

Appendix A - ZEC Cost Book

Workbook Guide

Worksheet Name	Purpose of Worksheet
Social Cost of Carbon Inputs	Input Assumptions for the Social Cost of Carbon
PJM and MISO Cap Prices Inputs	Input Assumptions for the PJM BRA and MISO PRA Capacity Prices
PJM and MISO Capacity Prices	Calculation of 50% of the PJM BRA and MISO PRA Capacity Prices and conversion to \$/MWh
Avg DA N IL Hub Price	Calculation of the Average Day Ahead Northern Illinois Hub Price
Market Price Index	Calculation of the Market Price Index
Price Adjustment	Calculation of the Price Adjustment to the Social Cost of Carbon
Net SCC and ZEC Price	Calculation of the Net Social Cost of Carbon and the Effective ZEC Price for the Delivery Year
2014_16-17_Sales Inputs	2014 Sales Inputs for Ameren and ComEd and 2016-17 Procured Energy for MidAmerican
2017-18 Contractual Vol and Cos	Calculation of the 2017-18 ZEC Contractual Volume and Cost
2008-09 Retail Rate	Calculation of the 2008-09 Retail Rate for Eligible Customers
2016-17 Delivered Electricity	Input Assumptions for the 2016-17 Delivered Electricity
2017-18 ZEC Cost Cap_Vol Cap	Calculation of the 2017-18 ZEC Cost Cap and the ZEC Volume Cap

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2017-18 ZEC Cost Cap and ZEC Volume Cap

	Ameren	ComEd	MidAmerican	Total
2008-09 Retail Rate (c/kWh)	10.77	11.82	6.18	
Rate Increase Cap	1.65%	1.65%	1.65%	
Cost Cap Rate (c/kWh)	0.18	0.20	0.10	
Cost Cap Rate (\$/MWh)	1.8	2.0	1.0	
2016-17 Delivered Electricity (MWh)	35,886,827	88,075,281	263,664	124,225,772
Unadjusted ZEC Cost Cap	\$63,748,017	\$171,817,027	\$268,705	\$235,833,749
ZEC Price (\$/ZEC)	16.50	16.50	16.50	
ZEC Retirement Fee (\$/ZEC)	0.05	0.05	0.05	
ZEC Contractual Volume (ZECs)	5,903,583	14,172,903	42,186	\$20,118,672
Retirement Fee Costs	\$295,179	\$708,645	\$2,109	\$1,005,934
ZEC Cost Cap Adjusted by Retirement Fee Costs	\$63,452,838	\$171,108,382	\$266,596	234,827,816
ZEC Volume Cap (ZECs)	3,845,627	10,370,205	16,157	\$14,231,989

2017-18 Paid and Unpaid ZECs

	Ameren	ComEd	MidAmerican	Total
ZEC Contractual Volume (ZECs)	5,903,583	14,172,903	42,186	20,118,672
ZEC Volume Cap (ZECs)	3,845,627	10,370,205	16,157	14,231,989
ZECs to be Paid (ZECs)	3,845,627	10,370,205	16,157	14,231,989
ZECs to go Unpaid (ZECs)	2,057,956	3,802,698	26,029	5,886,683

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2016-2017 Delivered Electricity (MWh)

	2016-17
AmerenIL	35,886,827
ComEd	88,075,281
MidAmerican	263,664
Total	124,225,772

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2008-2009 Retail Rate for All Eligible Customers

	Revenues	Sales (MWh)	Eligible Customers Retail Rate (\$/MWh)	Eligible Customers Retail Rate (c/kWh)
Ameren	\$1,853,574,838	17,217,197	107.66	10.77
ComEd	\$4,462,038,949	37,740,282	118.23	11.82
MidAmerican	\$118,553,699	1,919,440	61.76	6.18

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2017-2018 ZEC Contractual Volume and Cost

	Ameren	ComEd	MidAmerican	Total
Procurement Requirement (%) =	16%	16%	16%	
2014 Sales (Ameren and ComEd) / 2016-17 Procurement (MidAmerican) (MWh) =	36,897,391	88,580,643	263,664	125,741,698
2017-2018 ZEC Contractual Volume (MWh) =	5,903,583	14,172,903	42,186	20,118,672
2017-2018 ZEC Price (\$/ZEC) =	16.50	16.50	16.50	
2017-2018 ZEC Cost for Contractual Volume =	\$97,409,112	\$233,852,898	\$696,074	\$331,958,084

