



City of Bothell

COMMUNITY UTILITY DISTRICT

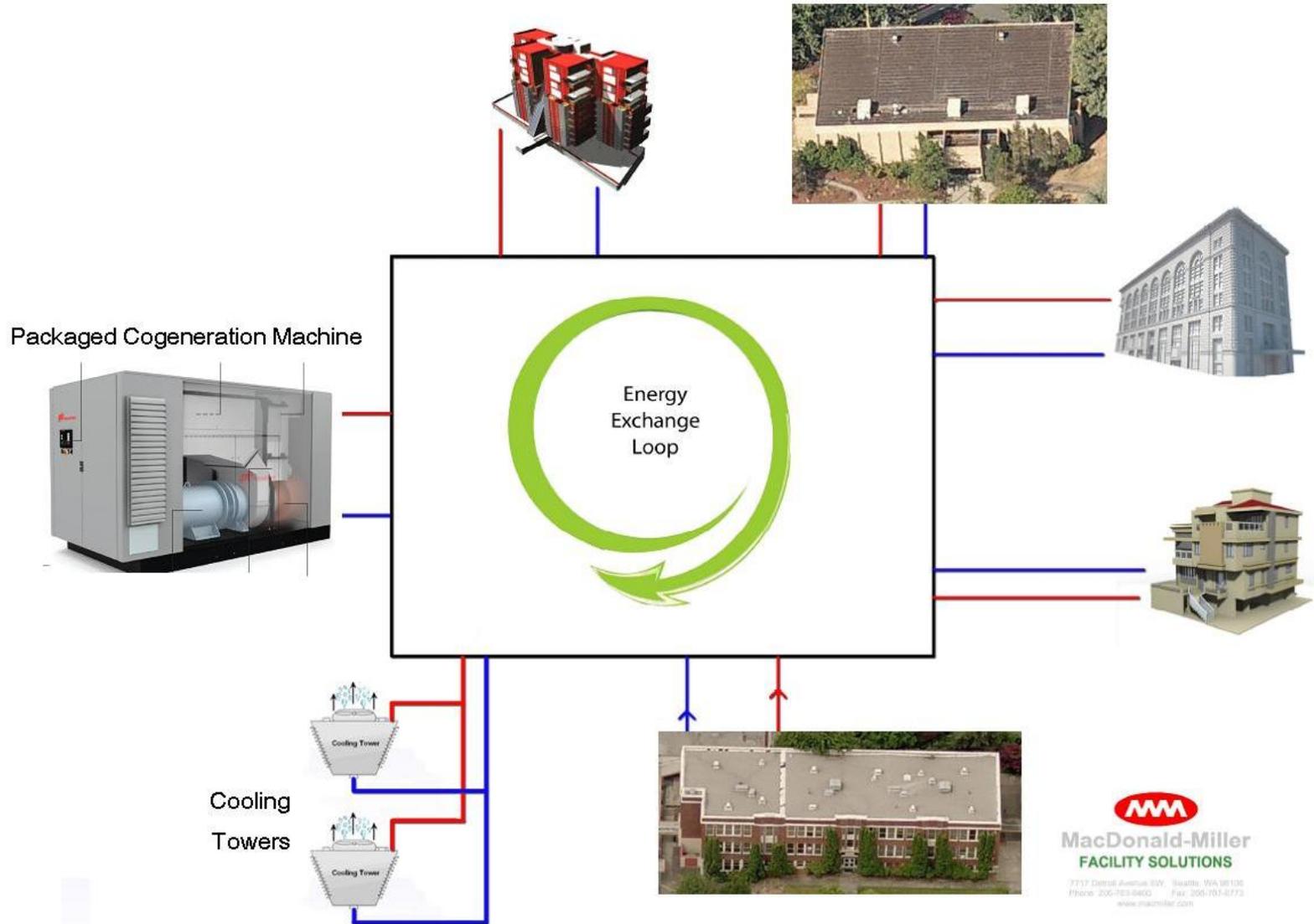
BothellCOOL₂



BUSINESS PRINCIPLES

- Economically viable approach to attract private development and galvanize the City's sustainability plan.
- City Cooperation in Project Planning, Permitting and On-going Partner.
- Turnkey Financing, Development & Operations by Private Company.
- Flexible business model to allow optional City ownership.
- Community engagement & transparent CUD Governance.

