Public Counsel Cross Exhibit No. LDL-8

Avista's original response to Staff Data Request No. 112

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	WASHINGTON	DATE PREPARED:	04/23/2015
CASE NO.:	UE-150204 & UG-150205	WITNESS:	Don Kopczynski
REQUESTER:	UTC Staff - Nightingale	RESPONDER:	Larry La Bolle
TYPE:	Data Request	DEPT:	State & Federal Regulation
REQUEST NO.:	Staff - 112	TELEPHONE:	(509) 495-4710
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REQUEST:

See page 15 - section III.J. Please provide the study demonstrating that the AMI project will result in $491,882 of reduced energy costs for its Washington customers. Please include all assumptions, worksheets and any other material relied upon by the study to determine the above-referenced cost savings.

RESPONSE: When customers have access to detailed and timely energy-use data they will be able to better understand their energy use. And, when coupled with utility-provided information and education on energy consumption, customers will have new, advanced tools to undertake the structural and behavioral changes necessary to achieve their own personal energy conservation objectives.

To estimate these energy savings, Avista evaluated both residential and commercial customers. Residential customers were further divided into three main groups for modeling, based on their monthly energy use. From Avista's experience, for those customers who elected to install energy conservation measures, their average energy reduction was estimated to be 3%. This was a conservative estimate when compared to savings that have been reported by others in the region: 5-15 % and 0-10 % for direct and indirect feedback, respectively [1,2,3]. The expected customer participation rate of up to 5 %, coupled with the expected energy savings of 3 %, was applied to Avista's Washington electric customer base to yield an estimated energy savings of approximately 5,786 MWh (Expected participation is 1,170 commercial customers and 7,079 residential customers, for a total of 8,248 customers with varying degrees of installation of measures). The direct financial benefit to customers, on average, was estimated to be $491,882 (5,786,000 kWh X $0.085).

The computation, determination, or source of these values is provided in Excell format in Staff_DR_112 Attachment A, under the tab labeled "Energy Efficiency." This worksheet, beginning on line 11, contains the financial and other information used to calculate the benefit value, and the source of each element of information is also provided. Where values are calculated in the worksheet, the particular computation, as well as the location of the data used, is provided by "mouse clicking" on the referenced cell.

1. BC HYDRO SMART METERING & INFRASTRUCTURE PROGRAMBUSINESS CASE (4% REDUCTION WITH 30% PENETRATION) (http://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/smart-metering/smi-program-business-case.pdf)
2. PIKE RESEARCH - EFFECTIVE CUSTOMER ENGAGEMENT UTILITIES MUST SPEAK CUSTOMERS' LANGUAGE (http://opower.com/uploads/library/file/24/Opower_WP_Effective_Customer_Engagement.pdf.pdf)
3. BEHAVIORAL APPROACHES TO ENERGY CONSERVATION PAY OFF – (INTELLIGENTUTILITY.COM /ARTICLE/12/02/BEHAVIORAL-APPROACHES-ENERGY-CONSERVATIONPAY&UTM_MEDIUM=ENL&UTM_CAMPAIGN=IU_DAILY2&UTM_TERM=ORIGINAL-MEMBER)

Energy Efficiency Customer Benefits

There are two principal areas of energy efficiency savings enabled by the deployment of advanced meters, efficiency measures undertaken by the customer as a result of better understanding their patterns of energy use, and energy savings associated with the utility's management of the electric distribution system.

CVR Energy usage reduction

			Source or Reference
1	Avoided Energy Purchased in kWh (from Utility CVR spreadsheet)	13,798,937	See Appendix Benefits CVR tab to see how this value was determined
2	Avista average cost per kWh	$0.086	Avg of Tier 2 for residential and Tier 2 for Schedule 21
3	Total	**$1,186,708.61**	Calculation

Energy Savings due to better understanding of energy usage
Model 1

Immediate direct feedback could be extremely valuable, especially for savings from daily behaviour in non-heating end-uses. In the longer term and on a larger scale, informative billing and annual energy reports can promote investment as well as influencing behaviour. Savings have been shown in the region of 5-15% and 0-10% for direct and indirect feedback respectively.

