continuing operation of an energy utility system.

Permit issuance

3.2 The City Engineer must issue an operator's permit to any person who submits an application under section 3.1 and holds a valid business license and an executed and valid franchise agreement with the City that authorizes that person to operate an energy utility system in a specified area.

Term of permit

3.3 No operator's permit may be issued or renewed for a term greater than 5 years, and shall expire after 5 years unless renewed in accordance with sections 3.4 and 3.5.

Application to renew

3.4 Every operator may apply to the City Engineer to renew an operator's permit no later than one month and no earlier than six months before the expiry of an operator's permit, under section 3.3, and such renewal shall take effect in accordance section 3.5.

Permit renewal

3.5 The City Engineer must renew an operator's permit issued to every operator who submits an application to the City Engineer under section 3.4 and holds a valid business license and an executed and valid franchise agreement that authorizes that operator to operate an energy utility system in a specified area, and such renewal shall take effect immediately prior to expiry of the permit under section 3.3.

Permit revocation

3.6 The City Engineer may revoke an operator's permit if the operator is no longer a party to a valid franchise agreement.

SECTION 4 BUILDING PERMIT REQUIREMENTS FOR BUILDING MECHANICAL SYSTEM

Building permit application

4.1 A person or owner who applies, under the Building By-law, for a permit to install or alter a building mechanical system must include in, or submit with, the application:

- (a) a copy of the connection agreement between the owner and operator;
- (b) the proposed location of the energy transfer station;
- (c) the proposed location of the entry points;
- (d) written confirmation from the operator that the building mechanical system complies with Schedule B of this By-law and the connection agreement; and
- (e) such other information as the Chief Building Official or City Engineer may require in writing.

Submission of copy of application

4.2 An applicant must submit a copy of the building permit application to the City Engineer.

Approval of locations

4.3 The proposed location of the:

- (a) energy transfer station, submitted under section 4.1(b); and
- (b) entry points, submitted under section 4.1(c);

are subject to approval by both the Chief Building Official and City Engineer who shall consider whether the proposed locations are convenient, efficient and practicable.

Approval of building permit

4.4 The building permit is subject to approval by the:

- (a) Chief Building Official under the Building By-law; and
- (b) Chief Building Official and City Engineer under this By-law.

No work before permit issuance

4.5 A person or owner must not begin to install or alter a building mechanical system until the Chief Building Official has issued the building permit for the building mechanical system.

Notice of development permit application

4.6 If an applicant also requires a development permit for the work authorized by a building permit, the applicant must notify the City Engineer of the proposed work at the time of the development permit application.

SECTION 5 DESIGN AND INSTALLATION OR ALTERATION OF BUILDING MECHANICAL SYSTEM

Design and technical requirements

5.1 Every building mechanical system must comply with Schedule "B".

Approval of building mechanical system

5.2 The design of the building mechanical system is subject to approval by the Chief Building Official and City Engineer, and the City Engineer must approve the design of the building mechanical system if:

- (a) the City Engineer determines that the building mechanical system meets the requirements of Schedule "B" and the Building By-law; and
- (b) the City Engineer receives the confirmation set out in section 4.1 (d) of this By-law.

Approval of installation or alteration of work

5.3 Completion of the installation or alteration of a building mechanical system is subject to approval by the Chief Building Official and City Engineer under this By-law.

No occupancy permit

5.4 An owner is not entitled to an occupancy permit under the Building By-law for a designated building until approval has been granted under section 5.3,

SECTION 6 ENTRY ONTO REAL PROPERTY

Entry with respect to building mechanical system

6.1 The City Engineer, and other employees of the city, may enter onto any real property and any buildings, at any reasonable time, to inspect the real property and any buildings, appliances and equipment, including any building mechanical system or part of an energy utility system, and to enforce this By-law or a permit issued under this By-law.

Work on entry

6.2 Without limiting the generality of sections 6.1, the City Engineer, and other employees of the city, for the purposes of those sections, may conduct investigations, expose pipes, calibrate instruments, and read and test meters.

SECTION 7 APPLICATIONS

Form of application

7.1 Every person who submits an application under this By-law must use the form of application prescribed by the City Engineer or Chief Building Official, as the case may be.

SECTION 8 OFFENCES AND PENALTIES AND ENFORCEMENT

Tampering with energy utility system

8.1 A person must not tamper, interfere with, damage, or destroy any part of an energy utility system.

Notice of violation

8.2 An inspector or official of the city, or a by-law enforcement officer, may give notice to any person ordering or directing that person to:

- (a) discontinue or refrain from proceeding with any work or doing anything that contravenes this By-law; or
- (b) carry out any work or do anything to bring any part of an energy utility system or a designated building into conformity with this By-law;

within the time specified in such notice.

