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BEFORE THE OREGON PUBLIC UTILITIES COMMISSION

In the Matter of

IDAHO POWER COMPANY'S

2017 Integrated Resource Plan

Docket LC 68

SIERRA CLUB'S FINAL COMMENTS

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1. INTRODUCTION

Sierra Club appreciates the opportunity to provide these final comments on Idaho Power Company's (IPC) 2017 Integrated Resource Plan (IRP). This document builds upon many points raised in Sierra Club's initial comments and was prepared with the assistance of Synapse Energy Economics. These comments primarily respond to certain inaccurate and misleading statements contained within IPC's reply comments and identify next steps toward addressing the deficiencies in IPC's IRP.

2. SUMMARY AND RECOMMENDATIONS

Overall, IPC's reply comments did not provide sufficient explanations for the numerous errors and flaws identified in Sierra Club's initial comments. We remain convinced that IPC's IRP relies on an inadequate portfolio design structure, unreasonable cost assumptions for renewable and battery storage resources, understated cost-effective energy efficiency potential, unreasonable coal price expectations, and several analytical errors. We are further concerned by the lack of evaluation of the economic status of Jim Bridger Units 3 and 4 in this IRP.

Ultimately, Sierra Club supports several of the action plan items proposed in IPC's IRP. We endorse IPC's plan to participate in the western Energy Imbalance Market (EIM), which will enable IPC to reduce costs and more easily integrated renewable resources. We agree with IPC's plans to retire the uneconomic North Valmy Units 1 and 2 in 2019 and 2025, respectively. We support the pursuit of all cost-effective energy efficiency.

However, Sierra Club opposes IPC's proposal to plan around retirement dates of 2028 for Bridger Unit 2 and 2032 for Bridger Unit 1. This proposal is likely neither legal nor least cost. Based on the evidence presented in this IRP, IPC should plan its exit from Bridger Unit 2 in

2021 and from Bridger Unit 1 in 2022. IPC should start negotiating with its co-owner PacifiCorp now, to enable its exit at those dates.

In addition, IPC should promptly evaluate the economic status of Bridger Units 3 and 4. This evaluation should have been, but was not, included within this IRP. Finally, Sierra Club recommends that the Commission require IPC to remedy each of the errors identified in these comments, Sierra Club's initial comments, and the comments of other intervenors, in future IRPs.

3. IPC STILL HAS NOT PROVIDED AN ADEQUATE EXPLANATION FOR ITS LACK OF CAPACITY EXPANSION MODELING

In opening comments, Sierra Club and Staff both identified a lack of capacity expansion modeling as a fundamental flaw in IPC's IRP.¹ In the absence of such modeling, IPC cannot verify that *any* of the portfolios analyzed through the IRP are least cost or least risk. The Company's attempted justifications for its manual portfolio design process are unconvincing.

According to IPC, "its specific portfolio selection in this IRP was appropriate because it allowed for levelized, dollar-per-MWh comparison of the most cost-competitive resources, while fulfilling the projected capacity deficiencies."² First, this statement makes no sense. Calculation of the levelized costs of various resources should happen outside the context of portfolio selection, based on factors specific to a given technology rather than on portfolio-level analysis. In any case, the Company's manually constructed portfolios do not allow for the isolation and evaluation of a particular resource's impact on portfolio costs. Although IPC describes its portfolio design construct as isolating certain resource decisions, the variation across IPC's portfolios undermines that claim.³

Second, the Company should be well aware that a "levelized, dollar-per-MWh" cost comparison cannot be the sole basis for selecting resources to contribute to a least-cost portfolio. Other relevant factors include the avoided energy costs associated with the hours in which a resource generates energy, as well as the resource's capacity value, modularity, and ramping ability. These factors are reflected in part by IPC's finding that its least-cost portfolio includes 180 MW of reciprocating engines and zero solar, despite solar offering a lower levelized cost of energy than reciprocating engines.⁴

¹ Sierra Club Comments at 3-5; Staff's Opening Comments at 14.

² IPC Reply Comments at 44-45.

³ IPC IRP at 98-107; *see also* Sierra Club Comments at 5-7.

⁴ IPC IRP at 89, 103.

