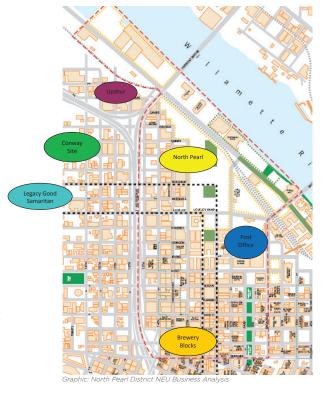
District Energy Analysis: North Pearl

Background

The North Pearl District, formerly an industrial and manufacturing area, represents a significant development opportunity for the residential, commercial, mixed-use and entertainment uses that have made the Pearl District so successful. In 2009, the City of Portland commissioned an in-depth district energy feasibility study as part of their goal to achieve carbon neutrality in the North Pearl District. The feasibility study demonstrated that a district heating and cooling system was financially sound and would have environmental benefits under a wide range of development scenarios and technologies.

There has been interest from local developers in a North Pearl district energy system and the analysis shows that there are sufficient potential loads to achieve adequate economies of scale within the district. The North Pearl is also well positioned as a core area from which to expand to other areas as they redevelop, most notably the Post Office and Conway sites (see graphic at right). The Good Samaritan hospital is also a potential candidate for a district energy service, although they have not participated in discussions to date. The North Pearl study includes only about 25% retrofitted buildings, with the new development providing less expensive and more efficient district energy integration.



Gas-fired boilers and chillers with waste heat recovery are the simplest technology available and would offer immediate environmental benefits. Combined heat and power (CHP) would offer additional benefits, as the waste heat can be used to generate electricity. However, in the long-run, the substitution of natural gas with some form of bioenergy, a plentiful resource in the Pacific Northwest, could offer the greatest opportunity to further reduce GHG emissions and other environmental impacts, while still remaining financially sound. There are a variety of bioenergy options ranging from simple wood waste combustion for heating to the production of biogas, possibly from food waste recovery, for use in a CHP plant.

North Pearl Key Statistics		Potential GHG Reduction by Technology (tons/year)	
Million Square Feet of Floor Area (Existing/New)	3.1 / 8.1	Baseline Emissions	27,000
Annual Space Heating / Cooling (MWh)	97,000 / 41,500	Gas Boilers + Electric Chillers with Waste	9.000
Peak Heating / Cooling Demand (MW)	27 / 45	Recovery from Cooling	3,000
On-site Boiler & Chiller Space Req.s (1000 sq. feet)	40 - 52	Natural Gas Cogeneration	16,500
District Energy Center Space Req.s (1000 sq. feet)	25 - 32	Biomass Heating	21,500
		Cogeneration with 60% Biogas	34,500

Note: Cogeneration can offer emissions reductions beyond the Baseline, due to the upstream reductions resulting from excess electricity generation.

For Further Information:

Compass Resource Management's March 2009 report "Business Analysis for a Neighborhood Energy Utility in the North Pearl District" provided much of the source material for this summary and contains more detailed information on district energy opportunities in the North Pearl District.



Photo: Flickr user Paul Lowry

Potential Benefits

In addition to operating cost efficiencies and the reduced space requirements / green house gas (GHG) benefits listed above, there are other justifications for pursuing district energy in the North Pearl District:

- The North Pearl study is based on conservative revenue and cost (capital and operating) assumptions and a district energy system appears viable under a wide range of demand and supply scenarios. Preliminary rates of return for virtually all scenarios are above required benchmarks.
- The economics of district energy improve further with rising energy prices and/or additional carbon offset requirements or taxes.

Opportunities

- Interconnecting a North Pearl district energy plant with the Brewery Blocks district cooling plant could create opportunities to connect loads between the two areas.
- Expansion to other sites, like the Conway site and/or the Post Office, should also be considered once a decision is made to proceed with the core development.
- While the feasibility analysis shows that district energy is environmentally and economically viable while utilizing natural gas with waste heat recovery, district energy serves as a platform for the ongoing adaption of new technology, including the future use of bioenergy.

Next Steps

- Municipal vision and policy leadership, as mentioned above, are required regardless of the ultimate ownership strategy for a district energy system. If the City does not wish to own and operate a district energy system, it could still take a proactive role in finding a suitable franchisee and developing appropriate supporting policies. This may be especially important in neighborhoods with a large number of individual landowners and with a mix of existing and new development.
- The City could provide financial or in-kind assistance in performing a baseline assessment for district energy in the North Pearl. Ideally, this type of commitment would come with assurance by private property owners/developers that they would consider connecting to a future district energy system.
- Further work is required to develop a bioenergy strategy for a possible district energy system, which might include emissions reduction targets, a staged transition plan toward exclusive usage of renewable fuels and potential regional suppliers of these fuels. However, bioenergy does not need to be implemented immediately. This could also be considered within a broader bioenergy strategy for the Portland region, which may include other sectors such as transportation, waste management and/or energy security.