Council Meeting Date: February 1, 2016 **Agenda Item:** 8(a)

CITY COUNCIL AGENDA ITEM

CITY OF SHORELINE, WASHINGTON

AGENDA TITLE:	Discussion of the 2016-2019 Priority Environmental Strategies
DEPARTMENTS:	Planning & Community Development and Public Works
PRESENTED BY:	Miranda Redinger, Senior Planner Rika Cecil, Environmental Services Analyst
ACTION:	____ Ordinance ____ Resolution ____ Motion __X_ Discussion ____ Public Hearing

PROBLEM/ISSUE STATEMENT:

On September 30, 2013, Council adopted the Shoreline Climate Action Plan, thereby committing to reduce community greenhouse gas (GHG) emissions 80% by 2050, with an interim target of 50% reduction by 2030. In 2014, the City reaffirmed that commitment by signing the King County-Cities Climate Collaboration (K4C) Joint County-City Climate Commitments, joining with the County and other cities in similar targets.

Through its partnership with the K4C, the City of Shoreline had the opportunity to work with Climate Solutions' New Energy Cities Program to perform a Carbon Wedge Analysis to examine what it would take for the City to achieve these "ambitious but achievable" targets. Council was introduced to the analysis and recommended actions at their October 14, 2014 meeting.

On September 14, 2015, Council discussed various strategies from the Climate Action Plan, K4C Commitments, and the Carbon Wedge Analysis, and identified priority programs for implementation over the next four years (2016-2019). These included:

- Adoption of a Living Building Challenge Ordinance and consideration of a Petal Recognition Program through the International Living Futures Institute;
- Studying feasibility of District Energy, specifically in the light rail station subareas, the Community Renewal Area at Aurora Square, and Town Center; and
- Conducting a Solarize campaign.

Funds were included in the 2016 budget for a District Energy feasibility study ($50,000) and a Solarize campaign ($15,000). However, Councilmembers had additional questions about these programs. Tonight's discussion will provide an opportunity to discuss these questions. Staff will also be joined by Thomas Puttnam, President of Puttnam Infrastructure, to present his findings on District Energy, and Linda Irvine, Program Director from Northwest Sustainable Energy for Economic Development, to answer questions about Solarize campaigns.

RESOURCE/FINANCIAL IMPACT:
No resource impacts are anticipated as a result of this discussion.

RECOMMENDATION

While no action is required as part of this discussion, staff does recommend the following actions for 2016:

- Adoption of Living Building Challenge Ordinance and consideration of Petal Recognition program;
- Examining feasibility of District Energy or Combined Heat and Power in areas that are likely to undergo redevelopment, including the light rail station subareas, Aurora Square, and Town Center; and
- Preparing to initiate a Solarize campaign, including exploring adoption of Solar-Ready regulations and building on partnerships with local educational, professional, and non-profit organizations dedicated to increasing solar power generation in Shoreline.

Approved By: City Manager ***DT*** City Attorney ***MK***

BACKGROUND

Since the 2008 adoption of the City's Environmental Sustainability Strategy, Shoreline has positioned itself to be a regional and national leader on how local governments can work to reduce the potential severity of climate change. Other City initiatives that have focused on environmental sustainability include:

- Analysis of City and Community Carbon Footprints (2009 and 2012);
- Launching of the *forevergreen* indicator tracking website (2012);
- Adoption of the Climate Action Plan (2013);
- Development of Carbon Wedge Analysis and Strategies (2014);
- Completion of significant capital projects with a variety of climate and other benefits, such as the construction of a LEED Gold certified City Hall (2010) and the Aurora Avenue Corridor project (anticipated completion in 2016);
- Adoption of K4C Climate Commitments (2014); and
- Promoting transit-oriented development, multi-modal transportation systems, and green building through subarea planning for light rail stations opening in 2023 (2013-2016).

To build on these actions, at the City Council's 2015 retreat, Council agreed to continue the focus of its goals for 2015-2017 towards achievement of Vision 2029 and being a sustainable city in all respects. This includes:

- **Sustainable neighborhoods** – ensuring they are safe and attractive;
- **Sustainable environment** – enhancing our built environment so that it protects our natural resources; and
- **Sustainable services** – supporting quality services, facilities and infrastructure.

Most recently, on September 14, 2015, Council discussed various strategies from the Climate Action Plan, K4C Commitments, and the Carbon Wedge Analysis, and identified priority programs for implementation over the next four years (2016-2019). These included:

- Adoption of a Living Building Challenge Ordinance and consideration of a Petal Recognition Program through the International Living Futures Institute (ILFI);
- Studying feasibility of District Energy, specifically in the light rail station subareas, the Community Renewal Area at Aurora Square, and Town Center; and
- Conducting a Solarize campaign.

The staff report for the September 14 discussion is available at the following link: http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2015/staffreport091415-9b.pdf.

Funds were included in the 2016 budget for a District Energy feasibility study ($50,000) and a Solarize campaign ($15,000). However, Councilmembers had additional questions about these programs. Tonight's discussion will provide an opportunity for to follow-up on those questions.

DISCUSSION

Living Building Challenge Ordinance (LBCO)

The City of Seattle adopted an LBCO in order to facilitate development of the Bullitt Center, the world's greenest office building. The International Living Futures Institute (ILFI) also offers a Petal Recognition program that emphasizes sustainability with regard to the following design considerations: site, water, energy, health, materials, equity, and beauty. The City has begun discussing how to work with King County and the ILFI to adapt and adopt these programs. This work has also been designated as a K4C priority for near-term implementation.

Implementation:

Representatives from the ILFI and King County have agreed to present information on the LBCO and Petal Recognition Program to the Council and Planning Commission and assist staff to adapt and adopt pertinent ordinances and regulations. On February 18, the Planning Commission will begin discussing these topics following a presentation by the ILFI. A workgroup of the K4C has been meeting to discuss the ordinance and various considerations. It is unknown at this time when an ordinance or regulations may be ready for Council discussion and potential adoption.

Would Council like any additional information on the program in advance of a recommendation from the Planning Commission?

District Energy (DE)

This concept refers to the central provision of heating and/or cooling services within a defined service area. Electricity may be produced as part of a combined heat and power (CHP) system. Attachment A to this staff report is a white paper about DE authored by Thomas Puttnam, President of Puttnam Infrastructure. The white paper was originally included in the September 14, 2015 Council meeting packet and provides details of components, benefits, and models of DE systems. The white paper includes recommendations for how to implement a system in areas that are likely to redevelop, such as light rail station subareas, Aurora Square, and Town Center. Mr. Puttnam will present findings of the white paper as part of tonight's discussion.

