VULNERABLE POPULATIONS AND DEEPEST NEED METHODOLOGY

APPENDIX I

PUGET SOUND ENERGY

Contents

1. Vulnerable populations

The data used to quantify vulnerability factors was reported in three unique spatial scales: census tracts, census block groups, and individual customer location. Most of the data resources were reported at the tract or block group level and it is not possible to assign a value from that larger spatial scale to a unique customer, but it is possible to identify areas where factors are quantified at a higher magnitude relative to other areas.

In its original 2021 approach to the quantification of vulnerable populations, PSE first applied a machine learning or algorithm method to discover patterns in the block group level data that would suggest unique areas of vulnerability within its service area. However, multiple attempts from these approaches did not yield a clear picture of vulnerability groups or patterns that would be useful in identifying vulnerable customers. PSE then changed its strategy to calculate a score like that used by the Washington State Department of Health EHD methodology, but with socio-economic and sensitivity factors supplementing the required environmental and human health factors defined for vulnerable populations. Each individual factor was ranked for its intensity relative to the other block groups in PSE's Electric Service Area on a scale of 1 – 5. Then the intensity scores were summed for each block group. PSE next took the spectrum of the summed scores and divided the range into thirds labelling block groups in the top third of cumulative scores for intensity being labelled "high vulnerability" the middle third, "medium vulnerability" and the bottom third "low vulnerability."

The three levels or terciles of vulnerability were then used to identify customers by location within the high, medium, or low vulnerable conditions, to group or bin customers into quantifiable groups to measure the distribution of burdens and benefits, and to provide a basis of prioritization for customers with the most intense levels of cumulative vulnerability.

Several criticisms and concerns were raised among Equity Advisory Group (EAG) members, interested parties, and Commission staff regarding PSE's methodology. Two common concerns were that individual customers that happened to reside in block groups classified as low vulnerability, but with unique vulnerability, would be overlooked or masked and thus missed by outreach and engagement. The second common concern was that the cumulative score would mask areas with a unique feature of vulnerability at the highest magnitude because lower scores in other vulnerability factors would reduce their visibility.

1.1. Update of vulnerable populations

In docket UE-210795 of Order 08, the Commission issued two conditions addressing these concerns directing PSE to improve its methodology classifying vulnerable populations. In the first condition (9), PSE was directed to change the score for a given block group to high vulnerability if any of the commonly identified features within those grouped under sensitive populations, energy security, or

other socio-economic factors were ranked at the top intensity level. PSE completed these steps and found the results reclassified nearly all of the block groups as high vulnerability.

The second condition (10) directed PSE to take three actions:

- Simplify its cumulative score by removing individual factors that may duplicate a unique factor, such as measuring federal poverty level and area median income level
- Include additional factors measuring extreme heat risk, housing quality, and deep poverty
- Consider the compounding impact of multiple factors in one location

PSE revised its methodology for classifying cumulative vulnerability as directed by Condition 10 and described in Chapter 3, Equity, completing several actions. PSE removed duplicate measures of factors retaining only percentage values when there were formerly both counts and percentages. PSE also updated data sets where available, for example moving from 2019 to 2020 vintage American Community Survey data sets. To further reduce the number of factors, PSE selected one measure of a vulnerability factor where multiple measures were present. To improve the accuracy of its factors, PSE replaced data sets with more current research. For example, PSE replaced its heat island data originally acquired from American Forest's Tree Equity Score resource with newly released data from the University of Washington Center for Health and Global Environment (CHanGE). Table I.1 provides a list of the original vulnerability factors. Table I.2 lists the factors dropped from the original method inclusive of the steps listed above.

Table I.1 List of vulnerability factors included in PSE's 2021 CEIP original tercile classification

Vulnerability factor (reported at block group scale unless noted)	Source
Count of Energy Burdened Customers	PSE[i]
Percent of Energy Burdened Customers	PSE[ii]
Count of Customers Experiencing Disconnection	PSE[iii]
Percent of Customers Experiencing Disconnection	PSE[iv]
Count of Customers in Arrears	PSE[v]
Percent of Customers in Arrears	PSE[vi]
Alternative Count of Customers in Arrears	PSE[vii]
Alternative Percent of Customer in Arrears	PSE[viii]
Count of HHs with Housing Burden (Owner)	ACS[ix]
Count of HHs with Housing Burden (Renter)	ACS[x]
Percentage of HHs with 2 or More Occupants/Room (Renter)	ACS[xi]
Count of Estimated Customers Renting Home	PSE/Experian[xii]
Percent of Estimated Customers Renting Home	PSE/Experian[xiii]
Count of Estimated Customers Owning Home	PSE/Experian[xiv]
Percent of Estimated Customers Owning Home	PSE/Experian[xv]
Percent of 2 Person HHs	ACS[xvi]
Percent of 3 Person HHs	ACS[xvii]
Percent of 4 Person HHs	ACS[xviii]

