BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

UM 1856

In the Matter of	)
PORTLAND GENERAL ELECTRIC COMPANY,	)
Draft Storage Potential Evaluation.	)

REPLY TESTIMONY

OF THE

OREGON CITIZENS' UTILITY BOARD

February 16, 2018

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My name is Bob Jenks, and my qualifications appear herein as Oregon Citizens' Utility Baord ("CUB") Exhibit 101.

I. INTRODUCTION

CUB appreciates Portland General Electric's ("PGE" or "the Company") work in putting together its proposals. As Oregon increases its investments in renewables and eliminates coal from its generation mix pursuant to SB 1547, storage is likely to play an important role. CUB is generally supportive of utility pilot programs associated with energy storage. While the technologies addressed in PGE's application are not yet cost effective, gaining expertise and experience with storage will help utilities identify how to successfully utilize storage in the future. HB 2193 mandated the development of energy storage, and the legislature believed the takeaways from initial pilot programs would justify the added ratepayer expense.

However, CUB is struggling with PGE's proposal. This testimony touches on a number of issues. First, CUB has concerns with PGE's approach in this docket. The

Company is proposing a project period of 5 years and a useful life of 20 years for non-residential programs. PGE will likely use technology with a 10-15 year life. Second, PGE is proposing to use the Renewable Resources Automatic Adjustment Clause (Schedule 122) for rate recovery. Third, PGE is attempting to push to the upper end of capacity and project size contemplated by the legislation. Can the Company pare back these pilots, reduce the rate impact and still gain knowledge and experience?

II. CONCERN WITH APPROACH

CUB's understanding is PGE will issue a Request for Proposals ("RFP"), select a vendor, and sign a 20 year contract to maintain and supplement the capacity as needed. Supplementing capacity is necessary as the batteries degrade. According to the National Renewable Energy Laboratory ("NREL"), lithium-ion ("Li-Ion") batteries have contract guarantees of 10 years, but they can be used up to 15 years, at which point they have degraded by 70% and need to be replaced.[1] PGE agrees Li-Ion batteries have a 10-15 year useful life.[2] This means a 20 year project with Li-Ion batteries will eventually have all of its original batteries replaced.

A. *Proposed Project Length is Incongruent with Technology Useful Life*

CUB is concerned with PGE's decision to propose a 20-year project life. First, consider:

- PGE is proposing a project period of 5 years, 2018-2022.[3]
- PGE is proposing using a 20-year useful life for non-residential projects.[4]
- PGE may be purchasing equipment with a 10 year useful life.[5]

[1] Economic Analysis Case Studies of Battery Energy Storage with SAM, NREL, Nov 2015.
[2] UM 1856/PGE/Exhibit 101/Riehl - Brown/25.
[3] UM 1856/PGE/Exhibit 101/Riehl-Brown/12.
[4] UM 1856 / PGE / 200 /Jordan – Hart – Landstrom / 5.
[5] UM 1856/PGE/Exhibit 101/Riehl - Brown/25.

During the five year project period, PGE will be reporting on progress, learnings, and costs. CUB assumes PGE set up its annual reporting to end after five years, because the majority of experience and knowledge to be gained will occur during the first 5 years.

This then raises an important question. Why is PGE proposing a 20-year useful life, particularly if the project is using equipment with a 10-year useful life? PGE's reason for a 20-year life is it is more cost effective than a 10-year life.[6] While this may be true according to the Company's studies, it also requires customers to pay more. If most of the gain in experience and knowledge has been achieved in the first 5 years, why spend additional funds extending the program to 20 years? For example, in the Microgrid Pilot, the difference in cost between the 10-year and the 20-year project life is $4.6 to $13.3 million.[7]

In addition, CUB believes the knowledge and experience gained in the first 5 years should be used to evaluate what happens after 10 years. If the legislature contemplated how knowledge gained would offset attendant ratepayer costs, why not pause after an initial test period, to further refine projects going forward? It might make sense to extend the projects from 10 to 20 years. If they are Li-Ion batteries, it might make sense to extend them from 10 to 15 years. It might be reasonable to change storage technology, change the size of the storage devise, or change the location. Additionally, new and more cost-effective battery technology may come online during the project lifetime.