Service of notice

8.3 An inspector or official of the city, or a by-law enforcement officer, may serve a notice under this By-law:

- (a) by mailing it by registered post to an owner at the address of the owner shown on the real-property assessment roll prepared under the Assessment Act;
- (b) by handing it to the owner or other person who is the addressee of the notice; or
- (c) if the notice refers to real property, by posting it on the real property.

Offences under By-law

8.4 A person who:

- (a) violates any provision of this By-law, or does any act or thing which violates any provision of this By-law, or suffers or allows any other person to do any act or thing which violates any provision of this By-law;
- (b) neglects to do or refrains from doing anything required to be done by any provision of this By-law; or
- (c) fails to comply, or suffers or allows any other person to fail to comply, with an order, direction, or notice given under any provision of this By-law;

is guilty of an offence against this By-law, and liable to the penalties imposed under this Section 8.

Fine for offence

8.5 Every person who commits an offence against this By-law is punishable on conviction by a fine of not less than \$250.00 and not more than \$10,000.00 for each offence, except that a person who fails to comply, or suffers or allows any other person to fail to comply, with an order, direction, or notice given under any provision of this By-law is liable to a fine of not less than \$500.00 for each offence.

Fine for continuing offence

8.6 Every person who commits an offence of a continuing nature against this By-law is liable to a fine not less than \$250.00 and not more than \$10,000.00 for each day such offence continues.

**SECTION 9
ENACTMENT**

Force and effect

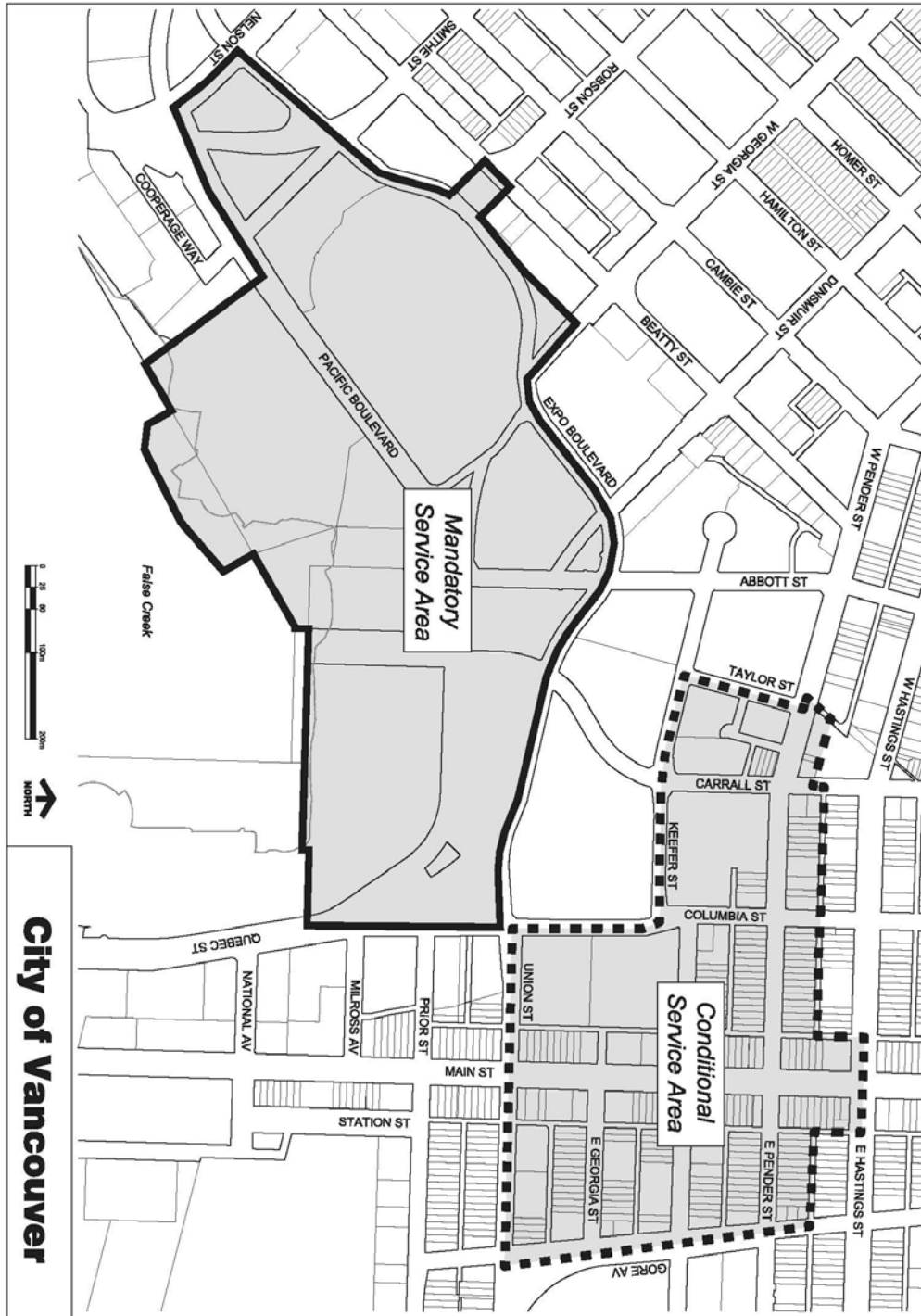
9.1 This By-law is to come into force and take effect on the date of its enactment.

