2015 Integrated Resource Plan
Stakeholder Comments and Recommendations
(As of 9/23/2014)

Topic	Organization	Source	Recommendation	Response / Proposed Resolution
Portfolio Development Cases				
CO2 Price	CUB	Feedback Form, August 22, 2014	"CUB recommends, in addition to a separate 111(d) default scenario and the separate carbon price only scenario, a synthesis of a carbon price with the 111(d) framework. The carbon price can start at $16.00 per short ton, beginning in 2022, escalating at a rate of 4.8% a year." "CUB agrees with the Company that the 111(d) proposed rule is still subject to scrutiny and change, however, this does not mean that we should assume that all other expectations of carbon regulation will be abandoned as a result of federal carbon policy."	**See case C13**, which pairs 111(d) compliance with a CO_2 price assumption. PacifiCorp will apply the CO_2 prices as recommended by the Clean Energy Scenario Stakeholders and as supported by ODOE. **See Case S11**, which applies a higher CO_2 price trajectory as compared to C13.
CO2 Price	Clean Energy Scenario Stakeholders ODOE concurred with request	Feedback Form, August, 20, 2014 ODOE Feedback Form September 5, 2014	CO2 Core Case Price Proposal: "A full "CO2 Price" case with a 2034 value of $52/short ton CO2, starting from an initial level of $20 in 2020 (we suggest using Core Case Matrix case C13). The recommended value of $52 has recently been adopted by the Transmission Expansion Policy Planning Committee (TEPPC) of the Western Electricity Coordinating Council for the 2015 WECC transmission plan as the value for the 2034 reference case. The WECC analysis (attached) combines all available public inputs, including utility IRPs, the Northwest Power and Conservation Council, LBNL, the draft federal guidance on social cost of carbon, EIA and Synapse to arrive at this result. We propose that this case be run in conjunction with the full 111(d) analysis to capture the interactive effects of both." The linear interpretation of CO2 prices (2014$/short ton): Year $/ton 2020 20 2021 22 2022 25 2023 27	**See case C13**, which pairs 111(d) compliance with a CO_2 price assumption. PacifiCorp will apply the recommended prices for this case. Note, on a nominal basis, the 2020 price starts at approximately $22/ton rising to approximately $76/ton by 2034, the end of the 2015 IRP planning horizon. **See Case S11**, which applies a higher CO_2 price trajectory as compared to C13.

			2024 29 2025 31 2026 34 2027 36 2028 38 2029 41 2030 43 2031 45 2032 47 2033 50 2034 52	
CO2 Price	IEA	Feedback Form, August 14, 2014	"In addition to Sec 111d assumptions, include carbon costs, with a mid-range of $56/tonne (based on Federal Social Cost of Carbon, with a 3% discount rate)".	**See case C13**, which pairs 111(d) compliance with a CO_2 price assumption. PacifiCorp will apply the CO_2 prices as recommended by the Clean Energy Scenario Stakeholders and as supported by ODOE. **See Case S11**, which applies a higher CO_2 price trajectory as compared to C13.
111(d)	Clean Energy Scenario Stakeholders	Feedback Form, August, 20, 2014	"We ask the Company to consider running one or more scenarios that change the order of the 111(d) scenario maker modeling framework by reordering the spreadsheet modeling dispatch to : (1) renewables; (2) other; (3) new NGCC; and (4) existing NGCC." "One proposal is for the Company to include a scenario that assumes that every state can reach the 1.5% load achievement used by the EPA in the target setting. We are open to other proposals for how to better incorporate energy efficiency resources in the 111(d) modeling, and welcome continued dialogue on this point."	**See cases C02 through C04 and cases C05 through C07.** These cases have been redesigned to accommodate alternative compliance strategies, including a strategy targeting EE up to 1.5% of retail sales and a strategy targeting EE and RE at levels up to those assumed in EPA's calculation of state targets.
111(d)	IEA	Feedback Form, August 14, 2014	"When modeling for 111d, is it possible to reverse the order of the assumptions, so that renewables are the first input, essentially reversing the order of application of each Building Block? If some limits are required to avoid overstating possible renewable assumptions, the trigger point analysis could potentially provide a rational limitations. In other words, to the extent of the trigger point, what is the modeling result if renewables are added first to comply with Sec. 111d?"	**See cases C02 through C04 and cases C05 through C07.** These cases have been redesigned to accommodate alternative compliance strategies, including a strategy targeting EE up to 1.5% of retail sales and a strategy targeting EE and RE at levels up to those assumed in EPA's calculation of state targets.