Caluclation of total kWh by the customer groups modeled

	Number	kWh
Commercial Customers	23,385	1,804,801,283
Residential Customers	212,659	2,482,493,050
Under 500 kWh/Mo	46,061	154,446,492
500 - 1000 kWh/Mo	85,416	762,768,267
Over 1000 kWh/Mo	81,121	1,564,546,291
Total		**6,769,055,383**

	Customers	% Participating	kWh Savings		
Commercial Customers	23,385	5%	2,707,202	3%	* Based on an assumption of 3% percent reduction in energy use. References$_{1\text{-}10}$ (Reviewed literature to estimate a reasonable reduction)
Residential Customers	212,659				* Customer counts obtained from Customer Information System
Under 500 kWh/Mo	46,061	1%	46,334		* % Participating estimates were based on qualitative assessments from literature and Avista Experience
500 - 1000 kWh/Mo	85,416	3%	686,491		* Based on a weighted average retail electric rate of $0.085 per kWh
Over 1000 kWh/Mo	81,121	5%	2,346,819		
Total			5,786,847	**$491,882**	Monetary savings to customers
				0.09%	<- Estimated reduction in retail load for these customer groups

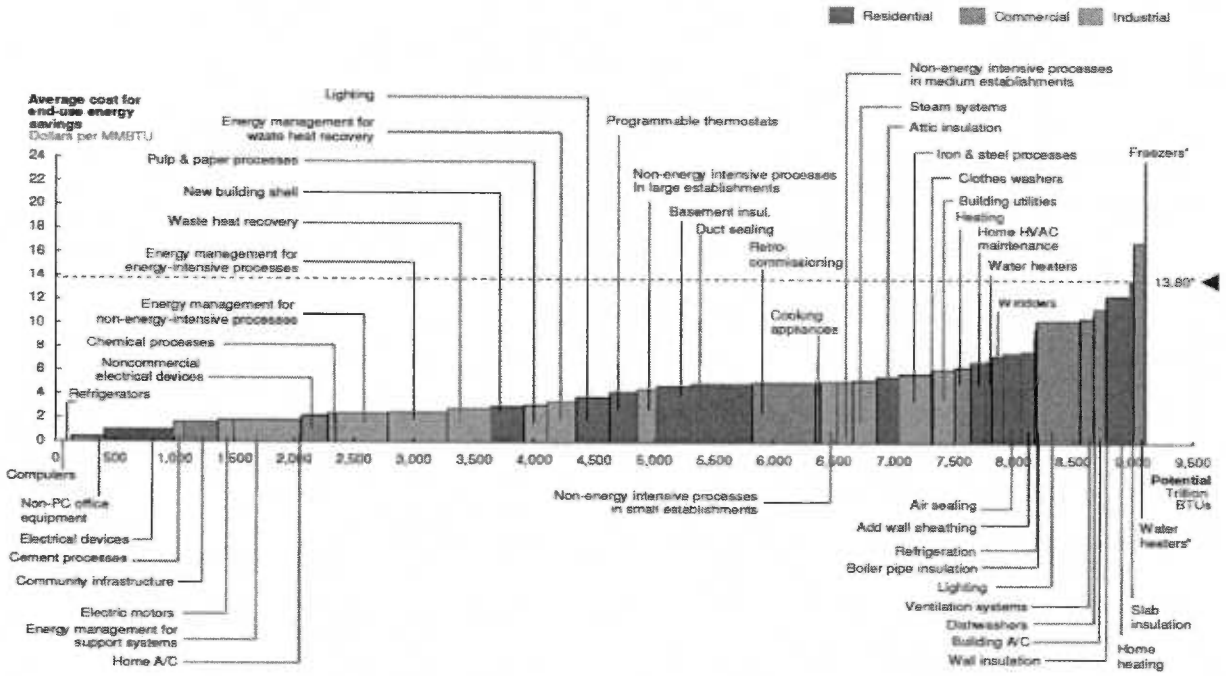
References

1 **6%** http://www.slideshare.net/breakingnews/unlocking-energy-efficiency-in-the-us-economy-1789726
2 http://www.eci.ox.ac.uk/research/energy/downloads/smart-metering-report.pdf
3 **1-4%** http://finance-commerce.com/2014/09/sustainable-reducing-energy-use-through-behavioral-science/
4 http://opower.com/uploads/library/file/24/Opower_WP_Effective_Customer_Engagement.pdf
5 http://www.elp.com/articles/2013/07/study-utility-customer-engagement-programs-are-worth-it.html
6 https://www.energystar.gov/buildings/program-administrators/state-and-local-governments/campaigns
7 **2%** http://www.energyvortex.com/pages/headlinedetails.cfm?id=4857
8 **2%** http://www.intelligentutility.com/article/12/02/behavioral-approaches-energy-conservation-pay&utm_medium=eNL&utm_campaign=IU_DAILY2&utm_term=Original-Member
9 **4%** http://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/smart-metering/smi-program-business-case.pdf
10 **3%** http://www.utilitydive.com/news/could-reducing-peak-demand-5-be-as-simple-as-asking/329102/