One reason that it could be beneficial to consider DE in areas that are likely to redevelop is that market forces will encourage new buildings to use natural gas for heating, which could then lock owners into this infrastructure for the life of the building. While natural gas is a less carbon-intensive energy source than some of the alternatives, the process produces significant emissions of methane, which is nearly 20 times more potent as a GHG than carbon dioxide.

Implementation:

Attachment A outlines a multi-year approach to studying the feasibility of and potentially developing DE systems. It identifies five phases of a project:

1) Advocacy, Vision, and Policy Development;
2) Feasibility (Screening, Pre-Feasibility, and Feasibility);
3) Detailed Investment Analysis;
4) Development; and
5) Operations, Maintenance, and Expansion.

The white paper also outlines a seven step process for evaluation of feasibility, including anticipated costs and timeframes:

1) DE Feasibility Evaluation - Consultant Cost: $50,000; Staff Cost: TBD; Timeframe: 6 months
2) Preliminary Go/No Go Decision - Consultant Cost: $0; Staff Cost: TBD; Timeframe: 2 months
3) Third Party DE Provider Selection - Consultant Cost: $0; Staff Cost: TBD; Timeframe: 2-3 months
4) DE Evaluation Refinement and Initial Agreements - Consultant Cost: $0; Staff Cost: TBD; Timeframe: 6 months
5) Final Go/No Go Decision - Consultant Cost: $0; Staff Cost: TBD; Timeframe: 2 months
6) DE Development - Consultant and Staff Cost: TBD; Timeframe: 18 months
7) DE Operations – Cost: TBD; Timeframe: Ongoing

Staff will be coming back to Council with a request to authorize the City Manager to execute a contract for the DE Feasibility Evaluation, given that the funding was included in the 2016 budget. Prior to taking that action, staff wanted to have the presentation by Mr. Puttnam and respond to any lingering questions that Council may have about this study.

What questions does Council have about DE and/or determining feasibility?

Solarize Program

This program could involve a spectrum of initiatives, including requiring that new construction be "solar-ready", and/or facilitating a campaign to promote photovoltaic (PV or solar panel) installation, either on community buildings or private residences. Local partnership opportunities for these initiatives are great, considering that Shoreline is home to the Shoreline Community College, which offers a solar design program; NW Mechanical, which installs PV systems; and Solar Shoreline, which hosts SolarFest and promotes local proliferation of PV systems.

Implementation:

Since this program could entail a couple of different initiatives, it would first be important for Council to provide direction regarding the scope of work. Should the City require that new construction be "solar-ready" or sponsor a community-solar or individual homeowner campaign? The answer will require varying degrees of staff and/or non-profit support.

Attachment B to this staff report outlines a potential scope of work if the City were to partner with Northwest Sustainable Energy for Economic Development (NW SEED) on a household challenge campaign. However, it is unlikely that any of the staff who would serve as project manager for such a campaign would be available to focus on this effort before fall of this year. Another consideration related to timing is availability of federal and state tax credits that provide an incentive for homeowners to install PV systems. At the September 14, 2015 Council meeting, the fate of the federal tax credits was unclear, but has since been resolved. The following information provides an update on both federal and state incentives:

Federal Investment Tax Credit for Solar:

- In December, Congress extended the solar investment tax credit through 2022. http://www.utilitydive.com/news/congress-strikes-deal-to-extend-wind-solar-tax-credits-and-lift-oil-export/410947/
- Therefore, if PV installation is begun before 2020, the project would get 30% of the project cost as a tax credit. After that, it scales down.

Washington State Cost Recovery Incentive:

- This state program pays the project owner for every kilowatt-hour of electricity made from the installation date through June 30, 2020.
- The sooner a project is installed, the longer the incentive.
- Rates start at $0.15/kilowatt hour (1.5 times the retail rate) and go higher if property owners use Made In Washington equipment.
- The reimbursement rate is set at the end of the fiscal year (June 30) and it is calculated by taking the total incentive pot available and dividing by the number of solar kilowatt hours generated by all the systems in the utility territory over the previous year. It's impossible to predict what the rate will be this coming June, but it will definitely be lower than last year. http://www.seattle.gov/light/solarenergy/Incentivecap.asp

Solar advocates, including NW SEED, plan to support a bill in Olympia to reform the State incentive to make it a 10 year incentive from the date of installation, which gives owners a locked in rate for 10 years, but ratchets downward for new systems with each passing year, so the early adopters lock in a higher rate. Because of the short legislative session, decisions about the incentive should be known by March 2016.

What questions does Council have about Solarize campaigns and resources involved? Linda Irvine from NW SEED will be available to answer these questions at the meeting.

Does Council wish to pursue a Solarize household challenge or community solar initiative or adopt regulations requiring new construction to be "solar-ready"?

RESOURCE/FINANCIAL IMPACT

No resource impacts are anticipated as a result of this discussion.

RECOMMENDATION

While no action is required as part of this discussion, staff does recommend the following actions for 2016:

- Adoption of Living Building Challenge Ordinance and consideration of Petal Recognition program;
- Examining feasibility of District Energy or Combined Heat and Power in areas that are likely to undergo redevelopment, including the light rail station subareas, Aurora Square, and Town Center; and
- Preparing to initiate a Solarize campaign, including exploring adoption of Solar-Ready regulations, and building on partnerships with local educational,

professional, and non-profit organizations dedicated to increasing solar power generation in Shoreline.

ATTACHMENTS

Attachment A - District Energy White Paper
Attachment B - Potential Scope of Work for the Solarize Campaign with NW SEED

August 27, 2015

RE: City of Shoreline
District Energy Overview and Development Opportunities
(DRAFT)

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The objective of this memo is to provide the City of Shoreline a general understanding of district energy and its potential value, identify potential locations for district energy in the city, provide an overview of district energy development phases and development models, and provide specific recommendations for initiate district energy development in the city to support future development.

Section 1 – District Energy Introduction

Overview

Much infrastructure development of the past century focused on large, centralized, single purpose systems. These systems were highly effective for promoting economic development, public health, and environmental quality in rapidly growing urban areas: these systems will continue to play an important role in cities. However, aging infrastructure, the densification and expansion of cities, new fiscal constraints, new technologies, and changing societal values are calling for an expanded toolkit to optimize infrastructure and meet sustainability objectives. Not as a replacement of centralized systems, but as an alternative or complementary strategy to address new challenges and seize new opportunities.

Sustainability demands creative and flexible solutions that are sensitive to local context and that produce real improvements in service quality and resource efficiency. In recent years, the focus has been on building-scale alternatives to centralized infrastructure – high efficiency to net-zero green building – but buildings are not always the most appropriate or cost-effective scale to promote sustainability. District energy systems—neighborhood-scale utilities that deliver heating, cooling, and/or hot water—are emerging as a

key strategy for cities that are pursuing aggressive environmental goals, including massive long-term reductions in building-related greenhouse gas emissions.