ENACTED by Council this day of
2015

Mayor

City Clerk

SCHEDULE "A"
BOUNDARIES OF SERVICE AREAS FOR FRANCHISE AGREEMENT REGARDING NORTHEAST
FALSE CREEK AND CHINATOWN



SCHEDULE "B"
DESIGN REQUIREMENTS

1. Design and Installation or Alteration of a Building Mechanical System

- a) Any design, installation or alteration of a building mechanical system must integrate the building mechanical system and energy utility system in a manner that enables the building mechanical system to make efficient use of the energy utility system.
- b) A person or owner who is altering an existing building may retain components of the existing building's mechanical system otherwise prohibited under this Schedule if approved by the Chief Building Official and the City Engineer under this By-law because the cost of replacement is prohibitive, or the efficiency of the system is not substantially improved by the replacement components.

2. Design and Technical Requirements

The building mechanical system must comply with the following design and technical requirements, to the satisfaction of the City Engineer:

- a) **General Requirements for the Building Mechanical System**

The building shall be heated using a hydronic heating system compatible with a hot water energy utility system. The heating and domestic hot water systems shall be designed to operate within a flow and temperature regime compatible with the energy utility system.

- b) **Energy Transfer Station and Centralized Mechanical Equipment**

The building shall include a designated space of sufficient size for the energy transfer station. The energy transfer station is to be located in the basement, parkade, or ground level of the building, or otherwise in the nearest practical proximity to the energy distribution system.

Heating and domestic hot water systems are required to have equipment centralized in a common mechanical room located in the same room as, or adjacent to, the energy transfer station. For developments comprising more than one building within one site, heating equipment shall be centralized within one mechanical room serving all buildings.

- c) **No On-site Heat Production Equipment**

A building mechanical system must utilize the energy transfer station for all of its space heating and domestic hot water requirements, and the building mechanical system must not incorporate any additional heat production equipment including, but not limited to, boilers, water source heat pumps, air source heat pumps, furnaces, hot water heaters, geo-exchange systems, electric baseboards, or sewer heat recovery systems except that:

- (i) a building may incorporate a solar system to generate heat energy,
- (ii) a building may incorporate hybrid heat pumps for space cooling, provided the compressor cannot operate in heating mode,
- (iii) a building may incorporate heat recovery ventilation (air to air heat exchangers) and waste heat recovery from refrigeration or active cooling systems for the purposes of supplementing the heat energy provided:
 - A) the systems used for heat recovery from refrigeration or active cooling do not provide any supplemental heating when there is no active cooling service required;
 - B) the approach to heat recovery is consistent with this Schedule (i.e. hydronic systems with centralized mechanical equipment); and
 - C) waste heat recovery systems do not cross property lines.

Exceptions

- d) Exceptions for on-site heat production may be approved by the City Engineer, provided the total heat production produced by all exceptions does not exceed 1% of the total annual thermal energy needs of the building.

NEFC COST ESTIMATES

NEFC Cost Estimates

The following tables outline the capital cost estimates for the NEFC NES as of April 2015. The estimates are considered Class 3 per AACE International Recommended Practice No. 18R-97. This implies that the accuracy is considered -15% to +30%.

Note, in all cases below taxes have not been allowed.

DPS Cost Estimate Backup:

NEFC DPS Costs - 2015\$						
See Notes below						
JM mar15						
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
	2016	2017	2018	2020	2022	2024
TM	45	360	345	670	60	280
Avg diam (mm)	179	126	103	134	80	174
Mechanical - Material & Installation	\$ 75,000	\$ 283,000	\$ 264,000	\$ 562,000	\$ 43,000	\$ 283,000
Civil - Excavation, Backfill & Reinstatement	\$ 47,000	\$ 314,000	\$ 169,000	\$ 525,000	\$ 8,000	\$ 54,000
Contractor Admin., Bonding, Insurance & OH&P	\$ 16,000	\$ 75,000	\$ 53,000	\$ 137,000	\$ 6,000	\$ 71,000
Construction Management & Supervision	\$ 6,000	\$ 27,000	\$ 19,000	\$ 49,000	\$ 2,000	\$ 25,000