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2014 Energy Sales (Ameren and ComEd) (MWh)

Ameren	36,897,391
ComEd	88,580,643

2016-2017 Procured Power and Energy (MidAmerican) (MWh)

Third Party Providers (ARES / RES) Supply	72,030
MidAmerican Owned Generation Supply	1,651,883
Total MidAmerican Supply	1,723,913
Actual electricity delivered to retail customers	1,987,577
Procured Power and Energy	263,664

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Net Social Cost of Carbon and ZEC Price

	2017-2018
Social Cost of Carbon (\$/MWh)	16.5
Price Adjustment (MPI-BMPI)	-0.19
Net SCC (SCC - PA) (\$/MWh)	16.69
ZEC Price (\$/ZEC)	16.50

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Price Adjustment Values (\$/MWh)

	2017-2018
MPI	31.21
BMPI	31.4
Price Adjustment (MPI-BMPI)	-0.19

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<u>Market Price Index (\$/MWh)</u>	<u>2017-2018</u>
100%*NIH	28.68
50%*BRA	2.50
50%*PRA	0.03
MPI	31.21

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PJM NI Hub Day-Ahead Peak Future Prices

Year	Month	Delivery Year	Average Projected Energy Price in 2016 (\$/MWh)
2017	6	2017-2018	33.57
2017	7	2017-2018	40.72
2017	8	2017-2018	38.45
2017	9	2017-2018	31.40
2017	10	2017-2018	29.91
2017	11	2017-2018	30.26
2017	12	2017-2018	32.44
2018	1	2017-2018	42.61
2018	2	2017-2018	38.89
2018	3	2017-2018	35.09
2018	4	2017-2018	30.77
2018	5	2017-2018	31.89

PJM NI Hub Day-Ahead Off-Peak Future Prices

Year	Month	Delivery Year	Average Projected Energy Price in 2016 (\$/MWh)
2017	6	2017-2018	20.05
2017	7	2017-2018	23.26
2017	8	2017-2018	21.45
2017	9	2017-2018	19.74
2017	10	2017-2018	19.43
2017	11	2017-2018	20.11
2017	12	2017-2018	24.32
2018	1	2017-2018	33.83
2018	2	2017-2018	30.75
2018	3	2017-2018	26.32
2018	4	2017-2018	22.95
2018	5	2017-2018	19.24

PJM NI Hub Day-Ahead Around the Clock Future Prices

Delivery Month-Year	Hours			Time Weighted Average Projected Energy Price in 2016 (\$/MWh)
	Pk	Off Pk	Total	
Jun-17	352	368	720	26.66
Jul-17	320	424	744	30.77
Aug-17	368	376	744	29.86
Sep-17	320	400	720	24.92
Oct-17	352	392	744	24.39
Nov-17	336	384	720	24.85
Dec-17	320	424	744	27.81
Jan-18	352	392	744	37.98
Feb-18	320	352	672	34.63
Mar-18	352	392	744	30.47
Apr-18	336	384	720	26.60
May-18	352	392	744	25.22
2017-2018 PJM NI Hub Day-Ahead Average Price				28.68

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BRA and MISO PRA Capacity Prices

	2017-2018
<u>PJM</u>	
Price (\$/MW-Day)	120
50%*Price (\$/MW-Day)	60
50%*Price (\$/MWh)	2.50
<u>MISO</u>	
Price (\$/MW-Day)	1.50
50%*Price (\$/MW-Day)	0.75
50%*Price (\$/MWh)	0.03

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PJM and MISO Capacity Prices (\$/MW-Day)

	PJM BRA	Notes
2017-2018	120	Actual Cleared Price (RTO)

	MISO PRA	Notes
2017-2018	1.50	Actual Cleared Price (Zone 4)

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Social Cost of Carbon (SCC)

DY#	DY	SCC (\$/MWh)
1	2017-2018	16.5
2	2018-2019	16.5
3	2019-2020	16.5
4	2020-2021	16.5
5	2021-2022	16.5
6	2022-2023	16.5
7	2023-2024	17.5
8	2024-2025	18.5
9	2025-2026	19.5
10	2026-2027	20.5