Buildings are part of a community, and resource sharing is a common practice in communities, from sharing public spaces to water to electricity grids. Cities and building owners will be compelled to look to district-level solutions to meet their clean energy needs, and to meet their needs around other resource and infrastructure issues such as sustainable storm water management and waste water recycling. The aggregation of energy demand and the customer service model established for district energy can serve as the foundation for these other "eco-district" services and infrastructure projects.

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About District Energy

District energy is a very old concept used as far back as the Romans. District energy helped the initial development of the electric power industry by enhancing the economics of new power plants by generating additional revenue from waste heat recovery. Today, more than 50% of all building stock in countries of Northern Europe is connected to district systems. In Stockholm, Sweden, for instance, the entire city of more than 800,000 people is served by two systems. As they incrementally expanded to serve more people, these systems added new sources of energy. With such systems, technologies tend to evolve on a regular basis, approximately every 15 to 20 years.

Based on 2005 information from the International District Energy Association (IDEA), the U.S. and Canada had about 650 district systems in operation, though a number of systems have begun operations since then. Of this number, more than 75 percent serve either university or hospital campuses, while the remainder serve portions of downtown urban areas. These district energy systems provide energy to about 10 percent of non-residential spaces in the U.S.

District energy refers to the central provision of heating and/or cooling services within a defined service area. Electricity is sometimes also produced as part of a combined heat and power (CHP) system (also referred to as cogeneration).

As shown in the exhibit below, there are three main components to a district energy system.

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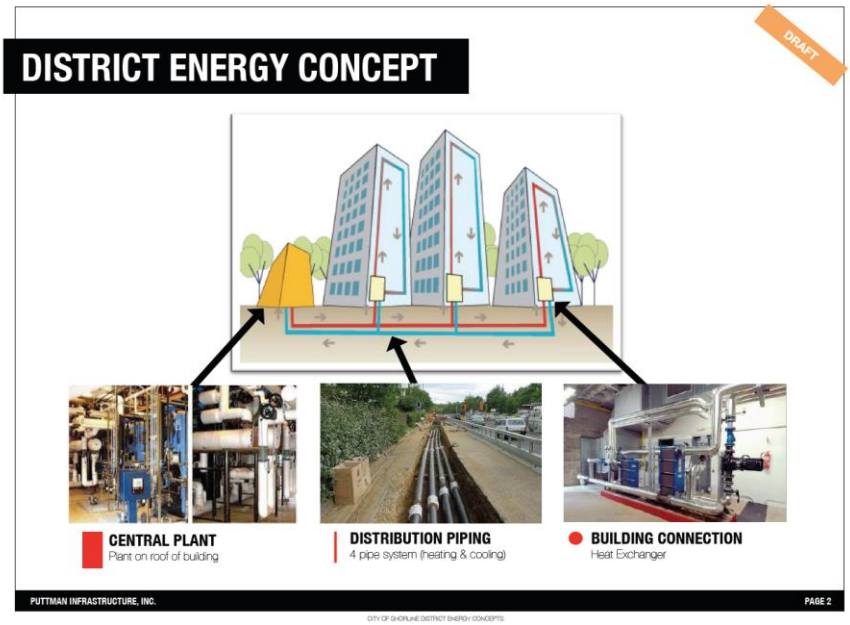

Central Energy Plant (CEP)– One or more energy-producing plants provide all of the heating and/or cooling energy required by customers within the defined service area. A single, central plant offers significant economies of scale compared to individual systems within every building, and simplifies system design and operation. However, several plants may be better in certain circumstances, notably where development is slow and/or dispersed, or where different energy sources are being integrated in different locations.

Distribution Piping System (DPS) – Hot and cold water are distributed to individual customers via underground pipes (one supply and one return pipe each for heating and for

cooling). While older district heating systems distributed energy in the form of steam, newer systems almost all use hot water distribution. Systems often grow out of central distribution line, with smaller loops that link buildings together.

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Energy Transfer Station (ETS) – Individual buildings are served via energy transfer stations (ETS) consisting of heat exchangers and meters, eliminating the need for on-site boilers in the case of district heating and chillers, or cooling towers in the case of district cooling. Within buildings, thermal energy must be provided to individual spaces by hydronic HVAC systems, which could include fan coils, hydronic baseboards or in-floor radiant systems.

In order to deliver district energy services, some form of utility service provider (e.g., a local government or a privately-owned utility), assumes responsibility for capital investments (i.e., construction), and secures (i.e., generates or captures) and delivers energy that meets the end users' needs, and ultimately charges building owners for use of the system. A utility is simply an entity that plans, invests in and operates the infrastructure required to deliver services and recover costs, both capital and ongoing operating costs, whether through user rates or other funding mechanisms.

Benefits of District Energy

District energy systems have the potential to generate numerous benefits to the City of Shoreline as well as the owners and tenants of the buildings connected to the system. Making sure that energy consumers and building owners understand the ways that district energy directly benefits them is critical. Of course many of these benefits overlap with those of communities—what is good for owners is good for communities, and vice versa. Nevertheless, in order to engage the participation of owners and tenants, cities need to analyze and articulate how district energy benefits the community as well as building owners and tenants through key

metrics like energy efficiency, cost savings, and risk management over the long term.

Community benefits include:

Increased Energy Efficiency and Reduced GHG Emissions
District energy systems can produce significant energy savings – up to 20 to 30% - compared to stand alone building systems due to load diversification, equipment "right-sizing" and operational efficiency. Enhanced efficiency reduces energy-related GHG emissions while also providing opportunity for greater emissions reductions by shifting to cleaner energy sources over time.

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Improved Resiliency and Risk Mitigation
District energy systems increase community resiliency by providing distributed energy solutions that reduce risk in terms of future energy and environmental policy, carbon costs, fuel availability and cost variability, and the future effects of climate change.

Partnership and Investment Opportunity
As a commercially viability investment, district energy provides cities the opportunity to partner with the private sector to begin non-tax based investments into the city to realize both policy and development objectives.

Building benefits include:

Reduced Energy Costs and Cost Stability
The bottom line for any building owner is cost. Long-term net cost savings are a key selling point of district energy systems. District energy delivers lower cost energy through improved efficiency, load diversification, and economies of scale. Also due to the long-term aggregate nature of demand, a district energy system operator can negotiate

long-term fuel contracts, which facilitates greater energy price stability for consumers.

