



POLICY REPORT  
ENVIRONMENT

Report Date: September 25, 2012  
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Meeting Date: October 3, 2012

TO: Standing Committee on Planning, Transportation and Environment  
FROM: General Manager of Engineering Services  
SUBJECT: Vancouver Neighbourhood Energy Strategy and Energy Centre Guidelines

**RECOMMENDATION**

- A. THAT Council adopt in principle the Strategic Approach to Neighbourhood Energy, as described in this report.
- B. THAT Council adopt the Energy Centre Guidelines, generally set out in Appendix A, which guide the evaluation and approval process for new energy centre projects.
- C. THAT staff report back in the second quarter of 2013 with implementation strategies for the Downtown and Cambie Corridor areas.

**REPORT SUMMARY**

This report recommends adoption of the city's Strategic Approach to Neighbourhood Energy, which targets areas of the city with the greatest carbon reduction potential and uses a flexible approach tailored to each target area. In addition, this report recommends implementation of the Energy Centre Guidelines, which will enable both the conversion of existing steam heat systems to low carbon sources and the development of new Neighbourhood Energy Systems. These recommendations are based on the need to achieve a City 2020 greenhouse gas emission reduction target of 120,000 tonnes CO<sub>2</sub> per year while ensuring other public interest objectives and potential neighbourhood concerns are addressed including clean air, energy security, traffic and neighbourhood fit.

## ***COUNCIL AUTHORITY/PREVIOUS DECISIONS***

In March 2006, Council approved in principle the creation of the Southeast False Creek Neighbourhood Energy Utility (NEU), to provide space heating and domestic hot water to multi-family residential, commercial, institutional and industrial buildings in the Southeast False Creek Official Development Plan Area. In June 2012, Council approved the expansion of the NEU to the Great Northern Way Campus Lands and adjacent lands in the False Creek Flats South Area.

On July 12, 2011, Council adopted the Greenest City 2020 Action Plan, and directed staff to begin implementation of the highest priority actions. These actions include the development of economically viable opportunities for the large scale deployment of sustainable energy systems for high-density, mixed-use neighbourhoods. In addition, the plan directed staff to work with key stakeholders to develop a policy framework for the evaluation of development proposals for new energy sources.

## ***REPORT***

### ***Background/Context***

Neighbourhood Energy Systems (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.

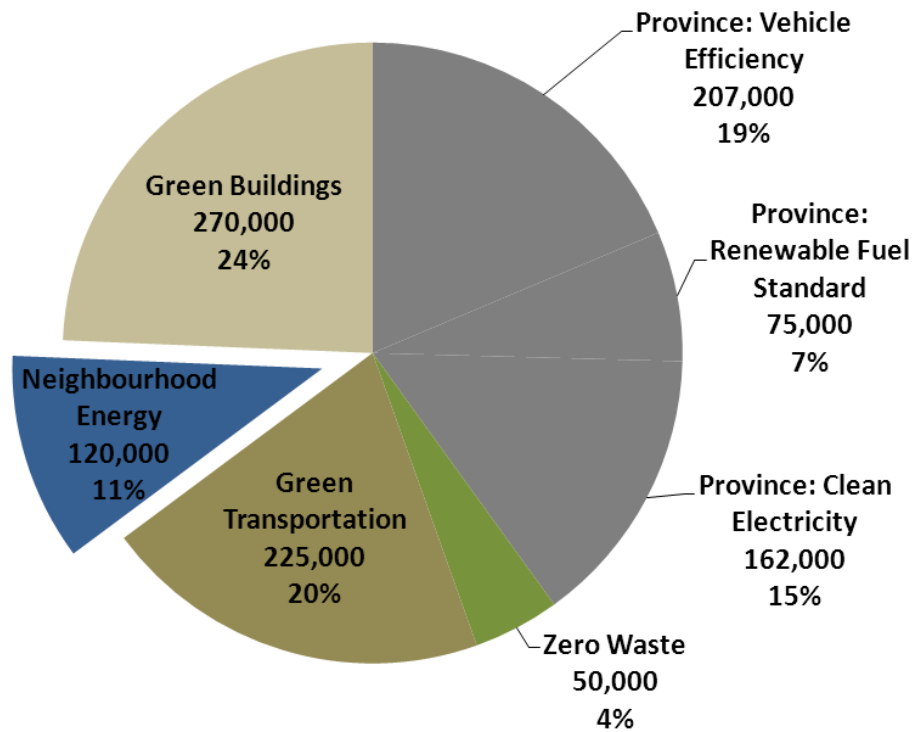
Vancouver has a long history with NES. Central Heat Distribution Ltd. was established in the 1960's and provides steam heat to more than 200 buildings in the downtown core. Public sector steam heat systems are also in service at the large health campuses of BC Children and Women's Hospital and the Vancouver General Hospital. The Southeast False Creek NEU has been operating since 2010, and is forecast to reduce greenhouse gas emissions from building and water heating in its service area by 71% in 2012, compared to serving the buildings with traditional heat sources. Privately owned NES are being implemented in the new RiverDistrict (East Fraserlands) and Northeast False Creek neighbourhoods.

There has also been NES development activity in other regional municipalities. The Lonsdale Energy Corporation in North Vancouver has been operating since 2004. UBC is currently in the process of modernizing its steam heat system and has implemented a new low carbon energy centre which utilizes gasification of waste wood. In addition, development of new systems is underway at the SFU UniverCity community development and the municipalities of Richmond and Surrey.

Energy used by buildings generates 55% of Vancouver's total greenhouse gas emissions. To address this, a high priority strategy of the Greenest City 2020 Action Plan (GCAP) is

to pursue NES for high-density mixed-use neighbourhoods. NES also support the GCAP goals that relate to Green Jobs and Green Buildings. The Greenest City Action Plan seeks to reduce city-wide greenhouse gas emissions by 33%, or 1,110,000 tonnes CO<sub>2</sub> per year by 2020. As per Figure 1, Neighbourhood Energy is targeted to deliver 11% of this reduction (120,000 tonnes CO<sub>2</sub> per year).

FIGURE 1. GREENEST CITY ACTION PLAN 2020 GHG REDUCTION TARGETS (TONNES/YEAR)



The 120,000 tonne CO<sub>2</sub> per year reduction attributable to Neighbourhood Energy will be achieved in two parts: by converting existing steam heat systems to low carbon energy sources and by establishing new NES (see Table 1).

