EXH. AJP-1T
DOCKET UE-210795
PSE'S CEIP
WITNESS: AUSTIN J. PHILLIPS

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of **PUGET SOUND ENERGY** **Clean Energy Implementation Plan Pursuant to WAC 480-100-640**	**Docket UE-210795**

PREFILED REBUTTAL TESTIMONY (NONCONFIDENTIAL) OF

AUSTIN J. PHILLIPS

ON BEHALF OF PUGET SOUND ENERGY

DECEMBER 12, 2022

PUGET SOUND ENERGY

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I. INTRODUCTION

Q. Please state your name, business address, and position with Puget Sound Energy.

A. My name is Austin J. Phillips, and my business address is Puget Sound Energy, P.O. Box 97034, Bellevue, Washington 98009-9734. I am employed by Puget Sound Energy ("PSE" or "Company") as Manager, Strategic Customer Insights.

Q. What are your duties as Manager, Strategic Customer Insights?

A. I lead the Strategic Customer Insights team in developing market research, business intelligence, and analytics related to PSE customers. I coordinate with other leaders at PSE to deliver data and analyses related to customer characteristics, which informs a variety of initiatives across PSE. I also guide the development of analytics that allow PSE to better predict key customer characteristics, such as their propensity to enroll in PSE programs and their likelihood of being low-income, energy burdened, or members of a Named Community. My team's goal is to use data to highlight PSE customers' needs, and then to build models that empower PSE to meet those needs.

Q. Have you prepared an exhibit with your professional qualifications?

A. Yes, it is Exh. AJP-2.

Q. Please summarize your prefiled rebuttal testimony.

A. My rebuttal testimony addresses other parties' response testimony related to PSE's methodology for using data to quantify Vulnerable Populations. Specifically, I will address issues related to key aspects of the methodology, including the geographic scale of analysis, the choice to treat all vulnerability factors equally, the determination of vulnerability labels based on cumulative vulnerability score, the treatment of data from raw score to rescaled values, the determination of which vulnerability factors to include in PSE's analysis, and the mapping of vulnerability onto a single cumulative value.

II. PSE'S ANALYSES OF VULNERABLE POPULATIONS DATA IS REASONABLE

Q. Please briefly describe the process that PSE used to analyze data on Vulnerable Populations within its service area.

A. PSE relied on the factors that the Clean Energy Transformation Act (CETA) outlined concerning Vulnerable Populations[1] and consulted with PSE's Equity Advisory Group to determine the set of factors PSE used to quantify Vulnerable Populations.[2] In Table 3-1 of PSE's Clean Energy Implementation Plan (CEIP), PSE lists the primary vulnerability factors and their definitions that came out of

[1] RCW 19.405.020.
[2] All Equity Advisory Group Meeting Materials can be found here: https://www.cleanenergyplan.pse.com/complete-equity-advisory-group-meetings

that collaborative process.

One of the key responsibilities of the Equity Advisory Group is to "advise the utility on equity issues including, but not limited to, vulnerable population designations."[3] Therefore, PSE understands the importance of collaborating with the Equity Advisory Group early in the CEIP process to define Vulnerable Populations. PSE held three meetings with the Equity Advisory Group to list factors PSE should use when quantifying Vulnerable Populations. Copies of the Equity Advisory Group meeting summaries are included as the Second, Third, Fourth, and Fifth Exhibits to my prefiled rebuttal testimony.[4]

In its May 17, 2021 meeting with the Equity Advisory Group, PSE laid the foundation for how CETA defines Vulnerable Populations, which includes adverse socioeconomic factors and environmental sensitivities. In this discussion,[5] PSE asked the Equity Advisory Group to provide characteristics that contribute to customers' vulnerability. The Equity Advisory Group's feedback included themes related to mental health, senior status, disabilities, and historically redlined communities.[6]

In the next meeting with the Equity Advisory Group, PSE presented data sources that quantify certain vulnerability factors based on the themes the Equity

[3] WAC 480-100-655.
[4] *See* Exh. AJP-3 (May 17, 2021, Meeting Summary); Exh. AJP-4 (May 24, 2021, Meeting Summary); Exh. AJP-5 (June 21, 2021, Meeting Summary); Exh. AJP-6 (September 27, 2021, Meeting Summary).
[5] *See* Exh. AJP-3.
[6] *See* Exh. AJP-3; Exh. AJP-4.