Increased Cost Effectiveness

District energy enables incentives and financing that would not otherwise be available. District energy systems can attract sources of financing, such as municipal bonds or community energy grants, which are not available to individual owners. The cost efficiencies gained with district energy utility can in some cases create enough of a revenue premium for cities to offer incentives to owners of existing buildings for installing systems compatible with district energy and connecting to the system. This in turn can enable owners to take into consideration the full spectrum of options for replacement of heating and cooling equipment without having to bear a first cost premium.

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Enhanced Energy Efficiency and Greener Energy

Buyers and renters are becoming more and more aware of the energy performance of existing buildings, which makes energy efficiency a source of either opportunity or risk for owners, depending on how well their buildings compete. Cities are now adopting new policy initiatives around energy performance ratings and disclosure to accelerate the degree to which market forces will distinguish efficient buildings from those that use too much energy. Some cities, like Seattle and Vancouver, B.C., are already moving beyond disclosure policies toward regulations that will require buildings to meet aggressive post-retrofit energy targets in return for flexibility to innovate in how they achieve such targets, including use of on-site renewable generation equipment and/or low-carbon district energy sources. District energy offers an essential opportunity to owners in this emerging policy environment.

Reduced Building Operations & Maintenance Responsibility and Cost

With district energy, building owners receive reliable and predictable energy service from professional system operators. This means fewer worries for building management staff, in terms of fuel price uncertainty and system maintenance, upgrade and repair, compared to on-site systems.

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Future Technology Benefits

District energy allows cities and building owners to "fuel switch" over time to take advantage of new clean energy technology options and access capital financing for these fuel/technology upgrades.

Determining the Potential Value Proposition of District Energy

The value propositions, costs and risks of district energy must be weighed in project-specific business cases that consider the unique features and local context of every project. The ultimate business case for district energy will depend upon a number of criteria including:

- The ultimate scale of the expected system
- The density and mix of loads (higher density and greater use mix will typically results in greater ratio of benefits to costs)
- The actual rate and staging of development
- The security of loads (requirements or incentives for customers to connect and consume)
- The options for on-site energy systems (many building sites may be limited in terms of their ability to access alternative energy sources such as solar orientation or available scape and suitable ground conditions for geoexchange systems)
- The availability and cost of alternative energy sources (eg, large nearby waste heat sources, local underutilized biomass resources)

- Potential synergies with other infrastructure (eg, as sources of waste energy and/or in the installation and maintenance of equipment).
- Other opportunities for future growth or the addition of other services (sometimes referred to as "growth options" in the finance literature).

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Section 2 – District Energy Opportunities in Shoreline

Subarea Plan Nodes

Development of district energy in the City of Shoreline should be closely aligned with City planning activities. As development scale, phasing, mix of uses, and load certainty are significant drivers associated with successful district energy development, subarea planning nodes lend themselves to initial areas of consideration within the city.

The City of Shoreline Comprehensive Plan identifies six subarea planning areas - areas that the City will focus significant investment of public resources to both direct and support future development within the city of the next 20 years. In addition to these, the City is currently developing a Subarea Plan for land use surrounding the future 145th Street Station.

Adopted Shoreline subareas are shown in the following exhibit:

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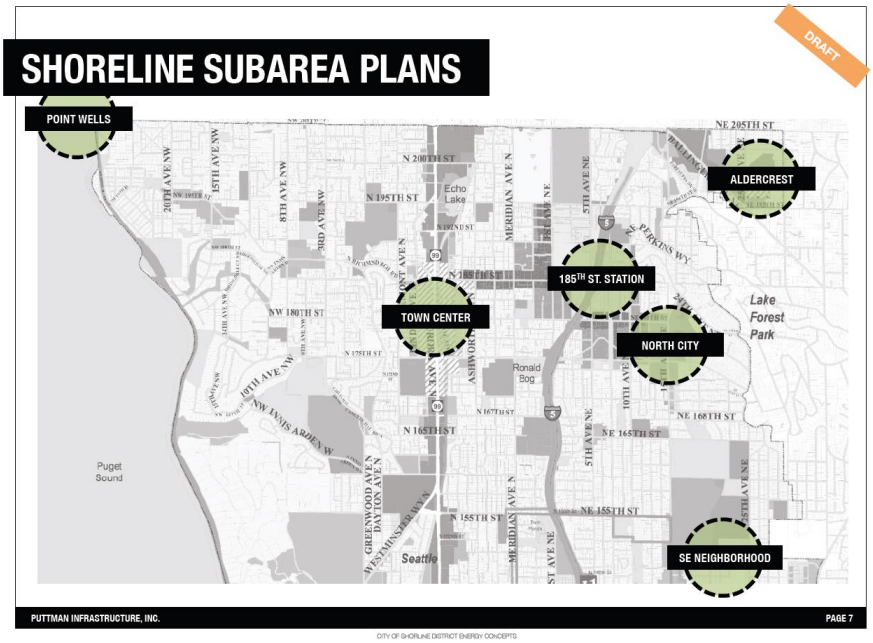

From the perspective of district energy, Shorelines subarea planning nodes lend themselves to the following district energy opportunity types:

Type 1 - Catalyst Node

Catalyst nodes are planned for intensively focused development such as transit orientated development associated with future transportation infrastructure (ie, light rail). Catalyst nodes may also be associated with existing city centers or new master planned development. The intensity of development and diversity of development of a catalyst node create ripe opportunity for district energy infrastructure.

Catalyst nodes in Shoreline include:

- Town Center
- 185th and 145th Street Station Subareas
- Community Redevelopment Area at Aurora Square
- North City
- Point Wells

Type 2 - Traditional Infill

Less intense in focus than a catalyst node and with less major infrastructure investments such as light rail, traditional infill still has the potential to support district energy, but will require more supportive City policy, regulations, and investment.

