

EIPC Update

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TOA-AC

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Futures

- Future 1: Business as Usual
- Future 2: Federal Carbon Constraint -- National Implementation
- Future 3: Federal Carbon Constraint -- State/Regional Implementation
- Future 4: Aggressive EE/DR/DG/Smart Grid
- Future 5: National RPS -- Top-Down Implementation
- Future 6: National RPS -- State/Regional Implementation
- Future 7: Nuclear Resurgence
- Future 8: Combined Federal Climate and Energy Policy
- 69 Approved Sensitivities

Futures

- Details of futures



Adobe Acrobat
Document

- 69 Approved Sensitivities



Microsoft Excel
Worksheet

Future 1: Business as Usual

Summary of Results – BAU Base Case

- For the BAU, the Eastern Interconnect new capacity and retirements by capacity type are shown below:
 - 2030 includes additions/retirements for both the 2025 and 2030 model year results

BAU Base Case: New Builds and Retirements by Capacity Type for the Eastern Interconnection
2015, 2020 and 2030 (GW)

	2010 In-service	Additions			Retirements			2030 In-service
		2015	2020	2030	2015	2020	2030	
Coal	271.9	8.4	0.0	3.3	69.7	47.6	0.0	166.4
Nuclear	99.8	2.7	4.5	0.0	0.0	0.0	1.5	105.0
CC	132.7	30.4	45.3	23.2	5.7	0.0	0.0	225.8
CT	120.3	4.9	10.2	3.3	0.9	0.0	0.0	137.8
Steam Oil/Gas	71.4	0.0	0.0	0.0	34.4	0.6	0.4	36.0
Hydro	44.6	0.0	0.0	0.0	0.0	0.0	0.0	44.6
On-shore Wind	18.7	22.2	12.7	13.0	0.0	0.0	0.0	66.6
Off-shore Wind	0.0	0.5	0.0	1.1	0.0	0.0	0.0	1.6
Other Renewables	6.7	2.3	3.3	5.9	0.8	0.0	0.0	17.4
New HQ/Maritimes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	17.1	0.0	0.0	0.0	0.0	0.0	0.0	17.1
Total	783.3	69.8	75.9	49.8	111.5	48.2	0.4	818.2
DR	33.1							70.7

In practice, the model is run for the year 2010 as well, for reporting purposes retirements/additions for 2010/2015 have been cumulated in 2015.

The results presented herein use modeling assumptions developed by EIPC, EIPC stakeholders and CRA for purposes of EIPC capacity expansion modeling. As such, these results do not necessarily reflect the opinions or views of CRA or any individual EIPC stakeholder.

Future 1: Business as Usual

Summary of Results – BAU Base Case

- In the EI, 87% of coal plants smaller than 200 MW retire by 2020, and 32% of larger plants.

Coal Retirements by EI NEEM Region (MW)

	Plants Smaller than 200 MW			Plants Larger than 200 MW		
	Existing 2010	Retired by 2015	Retired by 2020	Existing 2010	Retired by 2015	Retired by 2020
ENT	578	403	578	7,731	550	550
FRCC	136	136	136	9,327	998	3,919
IESO	306	306	306	6,110	6,110	6,110
MAPP_CA	1,746	1,010	1,010	-	-	-
MAPP_US	289	289	289	4,372	1,499	1,798
MISO_IN	2,842	395	1,978	11,905	-	764
MISO_MI	2,657	2,160	2,537	8,135	1,043	2,925
MISO_MO-IL	2,549	1,824	2,180	11,415	215	3,004
MISO_W	3,071	-	1,840	9,749	339	4,453
MISO_WUMS	1,857	1,857	1,857	5,688	-	2,547
NE	961	-	961	2,917	-	682
NEISO	768	768	768	1,803	1,483	1,803
NonRTO_Midwest	2,059	646	813	8,572	654	1,200
NYISO_A-F	1,568	1,568	1,568	684	684	684
NYISO_G-I	136	136	136	233	233	233
NYISO_J-K	-	-	-	-	-	-
PJM_E	1,132	1,132	1,132	2,721	2,153	2,721
PJM_ROM	3,829	3,829	3,829	12,552	4,217	4,738
PJM_ROR	10,420	6,500	9,889	49,448	6,812	15,767
SOCO	3,535	3,534	3,534	21,801	6,159	6,159
SPP_N	1,716	-	1,013	6,167	-	1,607
SPP_S	736	2	238	12,404	2,179	3,139
TVA	6,043	3,105	6,043	9,116	698	2,136
VACAR	5,354	2,305	4,648	14,782	1,774	3,039
Total	54,285	31,902	47,280	217,631	37,800	69,978
		59%	87%		17%	32%

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Future 1: Business as Usual

Summary of Results – BAU Base Case

- About 48 GW of new wind capacity is built in the EI by 2030.

