

PacifiCorp 2011 IRP Portfolio Development Case Definitions - 10/05/10

Case #	Assumption Alternatives										PaR Model ^{19f}
	Carbon Policy		Gas Price	Load Growth	Renewable Production Tax Credit Extension and Wind Integration Cost ^{10f}	Renewable Portfolio Standards	Demand-Side Management	Distributed Solar ^{16f}	Coal Plant Retirements	Energy Gateway Transmission ^{18f}	
	Type Cap & Trade ^{1f} System Hard Cap ^{2f}	Cost Low ^{3f} Medium ^{4f} High ^{5f} Medium-High ^{6f}	Low Medium High	Low Econ. Growth ^{7f} Medium Econ. Growth High Growth ^{7f} Low Indust. Growth ^{8f} High Indust. Growth ^{8f} High Peak Demand ^{9f}	No PTC Extension PTC Extension to 2015 PTC Extension to 2030 Alt. Wind Integ. Cost	None Federal RPS ^{11f}	Medium Achievable ^{12f} High Achievable ^{12f} Class 3 Included ^{13f} Utah 50% Incentive ^{14f} Utah 75% Incentive ^{14f} Utah 100% Incentive ^{14f} Distribution Efficiency ^{15f}	No Incentives Current Incentives High Incentives	None Optimized ^{17f}	Base Scenario 1 Scenario 2 Scenario 3	
Energy Gateway Evaluation Cases											
EG1	Cap & Trade	Medium	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base	
EG2	Cap & Trade	Medium	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Scenario 1	
EG3	Cap & Trade	Medium	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Scenario 2	
EG4	Cap & Trade	Medium	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Scenario 3	
EG5	Cap & Trade	Medium	High	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base	
EG6	Cap & Trade	Medium	High	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Scenario 1	
EG7	Cap & Trade	Medium	High	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Scenario 2	
EG8	Cap & Trade	Medium	High	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Scenario 3	
EG9	Cap & Trade	High	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base	
EG10	Cap & Trade	High	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Scenario 1	
EG11	Cap & Trade	High	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Scenario 2	
EG12	Cap & Trade	High	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Scenario 3	
EG13	Cap & Trade	High	High	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base	
EG14	Cap & Trade	High	High	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Scenario 1	
EG15	Cap & Trade	High	High	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Scenario 2	
EG16	Cap & Trade	High	High	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Scenario 3	
Core Cases											
1	None	None	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
2	Cap & Trade	Low	Low	Low Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
3	Cap & Trade	Medium	Low	Low Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
4	Cap & Trade	Low	Medium	Low Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
5	Cap & Trade	Medium	Medium	Low Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
6	Cap & Trade	High	Medium	Low Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
7	Cap & Trade	Low	High	Low Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
8	Cap & Trade	Medium	High	Low Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
9	Cap & Trade	High	High	Low Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
10	Cap & Trade	Low	Low	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
11	Cap & Trade	Medium	Low	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
12	Cap & Trade	Low	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
13	Cap & Trade	Medium	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
14	Cap & Trade	High	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
15	Cap & Trade	Low	High	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
16	Cap & Trade	Medium	High	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
17	Cap & Trade	High	High	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
18	Cap & Trade	Low	Low	High Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
19	Cap & Trade	Medium	Low	High Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
20	Cap & Trade	Low	Medium	High Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
21	Cap & Trade	Medium	Medium	High Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
22	Cap & Trade	High	Medium	High Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
23	Cap & Trade	Low	High	High Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
24	Cap & Trade	Medium	High	High Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
25	Cap & Trade	High	High	High Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
Alternative Carbon Policy / Coal Plant Retirement Cases											
26	Cap & Trade	Medium	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	Optimized	Base/Scenario	X
27	Cap & Trade	Medium	Low	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	Optimized	Base/Scenario	X
28	Cap & Trade	High	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	Optimized	Base/Scenario	X
29	System Hard Cap	Medium	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	High Achievable	Current Incentives	Optimized	Base/Scenario	X
30	Cap & Trade	Medium-High	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	Optimized	Base/Scenario	X
Alternative Load Forecast Cases											
31	Cap & Trade	Medium	Medium	Low Industrial Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	
32	Cap & Trade	Medium	Medium	High Industrial Growth	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	
33	Cap & Trade	Medium	Medium	High Peak Demand	Extension to 2015	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	
Renewable Resource Cases											
34	Cap & Trade	Medium	Medium	Med. Econ. Growth	No Extension	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	
35	Cap & Trade	Medium	Medium	Med. Econ. Growth	Extension to 2030	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	X
36	Cap & Trade	Medium	Medium	Med. Econ. Growth	Extension to 2015	None	Medium Achievable	Current Incentives	None	Base/Scenario	
37	Cap & Trade	Medium	Medium	Med. Econ. Growth	Alt. Wind Integ. Cost	Federal RPS	Medium Achievable	Current Incentives	None	Base/Scenario	
DSM Expanded Potential Cases											
38	Cap & Trade	Medium	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	High Achievable	Current Incentives	None	Base/Scenario	X
39	Cap & Trade	Medium	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Class 3 Included	Current Incentives	None	Base/Scenario	
40	Cap & Trade	Medium	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Utah 50% Incentive	Current Incentives	None	Base/Scenario	
41	Cap & Trade	Medium	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Utah 75% Incentive	Current Incentives	None	Base/Scenario	
42	Cap & Trade	Medium	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Utah 100% Incentive	Current Incentives	None	Base/Scenario	
43	Cap & Trade	Medium	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Distribution Energy	Current Incentives	None	Base/Scenario	
Distributed Solar Case											
44	Cap & Trade	Medium	Medium	Med. Econ. Growth	Extension to 2015	Federal RPS	Medium Achievable	High Incentives	None	Base/Scenario	X
Business Plan Reference Case											
45	To Be Determined										X