Advisory Group previously offered.[7] The Equity Advisory Group then expanded on the primary list of vulnerability factors and added factors stemming from their collective experience and interactive sessions with PSE.[8]

PSE then used the composite list of vulnerability factors to find additional data sources to match with each factor.[9] PSE mapped these data sources to PSE's service area, which created an initial snapshot of Vulnerable Populations.[10] PSE presented this mapping to the Equity Advisory Group to verify if any factors were missing related to Vulnerable Populations or metrics. PSE also discussed the scale of data sources with the Equity Advisory Group and how various geographic scales could be used in the definition of Vulnerable Populations.[11]

Q. Please explain what is meant by the term Census Block Groups.

A. Census Block Groups are geographic areas defined by the United States Bureau of the Census ("Census"). Census Block Groups are combinations of census blocks, which are the smallest geographic units defined by the Census. Multiple Census Block Groups comprise a census tract, and multiple census tracts comprise a county. A Census Block Group can include anywhere from a few hundred to a few thousand households.

Census Block Groups are essential to PSE's CEIP because the Census provides a variety of publicly available sociodemographic data features aggregated to the

[7] Exh. AJP-4.
[8] Exh. AJP-3; Exh. AJP-4.
[9] Exh. AJP-5.
[10] Exh. AJP-5 at 11-19.
[11] Exh. AJP-5; Exh. AJP-6.

Census Block Group level through the American Community Survey program. Using geospatial tools, PSE identified the set of Census Block Groups that contain households within PSE's service area. American Community Survey data at the Census Block Group level was the primary data source for quantifying most of the vulnerability factors in PSE's analysis.

Q. Is geographical data the only way to identify and quantify Vulnerable Populations?

A. No. NW Energy Coalition ("NWEC") and Front and Centered, as well as Commission Staff ("Staff") disagree with PSE's approach to identifying Vulnerable Populations on a geographic basis and instead would have PSE use a customer-by-customer approach.[12] PSE's geographic approach assigns both a numerical and categorical level of vulnerability to each Census Block Group in its service area, based on both the geographic and individual characteristics of customers within each Census Block Group. However, NWEC asserts that a geographic approach ignores variation among individual customers, and PSE should designate Vulnerable Populations at the Census Block Group level only when individual customer data is not available.[13] Staff states that PSE should also identify Vulnerable Populations through more specific characteristics that may not correlate with Census Block Group-level mapping.[14]

[12] Snyder, Exh. JES-1T at 34:13
[13] Colton, Exh. RDC-1T at 28:5.
[14] Snyder, Exh. JES-1T at 34:10.

Q. Why is it better to quantify Vulnerable Populations at a geographic level?

A. PSE used a geographic approach to quantify Vulnerable Populations for several reasons. First, PSE's approach is based on the best available data, in terms of level of granularity and availability. In cases where there is a trustworthy, publicly available source of customer-level data to quantify a vulnerability factor, PSE applied that source. But most vulnerability factors designated by CETA and the Equity Advisory Group are unavailable at the customer or household level. Sociodemographic features influencing vulnerability, such as Black, Indigenous, and People of Color status, linguistic isolation, and others, are available at aggregated geographic levels via the American Community Survey data tool. The American Community Survey reports the number of households within each Census Block Group with a given characteristic of interest, and this data source is superior to customer-level data for these vulnerability factors that is simply not available.