ENERGY EXCHANGE LOOP



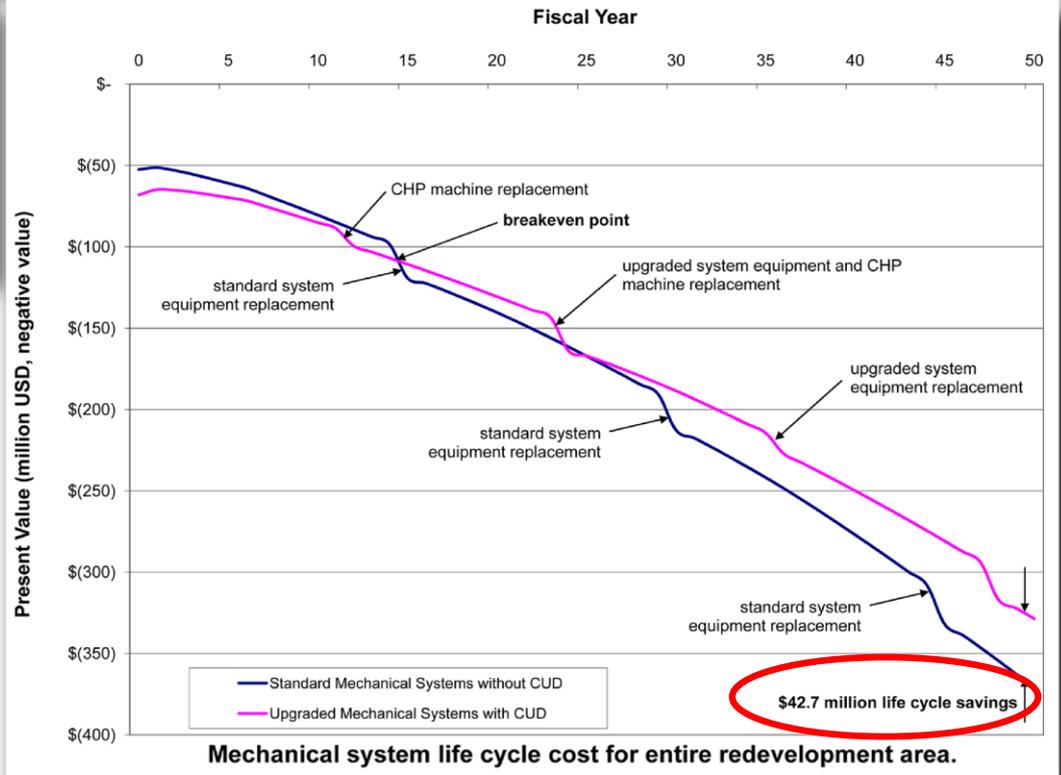
LIFECYCLE ECONOMICS



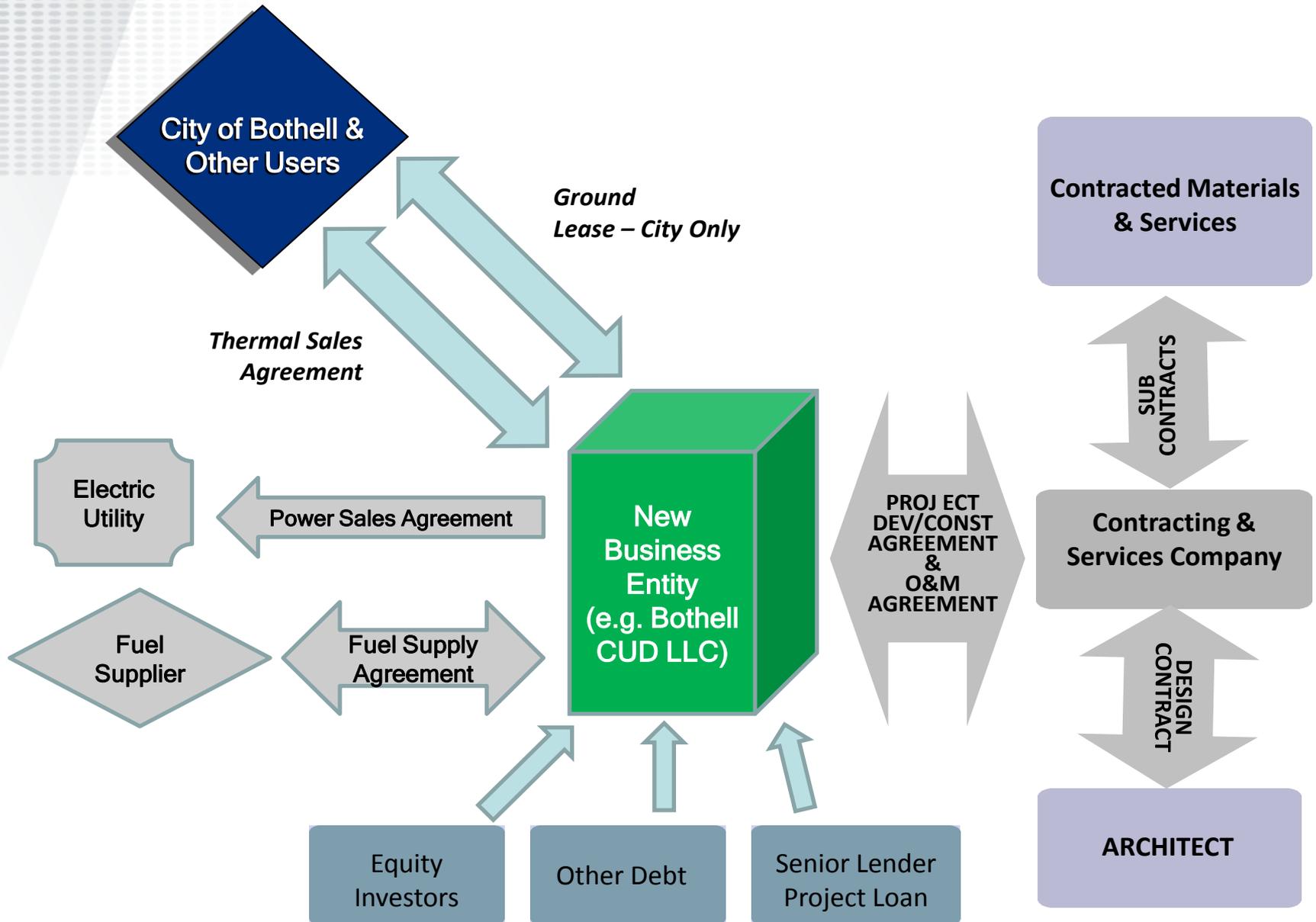
Bothell Central Energy District

Building	Area (sf)	Base Electricity (kWh)	Base Gas (therms)	Base Energy Cost (USD)	Proposed Electricity (kWh)	Proposed Gas (therms)	Proposed Energy Cost (USD)	Electricity Savings (kWh)	Gas Savings (therms)	Energy Cost Savings (USD)	Base CO ₂ Emissions	Proposed CO ₂ Emissions	CO ₂ Savings (tons)
Phase 1													
City Hall/City Center	50,000	1,025,491		\$ 100,275	396,133	36,730	\$ 73,875	629,358	-36,730	\$26,400	800	524	276
Phase 2													
Anderson	50,000	2,281,776	91,004	\$ 310,118	832,905	189,214	\$ 262,118	1,448,871	-98,210	\$48,000	2313	1759	554
Northshore Pool	20,000	205,354	84,017	\$ 100,400	-1,414,628	212,187	\$ 64,600	1,619,982	-128,170	\$35,800	684	171	513
Bastyr Office	5,000	102,549		\$ 10,028	39,613	3,673	\$ 7,388	62,936	-3,673	\$2,640	80	52	28
Office-Retail	20,000	410,196		\$ 40,110	158,453	14,692	\$ 29,550	251,743	-14,692	\$10,560	320	210	110
UW Bothell Housing	31,200	447,934		\$ 43,800	76,004	19,350	\$ 25,930	371,930	-19,350	\$17,870	349	172	177
Phase 3													
Office-Retail (City Land)	475,000	9,742,162		\$ 952,613	3,763,261	348,935	\$ 701,813	5,978,901	-348,935	\$250,800	7598	4976	2,622
Office-Retail (Private)	800,000	16,407,852		\$ 1,604,400	6,338,124	587,680	\$ 1,180,400	10,063,728	-587,680	\$224,000	12796	8380	4,416
Total	1,451,200	30,623,315	175,021	\$ 3,161,743	10,189,866	1,412,461	\$ 2,345,673	20,433,449	-1,237,440	\$816,070	24,940	16,244	8,696

Building	Area (sf)	Baseline System Cost (USD)	CUD System Cost (USD)	CUD Premium (USD)
Phase 1				
City Hall/City Center	50,000	\$1,732,000	\$3,030,000	\$1,298,000
Phase 2				
Anderson	50,000	\$3,088,000	\$3,088,000	\$0
