AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	WASHINGTON	DATE PREPARED:	12/22/17
CASE NO.:	UE-170485 & UG-170486	WITNESS:	Kevin Christie
REQUESTER:	UTC Staff	RESPONDER:	Amber Gifford
TYPE:	Data Request	DEPT:	DSM
REQUEST NO.:	Staff - 309	TELEPHONE:	(509) 495-2896
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REQUEST:

Avista is going to make a Purchase Gas Adjustment ("PGA") filing soon. This may impact the data provided by Avista in its Response to UTC Staff's Data Request Nos. 292 and 293. Please provide updates to Avista's Response to UTC Staff's Data Request Nos. 292 and 293 incorporating the company's gas prices in the upcoming PGA filing.

RESPONSE:

Update to STAFF_DR_292: Please see STAFF_DR_309 Attachment A for the Heating Fuel Cost Comparison Calculator which Avista uses to determine the cost savings that can be expected when a customer converts their heating system from electric resistance to natural gas. The example shown in the calculator is for an average residential customer with a 2,000 square foot home (1,000 square feet on the main floor with a full basement). The annual heating load for the home is calculated (in the home-use estimator tab of the calculator) using heat loss and gain equations along with heating degree day information for Spokane, WA. The example assumes 14,308 kWh of annual usage. The output of the calculator indicates that the cost of heating with electric resistance is $1,544.25 annually, while the cost of heating with natural gas is $536.41 annually. In this example, the cost of heating with electric resistance heat is 2.9 times to cost of heating with natural gas resulting in an annual savings of 65%.

Update to STAFF_DR_293: Please see STAFF_DR_309 Attachment B 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 $0.88 (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.

Heating Fuel Cost Comparison

The purpose of this calculator is to show how Avista determines the cost savings that can be expected when a customer converts their heating system from electric resistance to natural gas. The example below is for an average residential customer with a 2,000 square foot home (1,000 square feet on the main floor with a full basement). The annual heating load for the home is calculated on a seperate tab using heat loss and gain equations along with heating degree day information for Spokane, WA. It is generally accpeted that electric resistive heat is 100% efficient, 90% gas efficiency was chosen as that is the minimum efficieny required to qualify for an incentive through our prescriptive HVAC incentive program.

Fuel Heating Value	
Electric(BTU/KWH)	3,412
Natural gas (BTU/Therm)	100,000

Fuel Costs	
Electric ($/KWH)	0.1008
Electric Monthly service charge	$8.50
Natural gas ($/Therm)	0.7898
Gas Monthly service charge	$9.00

Equipment Information		
	Efficiency	Fuel Type
Existing	100.0%	Electric
Proposed	90.0%	Natural Gas

User Input Cells
Calculated Cells

Equipment Energy Usage				
	Fuel Usage	Cost	BTU's consumed	BTU's delivered to home
Existing (KWH)	14,308	$1,544.25	48,818,896	48,818,896
Proposed (Therm)	542.4	$536.41	54,243,218	48,818,896
Annual Savings:		**$1,007.83**		
Annual Savings %:		**65.3%**		

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

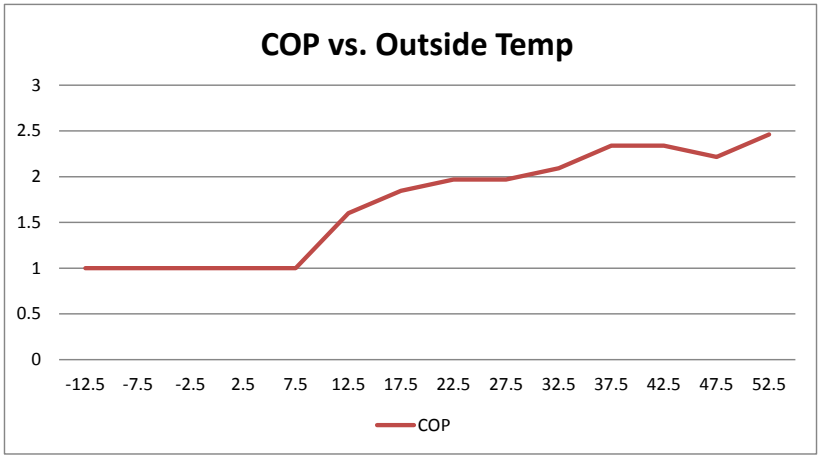
Elec $/kWh = $0.1008

Gas $/therm = $0.7898

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	$ 0.88
-7.5	1	1	$ 2.95	$ 0.88
-2.5	1	1	$ 2.95	$ 0.88
2.5	1	1	$ 2.95	$ 0.88
7.5	1	1	$ 2.95	$ 0.88
12.5	1.3	1.6	$ 1.85	$ 0.88
17.5	1.5	1.846153846	$ 1.60	$ 0.88
22.5	1.6	1.969230769	$ 1.50	$ 0.88
27.5	1.6	1.969230769	$ 1.50	$ 0.88
32.5	1.7	2.092307692	$ 1.41	$ 0.88
37.5	1.9	2.338461538	$ 1.26	$ 0.88
42.5	1.9	2.338461538	$ 1.26	$ 0.88
47.5	1.8	2.215384615	$ 1.33	$ 0.88
52.5	2	2.461538462	$ 1.20	$ 0.88



*COP = Coefficient of Performance