REV_CLASS_CDE	CountOfUSAGE_PT_KY	SumOfACCUM_USAGE_QTY
01	212,659	2,482,493,050
21	23,385	1,804,801,283
39	570	80,159
31	359	205,546,579
80	56	12,095,526
51	1	2,875

Conservation Tools (in-home feedback) Offering customers opportunities to monitor their electricity consumption in new ways can lead to increased awareness of energy consumption and therefore increased conservation behaviour. Customers will be offered two feedback options: 1. Near real-time feedback delivered via an optional in-home display device; and/or 2. Hourly data, provided within 24 hours, through the Power Smart website.	**$220 M** Range is: $170 M–$270 M	BC Hydro will offer a rebate program to encourage customers to choose a basic, market available in-home display. Customer take-up of in-home display is assumed at 30 per cent. Energy savings from in-home displays are 4 per cent with eight year persistence. Website-based energy savings are 2 per cent, with 15 per cent penetration of residential customers.	An increase/ decrease of 1 per cent in customer participation translates to approximately $1.2 M in PV.

Exhibit D: U.S. energy efficiency supply curve – 2020



* Average price of avoided energy consumption at the industrial price; $35.60/MMBTU represents the highest regional electricity price used; new build cost based on AEO 2008 future construction costs

Source: EIA AEO 2008, McKinsey analysis

AMI can increase CVR savings [1] is based on voltage alarming. Avista has 70 feeders with Integrated Volt Var Control (IVVC) which is an application that implements CVR for energy savings based on power flow and primary measurement points. Using power flow (IVVC) provides a good estimate of voltage, but requires us to assume a conservative minimum voltage at each meter since we don't know the exact characteristics/loading of each transformer and secondary circuit. With voltage alarming at the meter level, we could set the IVVC system to a lower setpoint and verify each customer receives the appropriate voltage. Our estimation is that this could provide at least 0.5% additional energy savings over the 2% [2] IVVC is achieving today. The cost savings below are based on the same method used for SGIG/SGDP cost savings for CVR.

Benefits Description

Component Estimate		Source or Reference	
Annual Usage on Feeders with IVVC (kWh)	1,667,139,240	Used ArcGis to associate meters to feeders and summed up usage for trailing 12 months (Nov 2013 - Oct 2014)	
Annual Usage on Feeders with IVVC installed over time (kWh)	1,092,648,228	Assume balance of feeders upgraded over the life of the meters (15 years) = 50% of remaining	
(CVR) [1-2]	0.5%	Qualitative estimate of reduction on buffer that could exist with AMI alarming	
Energy Reduction kWh	13,798,937	Calculation	
Weighted Average Cost of Energy	$0.0860		
Savings due to Avoided cost of	$1,186,709	Calculation	* 6% based on EIA estimate

Table 1: Shows which feeders have IVVC today, and the energy they use:

	Feeders	Usage_PTs	Accum_Usage	% Feeders	% Usage_PTs	% Accum_ Usage
All	206	229,320	3,852,435,696	100%	100%	100%
No IVVC	136	127,188	2,185,296,456	66%	55%	57%
IVVC	70	102,132	1,667,139,240	34%	45%	43%

References
1 Low-Cost CVR May Pay for Your AMI System. Jerry Jackson, Ph.D., Smart Grid Research Consortium
2 Navigant Research, Avista Utilities' Conservation Voltage Reduction Program (April 2014) - Reference No.: 164638

