

# Overview of Results for EIPC Additional Future 8 Soft Constraint Sensitivities

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## Overview

- Using the EIPC stakeholder-approved input assumptions, CRA has completed modeling of:
  - *Future 8 “Combined Federal Climate and Energy Policy” for:*
    - *F8S5: Soft Constraint 75%, with Flat CO<sub>2</sub> prices after 2030, intra-MISO CC adjustments, and on-shore wind adjustments in the eastern MISO regions.*
    - *F8S6: Soft Constraint 75%, with Flat CO<sub>2</sub> prices after 2030, intra-MISO CC adjustments, and on-shore wind adjustments in MISO, SPP, MAPP\_US, and NYISO\_A-F.*
- Of the 80 total runs, 78 have now been completed.

## Future 8 (Combined Federal Climate and Energy Policy) Results

- Total EI capacity in 2030 is shown below by type for Future 8 in comparison to the BAU.
  - F8S1 (OL75) was used as the basis for the hard limits used in F8S3 and F8S4.
  - In comparison to F8S1, F8S5 and F8S6 have:
    - A similar level of total EI installed capacity in 2030.
    - Higher CC builds, lower CT and coal capacity, and slightly lower on-shore wind capacity.
  - From a total EI view, F8S5 and F8S6 are similar, with a small change in CC and CT capacity.

### Installed 2030 EI Capacity by Type: BAU vs. Future 8 (GW)

	Total 2010	Installed Capacity in 2030							
		F1S3	F8B	F8S1	F8S2	F8S3	F8S4	F8S5*	F8S6*
		BAU Base	CO2+ RPS	75% Soft	25% Soft	Low Rnw\$	Hi RPS	75% w FitCO2	75% w FitCO2
Coal	272	199	17	17	18	18	18	10	10
Nuclear	100	105	137	135	133	139	136	134	134
CC	133	202	210	199	186	181	190	215	213
CT	120	132	61	64	71	75	69	56	59
Steam Oil/Gas	75	36	9	4	4	4	4	5	5
Hydro	45	45	49	49	52	51	50	49	49
On-Shore Wind	19	68	245	263	287	294	303	259	259
Off-Shore Wind	0	2	2	2	2	3	2	2	2
Other Renewable	4	14	12	12	13	12	12	12	12
New HQ/Maritimes	0	0	0	0	3	5	5	0	0
Other	17	17	17	17	17	17	17	17	17
<b>Total w/o DR</b>	<b>783</b>	<b>819</b>	<b>759</b>	<b>762</b>	<b>786</b>	<b>799</b>	<b>805</b>	<b>759</b>	<b>759</b>
<b>DR</b>	<b>33</b>	<b>71</b>	<b>152</b>	<b>152</b>	<b>152</b>	<b>152</b>	<b>152</b>	<b>152</b>	<b>152</b>
<b>Total w/DR</b>	<b>816</b>	<b>890</b>	<b>912</b>	<b>915</b>	<b>938</b>	<b>951</b>	<b>958</b>	<b>912</b>	<b>912</b>

\* F8S5 and F8S6 include intra-MISO CC and on-shore wind build adjustments. F8S6 also includes on-shore wind build adjustments for SPP, MISO\_W, MAPP\_US and NYISO\_A-F.

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## Future 8 Results (cont.)

- El capacity in 2030 is shown below by region for Future 8. In comparison to F8S1:
  - *F8S5 has more wind in eastern MISO, and less in MISO\_W, SPP, MAPP\_US and NYISO\_A-F.*
  - *F8S6 has more wind in eastern MISO and less in MISO\_W, but not as much as F8S5.*

