

Memo



Date: May 25, 2010
File: 1325-30
To: City Manager
From: M.Watt, Manager, Strategic Projects
Subject: District Energy Feasibility Study - Pandosy Area

Recommendation:

THAT Council directs staff to use \$95,000 from the Energy Reserve towards completing the technical feasibility for a District Energy System in the Pandosy Center area.

AND THAT the 2010 Financial Plan be amended to transfer \$95,000 to the Corporate Carbon Energy/Emissions Plan (2010 capital project) budget from the Energy Reserve.

AND THAT Council supports a Preliminary Assessment Submission to P3 Canada for capital funding as soon as possible.

Purpose:

To secure interim funding to complete the technical feasibility study for a District Energy System for the Pandosy Centre area. This is a follow-up on recommendations from the District Energy Pre-feasibility Study; the study can be viewed on the City website under City Projects/Sustainability Projects/Renewable District Energy/Prefeasibility Study. Final funding is anticipated from an FCM grant later this year.

Background:

District energy systems (DES) provide space and water heating and/or space cooling to more than one building. This approach accesses 'economies of scale' in sourcing and distributing energy. Energy sources include waste heat, other renewable energy sources such as land and water energy exchange and solar thermal, as well as conventional energy sources. The more efficient distribution systems service high-density mixed-use areas which have a demand profile that balances daytime and nighttime energy uses. The benefits of DES include energy efficiency, reductions in GHG emissions, and increased energy security.

The Kelowna DES Pre-Feasibility Study completed by the Community Energy Association (CEA-Kelowna District Energy-Jan 2010) determined that there are opportunities for DES in Kelowna. The study included a technical and stakeholder workshop on October 8, 2009 a public Open House on November 10, 2009 and an in-depth technical workshop on December 3, 2009. Several locations were identified as potential sites for DES; the City Center (downtown) and the South Pandosy were deemed to have the best opportunity for success.

The Pandosy area was chosen as an ideal initial project because:

- It is proximate to the surplus heat produced by the City wastewater plant;
- the waste heat is owned by the City which simplifies energy pricing negotiations;
- Okanagan College has already successfully used this resource to heat their buildings;
- the draft 2030 OCP anticipates growth of a mixed-use building stock in the Pandosy Center area.

qv

The next step is a technical feasibility study. This will determine the scale and phasing of energy demands, screen the appropriate mix of energy sources, and complete the concept design for the Pandosy area DES. An RFP was competitively tendered; the successful proposal was from Stantec Consultants who provided a project estimate of \$106,828.

Financial/Budgetary Considerations:

This DES project is a complimentary project to the Community and Corporate GHG reduction planning that is currently underway and fully funded by the 2010 Financial Plan. There is insufficient funding in the GHG project budget to complete the DES technical feasibility study. However a Federation of Canadian Municipalities (FCM) grant application has been submitted for additional funding that would create sufficient funding to complete the DES study. A decision from FCM is anticipated in August. In the meantime it is proposed to fund this project from the Energy Reserve and to replenish that reserve with the FCM grant if the application is successful.

Recently the City received grants from the Climate Action Revenue Incentive Program (CARIP) announced in 2008. The conditional grant is for communities who have signed the Climate Action Charter, pledging to become carbon-neutral by 2012. Through this annual program, BC communities receive a grant equal to 100 per cent of their carbon tax costs (fleet fuel tax) to support their climate change efforts and become carbon neutral by 2012, provided they publicly report both their plan and ongoing progress in meeting that goal. Kelowna's Corporate Carbon Plan will be submitted to the FCM and to the Province following Council review early this summer. The CARIP funding is deposited in the Energy Reserve and is an appropriate source of funding for the GHG planning and DES technical feasibility work.

P3 Canada, a crown corporation, has announced significant funding for capital participation in multi-million dollar Public Private Partnerships projects. The Pandosy DES appears to qualify. The Preliminary Assessment Submission is due by June 30, 2010, and the business case must be submitted by March 31, 2011. The technical feasibility study needs to begin immediately to meet these deadlines.