IPC further defends its portfolio design based on its use of “the most cost-effective resources that, when combined, provided an acceptable level of reliability.”⁵ This is not an acceptable justification. While some form of cost-effectiveness screening may be a reasonable way to limit the number of options available to a capacity optimization model, only rigorous modeling can determine the *least-cost combination* of cost-effective resources that satisfies reliability and regulatory constraints.

Finally, according to IPC, including additional resources in its portfolio design process would only have yielded “a more diverse array of costly alternatives.”⁶ This statement is only true in IPC’s world of manually selected portfolios. Including additional resources as selectable options under a capacity expansion model framework cannot possibly lead to a higher-cost alternative. Under industry-standard optimization models, resources are only added to a portfolio if they result in lower costs.

IPC’s reply comments do acknowledge the portfolio design concerns raised by Sierra Club and Staff, and state that the Company “is amenable to evaluating capacity expansion modeling and more diverse portfolio selections in the 2019 IRP cycle.”⁷ Sierra Club appreciates that IPC is willing to conduct more rigorous modeling in future IRPs. To ensure that the Company follows through on this improvement, we recommend that the Commission require that future IRPs include capacity expansion modeling.

4. IPC HAS FAILED TO ESTABLISH THE LEGAL VIABILITY OF ITS PREFERRED PORTFOLIO

Sierra Club’s initial comments show that half of the portfolios evaluated in IPC’s IRP – including the preferred portfolio – are currently unlawful.⁸ Under regulatory requirements associated with the Regional Haze rule, IPC is required to either install selective catalytic reduction (SCR) systems at Bridger Units 1 and 2 by 2022 and 2021, respectively, or else cease operation of the Bridger units by those years. IPC nevertheless continues to assert that its selected portfolio – in which Bridger Units 1 and 2 continue to operate without SCRs until 2032 and 2028, respectively – reflects “reasonable planning based on established precedent.”⁹ That assertion is directly contrary to the Clean Air Act.

⁵ IPC Reply Comments at 45.

⁶ *Id.*, at 46.

⁷ *Id.*, at 44.

⁸ Sierra Club Comments at 7-8.

⁹ IPC Reply Comments at 51.

As evidence for the reasonableness of its preferred portfolio, IPC points to the case of Portland General Electric Company's (PGE) Boardman coal plant, for which PGE negotiated an alternative compliance plan that included installation of less expensive controls and an earlier retirement date instead of installation of SCR.¹⁰ However, IPC leaves out some key differences between the Boardman plant agreement and IPC's proposed plan for Bridger Units 1 and 2. These differences show why IPC's preferred portfolio does not present a legal alternative to SCR installation in the way that the Boardman alternative plan did.

The Boardman plant began operations in 1980.¹¹ Using a typical 60-year plant life assumption, PGE initially assumed an end-of-life date of 2040 for the Boardman plant.¹² Under Oregon's implementation of the federal Regional Haze rule, PGE was initially faced with a decision between either installing SCR at Boardman or retiring the plant by 2017.¹³ Under the alternative plan that was ultimately approved by the Commission, the Oregon Department of Environmental Quality, and the United States Environmental Protection Agency, PGE committed to shutting down the Boardman plant by the end of 2020 in return for a reprieve from the requirement to install SCR controls.¹⁴ In other words, the alternative Boardman compliance plan substituted three years of operating without SCR for 23 years of operating with SCR. Under the assumption that SCR reduces emissions of oxides of nitrogen (NO_x) by 85 percent or less, the revised Boardman plan will result in lower lifetime NO_x emissions than the original plan.¹⁵ Thus, PGE could make the case that its alternative plan was environmentally superior to the default Best Available Retrofit Technology (BART) approach to reducing NO_x emissions under the Clean Air Act.

IPC cannot make the same argument here for its preferred portfolio. Bridger Units 1 and 2 began operating in 1974 and 1975, respectively.¹⁶ Assuming a 60-year lifetime, these units would retire in 2034 and 2035. This matches IPC's most recent Idaho depreciation study, which "utilized a probable retirement year of 2034 for all four units at the Bridger plant."¹⁷ Under IPC's preferred

¹⁰ *Id.*

¹¹ U.S. Energy Information Administration. Form EIA-861. Available at <https://www.eia.gov/electricity/data/eia861/>.