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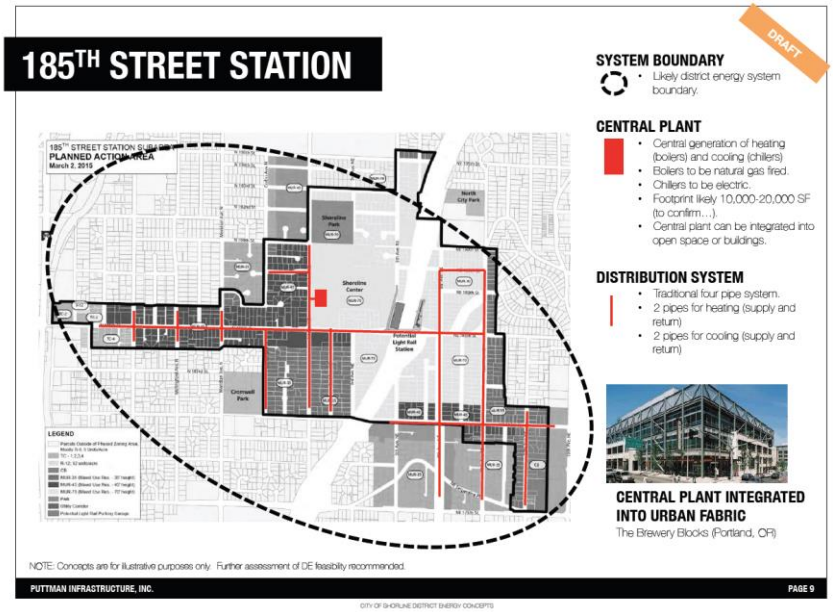
Traditional infill nodes in Shoreline include:

- SE Neighborhoods
- Aldercrest

Shoreline should focus attention on catalyst nodes initially as it considers developing district energy in the city. An example of a potential district energy concept to serve the 185th St. Station subarea planning node is provided below:



Section 3 – District Energy Implementation

Phases of District Energy Development

As illustrated in Page 10 – Phases of District Energy Development, district energy development may be divided into the following main phases:

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Phase 1 – Advocacy, Vision and Policy Development

This work actually precedes the development cycle, nevertheless, it is vital. Many people — even energy experts who work for utilities — consider district energy an "old, outdated" technology whose time has come and gone. If this approach is to once again receive serious consideration, these sorts of misconceptions need to be addressed and debunked.

Phase 2 – Feasibility (Screening, Pre-Feasibility and Feasibility)

This is the pre-feasibility screening and feasibility work required to confirm the basic technical and financial viability of a particular district energy project. As Table 1 makes clear, there are a number of important steps in this phase and it requires both financial and technical/engineering expertise.

Phase 3 – Detailed Investment Analysis

This is an extension of full feasibility, but includes making decisions about ownership and financing details, as well as securing customer commitments.

Phase 4 – Development

This is the design, permitting, construction and commissioning work.

Phase 5 – Operations, Maintenance and Expansion

This involves operating, maintaining and expanding the system after it is commissioned, and changing fuel sources if necessary and prudent.

District Energy Players - Roles and Responsibilities

As shown on Page 11, there are eight key players in the process of district energy development. The following pages describe key player roles and responsibilities:

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District Energy Advocate

This is the general advocate and source of information about district energy. Usually a government or nonprofit organization educates the general public about the benefits of district energy, articulating and promulgating the vision to build support. This entity also engages public agencies and industry representatives to encourage supportive public policy. The main U.S. advocate is the International District Energy Association.

Facilitator/Convener

This role is essentially the City-designated district energy "champion." This is an extremely important role, because the economic benefits of a municipal-scale, multi-stakeholder district energy system are often too dispersed to motivate any one self-interested party to drive the process. Because district energy benefits accrue to the public as well as the private sector, individual private actors tend not to take on this time-consuming and expensive facilitation role. As a result, without a strong facilitator driving the process, even an economically viable project can easily fall by the wayside.

Pre-Feasibility and Feasibility Consultant

The pre-feasibility consultant looks at a specific location with regard to current and projected energy and population density, as well as prevailing and projected energy costs,

and tries to determine whether or not there is a realistic opportunity for district energy in that area.

A feasibility consultant builds on the pre-feasibility study and prepares a comprehensive study that looks at site-specific energy intensity data, possible right of way alignments, specific sites for energy plants, neighborhood traffic patterns, and various potential technologies to determine whether or not a district energy project makes sense in a specific location. It also analyzes the business and technical case, including a pro forma, sensitivity analysis, thermal plant location options, and an analysis of the environmental benefits of various technology options and fuel sources. This work is typically funded either by a public sector entity that wants to maximize public benefits from a project, or by a project developer who hopes to develop the project and has a reasonable expectation of doing so.

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Project Owner

This entity owns the district energy system physical assets. Owners are typically either public, private or a hybrid blend. There are also a few district energy cooperatives. Private Franchisee/Owners are often linked to and/or backed by large financial institutions such as investment banks or pension funds. Sometimes systems have multiple owners (e.g. joint ventures and public-private partnerships) and ownership lines are often split between the energy center and the distribution network.

Project Developer

The project developer delivers the physical assets, such as the energy center and/or the distribution system to the owner/financier. In some cases, project developers have a limited period of engagement with the project, as they focus on winning the development contract, and then designing and building the physical assets. Developers tend to be

very bottom-line focused and deadline driven, because they generally succeed by limiting their risks and costs, and by completing high quality projects on time and on budget. In some instances a developer will also choose to be the long-term owner and operator (see below), but this is not always the case.

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Project Operator

The district energy operator is responsible for the ongoing technical operation and maintenance of the district energy system. As already noted, this entity is sometimes also the Developer and the Owner. For example, Veolia Energy North America purchased, rather than developed, most of their American district energy systems, and in some cases they operate district energy facilities that are owned by others.

Regulators

Regulators establish and monitor standards of construction, operational performance, safety and pricing/consumer protection. They also ensure compliance with standards and other applicable laws.

District Energy Ownership and Operating Models

There are four ownership and operating models utilized to develop and operate district energy systems.

The Municipal Model (Public)

Public district energy companies are typically owned and governed by the local municipality. The City either establishes a full-fledged district energy department to manage the system, or it creates a separate, wholly owned and operated subsidiary to shield the municipal general fund from direct and unlimited financial liability. Although the City or a subsidiary usually owns the district energy company under this model, the technical design, construction — and

possibly even the operation — is often contracted out to private firms.

For example, a private developer backed by private investment funds might use a traditional project finance structure to build the system. This might involve a Special Purpose Vehicle (SPV) to finance and develop the system that, once completed and fully operational, could be transferred to City full ownership and control. The City would thereby shed the construction risk and purchase the completed system with low-cost bonds secured either through contracted energy purchase agreements or by the full faith and credit of the City. In either case, the City would repay the relatively low-cost bonds over time.

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In other municipal examples the system build-out occurs over many years, so there is not a simple design-build phase followed by a bond financing phase. The municipal utility in such cases will require an ongoing source of new design-build capital. This may take the form of a revolving capital pool that is continually replenished by an expanding base of ratepayers.

Strengths of the Municipal Model:

- City procurement guidelines, along with long-term ownership, ensure control and close alignment with City goals, including social and environmental policies.
- Development risk can be transferred to a third party via a Special Purpose Vehicle, as described above.
- City controls zoning and building permits, so can create incentives, lower the cost of capital, and prioritize sustainability, efficiency, and carbon performance.
- City ownership enables provision of lower-cost long-term financing compared to private sector borrowing.