Internal Circulation:

Directors, Policy and Planning and Director, Financial Services.

Legal/Statutory Authority:

The City of Kelowna is a signatory to the BC Climate Action Charter.

Existing Policy:

The draft 2030 OCP supports the development of District Energy Systems to increase energy efficiency and reduce community GHG emissions. District Energy, implemented in all identified sites, has the potential to reduce the community's carbon footprint by 24,150 tonnes CO₂e (CEA, Kelowna District Energy Pre-feasibility Study, Jan. 2010). This represents 6% of our Community Carbon reduction target for 2020.

External Agency/Public Comments:

There may be opportunities to engage Interior Health (KGH expansion) and facilitate long term energy balancing efficiencies for both heating and cooling for their needs in conjunction with this project. This type of system integration between institutions and municipalities can have long term benefits. This opportunity will be pursued during and following the technical feasibility study.

Considerations not applicable to this report:

- Community & Media Relations Comments:
- Legal/Statutory Procedural Requirements:
- Personnel Implications:
- Alternate Recommendation:

Submitted by:



M.Watt, Manager, Strategic Projects

Approved for inclusion:



R Cleveland, Director, Infrastructure Planning

CC: J.Paterson, General Manager, Community Sustainability
S.Bagh, Director, Policy & Planning
K.Grayston, Director, Financial Services
R.Cleveland, Director, Infrastructure Planning
D.Graham, Director, Strategic Initiatives

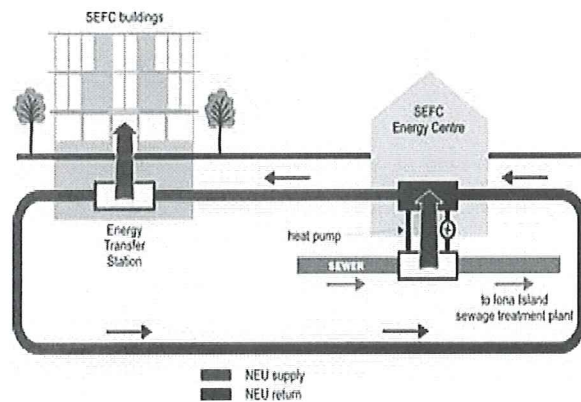
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DISTRICT ENERGY SYSTEM PANDOSY



COUNCIL REPORT
2010 MAY 31

SOUTH EAST FALSE CREEK DES SCHEMATIC



KELOWNA SITE EVALUATION

Project Opportunities	Type	Best Energy Sources	Notes	Potential CO ₂ reductions	Overall Rating
South Pandosy Centre, including hospital	Existing and New	WWTF effluent, and potential geo-exchange for cooling	Large existing demand to anchor district energy system, and area earmarked for growth	7,800 t/yr	Good
City Centre	New, and some existing	Lake, geo-exchange systems, arena and industrial / commercial waste heat recovery	Area earmarked for high growth, including Central Green and CD21 CD zones that have significant district energy potential. Some existing energy demand already in place.	8,500 t/yr	Good
Landmark Office Complex and Parkins Recreation Centre	Existing	Heat recovery from Landmark distributed to Parkins Recreation Centre	Some feasibility work already conducted (for 'The Mode'). Pipe can be routed through the Mill Creek culvert, or over the proposed pedestrian bridge	500 t/yr	Possible
Orchard Park	New	Commercial waste heat, and geoexchange	Heat recovery from commercial buildings to residential, and geoexchange	6,500 t/yr	Possible
Rutland Arena heat recovery	Existing	Arena waste heat, (and geoexchange if necessary for additional buildings)	Additional arena waste heat recovered from inside the building, potentially distributed to neighbouring buildings (YMCA / YWCA and schools)	850 t/yr	Possible
TOTAL				24,150 t/yr	