¹² *PGE 2009 Integrated Resource Plan* at 292. Available at <http://edocs.puc.state.or.us/efdocs/HAA/lc48haa151359.pdf>.

¹³ *Id.*, at 293.

¹⁴ Oregon Public Utility Commission Order No. 10-457 in Docket LC 48.

¹⁵ SCR systems are often designed to meet control targets of over 90 percent, but the reduction may be less than 90 percent when SCR follows other NO_x controls such as Low NO_x burners, which PGE had already committed to implementing at Boardman. John L. Sorrels et al. U.S. Environmental Protection Agency. May 2016. *EPA Air Pollution Control Cost Manual* Chapter 2: Selective Catalytic Reduction, at 2-2. Available at https://www3.epa.gov/ttn/ecas/docs/SCRCostManualchapter7thEdition_2016.pdf.

¹⁶ U.S. Energy Information Administration. Form EIA-861.

¹⁷ IPC's Response to Sierra Club Data Request No. 1-16(a)

portfolio, IPC would continue to operate Bridger Unit 1 without SCR until 2032 rather than installing SCR in 2022 and continuing to operate the unit until the end of its useful life. Similarly, IPC is proposing to continue to operate Bridger Unit 2 without SCR until 2028 rather than installing SCR in 2021 and continuing to operate the unit until the end of its useful life. In other words, IPC proposes to substitute 10 years of operation without SCR for 12 years of operation with SCR at Unit 1, and seven years of operation without SCR for 13 years of operation with SCR at Unit 2. Even if SCR were to reduce emissions by only 50 percent – far lower than typical SCR emission reduction achievements – IPC’s proposed plan would result in increased lifetime emissions at both units relative to the baseline plan. It would not be possible for IPC to show that the proposed plan is “better than BART,” and therefore worthy of a waiver of the current Clean Air Act deadlines.

IPC’s reply comments argue that Sierra Club’s contention regarding the illegality of the preferred portfolio is rooted in “a difference of opinion concerning regulatory behavior—not a legal or statistical argument.”¹⁸ This is a clear mischaracterization. Sierra Club’s argument regarding the illegality of the preferred portfolio is rooted in the plain fact that, under the Clean Air Act, that portfolio is illegal. Our point is further supported by facts and legal arguments laid out both here and in our initial comments. IPC has not demonstrated that its preferred portfolio is likely to achieve the necessary “better than BART” designation. Further, Sierra Club has established that the preferred portfolio would almost certainly not achieve such a designation. Absent a “better than BART” determination from state and federal agencies, IPC’s preferred portfolio will remain federally unlawful.

IPC’s final defense of the range of Bridger SCR and retirement options it considered is that those options were intentionally selected to correspond to those contained in PacifiCorp’s most recent IRP.¹⁹ While it is certainly prudent for IPC to work together with PacifiCorp on Bridger retirement issues, IPC cannot abdicate responsibility for important decisions like planned retirement dates, especially when PacifiCorp’s decisions are clearly flawed. If PacifiCorp insists on planning to operate Bridger Units 1 and 2 without SCR beyond 2022 and 2021, then IPC should explore options for divesting itself from those units by the dates at which SCR is required, rather than exposing itself to Clean Air Act violations.