TABLE 1. GREENEST CITY 2020 ACTION PLAN - TARGET REDUCTIONS FOR NES

FOCUS AREA	EXAMPLES	GCAP Reduction Target (tonnes CO <sub>2</sub> / year avoided)
1. Convert existing steam heat systems to low carbon energy sources	Central Heat Distribution Ltd. and Children and Women’s and VGH Hospital steam heat systems	95,000
2. Establish and expand new NES	SEFC NEU, River District Energy, Northeast False Creek	25,000
	<b>Total:</b>	<b>120,000</b>

Neighbourhood Energy is considered viable in areas of the city where the capital and operating costs of the system can be recovered through customer rates that are competitive with traditional forms of heating (i.e. electricity and gas). While NES generally benefit from the ability to utilize low operating cost energy sources such as sewage heat, these systems are capital intensive and generally require a large and densely developed customer base of buildings to achieve necessary economies of scale and to minimize the cost of the energy distribution infrastructure to the end users. Large scale and dense new development areas and locations already served by an existing steam system are good candidates for low carbon NES opportunities.

Existing steam heat systems represent the largest opportunity to rapidly reduce carbon emissions within the City. In order to convert these natural gas based systems to low carbon heat sources, the GCAP recommended that staff work with key stakeholders to develop a policy framework to establish clear expectations as to the conditions under which the City will (or will not) support proposals for the development or renewal of neighbourhood energy heat sources (referred to in this report as the “Energy Centre Guidelines”).

### ***Strategic Analysis***

Neighbourhood Energy Systems are needed to achieve rapid GHG emission reductions. To achieve the 2020 GCAP target reduction of 120,000 tonnes CO<sub>2</sub> per year, existing steam heat systems must be converted to low carbon energy sources and new systems must be established to serve high density areas of the City undergoing large and rapid development. This report asks Council to adopt:

1. A Strategic Approach to Neighbourhood Energy, and
2. Energy Centre Guidelines

#### **1. A STRATEGIC APPROACH TO NEIGHBOURHOOD ENERGY**

The Strategic Approach to Neighbourhood Energy policy includes a number of key elements: the results of stakeholder consultation, geo-spatial analysis to identify target areas for NES, tailored strategies for target areas and enabling, supportive policy.

#### **Stakeholder Consultation**

As part of the background research, two stakeholder workshops were conducted to discuss the strategy scope, objectives, issues, barriers and opportunities for NES in Vancouver. The first workshop was held on December 2, 2011 and second on May 10, 2012. A wide range of stakeholder interests were represented at the workshops (see Table 2).

**TABLE 2. STAKEHOLDERS WHO PARTICIPATED NEIGHBOURHOOD ENERGY STRATEGY CONSULTATION**

Utilities	Developer/Landowner/Customer	Government/Institutions/NGO
Central Heat Distribution Ltd. BC Hydro FortisBC Corix Cofely Dalkia/Veolia	Urban Development Institute Urban Land Institute Bentall Westbank Parklane Building Owners and Managers Association Condominium Homeowner’s Association Cadillac Fairview Convention Centre	Metro Vancouver City of North Vancouver City of Richmond Vancouver School Board University of BC BC Climate Action Secretariat BC Housing Port Metro Vancouver Natural Resources Canada BC Sustainable Energy Association Navius Research Community Energy Association

Key feedback received from stakeholders included the following:

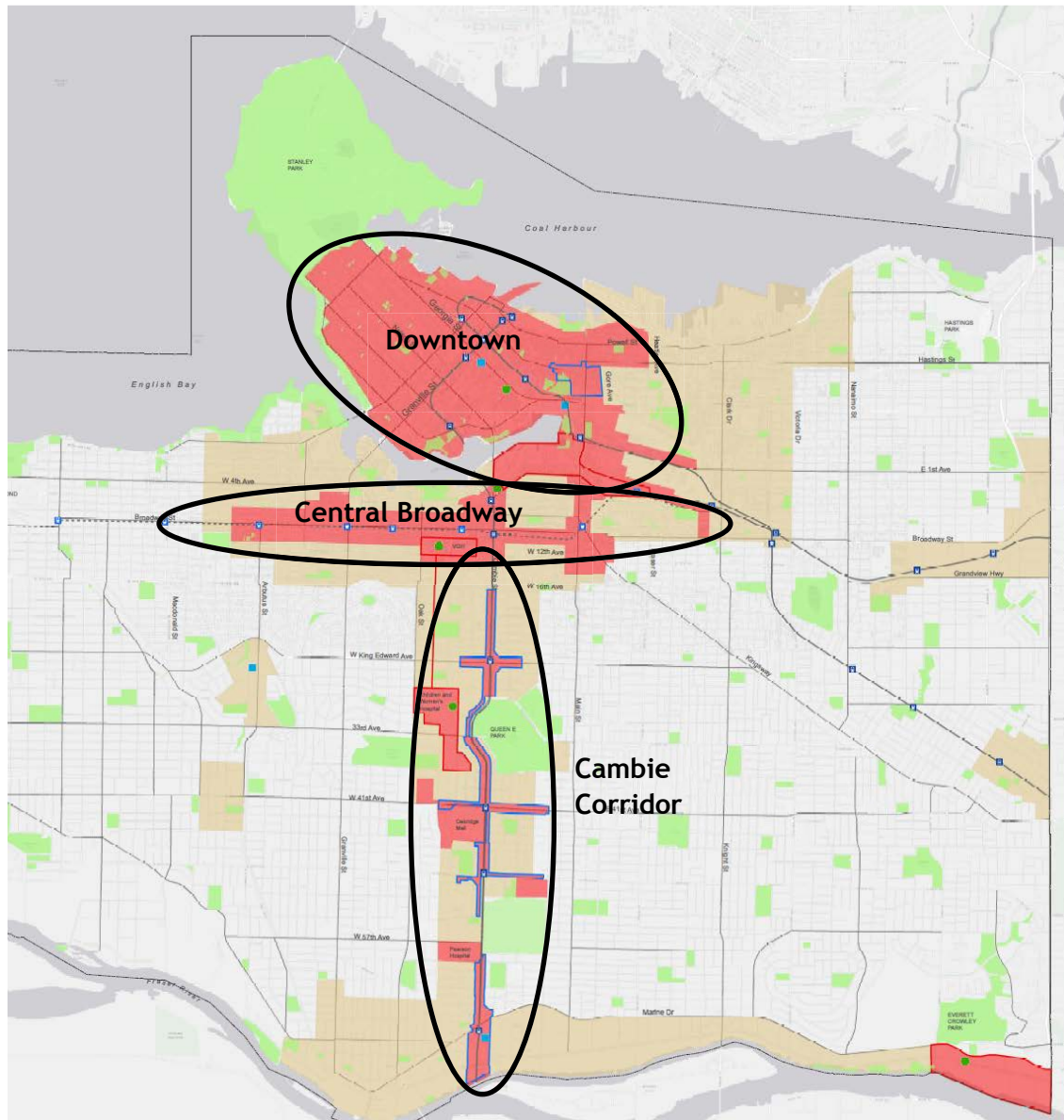
- There is strong support for the City to develop a Neighbourhood Energy Strategy, including developing a broad vision, coordinating stakeholder interests, undertaking proactive planning and developing supportive policies.
- Concerns were raised by the development community regarding perceived cost premiums to building NES compatible buildings, and confusion regarding how the use of mandatory connection policies apply in areas where there is no existing Neighbourhood Energy System (e.g. Cambie corridor).
- There is general support for city-wide standards and coordination, but also a desire for a framework that permits some flexibility for different technologies and approaches to address local conditions and allow some experimentation.
- There is general confusion about the roles and responsibilities for NES in the city, and concern about lost opportunities as a result of confusion, lack of vision and timeliness of decisions.
- Concerns were expressed about the interactions between neighbourhood energy policy and other green building and land use policies. Stakeholders see a need to coordinate and rationalize policies to ensure optimal outcomes.
- Some concern was expressed about the ability to site larger energy centre plants within the City (land availability, public receptiveness ).
- There was a range of opinions about the role of city ownership. Some stakeholders favoured City ownership to minimize costs and provide public control. Others favoured private delivery for transparency (BCUC regulation), timeliness of decisions, risk transfer and access to technological and business expertise. There was also interest in diverse partnership models as a way to leverage benefits for both public and private involvement. Regardless of ownership model, there was strong support for city vision, coordination and policy role.