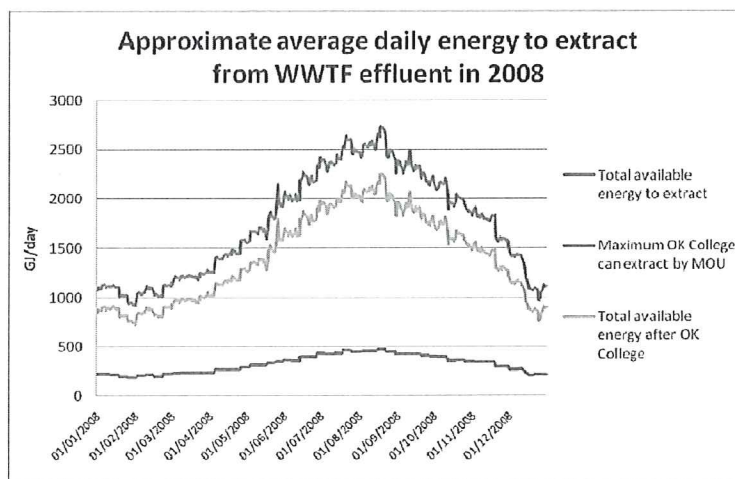
PROJECTED ENERGY DEMANDS

Area	New high density floor space (ft ²)	Anticipated heating and hot water demand (GJ)
City Centre	Residential: 2,300,000	77,000
	Commercial: 3,100,000	50,000
	Industrial: 3,800,000	Highly dependent on industry type
South Pandosy	Residential: 800,000	30,000
	Commercial: 810,000	14,000
Orchard Park / Highway Centre	Residential: 1,800,000	60,000
	Commercial: 4,000,000	65,000
	Industrial: 320,000	Highly dependent on industry type
Rutland Centre	Residential: 1,300,000	45,000
	Commercial: 915,000	15,000

TECHNICAL OPTIONS

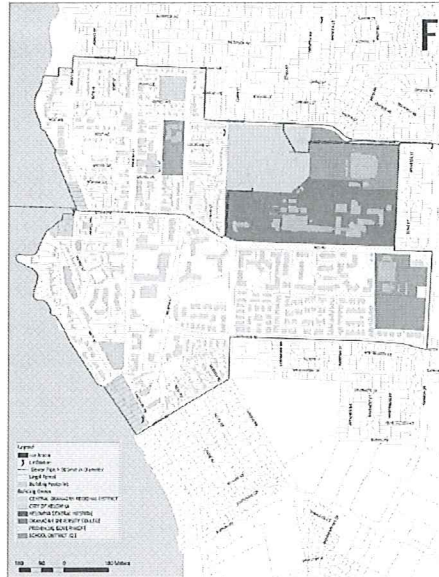
Energy Source	Considerations	Approach	District Scale	Building Scale	Capital Cost	Operating Cost
Air-source heat pumps	Good climate conditions in Kelowna. Short payback.	Low grade heat source + heat pump	+	+++	\$	\$\$\$
Geoechange (closed-loop borehole)	Soil properties affect drilling cost and sizing of ground heat exchanger	Low grade heat source + heat pump	++	+++	\$\$\$	\$
Geoechange (open-loop borehole)	Capital cost depends on drilling conditions. Output depends on flow rates	Low grade heat source + heat pump	++	+++	\$\$	\$
Geoechange (horizontal loop)	Lower capital cost than borehole. Requires large surface area	Low grade heat source + heat pump	+	+++	\$\$	\$
Lake	Similar to geoechange. Great for cooling. Requires appropriate environmental licences.	Low grade heat source + heat pump	++	++	\$\$	\$
Heat recovery (Sewer mains or lift station)	Cheaper if installed from beginning. Can be retrofit. Heat output dependent on volume	Low grade heat source + heat pump	++	+	\$\$\$	\$
Heat recovery (Sewage treatment plant)	Relatively common in practice. Heat output dependent on volume	Low grade heat source + heat pump	+++	+	\$\$\$	\$
Solar hot water	Good solar resource. Requires south orientation.	Low grade heat source + heat exchanger	+	+++	\$\$\$	\$
Waste heat	Often considered a "low hanging fruit". Some good opportunities in the City.	Existing heat source with or without a heat pump	+++	++	\$\$	\$
Wood waste	Very difficult to source economical long-term supply contract	Combustion or gasification	++	++	\$\$	\$\$\$
Wood pellets	Wood pellet deliveries available but expensive, urban systems becoming more common in BC	Combustion or gasification	++	++	\$\$	\$\$\$