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- Operating profits would flow back to the City and support the delivery of other services. While this is a positive outcome, there is also the potential for losses.
- System expansion or modification can be encouraged, coordinated and controlled by the City.
- City may have access to grants not available to private sector owners.
- City may recover some costs from taxes rather than customer rates if there are broader public benefits from the project and costs exceed private benefits (sustainable rates) or to minimize revenue risks from voluntary-only participation.

Weaknesses of the Municipal Model:

- Long-term financing costs are reliant on the financial strength (i.e. the credit rating) of the City, and project debt will remain on the City balance sheet.
- The City carries the long-term debt, and arguably might discourage energy efficiency investments that could reduce its income from energy sales.
- Without a clear commitment to finance expansion and renewal, the system may not reach its full (sustainable) potential and stagnate.

The Private Model

A number of private companies develop, own and/or operate district energy systems. Most of these firms are relatively unknown; however, in Europe and Canada, several very large investor-owned utilities have entered this market, either directly or by buying a stake in a specialist company and providing solid financial backing, but there are still relatively few U.S.-based utilities in this space.

Private companies can arrange external debt financing, but building owners and/or the project developer sometimes may need to make an equity contribution to the project.

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More common is a connection fee that is required upon connecting to the system. Building owners are sometimes required to make long-term commitments to purchasing energy for no less than the projected or actual "business as usual" price of energy from more traditional sources. This way the district energy developer can model incoming future cash flows with a reasonable degree of certainty. Sometimes interested public entities also must supply gap financing, especially for distribution systems in areas with relatively few initial customers. This gap financing may be justified on the basis of broader public benefits.

Strengths of the Private Model:

- The private company and its backers typically carry most, if not all, of the financial risk.
- The private company brings substantial expertise to the project with extensive project finance skills, project management experience and technological knowledge, all of which enables them to carry the technical performance risk.
- The developer will continue to own and/or operate the system over the long term, so a City will not have to handle maintenance or operations.
- A private utility will typically continue to capitalize the business for expansion and renewal.

Weaknesses of the Private Model:

- Relatively high rates of return are required to compensate for developer risk, so energy charges may be higher.
- Unless there is a very strong business case, privately-financed projects often need at least some public support, whether in the form of policies that reduce development risks and barriers or incentives and financing support in recognition of broader public benefits.

- Public sector stakeholders have more trouble exerting control and are less able to direct future development of privately-owned projects, particularly those with a lower rate of return.
- The details of a City franchise agreement are extremely important, because customers will be tied to a private company with near-monopoly control, and depending on the type of system that is developed, it could be exempt from Public Utility Commission (PUC) oversight.

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The Hybrid Model (ie, Public Private Partnership)

Various hybrid structures, some of which are known as public-private partnerships, may be established in order to share financing, development, ownership and operating risks and functions. The hybrid model — which is actually a "family" comprised of dozens of possible configurations — also shares decision-making power/control between the public and private sectors while still allowing the district energy developer to access capital at the lower interest rates available to the public sector. Hybrid approaches offer tremendous flexibility and the opportunity for innovation in creating a unique ownership/ operating structure.

Several discrete elements of a project can be "hybridized":

- Financial Ownership. For example, a typical joint venture combines all of the assets into a single entity and splits ownership of that entity between the owners.
- Hard Assets. This is not really a joint venture, as actual assets are not shared. An example might be a system where a one entity (typically, but not always, a municipality) owns and maintains the thermal distribution system, while a private company owns and operates the energy center.

- Operations, Maintenance and Upgrades. Operations and maintenance can be outsourced via a simple operating agreement. Alternately, a more comprehensive and longer-term concession agreement might also include outsourced responsibility for funding system upgrades and expansions.

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One possible hybrid arrangement is for public entities to handle the financing, construction, operation and maintenance of a thermal distribution (piping) system, while the central plant is handled by one or several different private entities. The municipality would manage the energy distribution system since its installation because ongoing maintenance and extension requires tearing up the streets, an activity that municipalities already know how to manage. This work can be closely coordinated with other public utility repairs within the public right-of-way. The thermal distribution and/or other components of a system could also initially be financed, owned and operated by a municipality but later sold off once the system is established and its financial viability is clearly demonstrated.

Strengths of the Hybrid Model:

- City still controls zoning and building permits, so can create incentives to connect — and thereby influence — the cost of capital.
- Can readily be influenced by the City procurement process and regulations to pursue efficiency, carbon performance, the use of locally-sourced renewable fuels and rapid expansion into new or redeveloping neighborhoods.
- Greater flexibility in terms of financing sources and risk allocation than either wholly-public or wholly-private approaches.
- Sometimes provides access to low-cost, public-sector borrowing rates.

- May reduce political risk for elected officials supporting district energy projects.

Weaknesses of the Hybrid Model:

- The public sector (i.e. the taxpayer) often still assumes some financial risk.
- Liabilities are sometimes, but not always, reflected in public sector accounts.
- Process requires compliance with (potentially cumbersome) public sector procurement procedures.

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The Cooperative Model

Cooperatives (co-ops) are also sometimes known as stakeholder-owned Special Purpose Vehicles, because ownership is shared among the co-op customers. Key stakeholders are typically customers receiving the energy, like commercial buildings and/or residents within a defined location and local public agencies.

Strengths of the Cooperative Model:

- Because the owners are also customers, this structure is likely to offer maximum accountability and transparency.
- Co-op structures can enable projects in areas with limited access to capital by securing relatively small amounts of capital from many different owners/customers.
- By owning the network that serves them, co-op members reduce the risk of monopoly abuse.
- Offering outside entities an ownership stake can help fund expansion and attract more members.

Weaknesses of the Cooperative Model:

- Decision-making can be cumbersome for cooperatives, since ownership is divided across many stakeholders that may have disparate interests.
- A co-op may lack the expertise that a private firm can offer through a private or hybrid model.

- It may be difficult to utilize the co-op model in newly developed areas without an established base load. This model may work best for purchasing existing district energy infrastructure, rather than building new facilities.

Challenges to Implementing District Energy

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There are normally many potential challenges to overcome as well. Some key challenges include:

Building Developer/Owner Buy-In

The most critical challenge to district energy development is building developer/owner buy-in (ie, will they choose to connect?). Detailed financial analysis will provide these future customers with the necessary information to make informed decisions. Moreover, having the City backing the system will provide additional certainty of energy service and cost now and into the future.