Northshore Pool	20,000		\$0	\$0
Bastyr Office	5,000	\$170,000	\$210,000	\$40,000
Office-Retail	20,000	\$680,000	\$840,000	\$160,000
UW Bothell Housing	31,200	\$1,060,800	\$1,310,400	\$249,600
Phase 3				
Office-Retail (City Land)	475,000	\$16,150,000	\$21,810,000	\$5,660,000
Office-Retail (Private)	800,000	\$27,200,000	\$36,390,000	\$9,190,000
Total	1,451,200	\$50,080,800	\$66,678,400	\$16,597,600



CUD FINANCE & OWNERSHIP STRUCTURE



BUILDING/DEVELOPER CONSIDERATIONS

- A mechanical system that is capable of utilizing heat and cooling from a central condenser water loop is required
 - Ex: hydronic heat pump, water-cooled VRF systems, water-cooled a/c with water-to-water heat pumps to generate heating water.
 - Systems with electric heat will not make full use of the CUD.
- The domestic water heating system should also use heat pump equipment
 - Ex: high temp water-to-water heat pumps.
- BTU metering is required to track heat sharing (CUD provided)
 - BTUs into and out of the CUD loop should be metered so energy consumption can be correctly attributed to individual buildings.
 - BTU meters would need to be installed wherever the building mechanical system interfaces with the main CUD loop.
- Space considerations for distributed CUD equipment
 - Provisions need to be made for CUD equipment, such as cogeneration machines, in individual buildings.
 - The space provided needs access to the outdoors for flue routing and fresh air intake
 - The required amount of floor space and room height should be coordinated with the CUD engineer.
 - The CUD equipment would need to interface with the building's main electric service, so a location near that service would be preferable.

BUILDING SUSTAINABLE NEIGHBORHOODS

DISCUSSION

September 13, 2011

King County GreenTools Government Confluence