### Identification of Target Areas

An energy study was conducted to identify target areas of the City that may be viable for the establishment of NES. Target areas were based on:

- Service areas of existing steam heat system and new NES
- Existing and projected development density and types of uses
- Major development projects (large site rezoning projects)
- Areas of the city with existing natural gas heated buildings that could be connected to Neighbourhood Energy

FIGURE 2. MAP OF TARGET AREAS



The energy study identified three key target areas, as illustrated in Figure 2:

1. The Downtown
2. The Cambie Corridor
3. Central Broadway

### **The Need for a Tailored Approach**

Each target area has different heat demands as well as different opportunities for sources of energy to supply NES. Additional differences in each of these areas include:

- Existing systems have different types of ownership (private, institutional and City), mandate (public sector facilities versus private sector buildings) and regulation (e.g. utilities that are not municipally-owned are regulated by the BC Utilities Commission, municipally-owned systems are regulated by municipal Councils).
- Some target areas are not served by existing systems, thus requiring variances in connection policy
- The business case for development of new systems varies with density, scale, types of land use and pace of development

As a result of these differences, the City must develop a unique approach in each target area. The City has a number of different policy tools available to support the establishment and expansion of NES. Different tools may be applied across the target areas to address the unique characteristics of those areas, and include:

- *NES Enabling Tools*: these tools may be used to facilitate the low carbon conversion of existing steam systems, establishment and expansion of new NES, and measures to help systems be cost competitive with business as usual. These enabling tools include the Energy Centre Guidelines, regulatory and contractual tools, cost competitiveness measures and connection policy:
  - *Energy Centre Guidelines*: a policy framework that guides the evaluation and clarifies requirements for new or renewed energy centre projects, enabling the implementation of low carbon energy supply technologies.
  - *Regulatory and Contractual Tools*: recognizing that each identified area may have unique characteristics and opportunities, the City will determine the most suitable combination of regulatory and contractual tools necessary to establish new or expanded low carbon neighbourhood energy systems. These tools may include the granting of a franchise right, rezoning policy and service area bylaws.
  - *Cost Competitiveness Measures*: to be viable, a Neighbourhood Energy system must be able to recover its capital financing and operating costs

via customer rates that are cost competitive with business as usual. The City has a number of options available to help improve the business case of NES, including adjustment to property tax policy for NES utilities, access to senior government grants, capital funding mechanisms, etc.

- *Connection Policy Tools*: Neighbourhood Energy system projects typically require capital to be invested prior to the connection of customer buildings. To reduce risk to sufficient levels to enable the financing of projects, policy tools are needed to secure customer connections and associated rate revenues. Tools include:
  - *Zoning policy* (e.g. Northeast False Creek, Cambie Corridor, East Fraserlands)
  - *Service area bylaws* (e.g. Southeast False Creek)

### **Strategies for Target Areas**

#### **The Downtown Area**

The Downtown has the greatest carbon reduction potential of any area in the City, and is characterized by the presence of a large established steam heat system (Central Heat Distribution Ltd.), which serves more than 200 buildings and has a carbon emission reduction potential of greater than 70,000 tonnes CO<sub>2</sub> per year (equivalent to 58% of the GCAT 2020 target for Neighbourhood energy). In addition, there are two new NES (Southeast False Creek and Northeast False Creek), significant development activity forecast and many existing gas heated buildings that are potentially convertible to Neighbourhood Energy system supply.

Table 3 provides a description of Downtown area characteristics and strategies for implementing and expanding NES. The Downtown approach focuses on strategies to facilitate the conversion of Central Heat Distribution Ltd. to a low carbon energy supply, the identification of opportunities for complementary low carbon systems and the use of policy to secure the connection of new developments to de-risk investments in system expansions and low carbon energy supply technologies.



**TABLE 3. DOWNTOWN AREA CHARACTERISTICS AND STRATEGIES**

AREA CHARACTERISTICS	
<b>Existing Systems:</b>	<ul style="list-style-type: none"> <li>Central Heat Distribution Ltd. currently serves more than 200 buildings (largest GHG emission reduction opportunity in the City at greater than 70,000 tonnes CO<sub>2</sub> per year)</li> </ul>
<b>New Systems:</b>	<ul style="list-style-type: none"> <li>Southeast False Creek (established)</li> <li>Northeast False Creek (implementation underway)</li> </ul>
<b>Energy Demand Context:</b>	<ul style="list-style-type: none"> <li>Significant development activity underway and/or anticipated in False Creek Flats, West End, Granville Loops area, Central Business District, Northeast False Creek and Southeast False Creek.</li> <li>Many existing gas heated buildings are potentially serviceable with NES, including a high proportion of West End and Downtown Eastside buildings.</li> <li>Availability of a Neighbourhood Energy System allows building owners and developers to avoid capital costs associated with energy supply systems.</li> </ul>
STRATEGIES	
<b>Energy Supply:</b>	<ul style="list-style-type: none"> <li>Enable the conversion of Central Heat Distribution Ltd. to a low carbon energy source:                             <ul style="list-style-type: none"> <li>Require significant expansions to be low carbon via regulatory and contractual tools (e.g. Northeast False Creek)</li> <li>Create supportive policy for low carbon conversion (e.g. the “Energy Centre Guidelines”).</li> <li>Utilize rezoning policy to require low carbon heat for new buildings.</li> </ul> </li> <li>Investigate complimentary low carbon options.</li> </ul>
<b>Connection Policy:</b>	<ul style="list-style-type: none"> <li>Continue use of service area bylaw to secure connection of new developments in Southeast False Creek.</li> <li>Continue to use Northeast False Creek rezoning policy to secure connections of new development, and establish a new service area bylaw</li> <li>Develop and implement connection policy for those areas with NES potential.</li> </ul>

### The Cambie Corridor Area

The Cambie Corridor has significant potential for Neighbourhood Energy due to the opportunity to convert the Children and Women’s Hospital steam system to a low carbon energy source and a number of large development sites coming on stream that can potentially catalyse the establishment of new systems. It is a significant priority for the city given the rapid pace of development in the area.