Sensitivity Cases				
CO2 Price	Clean Energy Scenario Stakeholders ODOE concurred with request	Feedback Form, August, 20, 2014 ODOE submitted Feedback Form September 5, 2014	CO2 Sensitivity Case Price Proposal: "A "High CO2 Price" sensitivity case using a 2034 value of $111/short ton CO2, starting from an initial value of $20 in 2020 (we suggest using Scenario Case S11). This value is used by CEC in their high case for California AB 32 cap-and-trade in 2034. Other approaches are possible but we believe the CEC analysis is thorough and observe that the California carbon pricing program will have significant influence on the rest of the western region. Consideration of a high value is appropriate in a context where policy makers focus on the tail risk of climate change and decide to take on an "insurance" approach to potential climate impacts." The linear interpretation of CO2 prices (2014$/short ton): Year $/ton 2020 20 2021 27 2022 33 2023 40 2024 46 2025 53 2026 59 2027 66 2028 72 2029 79 2030 85 2031 92 2032 98 2033 105 2034 111	**See case S11**, which pairs 111(d) compliance with the recommended CO_2 price assumption. Note, on a nominal basis, the 2020 price starts at approximately $22/ton rising to approximately $162/ton by 2034, the end of the 2015 IRP planning horizon.
Solar	Clean Energy Scenario Stakeholders ODOE concurred with	Feedback Form, August, 20, 2014 ODOE	Scenario proposals:* (a) "Medium Solar PV Breakthrough" analysis (proposed Scenario Case S12a). See table 2 line 47 of the attached spreadsheet. For example, current residential rooftop costs (kW/dc) are $4,809, declining to $1,855 in 2034.	**See cases S12 and S13**, PacifiCorp is willing to work with parties as requested to finalize definitions for the proposed sensitivities. Note, PacifiCorp cannot to produce new DG penetration scenarios and recommends applying trigger point cost

	request	Feedback Form September 5, 2014	(b) "High Solar PV Breakthrough" analysis (proposed Scenario Case S12b). See Table 2, line 48 of the spreadsheet. Residential rooftop costs would be $1,537 in 2034. *The Clean Energy Stakeholders offer to work with the Company to provide annual interpolations for proposed cost trajectories. The referenced attachment includes 2034 prices for: • Commercial rooftop ($1,507 for the proposed S12a case and $1,249 for the proposed S12b case) • Fixed tilt sized between 1-20 MW ($1,552 for the proposed S12a case and $1,286 for the proposed S12b case) • Tracking sized between 1-20 MW ($1,540 for the proposed S12a case and $1,276 for the proposed S12b case) • Fixed tilt > 20 MW ($1,318 for the proposed S12a case and $1,092 for the proposed S12b case) • Tracking > 20 MW ($1,338 for the proposed S12a case and $1,109 for the proposed S12b case)	assumptions to utility scale solar resources, but pairing these cases with High DG penetration sensitivities. As a result, the comparator for these sensitivities would be case S05.
Clean Energy Scenario	Clean Energy Scenario Stakeholders ODOE concurred with request	Feedback Form, August, 20, 2014 ODOE submitted Feedback Form September 5, 2014	"Finally we propose a new case, which could be designated Scenario Case S14, to combine the interactive effects of the CO2 price (Base Case C13) and the Medium Solar PV Breakthrough (Scenario Case S12a)." "We would also like to request a PaR analysis for this scenario case."	PacifiCorp will consider adding this case as time and resources permit in advance of filing its 2015 IRP in March 2015. At this time, PacifiCorp cannot commit to adding an additional sensitivity in addition to the proposed S12 and S13 sensitivities.
CO2 Price	IEA	Feedback Form, August 14, 2014	"And [include] a sensitivity of $80/tonne (federal Social Cost of Carbon with a 2.5% discount rate) and a sensitivity case of a high carbon price of $125/tonne (federal Social Cost of Carbon with a 3% discount rate), in order to provide some bookend information"	**See case S11**, which pairs 111(d) compliance with CO_2 price assumptions recommended by the Clean Energy Scenario Stakeholders and as supported by ODOE. Note, on a nominal basis, the 2020 price starts at approximately $22/ton rising to approximately $162/ton by 2034, the end of the 2015 IRP planning horizon.