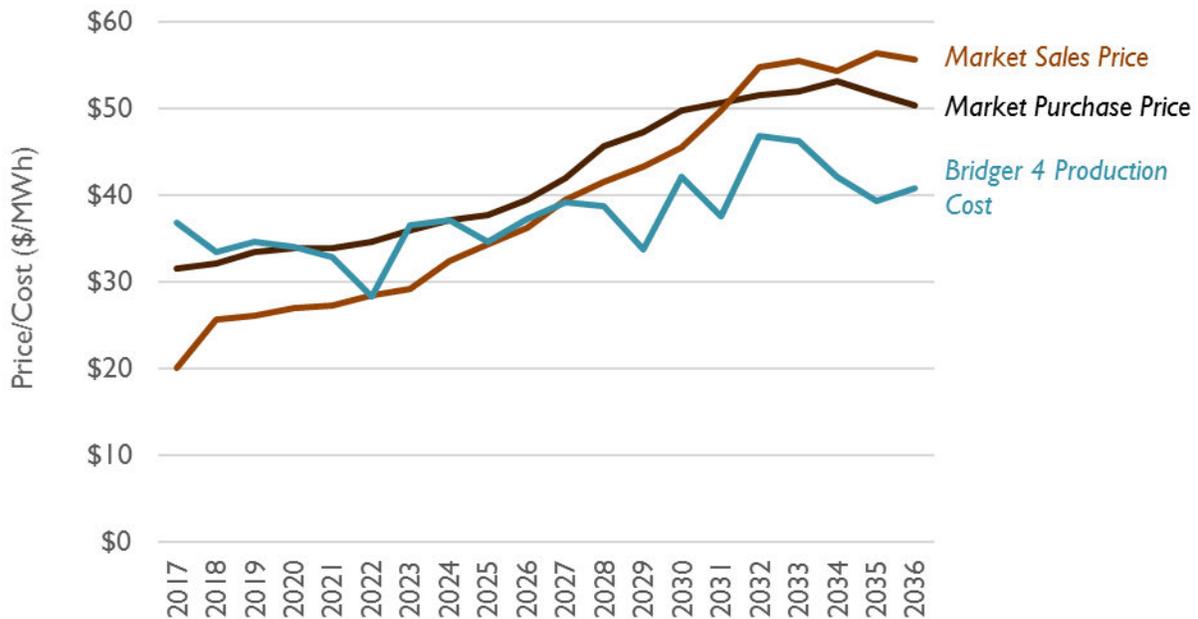
¹⁸ IPC Reply Comments at 51.

¹⁹ *Id.*, at 57.

5. IPC HAS NOT SHOWN THAT THE BRIDGER UNITS ARE ECONOMIC

IPC devoted a section of its reply comments to the claim that “the Jim Bridger units remain economic resource options.”²⁰ However, IPC did not provide any evidence to support this claim. In contrast, Sierra Club’s opening comments demonstrate that IPC’s own modeling indicates that, even under assumptions that are unreasonably favorable to the Bridger plant, neither Bridger Unit 1 nor Bridger Unit 2 is an economic resource.²¹ Since IPC’s IRP modeling did not contain any information regarding future fixed costs at Bridger Units 3 or 4, it is not obvious what IPC’s modeling would show regarding the long-term economic status of these units. Nonetheless, IPC’s files show that, over the short term, Bridger Units 3 and 4 are both expected to incur net operational losses, without accounting for any fixed costs. Figure 1 shows that for nearly every year between now and 2025, IPC forecasts that Bridger Unit 4 will incur variable production costs that are greater than the average price IPC will receive for energy it sells on the market. The same general picture holds for Bridger Unit 3.

Figure 1. IPC forecasted market energy prices and Bridger Unit 4 production costs



Sierra Club’s initial comments show that the Bridger units look even less economic when using a coal price forecast that is more reasonable than IPC’s assumption of declining coal prices.²² In its reply comments, IPC recognizes that Bridger coal prices have increased in recent years, but

²⁰ *Id.*, at 59-61.

²¹ Sierra Club Comments at 23-29.

²² *Id.*, at 16, 26-27.

states that its forecast of declining prices “relies on the most current data” and is “an appropriate reflection of likely future outcomes at the time the IRP was prepared.”²³ IPC does not specify what current data it has access to that justifies such an optimistic coal price forecast, nor does it sufficiently explain why the Bridger coal price trajectory would change so abruptly.

IPC then attempts to justify its lack of coal price sensitivity analyses by arguing that its gas price sensitivities effectively test “the viability of coal to economically compete in the future.”²⁴ This argument assumes both that coal does not compete with any non-gas resources such as renewables and that IPC’s low gas price sensitivities accurately account for the economics of coal under the combination base gas price forecast and a higher coal price forecast. It is not obvious that either of these assumptions is reasonable.