Second, some key vulnerability factors such as low-income status, high energy burden, and disconnection history are available at the customer level. In those cases, PSE did leverage individual-level data in determining the vulnerability scores for those factors in each Census Block Group. Additionally, PSE already does and will continue to develop programs and resources toward households with those specific vulnerability factors that are individually identifiable. For example, PSE has numerous programs, such as Low Income Home Energy Assistance Program ("LIHEAP") and PSE's Home Energy Lifeline Program

("PSE HELP"), intended to assist low-income and energy burdened customers that leverage individual-level data. Accordingly, PSE is pinpointing – rather than ignoring – variation among customers within a geographic area.

Third, many of the ways in which PSE will enact changes to improve equity are done so at a geographic level. Such actions may entail focusing on system development of particular circuits, targeted marketing toward specific areas, or engaging with leaders of particular communities. It is preferable if the source for determining vulnerability is closely aligned with the actions PSE will take to address that vulnerability. Conversely, a hypothetical dataset of all vulnerability factors at the individual level would not necessarily provide insight into which specific actions to take to improve equity.

Criticisms of PSE's geographic level of analysis for quantifying Vulnerable Populations ignore the fact that most vulnerability data are only available at the geographic level. Additionally, PSE does leverage any individual-level vulnerability data available, and a geographic assessment of vulnerability does not hinder PSE's ability to improve equity in vulnerable communities.

It is also important to note that PSE's application of geographic data sources is not unique. Parallel assessments of named communities, such as the delineation of Highly Impacted Communities via the Washington Department of Health's Environmental Health Disparities Map, are also conducted at the geographic

level.[15] PSE's use of Census Block Group data in its analysis of vulnerability is supported by and consistent with other CETA efforts in Washington State.

Q. Please explain why PSE has not designated Census Block Groups from PSE's Biennial Conservation Plan, Housing and Urban Development's Qualified Census Tracts, Distressed Communities identified for federal New Markets Tax Credits program as Vulnerable Populations, as recommended by NWEC and Front and Centered.

A. The methodologies and data available that PSE used to analyze Vulnerable Populations in its CEIP are an improvement over what was available during the most recent Biennial Conservation Plan formulation. PSE's preference is to use the best data available, and thus PSE is pivoting as a company towards using the Vulnerable Population analysis found in the CEIP for future Biennial Conservation Plans.

Qualified Census Tracts and New Markets Tax Credits are defined at the census tract level, which is a lower-granularity (larger area) geography than PSE's current level, which is defined at the Census Block Group level. This recommendation is inconsistent with NWEC's recommendation not to define vulnerability at the geographic level when possible.[16]

In addition, Qualified Census Tracts and New Markets Tax Credits likely capture features such as poverty that are correlated with existing features in PSE's

[15] https://doh.wa.gov/data-statistical-reports/washington-tracking-network-wtn/climate-projections/clean-energy-transformation-act/ceta-utility-instructions

[16] Colton, Exh. RDC-1T at 28:5

analysis, such as percentage of Census Block Group below 100 percent of the Federal Poverty Line. This recommendation is inconsistent with NWEC's recommendation to ensure vulnerability factors are not duplicative.[17]

Q. Why does PSE's scoring system for vulnerable populations treat each factor as having equal weight?

A. Through its understanding of CETA and discussions with the Equity Advisory Group, PSE performed its Vulnerable Populations scoring analysis under the assumption that all factors identified by CETA and the Equity Advisory Group are important. There is no instruction in CETA or guidance from the Equity Advisory Group that calls for weighting some factors differently than others. However, other parties recommend that some factors, such as energy burden, be weighted more heavily than other factors.[18] They also expressed concern that treating each factor with equal weight may mask PSE's ability to identify highly vulnerable communities.[19]

Weighting some vulnerability factors higher than others, without explicit legal guidance or input from stakeholders, introduces a number of hypotheticals that are difficult for PSE to resolve with available data. For example, PSE would have to consider whether being in a Black, Indigenous, and People of Color community is "more important," in the sense of vulnerability, than having limited English

[17] Colton, Exh. RDC-1T at 28:7
[18] Colton, Exh. RDC-1T at 15:6, 28:19
[19] Colton, Exh. RDC-1T at 16:6

proficiency; or whether being a renter is "more important" than being a senior citizen with fixed income. PSE is neither well positioned nor comfortable making those value judgments without robust input and recommendations from stakeholders; consequently, PSE regarded all vulnerability factors as carrying equal weight.