Table 4 provides a description of Cambie corridor area characteristics and strategies for implementing and expanding NES. The Cambie corridor area approach focuses on strategies that facilitate the conversion of the Children and Women’s Hospital steam system to a low carbon energy source, expanding that system to serve adjacent areas and establishing new systems at large development sites where viable. In addition, the Cambie corridor connection policy will be reviewed in consultation with the Urban Development Institute to ensure that it is sufficient to de-risk investments in NES

while meeting the needs of the development community. Staff will continue work on these strategies and report back to Council in the second quarter of 2013.

**TABLE 4. CAMBIE CORRIDOR AREA CHARACTERISTICS AND STRATEGIES**

<b>AREA CHARACTERISTICS</b>	
<b>Existing Systems:</b>	<ul style="list-style-type: none"> <li>• Children and Women’s steam heat system (GHG emission reduction opportunity is greater than 10,000 tonnes CO<sub>2</sub> per year).</li> </ul>
<b>New Systems:</b>	<ul style="list-style-type: none"> <li>• Southeast False Creek (established) at north end of area</li> </ul>
<b>Energy Demand Context:</b>	<ul style="list-style-type: none"> <li>• Large development sites located at Oakridge, Pearson Hospital, Little Mountain</li> <li>• Corridor-wide redevelopment underway</li> <li>• Rezoning connection policy already in place</li> </ul>
<b>STRATEGIES</b>	
<b>Energy Supply:</b>	<ul style="list-style-type: none"> <li>• Convert Children and Women’s and Vancouver General Hospital steam systems to a low carbon energy source:                             <ul style="list-style-type: none"> <li>○ Require as condition of the Children and Women’s Hospital Acute Care Centre rezoning.</li> <li>○ Create supportive policy for low carbon conversion (e.g. the “Energy Centre Guidelines”).</li> </ul> </li> <li>• Evaluate business case of establishing new NES at large development sites.</li> <li>• Explore a competitive process and utilize regulatory and contractual tools to establish new NES.</li> </ul>
<b>Connection Policy:</b>	<ul style="list-style-type: none"> <li>• Clarify connection policy for rezonings</li> </ul>

**The Central Broadway Area**

Central Broadway was identified as a target area due to a large number of natural gas heated buildings that are potentially convertible to Neighbourhood Energy and existing zoning policy that allows high density development. It is also adjacent to the Vancouver General Hospital steam system and in proximity to the Southeast False Creek Neighbourhood Energy Utility.

Table 5 provides a description of the Central Broadway area characteristics and strategies for implementing and expanding NES. A land use planning exercise is currently underway to inform future land uses and densities in the area, and the establishment of rapid transit for the area may also create opportunities for the establishment and growth of NES. Strategies for energy supply and connection policy will follow the land use planning exercise.

**TABLE 5. CENTRAL BROADWAY AREA CHARACTERISTICS AND STRATEGIES**

AREA CHARACTERISTICS	
<b>Existing Systems:</b>	<ul style="list-style-type: none"> <li>Vancouver General Hospital steam heat system (GHG emission reduction opportunity is greater than 15,000 tonnes CO<sub>2</sub> per year).</li> </ul>
<b>New Systems:</b>	<ul style="list-style-type: none"> <li>Southeast False Creek (established) adjacent to area</li> </ul>
<b>Energy Demand Context:</b>	<ul style="list-style-type: none"> <li>Broadway land use planning exercise will define future development</li> <li>Many existing gas heated buildings potentially serviceable with Neighbourhood Energy</li> </ul>
STRATEGIES	
<b>Energy Supply:</b>	<ul style="list-style-type: none"> <li>Pending low carbon conversion, expand the Vancouver General Hospital steam systems to a low carbon energy source:                             <ul style="list-style-type: none"> <li>Create supportive policy for low carbon conversion (e.g. the “Energy Centre Guidelines”).</li> <li>Expand system to adjacent areas of the Broadway area via regulatory and contractual tools</li> </ul> </li> <li>Future rapid transit infrastructure work may present opportunities to expand Southeast False Creek or Vancouver General Hospital systems or to establish new systems to serve existing and anticipated corridor development.</li> <li>Strategy will follow Broadway land use planning exercise.</li> </ul>
<b>Connection Policy:</b>	<ul style="list-style-type: none"> <li>To be defined following Broadway land use planning exercise.</li> </ul>

### Other Areas of the City

The City will continue to work with developers to deliver low carbon energy systems in areas outside of the three target areas described above. For very large developments the focus will be on implementing neighbourhood-scale systems, while on smaller developments the focus will be on site-scale options. These opportunities support the continued use of the Sustainable Large Development Site Rezoning Policy and Green Building Policy to leverage low carbon outcomes.

- Sustainable Large Development Site Rezoning Policy:*** For any rezoning application for property larger than 80,094 m<sup>2</sup> (2 acres) and/or 46,452 m<sup>2</sup> (500,000 ft<sup>2</sup>) of floor area, the applicant must complete a low carbon energy study.

For very large developments, the studies must consider neighbourhood-scale energy supply opportunities. The development of the RiverDistrict Energy system at East Fraserlands is an example of a successful outcome from this type of policy. RiverDistrict Energy is also an example of a system that requires a flexible approach, with its energy supply planned to utilize waste heat from the Metro Vancouver-owned Burnaby Waste-to-Energy Facility.

For smaller sized developments covered by this policy, studies will generally focus on site-oriented energy supply options such as geo-exchange or air-sourced heat pumps. Should the study indicate that a low carbon system is

cost competitive with business as usual, then the developer is expected to implement the low carbon system as condition of the development. Examples of sites that are developing building scale low carbon energy systems as a result of this policy include Shannon Estates, 70<sup>th</sup> and Granville, Marine Gateway and Arbutus Village developments.

- **Green building policy:** For all rezonings, developments must achieve LEED™ Gold certification, which provides developments with credit for use of high performance building systems.