Sierra Club’s initial comments also pointed out that IPC’s modeling incorporates the optimistic assumption that market energy prices will rise substantially faster than coal or natural gas prices, thus making the viability of coal resources appear to improve over time.²⁵ IPC defends these market price assumptions as a mere “product of the AURORA model,” such that the Company could not have “skewed” them to favor the Bridger plant.²⁶ This claim obscures the fact that the AURORA market prices result from model runs in which IPC decided on the relevant input assumptions. Without access to the AURORA model, Sierra Club cannot verify the reasonableness of the input assumptions used in the runs that generated the market prices reported by IPC. However, we would point out that the market prices are not the only surprising outputs of IPC’s AURORA runs. IPC reports that in its long-term AURORA runs, neither of the Valmy units was selected for retirement, despite the Company’s repeated demonstration that those units are not economic.²⁷ This finding further calls into question the reasonableness of the input assumptions used in IPC’s AURORA modeling.

Ultimately, Sierra Club recognizes that IPC’s “decision not to pursue investment in SCRs in no way precludes shutting down the units at a revised date.”²⁸ However, as IPC has itself noted, retirement of the Bridger units will require coordination with PacifiCorp. It is therefore essential that IPC fully assess the economics of each of the Bridger units – using reasonable assumptions – as soon as possible. If the findings of that assessment continue to indicate that the Bridger units are not economic, IPC should promptly move forward with developing retirement plans.

²³ IPC Reply Comments at 60.

²⁴ *Id.*, at 84.

²⁵ Sierra Club Comments at 16-18.

²⁶ IPC Reply Comments at 61.

²⁷ *Id.*, at 32.

²⁸ *Id.*, at 58.

6. IPC FAILED TO JUSTIFY ITS UNREASONABLE ASSUMPTIONS REGARDING SOLAR, ENERGY STORAGE, AND ENERGY EFFICIENCY RESOURCES

Sierra Club's opening comments identify a variety of ways in which IPC's modeling assumptions biased its analysis against solar, energy storage, and energy efficiency resources, and in favor of the Bridger plant and Boardman to Hemingway (B2H) project. IPC's reply comments attempted to justify its assumptions for these resources. However, each of these alleged justifications fell short.

6.1. Solar cost assumptions

Sierra Club's initial comments show that the IRP used overstated cost assumptions for future solar resources.²⁹ IPC's reply comments responded to this claim with an array of inapposite and misleading statements. First, IPC claimed that its solar cost assumptions are reasonable because the Company's assumptions are based on Lazard's reporting.³⁰ But this partial truth sidestepped Sierra Club's point. It is true that IPC's assumptions for current solar costs are based on Lazard reports. It is also true that Sierra Club did not challenge these current cost assumptions. However, Sierra Club *does* dispute the Company's assumed *future trajectory* of solar capital costs. IPC has provided no support for its assumption that a years-long trend of declining solar costs will suddenly and immediately transition into a climate of increasing costs. Lazard provided no evidence for this assumption, which cuts against general expectations and numerous third-party forecasts.³¹

Second, IPC argued that Sierra Club's comments "fail to give adequate weight" to the impacts of solar resources' capacity credit and variability on the value of future solar development.³² This statement is a distraction. Sierra Club fully recognizes that solar is a variable resource that provides a capacity credit lower than that of most dispatchable resources. However, to all appearances, the Company's modeling accounted for the capacity credit and variability of solar resources, but did not reasonably model the costs of those resources. The fact that solar resources have some drawbacks in no way justifies the use of overstated cost assumptions.

Next, IPC summarizes one of Sierra Club's comments as suggesting "that the phasing out of the federal investment tax credits ("ITCs") will not preclude solar resource development between now and 2023, as some measure of ITC benefit will remain."³³ IPC responds to this supposed

²⁹ Sierra Club Comments at 19-20.

³⁰ IPC Reply Comments at 62.

³¹ See, e.g., National Renewable Energy Laboratory. 2017. Annual Technology Baseline: Utility-Scale PV Power Plants. <https://atb.nrel.gov/electricity/2017/index.html?t=su>.

³² IPC Reply Comments at 62.