Q. Does that mean PSE is opposed to ever weighting certain factors differently if policy or data supports it?

A. No, it does not. PSE acknowledges that the development of a functional CEIP is an iterative process. PSE is receptive to any guidance demonstrating that some vulnerability factors should carry greater weight than others, in virtue of more aptly capturing the vulnerability dimensions expressed in CETA and the Equity Advisory Group. Such guidance would, however, need to justify in quantitative terms why some vulnerability factors should be *under*-weighted as a result, despite being outlined equally in the language of CETA and by Equity Advisory Group members. Without a statutory basis or policy guidance, applying variable scoring could be seen as arbitrary or produce inequitable and unintended results.

Q. Does PSE's equal scoring methodology allow for any consideration of inequity?

A. Yes. It is important to note that PSE's scoring method does allow PSE to quantify which Census Block Groups face a greater extent of vulnerability due to the cumulative impact of multiple factors at high levels. A Census Block Group cannot, for instance, have a high cumulative vulnerability score without having a

high number of vulnerability factors present at the highest severity. The criticism that PSE's equal weighting scheme hampers its ability to identify Vulnerable Populations ignores the fact that an equal weighting scheme still identifies which Census Block Groups disproportionately face vulnerability factors and evaluates the levels of severity.

Q. Please explain why PSE rescaled its data when quantifying vulnerability factors.

A. PSE rescaled its data to standardize vulnerability factors in a way that does not privilege one factor as carrying more weight than another.

Q. How did PSE perform this rescaling?

A. PSE's method of rescaling data involved a two-step process for each vulnerability factor (*e.g.*, the proportion of households within a Census Block Group having high energy burden), is a two-step process. First, PSE calculated the raw value of the factor for each Census Block Group under consideration. Second, PSE assigned a score for each Census Block Group from 1 to 5 based on, among the distribution of raw factor values for all Census Block Groups, which quintile the factor value for that Census Block Group fell into (1st quintile corresponding to "1", 2nd to "2", and so on, up to "5"). By relying on quintiles to map raw factor values to a 1 to 5 scale, PSE aligned each vulnerability factor in Census Block Groups with higher 1-5 scores where that factor's severity is highest, and Census Block Groups with lower 1-5 scores corresponded with where that factor's severity is lowest. Since the raw factor values present in a Census Block Group

could differ greatly from one vulnerability factor to another (e.g., proportion Black, Indigenous, and People of Color versus proportion experiencing unemployment), it was necessary to rescale each factor.

Q. Do other parties oppose PSE's methodology for rescaling data?

A. Yes. Other parties thought the rescaling methodology could distort the interpretation of vulnerability.[20]

Q. How do you respond?

A. PSE disagrees that its rescaling of data could distort the interpretation of vulnerability. Had PSE not undertaken a rescaling process with vulnerability factors, those factors for which the maximum level of severity represented a smaller raw value (*e.g.*, 0.10) would not contribute to a higher vulnerability score, relative to factors for which the maximum level of severity reached a high raw value (*e.g.*, 0.90). Since the qualitative meaning of each vulnerability factor is different, it would be erroneous to assume a factor represents low vulnerability simply because it has a low raw numerical value. That is, PSE's rescaling method allows each vulnerability factor to represent an equal contribution to total vulnerability, which PSE found necessary so as not to qualify *a priori* some factors as more important than others.