Cumulative New Wind Capacity by NEEM Region (MW)

NEEM Region	Future 1 BAU: Base Case			
	2015	2020	2025	2030
ENT	0	0	0	0
FRCC	0	0	0	0
IESO	2,108	2,108	2,108	2,108
MAPP_CA	302	302	302	302
MAPP_US	421	778	1,129	1,224
MISO_IN	0	0	0	0
MISO_MI	2,000	2,000	2,600	2,718
MISO_MO-IL	300	300	300	300
MISO_W	2,801	4,935	7,920	8,871
MISO_WUMS	989	989	989	989
NE	202	2,628	2,628	2,628
NEISO	231	2,903	3,385	4,385
NonRTO_Midwest	0	0	0	0
NYISO_A-F	2,478	3,188	3,188	3,188
NYISO_G-I	0	60	60	60
NYISO_J-K	0	0	0	0
PJM_E	1,150	1,150	1,150	1,150
PJM_ROM	480	902	1,230	7,040
PJM_ROR	8,326	8,326	8,517	8,517
SOCO	0	0	0	0
SPP_N	0	257	370	370
SPP_S	430	580	580	580
TVA	0	0	0	0
VACAR	1	3,500	3,500	3,500
Total	22,195	34,882	39,933	47,907

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Future 1: Business as Usual

- The MRN-NEEM model has complete foresight and will seek to optimize the resource mix to achieve the lowest cost solution under the assumptions provided.
- Most of the changes in the resource mix in the first 5 years are the result of “forced builds” under the Baseline Infrastructure specified by the SSC.
- Beyond that, generation is added in large part to meet State RPS requirements and load growth, and replace retired generation.
- There were significant coal plant retirements probably due to the combination of low gas prices, new environmental regulations, and lower load growth.
- The changes in the transfer limits under Sensitivities 1 and 2 did not result in significant changes in the resource mix.

Future 1: Business as Usual

- Concerns Raised from 1st BAU Run
 - Environmental Regulations Update
 - High Coal Retirements in 2015
 - Large Amount of CC/CT Additions in Concentrated Areas of MISO
 - Disproportionate Wind Additions Among NE/SPP
 - Other Small Corrections and Adjustments

Future 1: Business as Usual

- Overview of Environmental Regulation Changes
 - Utility MACT - Revised
 - 316(B) - Revised
 - Coal Combustion Residuals – No Change
 - \$15 per ton (2010 dollars) of ash waste added to operating costs of coal plants by 2018
 - estimated to be approximately \$0.63/MWh adder to VOM
 - Transport Rule – No Change
 - Rendered non-binding because the Utility MACT Rule requirements are more stringent
 - Existing Regulations - Revised

Future 1: Business as Usual

- MACT
 - All coal units larger than 600 MW without scrubbers must have dry FGD by 2018
 - All other coal units without SO₂ controls must have DSI by 2018
 - All coal units larger than 200 MW without PM controls must have fabric filters by 2018
 - All coal units larger than 200 MW with ESP and without FF and all coal units smaller than 200 MW must have ESP upgrades by 2018
 - All coal units larger than 200 MW without ACI and without both FGD and SCR must get ACI by 2018
 - All coal units smaller than 200 MW must get ACI by 2018

Future 1: Business as Usual

- 316(b)
 - All nuclear generating units and all coal generating units larger than 500 MW without cooling towers will be required to install a compliance technology valued at 25% the cost of cooling towers
 - All coal generating units smaller than 500 MW and non-nuclear steam generating units will be required to install an alternative compliance technology valued at 90% of the cost of fine-mesh screens
- Existing Regulations
 - CAIR NO_x rule modeled to determine need for SCR retrofits

Future 1: Business as Usual

- Concern over High Coal Retirements in 2015

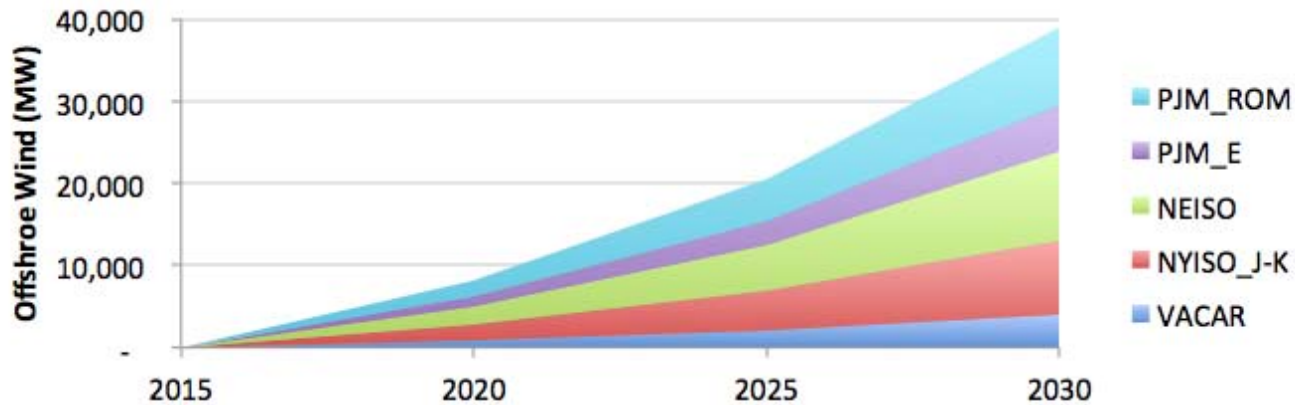
Options

- Increasing Reserve Margin
- Not Allow Economic Retirements in 2010
- Reluctant to change selected inputs to force an outcome
- Reluctant to establish a precedent
- Sensitivities will address some of these issues
- Phase I report will include explanation and interpretation of modeling results

Future 1: Business as Usual

- Environmental Sensitivity
 - Stakeholder Steering Committee will review results
 - Decide whether to use this sensitivity or original BAU case as base case for the rest of the runs and remaining futures

Future 5 & 6: Offshore Wind Sensitivity Forced Capacity Additions Strawman Future Decision



Extra High Natural Gas Price Sensitivity Future Decision