³³ *Id.*, at 63.

comment by stating that it does not forecast a capacity need between now and 2023, so the existence of the ITC through that year has no impact on its modeling.³⁴ These statements indicate that IPC misread Sierra Club’s comment, and therefore provided an irrelevant response. Sierra Club’s actual point was that the solar ITC is “slated to remain at a level of 10 percent for all years from 2022 onwards.”³⁵ In other words, the ITC will continue to be present after 2023. By ignoring this fact in its modeling, IPC further overstates the cost of future solar resources.

Finally, IPC claims that its lack of a forecasted capacity need between now and 2023 means that any costs associated with building solar resources prior to 2023 “would not be prudently incurred.”³⁶ This is not necessarily the case. It is possible that the higher 30 percent ITC level available between now and 2019 would render prudent a decision to invest in new solar resources within the next two years, even in the absence of a capacity need. If the all-in levelized cost of the solar resource were either less than the cost of market energy or substantially less than the anticipated cost of future renewable resources needed to achieve renewable portfolio standard (RPS) compliance, early investment in solar could be a reasonable path. Even if that is not the case currently for IPC, the Company should not on principle rule out the possibility of obtaining resources in the absence of a clear need for capacity.

6.2. Battery storage cost assumptions

Sierra Club’s initial comments showed that IPC’s assumptions regarding the future costs of battery storage are even more overstated than its solar cost assumptions.³⁷ The Company did not dispute this point, but argued that “even if parties are correct that more substantial capital cost savings might be expected from these resources, storage remains a higher-cost option compared to B2H for many years to come.”³⁸ As an initial matter, we would clarify that the Company assumes *zero* future battery storage cost declines. Instead, IPC assumes that battery storage costs will increase at an annual rate of 2.1 percent, despite Lazard’s projection that lithium-ion battery capital costs will decline at a rate of about 10 percent per year over the next five years.³⁹ Even if IPC is correct that expected cost declines will not make storage cost-competitive with B2H, that development would not justify the use of indefensible assumptions.

Perhaps IPC would find that, modeled correctly, the scalability and ramping ability of batteries earn them a place in a least-cost portfolio. However, to find that out IPC would need to use

³⁴ *Id.*

³⁵ Sierra Club Comments at 20.

³⁶ IPC Reply Comments at 63.

³⁷ Sierra Club Comments at 20-21.

³⁸ IPC Reply Comments at 64.

³⁹ Lazard. 2017. Lazard’s Levelized Cost of Storage – Version 3.0.

reasonable input assumptions and an industry-standard optimization modeling framework. Unfortunately, IPC has done neither in this IRP.

6.3. Energy efficiency potential

Sierra Club's initial comments showed that the energy efficiency potential assumptions used in IPC's IRP are likely understated.⁴⁰ IPC's reply comments reiterated the claim that, using potential estimates from the Applied Energy Group (AEG), the Company "included all achievable energy efficiency in every portfolio prior to any supply-side resource being considered."⁴¹ However, as shown in our initial comments, AEG's forecasts of energy efficiency "achievable potential" have historically been lower than what IPC has actually achieved. In fact, IPC boasts that that Company "has exceeded its energy efficiency potential estimate in three of the last four years."⁴² Sierra Club appreciates that IPC does not allow its forecasted "potential" to limit its energy efficiency programs. But the fact that IPC's savings consistently exceed "potential" is an obvious sign that the "potential" estimates used by IPC are too low.

IPC further responds to concerns regarding its energy efficiency potential estimates by warning that "including unrealistic amounts of energy efficiency potential in the load-resource balance may understate the need for future resources and undermine the Company's obligation to reliably serve its load."⁴³ Sierra Club does not dispute this point. However, the reverse is equally true. Including *unrealistically low* amounts of cost-effective energy efficiency *overstates* the need for future resources and could lead to the construction of unnecessary, uneconomic resources. In general, IPC should endeavor to accurately forecast the most likely level of future cost-effective energy efficiency, rather than intentionally using a low estimate to ensure reliability. Other components of the IRP, such as the use of reserve margins and sensitivity analyses, are better suited for addressing reliability and risk concerns in a rigorous, transparent way.

⁴⁰ Sierra Club Comments at 8-11.

⁴¹ IPC Reply Comments at 67.

⁴² *Id.*, at 68.

⁴³ *Id.*