Other				
Data Access	OPUC Staff	Feedback form June 11, 2014	We request that data disks that will be provided with the 2015 IRP, not only contain modeling results, but also model inputs	PacifiCorp is planning to file data disks with its 2015 IRP for key model inputs and outputs.
DSM	UAEU	Feedback form July 10, 2014	Further discussion is requested on the appropriate cost-benefit tests and characteristics of DSM programs that should properly be considered as potential IRP resources, for Utah and for other states.	Costs for DSM programs are implemented in IRP modeling consistent with the cost-benefit methodology used to evaluate program delivery cost-effectiveness criteria in each state (utility cost for Utah and total resource cost in other states). Please refer to slide 65 from the 2015 IRP public input meeting held July 17-18, 2014, available on PacifiCorp's IRP website: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2015IRP/PacifiCorp_2015IRP_PIM02_7-17-18-2014.pdf
Number of portfolios – scenarios	DPU	Feedback form July 25, 2014	The Division recommends that the Company continue to manage the number of portfolio cases and sensitivity studies, in order to fully complete the IRP on schedule.	PacifiCorp intends to complete all core cases with the planned PaR scenarios identified in the September 24-25, 2014 public input meeting, targeted sensitivity cases in System Optimizer, and Volume III coal studies in System Optimizer. To facilitate meeting the schedule, PacifiCorp is limiting incremental sensitivity requests on an "as time permits" basis. Similarly, PacifiCorp PaR runs on sensitivities will be performed on an "as time permits" basis.
Data presentation	John Klingele	Feedback form July 31, 2014	Suggestions related to presentation of load forecast graphs in 2015 IRP.	PacifiCorp has not yet determined how it will present data in the 2015 IRP when filed in March 2015. As the document is prepared, PacifiCorp will consider these recommendations.
Solar Assumptions	NWEC	Feedback form August 7, 2014	Recommendations: 1. Adopt WECC recommendations -- conversion ratios of 1.40 for fixed tilt (utility scale), 1.30 for tracking (utility scale) and 1.20 (rooftop). 2. Continue to assess dc>ac conversion factors in key market segments going forward. 3. Consider potential for advanced inverters and other load-side devices to provide ancillary services and decrease the need for conventional resources to provide same.	Current numbers in SSR are 1.37 for fixed tilt and 1.34 for tracking. Navigant provided estimates for rooftop energy via their DG study. Additionally, a lower number may lead to lower initial costs, but not necessarily lower costs of energy. Based on the E3 study, the cost of fixed tilt systems would increase. Conversion numbers would not be dictated in a design specification. The EPC design the system to meet objectives (lowest LCOE, greatest on peak energy contribution, etc.) PacifiCorp is aware of the reactive power capabilities of smart inverters; these are attributes and benefits which would be addressed during the resource interconnection process.

CVR Study	UCE on behalf of WRA and SWEEP	Feedback form August 12, 2014	"SWEEP and WRA believe that the CVR analysis in the last PacifiCorp IRP is badly out of date and needs revision, and that CVR offers significant cost-effective energy savings potential in the PacifiCorp service territory as is the case elsewhere. We request that this topic be included in one of the upcoming IRP stakeholder meetings."	CVR is on the agenda for the September 24-25, 2014 public input meeting.
Nuclear Costs	BCH	Feedback form August 14, 2014	Issue with assumed costs for nuclear power plants. "We recommend that BCH be permitted to review the IRP Supply Side Resources, Performance and Cost Summary for Advanced Fission nuclear resource and provide justifiable updates."	Two studies informed the costs for both capital and O&M figures cited. One prepared by the Energy Information Agency (EIA), , "Updated Capital Cost Estimates for Electricity Generation Plants" the other by the Bureau of Economic and Business Research, David Eccles School of Business, University of Utah "A Review of the Costs of Nuclear Power Generation". They can be found at the following links: http://www.eia.gov/oiaf/beck_plantcosts/pdf/updatedplantcosts.pdf http://bebr.business.utah.edu/sites/bebr/Documents/studies/Nuclear_Report_Final_Web_7Mar2012.pdf The EIA study was updated in 2013 and can be found at: http://www.eia.gov/forecasts/capitalcost/pdf/updated_capcost.pdf PacifiCorp is currently reviewing the cost assumptions and will provide updates at a later date. Should nuclear resources be identified as part of a least cost, least risk portfolio in the 2015 IRP, PacifiCorp will address nuclear cost risks in its 2015 IRP filing.
Wind/Solar cost & performance	IEA	Feedback form August 14, 2014	"PacifiCorp should model similar costs [referencing bid portfolio summary from PSCo] with 38% capacity values based on Wyoming wind potential." "PacifiCorp should perform a trigger point analysis to reflect what price points would result in additional penetration of wind energy, for substantial (greater than 250 MW) capacity amounts to be acquired prior to 2020." "Utility-scale PV solar average energy prices have fallen from $0.21/kW in 2010 to $0.11/kWh at the end of 2013. Weighted	PacifiCorp reviewed the referenced PSCo report provided, and notes all bid cost data on pages 10-15 are redacted. The reference to Table 9, shows PSCo system PVRR data, not resource cost data. Capacity values are specific to a system – PacifiCorp is completed an updated its capacity contribution study for the 2015 IRP using a LOLP-based capacity factor approximation method. Results are shown in the September 24-25, 2014 public input meeting presentation materials. As time permits prior to filing its 2015 IRP, PacifiCorp will consider performing a wind resource trigger point sensitivity,