## 2. ENERGY CENTRE GUIDELINES

To achieve low carbon objectives, NES require energy production facilities, often referred to in this report as “energy centres.” Energy centres may make use of a variety of different low carbon energy technologies, examples including sewage heat recovery, wood chips, geothermal and heat recovery from industrial processes. For individual projects, the technology selection is influenced by waste energy source availability, site conditions, economic, technical and risk considerations.

Because energy centres are substantially different from typical forms of urban development, specific policy guidance is required to enable low carbon development and protect the public interest as it relates to air quality, neighbourhood fit, sustainability of fuel sources and public engagement. The Energy Centre Guidelines will be applied when new energy centres are proposed, for substantial renovations to existing energy centres, and will also apply to the use of low carbon energy technologies used for industrial processes.

The guidelines address three key objectives:

1. To clarify City of Vancouver expectations and set standards for proponents of neighbourhood energy centre development
2. To guide City of Vancouver evaluation & approval of neighbourhood energy centre projects
3. To clarify the roles and responsibilities of the City and other regulatory authorities

### Development of the Energy Centre Guidelines

Development of the Energy Centre Guidelines was initiated with a Carbon Talk<sup>1</sup> organized by the SFU Centre for Dialogue in February 2011, and followed with four stakeholder structured decision making workshops that were conducted between May and November 2011<sup>2</sup>. The stakeholder workshops made use of a structured decision

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<sup>1</sup> The report titled “Low Carbon Heat Energy Options: a Round Table Dialogue with the City of Vancouver,” was produced by the SFU Centre for Dialogue on February 23, 2011. The report is available on request from the City of Vancouver Sustainability Group.

<sup>2</sup> The report titled “District Energy Options Dialogue: A BC Clean Air Research Project,” produced by Compass Resource Management on March 30, 2012, and produced for: City of Vancouver, BC Hydro, Fraser Basin Council (BC Clean Air Research Fund). The report is available on request from the City of Vancouver Sustainability Group.

making framework that examined stakeholder values and choices regarding different low carbon technologies.

Table 6 provides a list of stakeholders that were included in the development of the Energy Centre Guidelines. These stakeholders were selected based on demonstrated interest and/or expertise in fields that relate to climate protection, air quality, resource use sustainability and utility industry. Stakeholders also included residents who have actively participated in past public engagement processes for NES or related policy.

**TABLE 6. STAKEHOLDERS CONSULTED FOR DEVELOPMENT OF THE ENERGY CENTRE GUIDELINES**

<b>NGOs with environmental mandates:</b>	<ul style="list-style-type: none"> <li>• David Suzuki Foundation</li> <li>• Pembina Institute</li> <li>• Wilderness Committee</li> </ul>
<b>Government agencies:</b>	<ul style="list-style-type: none"> <li>• Vancouver Coastal Health: Chief Medical Health Officer</li> <li>• Metro Vancouver: Air Quality Policy, Regulation and Enforcement Division</li> <li>• Fraser Valley Regional District: Board Member</li> </ul>
<b>Academia providing expertise in air quality, atmospheric science, public health and climate protection:</b>	<ul style="list-style-type: none"> <li>• UBC: Professor Douw Steyn, Professor Michael Brauer, Professor Stephen Sheppard</li> <li>• UVIC: Professor Andrew Weaver</li> </ul>
<b>Utility Industry:</b>	<ul style="list-style-type: none"> <li>• The Canadian District Energy Association</li> <li>• BC Hydro</li> <li>• RiverDistrict Energy / Parklane Homes</li> </ul>
<b>Residents from neighbourhoods served by existing NES, or who have been involved in NES initiative consultation</b>	<ul style="list-style-type: none"> <li>• False Creek South</li> <li>• False Creek East</li> <li>• Cambie corridor</li> </ul>

**The Energy Centre Guidelines**

The Energy Centre Guidelines address key areas of importance, including climate protection, air quality, neighbourhood fit, sustainability of fuel sources and community engagement. The Energy Centre Guidelines are attached in Appendix A, with summary provided in Table 7.

**TABLE 7. ENERGY CENTRE GUIDELINES SUMMARY**

RATIONALE FOR GUIDELINE	LEAD AUTHORITY	IMPLEMENTATION TOOLS
<p><b>1. Climate Protection:</b> Energy Centres must optimize GHG reductions and achieve reductions of at least 50% compared to business as usual.</p>		
<p>NES are needed to achieve City carbon reduction targets, and experience demonstrates that significant GHG emission reductions are achievable. Stakeholders in general support the use of low carbon energy sources to displace fossil fuels</p>	<p>City of Vancouver</p>	<p>To be implemented through Energy Centre zoning and development permitting process, and operating agreements.</p>
<p><b>2. Air Quality:</b> Energy Centre proposals must demonstrate that the impacts of the facility on ambient air quality will not compromise Provincial and Regional air quality objectives and must meet or exceed all applicable air quality regulations.</p>		
<p>Clean air is essential for public health, and is a City goal, and is a high priority of all stakeholders. Metro Vancouver regulates air quality, and the City can support this by requiring appropriate technical analysis and transparency in the evaluation of projects.</p>	<p>Metro Vancouver (with supporting action by City of Vancouver)</p>	<p>Metro Vancouver regulates the emissions from boilers. The Metro Vancouver District Director of Air Quality Management also has the discretionary authority to require emissions modelling and monitoring. The City will require discretionary components of Metro Vancouver regulation (modelling and monitoring) through rezoning and development permit processes and operating agreements.</p>
<p><b>3. Neighbourhood Fit:</b> Energy Centres must demonstrate architectural, urban design, and operational characteristics that ensures that the facility integrates with the surrounding neighbourhood and addresses impacts such as traffic, noise, and/or odour.</p>		
<p>Energy centres must effectively integrate into neighbourhoods, and address stakeholder concerns regarding potential impacts on local liveability</p>	<p>City of Vancouver</p>	<p>To be implemented through Energy Centre zoning and development permitting process, and operating agreements.</p>
<p><b>4. Sustainability of Fuel Sources:</b> Optimize use of available waste-heat resources to provide low-carbon energy, and demonstrate sustainable sourcing and supply of all proposed renewable fuels.</p>		
<p>Waste heat is in general the preferred low-carbon energy source of stakeholders. If wood fuel is to be used ensure that it is clean and from waste sources to ensure that it supports objectives of protecting natural environments and waste reduction.</p>	<p>City of Vancouver</p>	<p>To be implemented through Energy Centre zoning and development permitting process, and operating agreements.</p>
<p><b>5. Community Engagement:</b> Proponents of new Neighbourhood Energy Centres must demonstrate robust consultation has taken place with the local community and stakeholders when planning energy facilities, and use the project to build energy awareness in the community.</p>		
<p>Public input is required for the planning of new energy centres, and the consultation process must be robust and transparent. This, along with access to information regarding ongoing energy centre operations will help build community support.</p>	<p>City of Vancouver</p>	<p>Early discussions with City staff are required, to align public consultation activities around siting, design, and operations, recognizing that rezoning and development permits will have enhanced consultation requirements</p>

### 3. NEXT STEPS

This report recommends that staff report back with implementation strategies for target areas, connection policies for these areas, strategies to improve the viability of NES and a plan to engage with Metro Vancouver and neighbouring municipalities. These strategies will be developed in consultation with key stakeholder groups as necessary. For example, a series of workshops will be held with the Urban Development Institute to develop connection policy options for target areas. Table 8 provides details on work to follow, along with anticipated timing for report back to Council.