Staff's critique of PSE's rescaling method concerns scenarios with vulnerability factors such as poverty line status, for which they argued a set, evidence-based

[20] Snyder, Exh. JES-1T at 31:2

threshold value (*e.g.*, a household's income relative to the poverty line) is a better delineation of vulnerability.[21] This example fails to acknowledge that PSE quantified vulnerability at the Census Block Group level rather than the individual customer level. In the above example, a household may have a position relative to the Federal Poverty Line, but PSE's translation of that feature to the Census Block Group-level results in the factor "proportion of households below the poverty line" for a given Census Block Group. A Census Block Group itself cannot have a certain status relative to the poverty line; only individual households can. In the absence of an evidence-based metric with which to delineate certain Census Block Groups as vulnerable based on the proportion of households below the Federal Poverty Line, PSE rescaled such factors to capture variation among Census Block Groups in the factor value.

Even if an evidence-based threshold did exist by which to delineate Census Block Groups as vulnerable or not vulnerable for the proportion of households below the Federal Poverty Line, doing so would binarize the factor in a way that ignores some Census Block Groups that are *nearly* at that threshold. For example, if PSE used the criterion that Census Block Groups with > 50 percent of households below the Federal Poverty Line are considered vulnerable, that would mean Census Block Groups with 49 percent of households below the Federal Poverty Line would be considered not vulnerable, whereas those with 51 percent below the Federal Poverty Line would be considered vulnerable. This scenario does not

[21] Snyder, Exh. JES-1T at 31:4

account for the fact that vulnerability factors can take on a spectrum of values. PSE's rescaling of the Federal Poverty Line factor to numerical values of 1 to 5 for each Census Block Group reflects that spectrum, and as a result PSE is less likely to miss Census Block Groups that would almost meet a threshold.

Q. Please describe why dividing vulnerability score into terciles does not understate vulnerability for some geographies or customers.

A. NWEC expressed concerns that under PSE's approach only Census Block Groups with a "high" vulnerability label are considered Vulnerable Populations.[22] NWEC claimed that populations in a Census Block Group labeled "low" vulnerability could still face high vulnerability for some factors, and that having a low numerical score for a given factor may still indicate a substantial level of vulnerability for some customers.[23]

PSE has several responses to such concerns. First, PSE does not consider only the Census Block Groups labeled as "high" to be vulnerable. PSE's methodology enables vulnerability to be viewed as a spectrum, either through the categorical tercile label, or, at a more quantitative level, the total vulnerability score resulting from the sum of all vulnerability factor values. The spectrum approach does not leave out Census Block Groups that have lower scores; it simply allows PSE to examine which Census Block Groups have the greatest intersection of vulnerability factors relative to others.

[22] Colton, Exh. RDC-1T at 12:17
[23] Colton, Exh. RDC-1T, at 13:1

It makes sense that PSE should especially focus on areas with the highest cumulative vulnerability because customers in those Census Block Groups, by definition, face the most barriers from a health and sociodemographic standpoint. The CETA-based description of vulnerable populations and WAC 480-100-605 highlight communities that experience a disproportionate cumulative risk. PSE's method for quantifying vulnerability directly translates CETA's language by (1) measuring the *cumulative* sum of a Census Block Group's vulnerability factors, and then (2) determining whether the Census Block Group's cumulative score is *proportionately* higher or lower than other Census Block Groups that PSE serves.

Second, it is true, as NWEC claims, that a Census Block Group could have a high vulnerability score for a certain factor, such as energy burden, and still be labeled as "low" vulnerability. However, PSE's scoring methodology operates on the philosophy that the effects of vulnerability are cumulative, in line with language from CETA.[24] Therefore, communities that have high vulnerability scores for more factors should be considered more vulnerable, relative to other communities. Doing so does not preclude PSE from taking action to improve equity for all communities; it simply highlights communities that face disproportionate cumulative impacts.

Third, for vulnerability factors such as low-income status and energy burden, PSE can take actions to mitigate the effects of those factors at the customer level, regardless of their Census Block Group's vulnerability label. In cases where PSE

[24] See WAC 480-100-605

has customer-level data that can refine its view of vulnerability within a Census Block Group, PSE will leverage that data in the development of approaches to meet those specific customers' needs. However, the majority of vulnerability factors are not quantifiable at the customer level.