### 2030 EI Capacity by Region: Future 8 (GW)

	Cum New Builds in 2030								Cum New CCs in 2030								Cum New On-Sh Wind in 2030							
	F1S3	F8B	F8S1	F8S2	F8S3	F8S4	F8S5*	F8S6*	F1S3	F8B	F8S1	F8S2	F8S3	F8S4	F8S5*	F8S6*	F1S3	F8B	F8S1	F8S2	F8S3	F8S4	F8S5*	F8S6*
	BAU	CO2+	75%	25%	Low	Hi	75% w	75% w	BAU	CO2+	75%	25%	Low	Hi	75% w	75% w	BAU	CO2+	75%	25%	Low	Hi	75% w	75% w
	Base	RPS	Soft	Soft	Rnw\$	RPS	FitCO2	FitCO2	Base	RPS	Soft	Soft	Rnw\$	RPS	FitCO2	FitCO2	Base	RPS	Soft	Soft	Rnw\$	RPS	FitCO2	FitCO2
ENT	4	7	5	3	6	4	6	6	3	6	4	2	2	3	5	5	0	0	0	0	2	0	0	0
FRCC	16	31	31	31	31	31	31	31	13	11	10	10	11	11	11	11	0	0	0	0	0	0	0	0
IESO	5	5	5	5	5	5	5	5	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
MAPP_CA	2	3	3	5	4	4	3	3	2	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0
MAPP_US	2	6	10	12	5	8	9	9	0	0	0	0	0	0	0	0	1	6	10	11	5	8	8	9
MISO_IN	5	55	47	12	42	58	34	29	4	15	17	11	10	14	6	8	0	39	29	0	31	43	26	21
MISO_MI	3	6	3	2	3	4	14	14	0	3	1	0	0	1	5	5	3	3	3	2	3	3	9	9
MISO_MO-IL	2	28	8	8	14	22	33	25	0	0	0	0	0	0	5	5	0	26	6	6	11	19	27	18
MISO_W	9	27	61	96	71	69	48	59	0	0	0	0	0	0	4	4	9	27	61	96	71	69	45	55
MISO_WUMS	10	15	8	12	7	13	8	8	4	4	5	10	5	5	4	4	1	9	1	1	1	8	3	3
NE	1	13	15	18	19	17	15	14	0	0	0	0	0	0	0	0	0	12	15	18	19	16	14	13
NEISO	9	9	9	9	9	9	9	9	2	2	2	2	2	2	2	2	5	5	5	5	5	5	5	5
NonRTO_Mid	1	5	5	5	6	5	6	6	1	4	5	4	3	4	6	6	0	0	0	0	0	0	0	0
NYISO_A-F	4	6	7	4	9	4	5	7	1	1	1	1	1	1	1	1	4	5	6	3	8	3	4	6
NYISO_G-I	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NYISO_J-K	3	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
PJM_E	7	7	7	7	7	7	7	7	5	5	5	5	5	5	5	5	1	1	1	1	1	1	1	1
PJM_ROM	12	6	6	7	6	6	6	6	2	2	2	2	2	2	2	2	7	1	1	1	1	1	1	1
PJM_ROR	20	55	37	25	30	38	48	45	8	26	21	13	13	16	31	28	9	26	13	9	13	19	13	13
SOCO	10	22	21	15	20	20	21	21	8	10	10	10	11	10	12	12	0	0	0	0	0	0	0	0
SPP_N	3	27	42	67	53	42	37	38	2	0	0	0	0	0	0	0	0	26	41	66	52	42	37	37
SPP_S	8	35	47	45	47	42	42	43	2	0	0	0	0	0	0	0	3	33	46	43	45	40	40	41
TVA	8	8	8	8	8	7	9	9	4	6	6	4	4	6	7	7	0	0	0	0	0	0	0	0
VACAR	20	25	23	22	25	24	24	24	11	12	11	9	11	11	11	11	4	4	4	4	4	4	4	4
	165	404	411	421	429	443	421	420	75	109	101	86	81	92	117	115	49	226	244	268	275	284	240	240

\* F8S5 and F8S6 include intra-MISO CC and on-shore wind build adjustments. F8S6 also includes on-shore wind build adjustments for SPP, MISO\_W, MAPP\_US and NYISO\_A-F.

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## 2030 Energy Source by Future (Hard Limits, if Run)

- EI generation as a percent of demand, EI energy demand, and EI CO<sub>2</sub> emissions are shown below for 2030 for each Future.
  - Results for the Base transfer limits are shown for F1 (BAU), F4 and F7
  - Hard transfer limit results are shown for F2, F3, F5 and F6.
  - F8S1, F8S5 and F8S6 (OL75's) are shown for F8.
    - BAU is F1S3. Hard limits cases are F2S11, F3S12, F5S10, and F6S10.

**2030 EI Generation as Percent of EI Demand for Six Key Capacity Types, EI Demand, and EI CO<sub>2</sub> Emissions**

	BAU	F2 Hard	F3 Hard	F4B	F5 Hard	F6 Hard	F7B	F8S1	F8S5	F8S6
<b>CC</b>	25%	26%	37%	16%	15%	13%	19%	26%	28%	27%
<b>Coal</b>	38%	1%	2%	41%	32%	33%	39%	1%	0%	0%
<b>Nuclear</b>	22%	31%	32%	27%	23%	23%	27%	35%	35%	35%
<b>On-Shore Wind</b>	5%	30%	18%	5%	20%	13%	5%	28%	27%	27%
<b>Off-Shore Wind</b>	0%	0%	0%	0%	0%	4%	0%	0%	0%	0%
<b>Hydro</b>	5%	7%	7%	7%	6%	6%	6%	7%	7%	7%
<b>Total</b>	96%	96%	96%	96%	96%	91%	96%	96%	96%	96%
<b>Demand (TWh)</b>	3702	3248	3248	3008	3609	3609	3700	3008	3008	3008
<i>Change from BAU</i>		-12%	-12%	-19%	-3%	-3%	0%	-19%	-19%	-19%
<b>CO2 (MilMetricTons)</b>	1716	296	408	1367	1310	1316	1650	268	283	281
<i>Change from BAU</i>		-83%	-76%	-20%	-24%	-23%	-4%	-84%	-84%	-84%

## Next Steps

1. SSC selects which F8 soft constraint run (F8S1, F8S5 or F8S6) should be run as a hardened sensitivity.
2. The last remaining sensitivity is specified.