TABLE 8. NEXT STEPS

STRATEGY	REPORT BACK TO COUNCIL
<b><i>NES Implementation Strategies for Target Areas</i></b>	
<b><i>Downtown Area:</i></b> Staff will continue work to develop strategies to facilitate the conversion of Central Heat Distribution Ltd. to a low carbon energy source. These strategies may include use of regulatory and contractual tools to establish new low carbon supply areas, the refinement of green building policy to support low carbon growth and investigation of other low carbon options that would complement the conversion of Central Heat Distribution Ltd. Staff will utilize local and/or international expertise as appropriate to support this exercise.	Q2, 2013
<b><i>Cambie Corridor:</i></b> Staff will pursue the conversion of the Children and Women’s Hospital steam heat system to a low carbon energy source as a condition of rezoning for the development of the proposed Acute Care Centre. In addition, in collaboration with building developers staff will evaluate the business case of establishing new NES at large development sites and explore the use of a competitive process to implement new systems.	Q2, 2013
<b><i>Central Broadway:</i></b> Staff will investigate NES supply options and strategies on conclusion of the Central Broadway land use planning process.	Q1, 2014
<b><i>Connection Policy</i></b>	
Staff have initiated a series of consultative workshops with the Urban Development Institute (“UDI”) to evaluate existing connection policy as applied to the Cambie Corridor and options for future changes to connection policy. These workshops will include expert analysis to evaluate the capital cost implications for developers associated with connecting to NES, along with the long-term rate costs for customers. This analysis will help to inform discussions regarding connection policy options and also options for uses of different technologies.	Q2, 2013
<b><i>Strategies to Improve the Economic Viability of NES</i></b>	
Staff will investigate options for improving the economic viability of NES to ensure that systems can be cost competitive with traditional forms of energy. Options to be investigated include adjustment to property tax policy for NES utilities, access to senior government grants and capital funding mechanisms.	Q2, 2013
<b><i>Regional Coordination</i></b>	
Staff will continue to work with Metro Vancouver and neighbouring municipalities to develop a more coordinated approach to energy supply. This includes information sharing, policy advancements to enable recovery of waste heat from liquid/solid waste streams and facilitating opportunities for new NES systems to cross municipal boundaries where feasible. Metro Vancouver, UBC, the City of Richmond, and City of Burnaby are recognized as key strategic partners to work with.	Q2, 2013

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***Implications/Related Issues/Risk***

***Financial***

The work recommended in the Strategic Approach to Neighbourhood Energy will be funded from the 2012 and 2013 Operating Budget. Pending outcome of that work, any future financial impacts and funding sources will be presented to Council for their consideration and approval in the second quarter of 2013.

***Environmental***

This Strategic Approach to Neighbourhood Energy and Energy Centre Guidelines is necessary to enable greenhouse gas emission reductions in accordance with the City Neighbourhood Energy target of a 120,000 tonne CO<sub>2</sub> reduction per year by 2020. In addition, the Energy Centre Guidelines are necessary to ensure that sustainable energy sources are used and to protect air quality.

***CONCLUSION***

This report recommends adoption in principle of the strategic approach to facilitate implementation of Neighbourhood Energy Systems in the Downtown, Cambie corridor and Central Broadway areas and achieve greenhouse gas emission reductions in accordance with the Greenest City Action Plan target. In addition, this report recommends adoption of the Energy Centre Guidelines to enable the conversion of existing steam heat systems to low carbon sources and development of energy centres for new Neighbourhood Energy Systems.

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APPENDIX A  
NEIGHBOURHOOD ENERGY CENTRE GUIDELINES

**Neighbourhood Energy Centre  
Guidelines**

September 24<sup>th</sup>, 2012

This document provides a foundational policy framework to inform decision-making on the future development of Neighbourhood Energy Centres in the City of Vancouver.

### **Intent of Guidelines**

Neighbourhood Energy systems using heat from low-carbon Neighbourhood Energy Centres are key to achieving Vancouver's greenhouse gas reduction targets, as identified in the Greenest City 2020 Action Plan.

While a variety of technologies can provide low-carbon energy at the scale of individual buildings, these Guidelines anticipate development of Neighbourhood Energy Centres that provide thermal energy at the neighbourhood scale for space heating, domestic hot-water heating, and certain industrial processes. Energy Centres generally use large scale heat-pumps and equipment that combusts or gasifies wood fuels. These Guidelines do not consider proposals for mass-burn incineration of municipal solid waste.

The Guidelines recognize that Neighbourhood Energy Centre development will have a greater chance of success when broadly-held community values are respected. Through a focused stakeholder engagement process, and drawing on the City's experience, key criteria have been identified that describe areas of specific interest and importance regarding Neighbourhood Energy Centre development. The key criteria are:

1. Climate protection
2. Air quality
3. Neighbourhood fit
4. Sustainability of fuel sources
5. Community engagement

### **Application of Guidelines**

These Guidelines will be applied when new Neighbourhood Energy Centres are proposed or when substantial renovation to an existing Energy Centre is proposed. These Guidelines will be used primarily by:

- a) Neighbourhood Energy Centre proponents

These Guidelines will shape the development of project proposals for Energy Centres located in Vancouver, and provide project proponents with clear expectations for due diligence in the planning process and for high levels of ongoing operational performance.

- b) Elected officials and City staff

These Guidelines provide a tool to assist elected officials and City staff in considering the variety of objectives and issues related to development of Neighbourhood Energy Centres, and will help them to evaluate project proposals. Project proponents apply to the City for approval of rezoning and development permit applications, or look to the City of Vancouver for endorsement of approaches to matters for which the City is not the regulatory authority.

- c) Members of the public and stakeholders  
These Guidelines respond to public and stakeholder values regarding development of Neighbourhood Energy Centres. They clarify the lead agency for regulation of various matters. They also provide a clear signal to the public and stakeholders that specific objectives and performance criteria regarding Energy Centre development and operation must be met.
- d) Other regulatory agencies  
Metro Vancouver and the British Columbia Utilities Commission (BCUC) regulate certain aspects of Neighbourhood Energy Centre implementation in Vancouver. These Guidelines affirm policy positions or expectations regarding matters for which the City of Vancouver is not the direct regulatory authority but in which it takes an interest on behalf of its citizens. Examples of these matters are air quality regulation (Metro) and rates for energy charged by utilities (BCUC).