NWEC's criticisms of PSE's method for categorizing Census Block Group vulnerability based on terciles relies on an incorrect assumption that PSE will ignore the bottom two terciles of Census Block Groups regarding equity and responding to vulnerability factors.[25] Simply because PSE has identified certain communities as having the greatest need does not preclude PSE from addressing identified needs in other communities.

Q. Please explain PSE's treatment of vulnerability factors that may be measuring similar effects.

A. NWEC expressed concerns that highly correlated vulnerability factors may be double-counted and give those attributes a disproportionate impact on the determination of vulnerability scores.[26] There was concern that some factors are measuring the same underlying attribute and a suggestion that PSE should consolidate factors where this is the case.

PSE chose to include all vulnerability factors outlined by CETA and the Equity Advisory Group in its scoring of vulnerability. PSE knows of no data that suggests that PSE exclude factors that may be *correlated* unless they are

[25] Colton, Exh. RDC-1T at 12:17.
[26] Colton, Exh. RDC-1T at 13:4

quantifying identical effects. If factors are identifying different qualitative elements of vulnerability, it is important to understand all those different elements and capture them.

In the development of PSE's vulnerability scoring method, PSE conducted a clustering analysis that assessed whether there were groups of vulnerability factors that were highly correlated and therefore captured the same underlying effect. PSE did not find a clear clustering pattern that would indicate sets of factors that are highly correlated. On the contrary, the analysis showed that there is variation among Census Block Groups in terms of the magnitude of vulnerability across features. For any given set of vulnerability factors, some Census Block Groups have high values (on the 1 to 5 scale) for most factors; some Census Block Groups have a high value for only some; and some Census Block Groups have no high values. As a result, PSE did capture the variation in vulnerability among Census Block Groups.

PSE contends that NWEC's assertion that many sociodemographic factors are correlated is correct, as is the case in any human system, but it does not follow that certain correlated vulnerability factors should be excluded from the analysis altogether. PSE is open to guidance on incorporating a well-rounded set of vulnerability factors that account for multiple dimensions of risk. However, the evidence does not show the vulnerability factors identified in CETA or the Equity Advisory Group have an *identical* quantitative pattern to another factor. PSE found no such factors in its analysis.

Q. Please explain why certain factors, such as extreme poverty, housing quality, and rate of death and illness attributable to extreme heat events are not included in the vulnerability assessment.

A. As stated above, PSE used the CETA framework and stakeholder guidance to craft its current Vulnerable Populations analysis. PSE will continue to seek guidance from the Commission, PSE's Equity Advisory Group, and PSE's other advisory groups on ways to refine its analysis and incorporate additional features into its vulnerability assessment in the future.

Poverty is partially addressed by the vulnerability factor for the percentage of customers who are below 100 percent of the Federal Poverty Line within a Census Block Group. Additionally, effects of extreme heat events are captured by features related to Tree Equity Scores. PSE notes that if it were to expressly incorporate these additional factors into the vulnerability assessment, then that would contradict NWEC's' request[27] to exclude additional features that may quantify the same underling factors already included in PSE's analysis. The set of vulnerability factors PSE included is representative of multiple risk areas including income, ethnic background, disability, communication barriers, food access, and heat island effect, among others. PSE anticipates that future CEIPs may refine the set of vulnerability factors. At the same time, PSE is confident that its current methodology captures some effects of all major categories of

[27] Colton, Exh. RDC-1T at 28:7

sociodemographic, health, and environmental risk identified in CETA and the Equity Advisory Group.

