

Scenario Work Group Webinar: Implementing SPSC Study Requests

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State-Provincial Steering Committee

Topics

- Background: SPSC study request
- Proposal to implement scenarios
 1. High Load Growth sensitivity
 2. High DSM Scenario (DSM Work Group)
 3. Low Carbon scenario
 4. Breakthrough technology scenario

SPSC Study Request

1. Reference case: utility IRPs/plans (2020)
 - Utility IRP/resource plans with review by state regulators
 - Sensitivity for high load case
2. High DSM scenario (2020)
 - Energy efficiency, demand response, and CHP
3. Carbon reduction scenario (2020, 2030)
 - Waxman-Markey targets for reducing GHG
 - California's AB 32 GHG policy/targets
 - DSM, carbon adder, coal retirements, renewables
4. Breakthrough technology scenario (2020, 2030)
 - Impacts from breakthroughs on storage, PV, nuclear, IGCC, DSM, transmission , and other

Reference Case update

- **Loads**
 - DSM Work Group submitted to WECC on Aug. 6 state-adjusted loads from BA loads to adjust for existing state/provincial/federal DSM policies
- **Supply Resources**
 - RPS assumptions/methodology issued July 20 and reviewed by SPSC members
 - TEPPC's Studies WG completed draft renewable generation portfolio based on IRP and LRS data sets. Out for review on Sept. 3.
 - Final step to add conventional resources for loads & resource balance

High Load sensitivity

- LBNL will review sources to inform assumptions for high loads in 2020
 - IRPs with information on high load cases. Look for diverse geographic sample to guide high load assumptions across WECC
 - Consider load growth forecasts made in the 2007-2008 time frame for pre-recession expectations
 - Look at state historical growth rates
 - Fallback option to use simple across-the-board load adjustment

High DSM Scenario

- DSM WG working to construct High DSM assumptions
 - DSM WG developing memo that describes the approach to building this case
 - Look to existing studies that quantify potential DSM savings in geographic areas
 - Examine both energy efficiency and demand response
 - Full report by DSM WG at the SPSC meeting

Carbon Reduction Scenario

- 1. High DSM
 - Evaluate carbon reductions assuming the High DSM case loads and the renewable generation from the Reference Case.
- 2. Carbon price/adder
 - Run model with carbon price at different levels (e.g. \$20, \$40, and \$60/ton). Assumed carbon price increases coal generation costs relative to gas and shifts to more gas generation, and less CO₂ emissions.
 - Review model results for CO₂ reductions and examine how the model backed down coal plants.
- 3. Coal plant retirements
 - Identify coal plants likely to be retired based on existing retirement plans, likely retirement due to air quality regulations, input from air quality experts, model results from (2), and other information.
 - Possibly run model with one or more coal retirement options.
- 4. May require iterations
 - Information gleaned from Step 2 may suggest additional options for modeling carbon reductions

Comparison of WIRAB Series Cases

Case ID and Description	Annual Energy Total (GWh)	Variable Production Cost (\$1,000,000s)			CO2 Emissions (Million Metric Tons)		Coal		Natural Gas		Renewables	
		Oper Costs	CO2 Adder	Total	Diff From PC-1A'	Diff From 2005 Base (375 MMT)	GWh	% of Total Energy	GWh	% of Total Energy	GWh	% of Total Energy
PC-1A': 2017 Wind Heavy with increased NW loads and wind and solar shapes from PC-4 Series	1,059,519	23,875	0	23,875	407	407	288,609	27%	330,547	31%	93,283	8.8%
Difference						32						
% Difference						9%						
PC-1B': PC-1A' plus 20% energy efficiency	914,417	16,664	0	16,664	346	346	281,947	31%	205,846	22%	92,883	10%
Difference from PC-1A'	-145,102	-7,211		-7,211	-61	-29	-6,661		-124,701		-399	
% Difference	-14%	-30%		-30%	-15%	-8%	-2%		-38%		0%	
PC-1C': PC-1A' plus 20% energy efficiency and a \$20/ton-CO2 adder	913,879	16,807	7,487	24,295	340	340	274,932	30%	213,738	23%	93,344	10%
Difference from PC-1A'	-145,640	-7,068	7,487	420	-67	-35	-13,677		-116,808		62	
% Difference	-14%	-30%	31%	2%	-17%	-9%	-5%		-35%		0%	
PC-4A: WIRAB 15% Renewables	1,059,607	20,738	0	20,738	388	388	285,815	27%	274,461	26%	158,726	15%
Difference from PC-1A'	89	-3,137		-3,137	-19	13	-2,794		-56,086		65,443	
% Difference	0%	-13%		-13%	-5%	-9%	-1%		-17%		70%	
PC-4B: WIRAB 15% Renewables and 20% Energy Efficiency	916,000	14,075	0	14,074	324	324	272,037	30%	153,804	17%	156,881	17%
Difference from PC-1A'	-143,519	-9,800		-9,801	-83	-51	-16,572		-176,742		63,598	
% Difference	-14%	-41%		-41%	-20%	-14%	-6%		-53%		68%	
PC-4C-1: WIRAB 15% Renewables, 20% Energy Efficiency and \$60/ton-CO2 tax	913,354	19,846	13,165	33,012	199	199	87,684	10%	340,382	37%	152,300	17%
Difference from PC-1A'	-146,164	-4,029	13,165	9,137	-208	-176	-200,925		9,835		59,018	
% Difference	-14%	-17%	31%	38%	-51%	-47%	-70%		3%		63%	
PC-4C-2: WIRAB 15% Renewables, 20% Energy Efficiency and \$40/ton-CO2 tax	913,925	16,447	11,533	27,981	262	262	184,527	20%	242,894	27%	154,991	17%
Difference from PC-1A'	-145,594	-7,428	11,533	4,106	-145	-113	-104,082		-87,653		61,708	
% Difference	-14%	-31%	31%	17%	-36%	-30%	-36%		-26%		66%	
PC-4C-3: WIRAB 15% Renewables, 20% Energy Efficiency and \$20/ton-CO2 tax	914,823	14,291	6,925	21,217	314	314	259,786	28%	166,159	18%	157,051	17%
Difference from PC-1A'	-144,696	-9,584	6,925	-2,658	-93	-61	-28,823		-164,388		63,768	
% Difference	-14%	-40%	29%	-11%	-23%	-16%	-10%		-50%		68%	

Breakthrough Technology scenario

- Drop the 2020 Breakthrough Technology
 - Low likelihood of significant deployment of breakthrough technologies by 2020
- Consult with technology experts to guide selection of technologies in the 2030 scenario
 - Experts from utilities and other groups (e.g. EPRI)
 - Secure support from national labs
 - SPSC input will not be needed until Nov.-Dec since WECC needs to obtain and run long-term planning tool
 - Certain types of technologies may fit within groups/buckets given impact on transmission