Table 2

Feeder	Meters
3HT12F1	624
3HT12F2	1871
3HT12F3	1008
3HT12F4	2310
3HT12F5	1941
3HT12F6	556
3HT12F8	5
3HT12F7	414
9CE12F2	2350
AIR12F3	477
ARD12F1	1
ARD12F2	923
BEA12F1	1579
BEA12F2	2947
BEA12F3	239
BEA12F4	334
BEA12F5	514
BEA12F6	653
BEA13T09	2
BKR12F1	1878
BKR12F2	1311
BKR12F3	1178
BLA311	2
C&W12F1	2089
C&W12F2	2407
C&W12F3	1573
C&W12F4	1715
C&W12F5	2042
C&W12F6	1965
CFD1210	1744
CFD1211	1114
CHE12F1	1758
CHE12F2	1567
CHE12F3	2126
CHE12F4	1565
CHW12F2	1031
CHW12F3	703
CHW12F4	501
CLA56	3
CLV12F1	864
CLV12F2	1459
CLV12F3	1
CLV12F4	1453

CLV34F1	1626
COB12F1	2280
COB12F2	1759
DEP12F1	2259
DEP12F2	1057
DIA231	610
DIA232	384
DRY1208	1161
DRY1209	545
DVP12F1	947
DVP12F2	197
ECL221	570
ECL222	1462
EFM12F1	1550
EFM12F2	788
EWN241	436
F&C12F1	3054
F&C12F2	2056
F&C12F3	1344
F&C12F4	2513
F&C12F5	1763
F&C12F6	1873
FOR12F1	601
FOR2.3	1
FWT12F1	2361
FWT12F2	1720
FWT12F3	1464
FWT12F4	1093
GAR461	607
GIF34F1	1540
GIF34F2	965
GLN12F1	2636
GLN12F2	2435
GRN12F1	1456
GRN12F2	568
GRV1272	1
H&W12F2	555
HAR4F1	168
HAR4F2	189
INT12F1	1878
INT12F2	1195
KET12F1	84
KET12F2	845
L&R511	346
L&R512	411

L&S12F1	796
L&S12F2	3404
L&S12F3	2538
L&S12F4	1811
L&S12F5	894
LAT421	489
LAT422	259
LEO611	1
LEO612	573
LF34F1	468
LIB12F1	1989
LIB12F2	2696
LIB12F3	1741
LIB12F4	84
LIN711	404
LL12F1	433
LOO12F1	1046
LOO12F2	728
M15515	13
MEA12F1	1159
MEA12F2	2190
MIL12F1	1782
MIL12F2	1696
MIL12F3	1842
MIL12F4	1608
MLN12F1	875
MLN12F2	817
NE12F1	2581
NE12F2	697
NE12F3	1264
NE12F4	2141
NE12F5	878
NEZ1267	1
NMO521	19
NW12F1	1782
NW12F2	1391
NW12F3	1767
NW12F4	2009
ODS12F1	718
OPT12F1	1748
OPT12F2	531
ORI12F1	660
ORI12F2	174
ORI12F3	1176
OTH501	1132

OTH502	2
OTH503	4
OTH505	1
PAL311	699
PAL312	46
PDL1201	1642
PDL1202	2060
PDL1203	1612
PDL1204	282
POT322	1
PST12F1	454
PVW241	3
RDN12F1	555
RDN12F2	329
RIT731	694
RIT732	481
ROK451	326
ROS12F1	3143
ROS12F2	985
ROS12F3	2352
ROS12F4	983
ROS12F5	2024
ROS12F6	2462
ROX751	74
RSA431	668
SE12F1	1856
SE12F2	2943
SE12F3	2028
SE12F4	2161
SE12F5	2226
SIP12F1	1
SIP12F2	215
SIP12F3	171
SIP12F4	1984
SIP12F5	112
SLK12F1	1652
SLK12F2	916
SLK12F3	241
SLW1368	691
SOT521	1144
SOT522	716
SOT523	673
SPA442	238
SPI12F1	805
SPI12F2	372

SPR761	480
SPU121	2058
SPU122	2
SPU123	1558
SPU124	2
SPU125	3
SUN12F1	3080
SUN12F2	2108
SUN12F3	2603
SUN12F4	1281
SUN12F5	545
SUN12F6	1655
TKO411	554
TKO412	316
TUR111	18
TUR112	2165
TUR113	1829
TUR115	157
TUR116	2242
TUR117	2484
TVW131	1
TVW132	1789
VAL12F1	1059
VAL12F2	374
VAL12F3	699
WAK12F1	1734
WAK12F2	1505
WAK12F3	1507
WAK12F4	1266
WAS781	242
WIL12F1	629
WIL12F2	697