			average system prices fell 15% in 2013 to a low of $0.25/kWh. PacifiCorp modeling should reflect these low prices." "PacifiCorp should perform trigger point analysis to reflect what prices would result in additional penetration of significant amounts of utility scale solar energy by 2018 and by 2020, in part to capture the incentive tax credit higher valuables which expire soon."	but cannot commit to completing this requested sensitivity at this time. PacifiCorp has consistently updated its utility scale solar PV costs, and current estimates are generally aligned with the trends referenced in the provided DOE report. **See cases S12 and S13**, designed as utility scale trigger point analysis.
Least-cost IRP approach and allocation of RPS costs	NLRA	Feedback form August 15, 2014	NLRA's concern with respect to development of the Company's 2015 IRP is straightforward: Will it, in the end, fulfill PacifiCorp's overriding obligation to ensure reliable electric service at the lowest practicable cost for the customers that rely on it?	PacifiCorp's IRP is designed to evaluate costs and risks in light of future uncertainties. PacifiCorp's preferred portfolio and associated action plan, supported by extensive analysis, will establish a least cost, least risk plan.
Modeling Question	ODOE	August 19 Email	Are you planning to run all of the sensitivity cases through PaR? If not, which ones will you run through PaR? At the last meeting you indicated that the Storage case (S06) would be run through PaR. Any others?	PacifiCorp intends to run sensitivities through PaR; however, PaR runs for sensitivities will be performed on an "as time permits" basis.
Modeling Question	WCEC	August 19, 2014 Email	"Can you share with us your plans to (or not to) release draft Core Case Fact Sheet or similar info for the 2015 IRP? In particular, will participants in the public IRP process have a chance to comment on the Core Case assumptions prior to finalizing them?"	Fact sheets will be provided upon completion of forward price curve assumptions, as discussed at the September 24-25, 2014 public input meeting.
Renewable Capacity Values	RN	Feedback form August 21, 2014	"Renewable Northwest suggests that method 2) would be more appropriate (simply unweighting the capacity factor by the LOLP would yield the result) and still be in compliance with the directive of the Utah Public Service Commission. Renewable Northwest would also like to see the capacity credit calculated using the simplest approximation to an ELCC, method 1), which considers the average capacity factor during the top 10% load hours." 1) the average capacity factor during the peak-load hours; 2) the capacity factor during the peak-LOLP hours; and 3) the capacity factor during the peak-LOLP hours, where the capacity factor is weighted by the LOLP.	PacifiCorp will adopt capacity contribution assumption from its capacity factor approximation method (weighted by LOLP) study when developing portfolios in the 2015 IRP. PacifiCorp believes that the CF Method weighted by LOLP is the most appropriate of the three for the same reason stated by NREL: "the intuition behind the weighting in CF approximation is that the capacity provided by the PV is especially needed during hours with higher LOLPs." As a result, if one is going to look at LOLP for assigning capacity contribution to intermittent resources, a weighting is appropriate to ensure credit is given when LOLP is highest. PacifiCorp has reviewed the 1997 NREL study referenced in Renewable Northwest's comments. In review of the 1997 study, PacifiCorp did not see a reference in this study concluding that "method 2) (referred to as the LOLP method) should be used over method 3) (referred to as the "weighted method") because it is closest to an actual ELCC