Q. Please explain why PSE's scoring system does not consider synergistic impacts of vulnerability factors.

A. NWEC asserts that some vulnerability factors may result in a greater perceived vulnerability in combination, beyond their individual contributions.[28]

PSE broadly agrees that there are some vulnerabilities that interact synergistically. PSE has concerns, however, about how to quantify those effects without further guidance from the Commission, the Equity Advisory Group, or other advisory groups as part of its regulatory and public participation processes. For example, synergistic factors could result in a combined score of different magnitudes. If two vulnerability factors A and B are synergistic, it is unclear whether a score of "5" for both A and B should translate to a total score of 25 for example, or some other value, instead of 10. PSE lacks data or research to substantiate any particular choice, and therefore seeks guidance from the Commission and its stakeholders before incorporating any synergistic impact multiplier into its Vulnerable Population calculation.

PSE's current methodology for calculating total vulnerability score has the quality that high levels of multiple vulnerability factors will contribute toward a higher total vulnerability score. That is, for any pair of vulnerability factors A and B, a high 1 to 5 score for both A and B will result in a higher total score than a

[28] Colton, Exh. RDC-1T at 15:9

situation where only A or only B are high. While this method does not account for cases where A and B are especially synergistic, it does capture the effect that vulnerability factors are cumulative in their contribution toward total score.

Q. Please address the concern that high vulnerability in some areas may be diluted by the sum of medium scores in another area.

A. NWEC argued that under PSE's methodology, high vulnerability in some areas may be diluted by the sum of medium scores in another area.[29] As stated previously, PSE views vulnerability as cumulative. In other words, the impact of a community having high levels of vulnerability in multiple factors has a greater impact on the community than having one factor with a high level of vulnerability. PSE's analysis reflects this philosophy. Consequently, Census Block Groups with higher cumulative scores should be considered higher vulnerability relative to Census Block Groups with only a few high-scoring features.

A mathematical result of PSE's methodology is that the highest vulnerability Census Block Groups must have high scores for more factors, relative to lower vulnerability Census Block Groups. However, since PSE retains the full set of 1 to 5 vulnerability scores for all features and all Census Block Groups, PSE is still able to understand which areas have high vulnerability for a specific feature.

[29] Colton, Exh. RDC-1T at 15:16

Q. Did PSE include some qualitative and binary features in its vulnerability factors?

A. Yes. For some factors used in the Vulnerable Populations analysis, the nature of those factors is binary. For the binary vulnerability factors PSE used, PSE rescaled each Census Block Group's 0 or 1 value based on the proportion of Census Block Groups with a 0 or 1. The result was that those binary factors were also on the 1 to 5 ordinal scale before they were added together with the 1 to 5 scores for the other factors in the assessment. The effect is that these binary factors were *not* underweighted. Quantitatively, they carried the same weight as the continuous-valued factors in the total vulnerability score.

Q. Please explain why PSE summarized vulnerability as a single value for each Census Block Group in the analysis.

A. A central criticism from Staff was that PSE's method for quantifying vulnerability reduces vulnerability to a single value, the total vulnerability score, with which to compare Census Block Groups.[30] Staff's concern is that doing so ignores certain nuances of vulnerability. Staff points out that, for example, two Census Block Groups could have the same total vulnerability score with vastly different high-scoring metrics.[31] Staff argues that, as a result, a single value for vulnerability is not useful to tailor actions to the needs of PSE's customers.

[30] Snyder, Exh. JES-1T at 32:18
[31] Snyder, Exh. JES-1T at 32:20

PSE is operating under the philosophy that, to develop a functional CEIP, PSE must quantify vulnerability in a way that (a) allows PSE to assess which geographic areas face higher vulnerability than others, and (b) allows PSE to make decisions about how to reduce inequities across geographic areas. When quantifying vulnerability, PSE could either 1) condense vulnerability into a single value (total vulnerability score), or 2) represent vulnerability as a matrix of 1 to 5 scores for each factor and each Census Block Group, without further analysis. That is, PSE could either map vulnerability onto a single spectrum, or represent vulnerability as a higher-dimensional set of 1-5 values. Staff expressed concerns with option 1), that of mapping vulnerability into a single value (total vulnerability score).[32]

PSE contends that the problem with option 2) – to represent vulnerability as a multi-dimensional matrix of scores for each factor in each Census Block Group – is that it does not meet criteria (a) and (b) to be an actionable assessment of vulnerability. The nature of the guidance from CETA and PSE's Equity Advisory Group suggests that some communities have higher cumulative vulnerability than others. For a quantitative vulnerability methodology to result in some geographies having higher vulnerability than others, PSE must place geographies on the same spectrum so that they can be compared. Option 2) does not allow for that. As a result, option 2) does not meet criteria (b), because it does not suggest which

[32] *See* Snyder, Exh. JES-1T at 32:18

Census Block Groups PSE should focus on in order to reduce inequities between Census Block Groups.