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- 1/ Annual emissions targets: linear reduction to 80% below 2005 levels by 2050, starting in 2015. This approximates recent federal carbon legislative proposals. PacifiCorp will use an estimated annual allocated allowance schedule. The coal plant CO2 emission rate of 205 lbs/MMBtu is applied to system balancing spot market transactions and firm market purchases (front office transactions) at the start of CO2 regulations (2015), which assumes that sellers will retain cleaner generation to meet their own emission reduction requirements while expecting buyers to take on the CO2 risks of coal-based generation.
- 2/ Annual emissions capped at the emission targets outlined in footnote 1. The coal plant CO2 emission rate of 205 lbs/MMBtu is applied to system balancing spot market transactions and front office transactions at the start of CO2 regulations (2015).
- 3/ Starting at \$12/ton (2015\$) in 2015, with 5% annual escalation.
- 4/ Starting at \$19/ton (2015\$) in 2015, with 5% annual escalation.
- 5/ Starting at \$25/ton (2015\$) in 2015, with 7% annual escalation.
- 6/ Starting at \$19/ton (2009\$) in 2015, with 5% annual escalation through 2020; in 2020, escalating at 12% per year. Price reaches \$75/ton by 2030. Two portfolios will be developed. Portfolio 1 will represent a 20-year System Optimizer run. Portfolio 2 will represent the outcome of two System Optimizer runs; the first run will be a 10-year run, while the second run will be a 20-year run with the resources fixed per the initial 10-year run. These portfolios are intended to support analysis required in the Oregon Public Utility Commission's 2008 IRP acknowledgment order (Order No. LC 47), as well as the Oregon Commission's "Portfolio CO2 Risk Adaptability" IRP standard (Order No. 08-339).
- 7/ Low and High forecasts are two-percent decreases and increases, respectively, for economic drivers, relative to the medium forecast. Scenario details are yet to be determined.
- 8/ Low and High industrial load growth relative to the median forecast will be developed by the Load Forecast department in conjunction with Customer Account Managers. Scenario details are yet to be determined.
- 9/ A one-in-ten (10% probability of exceedance) high temperature load forecast.
- 10/ The "No Extension" assumption presumes that the federal production tax credit expires 12/31/12 for wind and 12/31/13 for other renewables. The PTC is currently \$21.5/MWh. The "Extension" assumption presumes that a PTC or equivalent incentive mechanism is in place for the duration of the simulation period (2011 - 2030). The Alternate wind integration cost assumes a lower (yet to be determined) cost than reported in PacifiCorp's September 1, 2010 wind integration study.
- 11/ Assumes a 3% energy requirement in 2015, escalating to 15% by 2025. This is in line with recently proposed federal legislation.
- 12/ Assumption alternatives constitute base and high achievable potential percentages informed by Cadmus Group and PacifiCorp DSM experience. Values to be determined.
- 13/ Class 3 DSM includes price-responsive load curtailment programs such as time-varying prices (Time of Use, Critical Peak pricing, etc.) and Demand Buyback programs.
- 14/ These three assumption alternatives are intended to meet Utah Public Service Commission DSM evaluation requirements. DSM will be modeled based on technical potential with the application of three utility incentive levels: 50% base, 75%, and 100%.
- 15/ PacifiCorp will evaluate whether a portfolio test that includes distribution energy efficiency (conservation voltage reduction) as a resource is practical and useful given available data. PacifiCorp is conducting a detailed study of distribution efficiency opportunities, but this study will not be completed in time to apply to the 2011 IRP.
- 16/ This case is intended to meet Utah Public Service Commission distributed solar evaluation requirements. Distributed solar (rooftop PV and solar water heating) will be modeled with aggressive (high) financial incentives in the form of a customer buy-down program.
- 17/ System Optimizer will select optimal coal plant retirement dates and replacement resources. Incremental environmental compliance, fueling, and decommissioning costs will be accounted for in coal plant costs. The simulation period will be extended to 2040 for the coal plant retirement cases.
- 18/ Scenarios are defined with the following Energy Gateway segments, which include capital costs:

Energy Gateway Scenarios			
Base	Scenario 1	Scenario 2	Scenario 3
Gateway Central*	Gateway Central	Gateway Central	Gateway Central
Sigurd - Red Butte	Sigurd - Red Butte	Sigurd - Red Butte	Sigurd - Red Butte
Harry Allen Upgrade	Harry Allen Upgrade	Harry Allen Upgrade	Harry Allen Upgrade
	Windstar - Populus	Windstar - Populus	Windstar - Populus
		Aeolus - Mona	Aeolus - Mona
			Populus - Hemingway
			H - B - CC **

* Populus - Terminal, Mona-Oquirrh

** Hemingway - Boardman - Cascade Crossing. Treated as a resource option in System Optimizer.

The "Hemingway - Boardman - Cascade Crossing" transmission project is treated as a resource option in Scenario 3 due to the dependency on the Populus to Hemingway segment. PacifiCorp will consider the System Optimizer results and other 2010 Energy Gateway studies to determine the Energy Gateway configuration to adopt for all other cases. This is necessary in order to recognize the long planning lead-time for transmission investment.

19/ The initial subset of portfolios to be simulated using PaR consists of the core cases plus a number of others based on the expectation that these portfolios will have materially different resource mixes than the core cases. PacifiCorp will determine the final PaR portfolios after inspecting all the portfolios for resource differences.