AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	WASHINGTON	DATE PREPARED:	12/08/17
CASE NO.:	UE-170485 & UG-170486	WITNESS:	Kevin Christie
REQUESTER:	UTC Staff	RESPONDER:	Amber Gifford
TYPE:	Data Request	DEPT:	DSM
REQUEST NO.:	Staff - 293	TELEPHONE:	(509) 495-2896
		EMAIL:	amber.gifford@avistacorp.com

REQUEST:

Mr. Christie, in Exh. KJC-2T at 6:15-16, states:

> "Because the Company is in a colder climate zone, the effectiveness of heat pumps diminishes when temperatures approach freezing."

And in, in Exh. KJC-2T at 16:16-17, Mr. Christie states:

> "the alternate use of heat pumps in our colder climate zone is not economic as compared to the west side of the State."

Please provide the data used to specifically analyze the economics of heat pumps in Avista's service territory. Include all assumptions concerning weather, power costs, and heat pump technology examined.

RESPONSE:

Please see Staff_DR_293 Attachment A for the calculation sheet which Avista uses to analyze the cost of heating with a natural gas furnace versus a heat pump. The calculation table looks at temperatures ranging from 52.5 to -12.5 degrees. The analysis estimates that the average residential heat pump in the Spokane area has a Seasonal Energy Efficiency Ratio (SEER) value of 16 and assumes a furnace efficiency of 90% (to represent the minimum efficiency required to participate in Avista's prescriptive HVAC incentive programs). The result of the analysis is that the cost of the electric heat pump depending on the temperature bin ranges from $1.20 - $2.95 (per 100,000 Btu of heat delivered) where the cost to heat with natural gas is $0.94 (per 100,000 Btu of heat delivered). It should be noted that if the customer has an 80% efficient furnace it is still cost effective to heat with natural gas at all listed temperature bins.

Performance Curves from BPA Study (http://www.bpa.gov/energy/n/emerging_technology/pdf/Multistage_heat_pump_monitoring_2006.pdf)

User Input Cells

Chiloquin, OR Climate most closely matches Spokane, Weather Data

Assuming Base @ 13 SEER Actual Provided SEER = 16

Current Rates

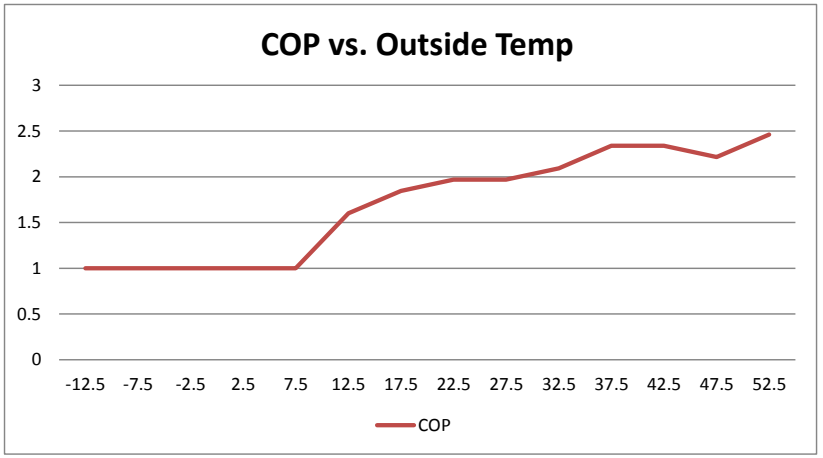
Elec $/kWh = $0.1008

Gas $/therm = $0.8462

Furnace Eff = 90%

For this analysis we estimate that the average residential heat pumps in the Spokane area has a SEER value of 16 or less. The furnace efficiency shown represents the minimum efficiency required to participate in Avista's prescriptive HVAC incentive programs. It should be noted that if the customer has an 80% efficient furnace it is still cost effective to heat with gas at all listed temperature bins.

			Cost per 100,000 Btu of heat delivered to space	
Temperature Bin (F)	BPA Study - COP	Adjusted COP	Elec	Gas
-12.5	1	1	$ 2.95	$ 0.94
-7.5	1	1	$ 2.95	$ 0.94
-2.5	1	1	$ 2.95	$ 0.94
2.5	1	1	$ 2.95	$ 0.94
7.5	1	1	$ 2.95	$ 0.94
12.5	1.3	1.6	$ 1.85	$ 0.94
17.5	1.5	1.846153846	$ 1.60	$ 0.94
22.5	1.6	1.969230769	$ 1.50	$ 0.94
27.5	1.6	1.969230769	$ 1.50	$ 0.94
32.5	1.7	2.092307692	$ 1.41	$ 0.94
37.5	1.9	2.338461538	$ 1.26	$ 0.94
42.5	1.9	2.338461538	$ 1.26	$ 0.94
47.5	1.8	2.215384615	$ 1.33	$ 0.94
52.5	2	2.461538462	$ 1.20	$ 0.94



*COP = Coefficient of Performance