If a Census Block Group's vulnerability is represented as the entire set of 1 to 5 scores for vulnerability factors, program managers and other decision makers at PSE do not have visibility on whether a given Census Block Group has received fewer previous benefits in tandem with being more vulnerable than other Census Block Groups. That is, they have no way of knowing where to focus efforts, because there is no way to assess whether more vulnerable Census Block Groups have historically received fewer benefits than less vulnerable Census Block Groups. Consequently, option 2) *represents* vulnerability, but it does not make it an actionable quantity that enables PSE to make decisions in the spirit of increasing equitable outcomes.

It is also important to note that PSE's decision to map a multi-dimensional set of factors onto a single spectrum is analogous to the Washington State Department of Health's ("DOH") method for delineating Highly Impacted Communities based on their cumulative impact analysis, as required by CETA. Specifically, the DOH impact analysis mapped a multi-dimensional set of health factors onto a 1-10 score for each census tract in Washington State, and then defined Highly Impacted Communities to be those census tracts with a 9 or 10 overall rank on the Environmental Health Disparities spectrum, or any census tract with tribal land.[33]

[33] https://doh.wa.gov/data-statistical-reports/washington-tracking-network-wtn/climate-projections/clean-energy-transformation-act/ceta-utility-instructions

While the set of factors PSE included in its vulnerability assessment was purposefully different than the Environmental Health Disparities spectrum (as required by CETA), PSE's choice to mathematically represent cumulative effects with a single-spectrum value was identical. Any methodological concerns with mapping vulnerability to a single spectrum should also extend to other cumulative impact assessments such as the Environmental Health Disparities, not just PSE's vulnerable populations analysis in the CEIP. In broad terms, summarizing multiple quantitative effects with a single value is a fundamental mechanism for human decision-making, whether it be creating risk scores, grading, voting, or any other collective action.

While the total vulnerability score for each Census Block Group is a single value, PSE retains the full data set of 1 to 5 scores for each vulnerability factor in each Census Block Group from its analysis. PSE is therefore able to examine which factors contribute to it being more vulnerable (e.g., language barrier, educational attainment) relative to other factors for a given Census Block Group. Capturing this variation between Census Block Groups will allow program managers and other decision makers to tailor their planning and outreach approaches based on the specific vulnerability factors found within a Census Block Group.

In effect, PSE's method compressed the high-dimensional space of vulnerability to assess which communities have higher or lower vulnerability. PSE can then re-expand that space to make strategic decisions concerning specific communities based on the uniquely prominent vulnerability factors within those communities.

Q. Please explain why PSE did not provide any further analysis of vulnerable populations.

A. Staff critiqued PSE's effort for not engaging in further discussion of how the metrics intersect with PSE's services or provide narrative meaning to the metrics.[34]

Since submitting the CEIP, PSE has already constructed multiple internal dashboards and performed analyses on programs related to equity. These analyses show how vulnerability intersects with factors such as program participation in energy efficiency, voluntary renewables programs, and energy assistance. PSE's understanding is that the inaugural CEIP should define the methodology for quantifying vulnerability, whereas subsequent updates should explore how that method intersects with various aspects of PSE's service. PSE is looking forward to refining its approach and using new sources of data as they become available.

III. CONCLUSION

Q. Does that conclude your prefiled rebuttal testimony?

A. Yes, it does.

[34] Snyder, Exh. JES-1T at 33:14