Note - The Guidelines do not supersede any other City policy.

## GUIDELINES

### 1.0 Climate Protection

***Low-carbon Neighbourhood Energy Centres must optimize greenhouse gas reductions and achieve reductions of at least 50% over a business-as-usual scenario.***

#### 1.1 Rationale

The Greenest City 2020 Action Plan provides a strategy for Vancouver to become the greenest city in the world by 2020. The Greenest City Climate Protection target is to reduce Vancouver's overall greenhouse gas (GHG) emissions by 33% by 2020 (from 2007 levels).<sup>3</sup>

New Neighbourhood Energy Centres and the conversion of existing fossil-fuel based Energy Centres provide a key opportunity to achieve the City's overall climate protection goal - provided they meet or exceed the expectations represented in the above Guideline.

A *business-as-usual (BAU)* emission scenario is a projection of the GHG emissions if a typical blend of electrical and natural gas-fuelled equipment were used to provide heat energy for a development, a neighbourhood area or an industrial process.

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<sup>3</sup> The amount of GHG in the atmosphere is not only the result of increased emissions from burning fossil fuels, but is also affected by deforestation and industrial development that limit the planetary ecosystem's ability to absorb GHG. These processes are important but are not easily quantified or able to be directly addressed by these Guidelines.

Neighbourhood Energy Centres can deliver significant GHG reductions over conventional, fossil-fuel based approaches to generating thermal energy. GHG reductions nearing 60% have been demonstrated by the City's *Neighbourhood Energy Utility* in South East False Creek while other low-carbon energy solutions in BC have demonstrated even greater reductions.

The above Guideline recognizes that implementation of low-carbon approaches generally require some conventional energy equipment (fuelled by natural gas) to supplement the low-carbon technologies at times of peak demand, and to provide for system back-up. Conventional equipment is often also required in the early stages of establishing a low-carbon Energy Centre when neighbourhood demand is still low.

In order to see the broad deployment of technology that reduces GHGs, a balance of GHG reduction with reasonable energy rates should be the goal. The City's experience has also shown that this is possible while achieving the above Guideline regarding Climate Protection.

Regulation of energy rates is generally the responsibility of the British Columbia Utilities Commission. The BCUC ensures that rates being charged for energy are just and reasonable for customers, while allowing energy utilities to earn a fair return.

## 1.2 Implementation

Lead Agency - City of Vancouver

Vancouver's City Charter gives it authority over land-use and development and provides tools to ensure the City's public policy objectives, such as GHG reductions, are being achieved when rezoning or development permits from the City are required.

Other parts of the Vancouver City Charter give authority over distribution of thermal energy. Section 153 of the Charter lets City Council prescribe terms, conditions, and restrictions on delivery of thermal energy that can also include GHG reduction requirements.

Neighbourhood Energy Centre proponents will need to demonstrate that a variety of technology options have been adequately assessed to ensure their proposal optimizes GHG reductions while considering the objectives identified in Section 4.0 of this document regarding taking advantage of readily available sources of waste heat.

The City will use a combination of planning and development powers and control over utility delivery to ensure the above Guideline for GHG reduction is achieved. These policy and regulatory tools also provide mechanisms to ensure the other public interest criteria noted in this document are addressed.

## 2.0 Air Quality

***Low-carbon Neighbourhood Energy Centre proposals must demonstrate that the impacts of the facility on ambient air quality will not compromise Provincial and Regional air quality objectives and must meet or exceed all applicable air quality regulations.***

## 2.1 Rationale

The Greenest City 2020 Action Plan confirmed citizens' and City Council's objective for Vancouver residents to breathe the cleanest air of any major city in the world by 2020.

Although there is variability within the city and across the region, ongoing air quality monitoring indicates that Vancouver already enjoys some of the cleanest air in the world when compared to other major urban centres. Nevertheless, a variety of initiatives that range from deployment of electric vehicles to increased deployment of cycling infrastructure are being implemented to ensure air quality improvements continue in light of population and economic growth.

As the regulatory authority for air quality in the Vancouver area, Metro Vancouver shares the City of Vancouver's air quality ambitions. To this end Metro Vancouver, in partnership with the BC Ministry of Environment, has established strong objectives for ambient air quality. For example, joint Provincial/Metro Vancouver objectives to achieve very low annual average fine particulate matter are even more stringent than the World Health Organization's guideline, and are among the lowest in the world.

Most residential and commercial heating in the Metro Vancouver region is fuelled by natural gas. Air pollutant emissions associated with natural gas combustion are relatively small, particularly when compared to other sources of pollution such as transportation. For instance, approximately 3% of Metro Vancouver fine particulate matter emissions are from natural gas heating vs. 29% from transportation sources.

Neighbourhood Energy Centres offer a compelling alternative to natural gas-fueled heating systems due to their ability to:

- significantly reduce greenhouse gas emissions
- efficiently use waste heat or other local resources
- reduce our dependence on fossil fuels

However, some Energy Centres (particularly those using wood-based fuels) require close attention to air pollutant emissions. The main air pollutants of concern are fine particulate matter (PM 2.5) and ground-level ozone (produced in the atmosphere when emissions of nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOC) mix and react).

There are two important measures that relate to air quality:

- 1) stack emissions - which is a measure of pollutant emissions given-off directly by an Energy Centre due to its operations
- 2) ambient air quality - which is a general measure of air pollution levels in a given area, taking into account all emission sources once they have had a chance to mix and combine in the atmosphere.

Both of these measures will need to be considered in order to satisfy this Guideline.

Vancouver residents and all people living in the Lower Fraser Valley air-shed want to feel secure that strong measures are in place to protect our air quality and that all

emission regulations are being effectively monitored and enforced to protect public health and the environment.

## 2.2 Implementation

Lead Agency - MetroVancouver

Under authority from the Provincial Government (*Environmental Management Act, Part 3 - Section 31*) Metro Vancouver creates air quality management plans, regulates emission of pollutants that pose a risk to human health, and enforces emission regulations and permits for a wide variety of sources.

The City of Vancouver does not have any direct authority over or jurisdiction for air quality but will work collaboratively with Metro Vancouver to ensure regulations, monitoring, and enforcement of emissions from Energy Centres ensures healthy air for residents of the entire region.

Proponents will be required to comply with Metro Vancouver's air emission regulations for boilers and heaters (*Boilers and Process Heaters Emission Regulation Bylaw No. 1087*) when they propose Energy Centres (with a capacity up to 50 megawatts). Bylaw 1087 contains stringent pollution emission limits, and the specific requirement that any wood fuels must be clean, uncontaminated, and free of substances harmful to humans, plants or animals when combusted.