				calculation." The study notes that the "weighted method" did not perform well in this instance. However, the authors note that they suspect this was because of shortfalls in the data it was able to use, which was further noted as a study caveat at page 4.
Transmission	UOCS	Feedback form August 25, 2014	Questions on transmission reinforcements associated with coal analysis. "We urge the Company to provide transparency on these transmission reinforcement costs and provide background information and details on these costs to stakeholders prior to the completion of the 2015 IRP. The Utah OCS would also like clarification from the Company on whether these transmission reinforcement costs will be incorporated in other scenarios or Cases where generating units are added or retired."	PacifiCorp will be transparent and identify/describe transmission reinforcement costs applied in the 2015 IRP. Transmission reinforcement costs will be identified in each case.
Nuclear Costs	HEAL Utah	Feedback form August 28, 2014	Recommends base capital costs of $9,624 per KW for nuclear plant based on 'negative learning' as seen in France nuclear build out from 1970-2000.	PacifiCorp is reviewing the cost estimates and will provide updates at a later date. Should nuclear resources be identified as part of a least cost, least risk portfolio in the 2015 IRP, PacifiCorp will address nuclear cost risks in its 2015 IRP filing.
Resource costs	HEAL Utah	Feedback form August 27, 2014	Request to show levelized costs in cents per kilowatt-hour for resources.	PacifiCorp will provide levelized costs for supply side resources in its 2015 IRP (typically in $/MWh). Current priorities are to prepare model inputs so that portfolio modeling can commence (levelized costs are not an input in to the model). Levelized cost information will be made available as soon as practicable.
Solar Resources	HEAL Utah	Feedback form August 27, 2014	Inclusion of additional solar resources with capacity factors and costs per KW for two resources represented by the average of capacity values and costs of recently signed Qualifying Facility Power Purchase Agreements for solar projects in Southern Utah.	PacifiCorp will not be modeling SSR resource alternatives for solar PPAs tied to recently executed QF contracts. An executed contract does not obligate the QF developer to build the project, and at this time, it is not certain whether these projects can be built at pricing established in the PPAs executed with QF developers in Utah. PacifiCorp began modeling geothermal resources as PPAs in its 2013 IRP to address dry-hole risk, which is unique to this resource category and not applicable to development risks associated with solar projects.
EPA BART timing for Utah	WCEC	Feedback form August 28, 2014	Issues with timing of the BART decision for Hunter and Huntington: "Pacificorp's assumption about the timing of EPA's finalization of its Utah BART rule runs contrary to EPA's statutory mandate to finalize its regional haze rule on a date between October 30, 2014-January 14, 2015 resulting in installation of BART controls on all four units in October 2019-January 2020 rather than	As stated during the August 7 & 8, 2014, Integrated Resource Plan workshop, PacifiCorp cannot speak for the state of Utah nor the U.S. EPA regarding their intended Regional Haze BART actions for Hunter Unit 1 & 2 or Huntington Units 1 & 2. However, for purposes of analyzing potential Regional Haze compliance scenarios in its IRP, and

			in 2021/2022."	in the absence of any current compliance obligations regarding installation of selective catalytic reduction ("SCR") or other controls on the subject units, PacifiCorp has developed three hypothetical Regional Haze compliance alternative cases based primarily upon PacifiCorp's general understanding of past state and federal Regional Haze rulemaking timelines across the industry and the potential legal proceedings that may follow. PacifiCorp believes that the three hypothetical Regional Haze compliance alternative cases developed for the subject Hunter and Huntington units will prove informative in the IRP setting regardless of the timing of the state of Utah's or EPA's ultimate Regional Haze BART actions for those facilities.

1/ Organization Acronyms:

CUB = Citizens' Utility Board of Oregon
ODOE = Oregon Department of Energy
NWEC = Northwest Energy Coalition
HEAL = Healthy Environment Alliance of Utah
IDCL = Idaho Conservation League
MESA = Mormon Environmental Stewardship Alliance
PRBRC = Powder River Basin Resource Council
RN = Renewable Northwest
SC = Sierra Club
IEA = Interwest Energy Alliance
OPUC Staff = Oregon Public Utility Commission Staff
UAEU = Utah Association of Energy Users
IPUC = Idaho Public Utilities Commission
Clean Energy Scenario Stakeholders includes: NWEC, HEAL, IDCL, MESA, PRBRC, RN, and SC
BCH = Blue Castle Holdings, Inc.
SWEEP = Southwest Energy Efficiency Project
NLRA = Northern Laramie Range Alliance
WCEC = Western Clean Energy Coalition
UOCS = Utah Office of Consumer Services
UCE = Utah Clean Energy
USMag = U.S. Magnesium / Roger Swenson
UAE = Utah Association of Energy Users
UPSC = Public Service Commission of Utah
WRA = Western Resource Advocates