CUB is concerned flexibility is being lost by committing to 20-year projects. The primary purpose of the 20-year project life seems to be to improve the cost effectiveness

[6] UM 1856 / PGE / 200 /Jordan – Hart – Landstrom / 5.
[7] UM 1856/ PGE/ 200/ Jordan – Hart – Landstrom/29.

of unprofitable projects. If customers are being asked to spend money to gain knowledge and expertise, let's make that money well-spent by allowing the knowledge and expertise to be utilized.

B. *Cost and Technology*

It is not clear to CUB how much of the difference in cost between the 10 and 20 year studies simply reflects different technologies. The cost effectiveness evaluation does not specify which technology is associated with various cost projections. The Company should provide clarity on this topic in testimony or in a supplemental application.

PGE has put forth a solid discussion of storage technologies.[8] CUB has drawn several relevant points from this discussion:

- Useful lives range from 10 to 40 years depending on technology.[9]
- Technologies with longer lives will be cheaper when evaluated over a longer period of time.[10]
- Li-Ion batteries are falling in price, and this is reducing venture capital for non Li-Ion technologies.[11]
- The market share of non Li-Ion batteries is less than 5%.

The second point is important when looking at the cost effectiveness analysis. The technologies with 20-year useful lives will be less cost effective on a 10 year analysis and more cost effective on the 20 year analysis. However, the cost effectiveness analysis does not tell us which technologies are being modeled, rendering it unclear how much of the difference in cost between the 10 and 20 year analysis reflects different technology choices. If we assume Li-Ion batteries are used in the low cost estimate for the 10 year case, and if the original batteries will have to be fully replaced over the life of

[8] UM 1856/PGE/Exhibit 101/Riehl - Brown/22-25.
[9] UM 1856/PGE/Exhibit 101/Riehl - Brown/25.
[10] UM 1856/PGE/Exhibit 101/Riehl - Brown/24.
[11] UM 1856/PGE/Exhibit 101/Riehl - Brown/24.

the project, why aren't the capital costs in the 20 year case close to double to that in the 10-year case? Are the replacement costs of batteries included in the Operation & Maintenance costs, rather than considered additional capital?

Finally, CUB is concerned using a 20-year evaluation will improve the cost effectiveness of the non Li-Ion technologies, which harms the cost effectiveness of the Li-Ion technology. The non Li-Ion batteries have a much greater technology risk, since they are being crowded out of capital markets and have been unable to penetrate the market significantly. PGE claims to be technology agnostic, but its decision to use a 20 year useful life for the project indicates a preference for riskier technology.

C. *CUB's Recommendation Regarding Project Life and Technology*

With regards to technology, PGE's analysis makes clear Li-Ion batteries are dominant in the marketplace. Li-Ion batteries were used in 96.5% of energy storage projects in the first quarter of 2017.[12] While using these projects to test various technologies could provide useful knowledge and experience, it is not unreasonable to expect the most viable projects will be Li-Ion. It is acceptable for PGE to be technology agnostic and to have a RFP open to various energy storage technologies. However, the Company should design a program to accommodate the useful lives of Li-Ion batteries, since the marketplace suggests this is the preferable technology.

With regards to project life, CUB recommends PGE begin with a more flexible approach. The RFP should allow projects to have a useful life of 10 to 20 years. This would accommodate various technologies, without trying to make lithium-ion perform like a flow battery, or make a flow battery perform like a lithium-ion battery.

[12] UM 1856/PGE/Exhibit 101/Riehl - Brown/22.

Finally, there is a significant technology risk associated with these projects, particularly if PGE selects a non Li-Ion product. PGE proposes:

> [T]he sourcing team will need to identify criteria that will be used to help score vendor proposals or include appropriate bonding and insurance requirements to mitigate known risks.[13]

CUB asserts PGE needs to develop a more detailed proposal for how it will manage this risk, *before* the projects are approved, rather than after being approved.

III. RENEWABLE RESOURCES AUTOMATIC ADJUSTMENT CLAUSE

PGE proposes to use Schedule 122, the Renewable Resources Automatic Adjustment Clause for rate recovery, by broadening the tariff to include energy storage as an eligible resource. CUB is opposed to using Schedule 122 and contends PGE should add a new automatic adjustment clause limited to energy storage associated with HB 2193.

Schedule 122 is a recovery mechanism associated with the Oregon's Renewable Portfolio Standard ("RPS"). While the RPS recognized utilities might build renewable projects combined with storage, PGE is not proposing to add renewables combined with storage. These are stand-alone storage projects being developed under the authority of HB 2193, not the RPS. The projects are not eligible resources to meet the RPS. Because there is a cost cap associated with the RPS, the cost of these projects--including cost recovery--should be kept separate from the costs of renewable resources.