Staging of Capital Investments

Some district energy capital investments are "lumpy" and must be staged carefully to minimize carrying costs prior to securing energy service revenues and to minimize stranded investment risk. One strategy to reduce these risks includes interim reliance on temporary or permanent natural gas boilers, which can then be used for peaking and back-up once loads reach sufficient levels to support investment in alternative technologies for baseload supply.

Energy Revenue Risks

Customer capture and retention is critical to ensuring economies of scale while minimizing the risk of stranded capital. Often communities and stakeholders play a critical role in mitigating these risks through vision and policy support.

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Project Financing

District energy offers stable, utility-style returns. However, there is a need to finance pre-implementation feasibility studies and design work for new systems. New systems will also typically need a "levelized rate" structure whereby expenses may exceed revenues in early years. Additional capital will be required to finance operating deficits in early years, which would be repaid through surpluses in later years of the investment cycle. Multiple sources of financing may be required to reflect the mix of public and private benefits. For example, customers may pay a small premium over conventional heating and cooling systems to reflect intangibles such as higher reliability, better service, reduced risks, and better environmental performance. But the willingness of private customers to pay for societal and long-term benefits such as deep carbon reductions and technological flexibility may be limited. Other sources of capital will be required to maximize these societal benefits.

Planning and Coordination

Considerable coordination among land use and infrastructure planning is required to minimize implementation costs, secure energy production sites, and secure certain alternative energy sources such as waste heat. Building codes and enforcement can be used to promote voluntary connection and ensure system performance. Careful coordination with building developers and designers is required to ensure optimal system compatibility.

Supply and Price of Alternative Technologies and Fuels

Supply chains for some alternative technologies and fuels are not yet well developed, and there may be both supply and price risks compared to well-established conventional fuels. These can be managed in part through competitive procurement processes, performance contracting, and the staging and diversification of technologies. Governments

may also have a role to play in facilitating market development for technology and fuel suppliers, as well as access to resources such as waste streams and heat recovery opportunities.

Electricity Market Interface

The primary focus of district energy is on the provision of thermal energy service (heating and/or cooling). Combined heat and power can reduce district energy costs and enhance the efficiency and security of the local electricity system. However, investors will often require long-term and stable power prices to finance the additional costs of CHP. Alternatively, electric utilities or independent power producers may need to build, own and operate the plants including the management of electricity supply contracts, and then sell waste heat to a district energy provider.

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Section 4 – District Energy Development Recommendations for Shoreline

Recent district energy development efforts in Portland, Oregon and Seattle, Washington initially began as private development models where the City engaged with a third party district energy provider through a competitive, public procurement process. However, based on the results of these initial efforts, it became evident that the third party district energy providers needed some type of partnership with cities – either financially or policy wise – to ensure commercial viability for the district energy system. As a result of these recent efforts, it is recommended that the City of Shoreline pursue a public private partnership (P3) development model to implement district energy within the new 185th Street Station Subarea.

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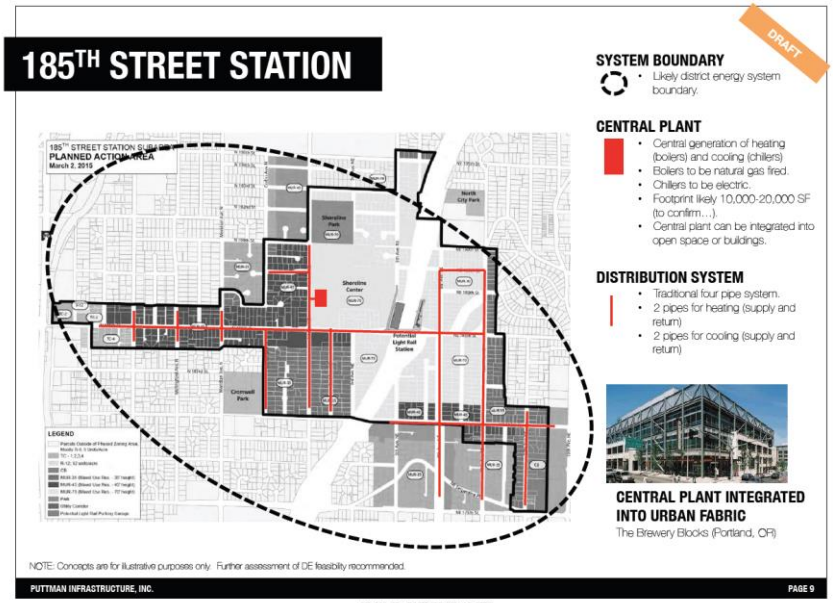

A P3 development model for implementing district energy in the 185th Street Station Subarea would require the City of Shoreline to engage with an experienced third party district energy provider (DE Provider). The terms of the P3 would likely include the following:

185th Street Station DE P3 Development Model (Example)

Ownership:	City/DE Provider
Funding:	
Central Plant:	DE Provider
Distribution Network:	City
Design/Build/Operate:	
Design/Build:	DE Provider
Permit:	DE Provider
Policy Support:	City
Operations:	DE Provider
Customer Relationships:	DE Provider

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The City and DE Provider would jointly own the district energy system. Each partner would be responsible for financing specific components of the system consistent with financial return needs and risk profiles. This would likely result in the City financing the distribution piping network – to be constructed with public street improvements – and the DE Provider financing the central plant – based on the timing of heating and cooling energy growth within the district. The DE Provider, utilizing their expertise and experience, would design/build/permit the system as well as operate and manage customer relationships. The City would support system development through the creation of support policies such as mandatory connection requirements for each building developed in the district to connect to the district energy system. Revenue generated from the district energy systems would be shared by the City and DE Provider based on the capital and risk invested into the system.

Other Partner/Stakeholder Engagement

In addition to the P3 development model recommended above, it will also be important to engage with key stakeholders early in the district energy system development process to ensure support. These stakeholders include:

Property Developers/Owners

Early in the process, property developers and owners should be engaged in order to promote system acceptance.

PSE (electricity and natural gas)

Puget Sound Energy should be engaged early to help shape system development, including potential incentives and other forms of support.

Regulators (Washington UTC)

The Washington Utility and Transportation Commission (UTC) should be engaged early as well to understand permitting requirements including specific requirements of the UTC related to developing district energy systems under a P3 development model.

Local NGOs

Local non-profits should be engaged to foster support for the district energy system as a means to accelerate sustainability nationally and in the Puget Sound region and Shoreline.