NEFC COST ESTIMATES

Construction Change Allowance	\$ 4,000	\$ 20,000	\$ 15,000	\$ 37,000	\$ 2,000	\$ 19,000
Engineering (Design & Construction Support)	\$ 22,000	\$ 86,000	\$ 63,000	\$ 157,000	\$ 7,000	\$ 81,000
Base DPS Cost	\$ 170,000	\$ 805,000	\$ 583,000	\$ 1,467,000	\$ 68,000	\$ 533,000
with 15% Contingency	\$ 195,500	\$ 925,750	\$ 670,450	\$ 1,687,050	\$ 78,200	\$ 612,950

Notes:

- 1) *Shoring trench box allowance included for trenches deeper than 1.2 m.*
- 2) *Trench depth allows for 1000 mm cover to top of pipe.*
- 3) *Cost per meter includes material supply, mechanical installation and associated civil works.*
- 4) *Price includes for supply and return lines.*
- 5) *Mechanical and civil costs include allowance for mobilization, specialist subcontractors, bonding and insurance.*
- 6) *Reinstatement included to as-was condition.*
- 7) *All costs are in 2015 dollars, no escalation or inflation has been included.*
- 8) *Costs include allocation for leak detection implementation.*
- 9) *Conduit and communication wires included*
- 10) *100% X-ray included*
- 11) *Offsite hauling of excess material included.*
- 12) *Contingency not included. Note recommend at least 15% for DPS for normal contingency. Contaminated soils would be extra.*
- 13) *Taxes not included*
- 14) *No allowance has been made for contaminated soil treatment*
- 15) *Estimate assumes minimum 8 hours per day of construction.*

NEFC COST ESTIMATES

16) Estimate assumes primarily "non-winter" construction, i.e. minimal trench pumping.

17) The above estimate is based on best information available at the time of development. Certain items that affect the ultimate capital cost, e.g. market conditions and labour costs, uncertain below grade conditions, have been estimated but are difficult to predict.

18) Cost estimates are considered AACE Class 3

NEFC COST ESTIMATES

ETS Cost Estimate Backup:

NEFC ETS Costs - 2015\$						
See Notes below						
JM mar15						
Phase	1	2	3	4	5	6
No. of ETS's	2	5	2	5	2	2
Ttl Capacity (KW)	3600	11100	2400	5800	2400	2400
KW/ETS	1800	2220	1200	1160	1200	1200
Owner Supplied Equip.	\$ 96,293	\$ 298,852	\$ 77,149	\$ 189,623	\$ 77,149	\$ 77,149
Contractor Material and Labour	\$ 192,360	\$ 592,648	\$ 157,213	\$ 391,944	\$ 157,213	\$ 182,213
Soft Costs	\$ 14,500	\$ 44,800	\$ 11,800	\$ 29,300	\$ 11,800	\$ 13,000
Engineering	\$ 30,400	\$ 93,600	\$ 24,600	\$ 61,100	\$ 24,600	\$ 27,400
Base ETS Cost	\$ 334,000	\$ 1,030,000	\$ 270,000	\$ 671,000	\$ 270,000	\$ 300,000
With 10% Contingency	\$ 367,400	\$ 1,133,000	\$ 297,000	\$ 738,100	\$ 297,000	\$ 330,000

Notes:

ETS Costs reflects primary side installation with minor spool on secondary

1. *side, only.*
2. *Pricing assumes sufficient floor space in a ground or basement level mechanical room and limits the ETS location to a maximum of 10 m. from an outside wall.*
3. *The cost estimates provided are considered AACE Class 3.*
4. *Pricing reflects 1 heat exchanger for heating and 1 heat exchanger for DHW.*
5. *Pricing reflects a combined commercial control system and metering.*
6. *ETS Cost reflects an in-direct connection based on design district heating supply temperature.*
7. *Pricing is based on calculated peak loads for heating as shown in the load table.*

NEFC COST ESTIMATES

8. *Taxes not included.*
9. *Cost estimate reflects best available information at time of estimate and is not definitive.*

NEFC COST ESTIMATES

S2HW Cost Estimate Backup:

NEFC S2HW Converter Estimate – Class 3 (both 7A and 5B stations will be the same)	Installed Capacity	Totals (\$)
Hot Water Production		
Building	88 m2	\$13,000
Electrical Installation	69 kVA	\$69,000
Mechanical Installation		\$363,000
Major Equipment	13.0 MWt	\$225,000
GC OH&P		\$79,000
Construction Sub-Total		\$749,000
Soft Costs		\$75,000
Total Project		\$824,000
With 10% contingency		\$906,400

Notes:

1. *AACE Class 3 estimate, includes quotes for steam HEX.*
2. *Assumes steam conversion facility located in existing building mechanical room*
3. *Estimate does not include taxes or contingency.*
4. *Estimate assumes services such as power, water, drains are provided to the mechanical room*
5. *Estimate assumes suitable space provided.*

END OF DOCUMENT

CREATIVE ENERGY