In addition, changing Schedule 122 to include storage projects will make it the default mechanism for energy storage in the future. CUB is concerned with the possible precedent this practice might establish. While HB 2193 authorizes an automatic

[13] UM 1856/PGE/Exhibit 101/Riehl - Brown/78.

adjustment clause for projects developed under HB 2193, the ratemaking treatment of future storage projects should not be decided in this docket. Through the SB 978 forum, the Commission has a venue to investigate how new technologies will develop and which business models and regulatory approaches are needed to accommodate those technologies. CUB upholds the SB 978 forum as the appropriate place to discuss ratemaking associated with future storage projects.

IV. SIZE AND COST

HB 2193 requires utilities to propose energy storage projects with capacity to store at least five megawatt hours (MWh), and the projects may not exceed one percent of the utility's 2014 peak load (38.7 MW).[14] The Commission Guidelines for this program encourage utilities to submit multiple projects with a cumulative capacity "close to the full one percent of 2014 peak load." [15] PGE is proposing projects with a cumulative capacity of 44 MW, exceeding the 38.7 MW cap. However, PGE pledges to hold the actual projects within that threshold.

CUB is concerned PGE has approached the 38.7 cap as a budget and is trying to make sure it spends it all, rather than sizing the projects based on the knowledge and experience to be gained. PGE is proposing two to five microgrids. PGE fails to explain what additional knowledge and experience will be gained by the fourth or fifth, as opposed to the first, second or third. PGE already has a microgrid installed in Salem. Will the takeaways from the Salem project be applied to this proposal? Because these are not cost-effective, the value must come from the knowledge and experience to be gained. For the residential pilot, PGE is proposing 300-500 devices. CUB recognizes some scale

[14] UM 1856 / PGE / 100/Riehl – Brown /2.
[15] OPUC Order No 16-504, page 4.

is necessary in order to make these dispatchable in a useful manner, but we do not understand the range. If 300 devices are enough, why should we consider 500?

The net present value of revenue requirement for these projects ranges from $105.5 million to $189.8 million.[16] In contrast, PGE's current rate case is seeking an increase of $86 million.[17] This is not an insignificant amount of money. In addition, these costs will begin to be collected around the same time PGE's Boardman plant closes, and replacement resources are placed into rates. PGE should take a serious look to see if some of these projects can be scaled back, without compromising the knowledge and experience to be gained.

V. CONCLUSION

This docket has a long road ahead, including several rounds of testimony, workshops and settlement conferences. CUB looks forward to seeing the Company's response to stakeholders' testimony. While at this point CUB is not recommending approval of any of the projects, CUB looks forward to working with PGE and other stakeholders to address our concerns.

[16] UM 1856 Workshop handout, page 11 November 2017.
[17] UE 334, PGE Application, Executive Summary, page 3.

WITNESS QUALIFICATION STATEMENT

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TITLE: Executive Director

ADDRESS: 610 SW Broadway, Suite 400
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EDUCATION: Bachelor of Science, Economics
Willamette University, Salem, OR

EXPERIENCE: Provided testimony or comments in a variety of OPUC dockets, including UE 88, UE 92, UM 903, UM 918, UE 102, UP 168, UT 125, UT 141, UE 115, UE 116, UE 137, UE 139, UE 161, UE 165, UE 167, UE 170, UE 172, UE 173, UE 207, UE 208, UE 210, UE 233, UE 246, UE 283, UG 152, UM 995, UM 1050, UM 1071, UM 1147, UM 1121, UM 1206, UM 1209, UM 1355, UM 1635, UM 1633, and UM 1654. Participated in the development of a variety of Least Cost Plans and PUC Settlement Conferences. Provided testimony to Oregon Legislative Committees on consumer issues relating to energy and telecommunications. Lobbied the Oregon Congressional delegation on behalf of CUB and the National Association of State Utility Consumer Advocates.

Between 1982 and 1991, worked for the Oregon State Public Interest Research Group, the Massachusetts Public Interest Research Group, and the Fund for Public Interest Research on a variety of public policy issues.

MEMBERSHIP: National Association of State Utility Consumer Advocates
Board of Directors, OSPIRG Citizen Lobby
Telecommunications Policy Committee, Consumer Federation of America
Electricity Policy Committee, Consumer Federation of America
Board of Directors (Public Interest Representative), NEEA