Recommended Next Steps

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Development will drive district energy implementation in Shoreline. For the City to "get ahead" of development to ensure district energy implementation, the following steps should be considered to ensure district energy is ready to meet the energy demands of future development when it comes:

1. **District Energy Feasibility Evaluation (Consultant Cost = $50,000, Staff Cost TBD, Timeframe = 6 months)**

A detailed district energy feasibility evaluation should be conducted to refine the value proposition for district energy in the 185th St. Station Subarea:

- Energy, cost and carbon savings.
- DE system options (including technologies and distribution networks)
- Detailed cost estimate
- Cost of energy service comparison (business as usual vs. DE with various options)
- DE utility development model refinement including roles and responsibilities for public and private partners.
- Identification of key "enabling strategies" to ensure DE system development (i.e., mandatory connection policies).

2. **Preliminary Go/No Go Decision (Consultant Cost = $0, Staff Cost TBD, Timeframe = 2 months)**

Based on the findings of the feasibility evaluation, City Council makes a go/no go decision to engage with a third party district energy provider and makes a potential preliminary commitment of capital for distribution network piping.

3. **Third Party District Energy Provider Selection (Consultant Cost = $0, Staff Cost TBD, Timeframe = 2-3 months)**

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City to develop and issue an RFQ to select a third party DE provider. Based on experience with other cities, this effort will probably take about 2-3 months to develop the RFQ including internal review and approval, issue the RFQ, review responses and make a selection (with or without interviews).

4. **District Energy Evaluation Refinement and Initial Agreements (Consultant Cost = $0, Staff Cost TBD, Timeframe = 6 months)**

Once the DE Provider is selected, an initial MOU will be established between the City and DE Provider to outline requirements for further evaluation including go/no go decision criteria. Refinement efforts will focus on commercial viability (i.e., cost of service acceptable to building owners, investment requirements acceptable to City and DE Provider).

5. **Final Go/No Go Decision (Consultant Cost = $0, Staff Cost TBD, Timeframe = 2 months)**

Based on the go/no go criteria identified in Step 4, City and DE Provider to make go/no go decision.

6. **District Energy Development (Consultant Cost = TBD, Staff Cost TBD, Timeframe = 18 months)**

DE Provider to design, permit and build district energy system.

7. District Energy Operations (Cost = TBD, Time = Ongoing)

DE provider to operate district energy system.

Overall, development of district energy based on the preliminary implementation schedule identified above should take around three (3) years. From a planning perspective, the recommended steps above should begin at least 3-years ahead of major development within the light rail station subareas or Aurora Square. Ideally, timing construction of systems would correlate to other road or utility capital projects.

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Northwest SEED Solarize Support Proposal for the City of Shoreline

Background

Northwest Sustainable Energy for Economic Development (Northwest SEED) launched Solarize Washington in 2011. Since then, we have led twelve Solarize campaigns, galvanizing over 750 homeowners to install solar and unleashing $17.5 million in local economic activity. We have also provided Solarize leadership training and campaign support for seven communities throughout the State, enabling them to leverage our expertise and spread Solarize.

The City of Shoreline is uniquely positioned to host a strong Solarize campaign: Shoreline Community College is home to the annual Northwest Solar Fest and provides training for future solar industry workers. The following is an outline of Solarize support services that could be provided to the City of Shoreline. These services support the role of a designated Campaign Lead, which would be filled by a city staff person. In addition, we will work with the City to recruit a team of volunteers to lead contractor selection and outreach, under the guidance of Northwest SEED.

1: Campaign Manager Training/Kickoff $4,000

Northwest SEED will provide comprehensive training to the campaign partners including city staff, utility representatives, and community and student volunteers. This three hour training lays the groundwork for the team to work together for a successful campaign. The training includes:

- *Solarize overview and best practices, including campaign goal setting*
- *Preview of Solarize educational workshop PowerPoint*
- *Workbook with Solarize informational resources, planning documents, and lessons learned*
- *Breakout sessions to brainstorm contractor selection criteria and outreach opportunities*

Northwest SEED	***City***	***Volunteers***
Lead Training, Provide Materials	*Host Training; Invite Volunteers*	*Attend Training; Join a Committee*

2: Installer Selection Support $4,500

Northwest SEED works with the community to competitively select a solar installer or team of installers. We coach the team through a transparent, defensible process that results in the best value for the community and a fully engaged installation partner.

- *Facilitate Installer Selection Committee Meeting to refine RFP and selection scoring process*
- *Convene and facilitate Proposal review meeting to select interviewees*
- *Facilitate installer interview session and subsequent decision-making with Selection Committee*
- *Create and sign an MOU with selected installer(s) specifying the solar installation pricing, customer service expectations, and campaign roles.*

Northwest SEED	***City***	***Volunteers***
Provide template RFP; Issue RFP; Guide committee through the selection process; Sign MOU	*Attend Selection Committee as non-voting member; host committee meetings*	*Finalize RFP; Review Proposals; Select installer(s)*

3: Grassroots Education & Outreach Support $2,500

Northwest SEED will guide and support the grassroots outreach effort by the City of Shoreline campaign lead and volunteers. We will provide the proven messages and materials, facilitate the Outreach Committee launch, and co-lead the first educational workshop. This does not include printing or mailing of outreach materials.

- *Provide outreach material templates from successful Solarize campaigns*
- *Facilitate initial Outreach Committee meeting; determine volunteer roles and responsibilities*
- *Update workshop curriculum and Co-lead first workshop with installer and volunteer team*

Northwest SEED	***City***	***Volunteers***
Convene Outreach Committee; Provide Workshop PowerPoint; Deliver first Workshop	*Host Workshops (4): Provide venue and publicize*	*Deliver subsequent workshops; Lead grassroots outreach*

4: Designated Webpage & Participant Tracking $3,000

Northwest SEED will host a dedicated campaign webpage with integrated Salesforce database to serve as the Solarize Shoreline homepage. Tracking customer contact from initial registration through installation is essential for ensuring customer service and provides valuable metrics for campaign evaluation. Services in this package include:

- *Host and maintain a campaign homepage with information about the Solarize campaign*
- *Host and maintain online registration with a participant database in Salesforce*
- *Track participant status through Workshop, Site Assessment, and Contracting*
- *Provide periodic registration reports to campaign organizers over a 4-month registration window*

Northwest SEED	***City***	***Installer***
Host campaign website and online registration; track and report participant status	*Receive periodic updates on campaign numbers*	*Provide updated participant status weekly*

5: Reporting & Evaluation $1,000

Solarize campaigns provide a valuable opportunity to connect with citizens and to track progress toward sustainability goals. Northwest SEED will provide final reporting and evaluation to enable the City of Shoreline to measure Solarize impact. Services include:

- *Final Data and Reporting on Campaign Results (# of installs; $ spent locally, etc.)*
- *Results of Participant Survey and Lessons Learned*

Northwest SEED	***City***	***Installer***
Conduct survey and prepare Final Report and	*Celebrate!*	*Provide final cost data*