In addition, as part of the City of Vancouver's land-use or development permit approvals, proponents will be expected to:

- 1) demonstrate, through detailed, site-specific modelling of primary air pollutant emissions and dispersion, using methods acceptable to Metro Vancouver, that the impacts of the facility on ambient air quality do not compromise Provincial and Regional air quality objectives, and will meet or exceed all applicable air quality regulations
- 2) commit to enhanced monitoring of air pollutant emissions and other key operational parameters and regularly provide publicly accessible information on system performance (including air quality and GHG emissions).

The expectation is that monitoring programs which track key operational variables will be continuously in effect and data will be easily accessible to the public. Periodic sampling procedures by certified third-party technicians will take place at an interval that MetroVancouver deems appropriate (monthly, quarterly or annually) to test parameters such as fuel composition, fine particulate matter emissions (that cannot easily be continuously monitored), and to verify the accuracy of operational monitoring. Baseline and subsequent periodic monitoring of ambient air quality near a facility may also be considered beneficial to provide residents information about broad trends in neighbourhood air quality.

- 3) demonstrate fuel quality assurance by describing procedures and protocols for raw material supply, production processes, and delivery chains (fuel sources and compliance with standards and certification will be evaluated by qualified

professionals with expertise in forestry, engineering, and/or sustainable supply chain management).

Finally, Neighbourhood Energy Centre proponents are encouraged to work with the City and Metro Vancouver to support initiatives such as residential fireplace /woodstove replacement programs that will enhance air quality in Vancouver.

### 3.0 Neighbourhood Fit

***Neighbourhood Energy Centres must have architectural, urban design, and operational characteristics that ensures that the facility integrates with the surrounding neighbourhood and addresses impacts such as traffic, noise, and/or odour.***

#### 3.1 Rationale

People's quality of life, along with the comfort and liveability of Vancouver's neighbourhoods is influenced by many factors including sensitive design and thoughtful development of the built environment. Residents take a strong interest in any new development occurring in their neighbourhoods. Neighbourhood Energy Centres must be carefully designed and operated to integrate with the surrounding neighbourhood.

#### 3.2 Implementation

Lead Agency - City of Vancouver

Integrating a neighbourhood energy centre in a neighbourhood shares many of the same issues associated with integrating other types of development in neighbourhoods. The City of Vancouver has jurisdiction over, and widely recognized professional expertise in managing land-use rezoning, development, and building processes. Review by the City's professional and citizen advisory panels, the Development Permit Board, and by City Council are established mechanisms and processes to implement the above criteria regarding neighbourhood fit using conditions of approval and operating agreements.

The City also has control over the regulation of traffic, use of streets, and regulating size and weight of vehicles. These powers allow truck traffic associated with Energy Centre operations to have their frequency and hours of operation controlled to ensure minimal impact on neighbourhoods.

### 4.0 Sustainability of Fuel Sources

***Optimize use of available waste-heat resources to provide low-carbon energy; and, demonstrate sustainable sourcing and supply of all other proposed renewable fuels.***

#### 4.1 Rationale

The preferred approach to providing low-carbon energy for heating is to take advantage of readily available sources of waste heat. Waste heat can be recovered

from commercial and industrial operations as well as urban infrastructure such as sewage lines.

Waste heat is not always available or able to match the energy demands of a particular facility or neighbourhood. Where technologies that use other primary fuels (such as wood) are the only viable low-carbon energy alternative, the City's expectation is for only clean waste wood be used. Clean waste wood comes from a variety of sources including: land clearing, construction, tree pruning, wood product manufacturing, sawmilling, and residue from forestry operations.

## 4.2 Implementation

Lead agency - City of Vancouver

Feasibility studies are required by the City to test and review various low-carbon alternatives to achieving the City's GHG reduction objectives. These feasibility studies will continue to be used in order to ensure the availability and suitability of waste heat resources are being properly assessed.

The City of Vancouver also has influence over the use of various fuels in Energy Centres through approval of development permits, rezoning conditions, and operating agreements - which can include a variety of performance criteria regarding matters ranging from the GHG intensity of delivered heat, to details regarding sources of fuels.

Throughout the approvals process, proponents of Neighbourhood Energy Centres will be required to demonstrate they can secure or have access to the low-carbon energy or fuel supply required by their proposal both in the short and long-term.

Particularly where wood-based fuels are proposed, projects will also be required to present details regarding anticipated sources of wood-based fuel and demonstrate using recognized international standards and/or certification approaches that fuel sourcing will not create or contribute to unsustainable practices and respond to the city's objectives regarding the use of clean wood waste. Conditions of City of Vancouver approval will ensure necessary agreements to ensure ongoing compliance.

## 5.0 Community Engagement

***Proponents of new Neighbourhood Energy Centres must demonstrate robust consultation has taken place with the local community and stakeholders when planning energy facilities, and use the opportunity to ensure the project builds energy awareness in the community.***

### 5.1 Rationale

Citizens need to be informed about and included in decision-making that affects their communities. Neighbourhood Energy Centres have the opportunity to deliver economic and environmental benefits to communities. These benefits must be delivered while maintaining livability and responding to neighbourhood context in planning and implementation of the Energy Centre. Community and stakeholder participation in the



planning process, along with having access to information about ongoing operations, will help build community acceptance and support.

## 5.2 Implementation

Lead agency - City of Vancouver

Neighbourhood Energy Centre proponents will be required to conduct community engagement activities in advance of any permits or approvals considered by the City.

The City of Vancouver will evaluate the engagement conducted by proponents to ensure they meet the objectives of this Guideline. The proponent is encouraged to work collaboratively with the City to ensure clear understanding of the City's communication and engagement expectations.

The following elements are considered necessary in order for a community engagement process to be effective:

- 1) Engage with the community in advance of or early in any application process for City approvals
- 2) Present clear and credible information about the benefits as well as the potential impacts and trade-offs associated with a proposed Neighbourhood Energy Centre
- 3) Make information regarding the proposal readily available to the public in an easy-to-understand format -through a variety of best-practise communications and engagement approaches such as using online information dissemination and feedback mechanisms, providing information in multiple languages, and providing the opportunity for face-to-face contact and feedback
- 4) Ensure technical experts or consultants are available to the public in order to respond directly to questions
- 5) Present clear information regarding which aspects of the proposal the public is able to influence, how public feedback and concerns will be taken into consideration, and at what points in the planning process these opportunities are available
- 6) Submit documentation that summarizes the engagement process and any continuing engagement activities, and that demonstrates how and which public input has been considered and how issues of concern have been addressed
- 7) Demonstrate how the project will contribute to community energy awareness and education.
- 8) Respond to concerns raised in the community engagement process.