WWTF WASTE HEAT



PANDOSY CENTRE DES STUDY AREA

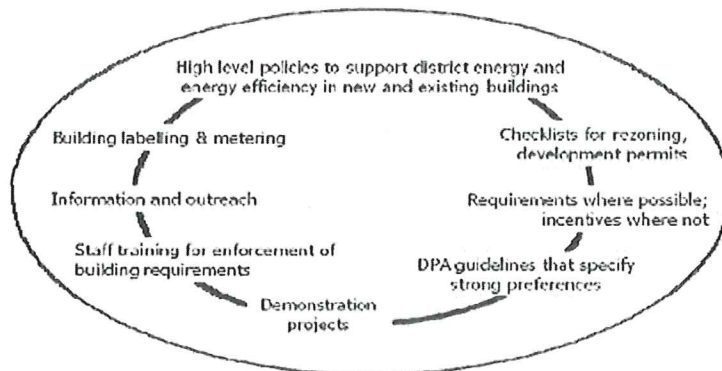
OPTION TO
EXPAND TO
HOSPITAL
DISTRICT



OPERATING MODELS

	Stakeholder	Role	Interest
Public	Municipality	Owns and operates water and wastewater infrastructure that can be source of heat. Responsible for some aspects of waste management. Influences development, some starting to own and operate heat utilities	<ul style="list-style-type: none"> Operational integrity of local water and wastewater infrastructure Public good is served Not being a barrier to deployment Rapid deployment of renewable heat to meet emissions targets Not incurring additional costs that have to be borne by the taxpayer
	PBO's	Schools, hospitals, and provincial buildings can form hubs for renewable heat systems	<ul style="list-style-type: none"> Renewable heat to meet carbon-neutral commitments Maintaining or decreasing current costs
Private	Developers	Builds new developments	<ul style="list-style-type: none"> Making an appropriate profit on developments Deployment of renewable heat because it is seen as the right thing to do Displacement of baseboard heaters
	For'tis	Potential funder for feasibility and pre-feasibility studies	<ul style="list-style-type: none"> Displacement of baseboard heaters
	Other Private Regulated Utilities	Potential funders for feasibility and pre-feasibility studies. Interest in owning and operating heat infrastructure. Capital and technical capacity.	<ul style="list-style-type: none"> Owning and operating renewable heat systems Obtaining regulated return on capital
	End User	Uses and pays for heat services	<ul style="list-style-type: none"> Performance Cost Green attributes

TOOLBOX FOR *DES* IMPLEMENTATION



P3 CANADA FUND/PARTNERSHIPS B.C.

- ▶ 25% capital contribution to P3 Projects, including Green Energy
- ▶ Preliminary Assessment Submission: June - September 2010
- ▶ Business Case Submission: August 2010-March 2011
- ▶ P3 Assessment: September 2010-June 2011

FCM *DES* FUNDING OPPORTUNITY

- ▶ 2010 Funding anticipated for DES
- ▶ Kelowna Canadian District Energy Association member
 - ▶ collaborating with FCM on terms of reference
 - ▶ Using Kelowna pre-feasibility study as best practice template

RECOMMENDATIONS

- ▶ Approve interim transfer of funding from Energy Reserve to Corporate Carbon Planning to support DES technical feasibility study
- ▶ Direct staff to make a Preliminary Submission to P3 Canada Fund