MEEIA/IRP Power Market Price Document Discussion - (Probability

Weighted Hourly Power Market Pricing for 2012 – 2016 IRP Filings.xlsx)

In the documentation regarding the MEEIA/IRP Power Market Prices, the following was provided to illustrate the uncertainty drivers and the probability weighting used to develop the power market prices for the IRP Filings between 2012 and 2016. As this shows, there was a series of nine price curves for the 2012 – 2014 IRP Filings and six price curves for the 2015 and 2016 filings.

Year	Gas Scenarios	CO2 Scenarios	High Probability	Mid Probability	Low Probability	CO2 Yes	CO2 No
2012	3 (H,M,L)	3 (H,M,L)	0.25	0.5	0.25		
2013	3 (H,M,L)	3 (H,M,L)	0.25	0.5	0.25		
2014	3 (H,M,L)	3 (H,M,L)	0.25	0.5	0.25		
2015	3 (H,M,L)	2 (Y,N)	0.25	0.5	0.25	0.4	0.6
2016	3 (H,M,L)	2 (Y,N)	0.25	0.5	0.25	0.4	0.6

2012 - 2014 Price Tree

EP	Gas	CO2	Probability
1	H	H	6.25%
2	H	M	12.50%
3	H	L	6.25%
4	M	H	12.50%
5	M	M	25.00%
6	M	L	12.50%
7	L	H	6.25%
8	L	M	12.50%
9	L	L	6.25%
			100.0%

2015 - 2016 Price Tree

EP	Gas	CO2	Probability
1	H	Yes	10%
2	H	No	15%
3	M	Yes	20%
4	M	No	30%
5	L	Yes	10%
6	L	No	15%
			100%

The 8760 Hourly Prices included in (**Probability Weighted Hourly Power Market Pricing for 2012 – 2016 IRP Filings.xlsx)** provided, were calculated for the corresponding year by applying the probabilities of the nine, or six EP/Scenarios to the 8760 hourly power price curves used. There is a tab for each year with the summary results of that calculation in that document, and supplemental documents (work papers) for each IRP Year details.

The table below is taken from the 2015 KCPL and GMO Triennial IRPs, for both KCPL (Volume 6 KCPL Integrated Resource Plan and Risk Analysis HC.docx, p109) & GMO (Volume 6 GMO Integrated Resource Plan and Risk Analysis HC.docx, p156). This table represents the uncertainty scenarios (endpoints) used in the IRP Integrated Analysis of the company Alternative Resource Plans (ARPs). Note that the six price curves for the 2015 – 2016 Price Tree listed previously are repeated here for each of the three load scenarios modeled – High (25%), Mid (50%), and Low (25%) – and the resulting (18) endpoint probabilities are the weighting applied to the Net Present Value of Revenue Requirement (NPVRR) calculation used to rank alternative resource plans.

Endpoint	Load Growth	Natural Gas	CO_2	Endpoint Probability
1	High	High	Yes	2.5%
2	High	High	No	3.8%
3	High	Mid	Yes	5.0%
4	High	Mid	No	7.5%
5	High	Low	Yes	2.5%
6	High	Low	No	3.8%
7	Mid	High	Yes	5.0%
8	Mid	High	No	7.5%
9	Mid	Mid	Yes	10.0%
10	Mid	Mid	No	15.0%
11	Mid	Low	Yes	5.0%
12	Mid	Low	No	7.5%
13	Low	High	Yes	2.5%
14	Low	High	No	3.8%
15	Low	Mid	Yes	5.0%
16	Low	Mid	No	7.5%
17	Low	Low	Yes	2.5%
18	Low	Low	No	3.8%

In the slide on the following page, the decision/analysis tree from the Midas Model is represented for the Alternative Resource Plan KAACA from the 2015 filing. The red boxes represent decision nodes that define that plan regarding financial and operating parameters for supply-side resources, resource additions and retirements, etc... The green circles represent the uncertainty nodes that model those uncertainties shown in the above table. The green circle in the middle represents the High, Mid and Low load scenarios. The green circles on the right hand side represent the scenario values for Natural Gas and CO2 prices and the energy power prices (power market price curves) associated with that scenario.

MIDAS Gold® - Build: 2008.350 - [Tree: KAACA]

Project   View   Study   Tree   Node   Branch   User   Tools   Visuals   Window   Help

KCPL:KCPL
[KCPL]

KAACA:Plan
[KAACA]

Load Growth :High
[LGHIC]

Load Growth :Mid
[LGMDC]

Load Growth :Low
[LGLOC]

NG_CO2_Power:Hi Gas Mid C
[HGMC]   1
NG_CO2_Power:Hi Gas Lo CO
[HGLC]   2
NG_CO2_Power:Mid Gas Mid
[MGMC]   3
NG_CO2_Power:Mid Gas Lo C
[MGLC]   4
NG_CO2_Power:Lo Gas Mid C
[LGMC]   5
NG_CO2_Power:Lo Gas Lo CO   6
NG_CO2_Power:Hi Gas Mid C   7
[HGMC]
NG_CO2_Power:Hi Gas Lo CO
[HGLC]   8
NG_CO2_Power:Mid Gas Mid
[MGMC]   9
NG_CO2_Power:Mid Gas Lo C
[MGLC]   10
NG_CO2_Power:Lo Gas Mid C
[LGMC]   11
NG_CO2_Power:Lo Gas Lo CO   12
NG_CO2_Power:Hi Gas Mid C   13
[HGMC]
NG_CO2_Power:Hi Gas Lo CO
[HGLC]   14
NG_CO2_Power:Mid Gas Mid
[MGMC]   15
NG_CO2_Power:Mid Gas Lo C
[MGLC]   16
NG_CO2_Power:Lo Gas Mid C
[LGMC]   17
NG_CO2_Power:Lo Gas Lo CO
[LGLC]   18