Vulnerability factor (reported at block group scale unless noted)	Source
Percent of 5 Person HHs	ACS[xix]
Percent of 6 Person HHs	ACS[xx]
Percent of 7 or more Person HHs	ACS[xxi]
Percent of HHs with Non-Family Members	ACS[xxii]
Percent of HHs BIPOC	ACS[xxiii]
Percent of HHs White	ACS[xxiv]
Percent of HHs Black	ACS[xxv]
Percent of HHs American Indian and Alaska Native	ACS[xxvi]
Percent of HHs Asian	ACS[xxvii]
Percent of HHs Hawaiian or Pacific Islander	ACS[xxviii]
Percent of HHs Identifying as non-Hispanic	ACS[xxix]
Percent of HHs Identifying as Hispanic	ACS[xxx]
Percent of HHs Identifying as Some Other Race	ACS[xxxi]
Percent of HHs Identifying as Two or More Races	ACS[xxxii]
Percent of HHs Identifying as Two Races Including Some Other Race	ACS[xxxiii]
Percent of HHs Identifying as Two Races Excluding Some Other Race	ACS[xxxiv]
Count of Customers Estimated 65 and at or below 80% AMI	PSE/Experian[xxxv]
Percent of Customers Estimated 65 and at or below 80% AMI	PSE/Experian[xxxvi]
Percent of HHs on Retirement Income	ACS[xxxvii]
Count of Customers with High School Diploma/GED or less	PSE/Experian[xxxviii]
Percent of Customers with High School Diploma/GED or less	PSE/Experian[xxxix]
Percent of HHs Receiving Public Assistance	ACS[xl]
Percent of HHs with Children Present	ACS[xli]
Percent of Population with no Health Insurance	ACS[xlii]
Percent of Population with a Disability (tract level)	ACS[xliii]
Measure of Mental Health	Tree Equity Score[xliv]
Number of Hospital Discharges	WA DOH[xlv]
Percent of HHs with Limited English-Speaking Ability	ACS[xlvi]
Percent of Labor Force Unemployed	ACS[xlvii]
Estimated People/Families at or Below Federal Poverty Level	ACS[xlviii]
Count of Customers with No Digital Engagement with PSE	PSE[xlix]
Percent of Customers with No Digital Engagement with PSE	PSE[l]
Percent of HHs with no Internet Access	ACS[li]
Average Temperature on a Hot Summer Day (2018)	Tree Equity Score[lii]
Tree Canopy Gap	Tree Equity Score[liii]
Priority (Composite) Index of Social Factors	Tree Equity Score[liv]
Tree Equity Score Based on Priority and Gap	Tree Equity Score[lv]
Percent of HHs with Commute of 35 Miles or More	ACS[lvi]
Rate of Deaths from Cardiovascular Disease (tract level)	WA DOH EHD[lvii]
Percent of Low Infant Birth Weights (tract level)	WA DOH EHD[lviii]

Vulnerability factor (reported at block group scale unless noted)	Source
Low Income and Low Food Access 1- and 10-mile scale	USDA[lix]
Low Income and Low Food Access ½ and 10-mile scale	USDA[lx]
Low Income and Low Food Access 1- and 20-mile scale	USDA[lxi]
Low Income and Low Food Access Considering Vehicle 20-mile scale	USDA[lxii]
Low Vehicle Access and beyond ½ mile scale	USDA[lxiii]

Table I.2: List of dropped vulnerability factors

Dropped vulnerability factor (reported at block group unless noted otherwise)	Source
Alternative Count of Customers in Arrears	PSE[lxiv]
Alternative Percent of Customer in Arrears	PSE[lxv]
Percent of 2 Person HHs	ACS[lxvi]
Percent of 3 Person HHs	ACS[lxvii]
Percent of 4 Person HHs	ACS[lxviii]
Percent of 5 Person HHs	ACS[lxix]
Percent of HHs White	ACS[lxx]
Percent of HHs Black	ACS[lxxi]
Percent of HHs American Indian and Alaska Native	ACS[lxxii]
Percent of HHs Asian	ACS[lxxiii]
Percent of HHs Hawaiian or Pacific Islander	ACS[lxxiv]
Percent of HHs Identifying as Non-Hispanic	ACS[lxxv]
Percent of HHs Identifying as Hispanic	ACS[lxxvi]
Percent of HHs Identifying as Some Other Race	ACS[lxxvii]
Percent of HHs Identifying as Two or More Races	ACS[lxxviii]
Percent of HHs Identifying as Two Races Including Some Other Race	ACS[lxxix]
Percent of HHs Identifying as Two Races Excluding Some Other Race	ACS[lxxx]
Percent of HHs on Retirement Income	ACS[lxxxi]
Count of Customers with No Digital Engagement with PSE	PSE[lxxxii]
Percent of Customers with No Digital Engagement with PSE	PSE[lxxxiii]
Measure of Mental Health	Tree Equity Score
Average Temperature on a Hot Summer Day (2018)	Tree Equity Score[lxxxiv]
Tree Canopy Gap	Tree Equity Score[lxxxv]
Priority (Composite) Index of Social Factors	Tree Equity Score[lxxxvi]
Tree Equity Score Based on Priority and Gap	Tree Equity Score[lxxxvii]
Low Income and Low Food Access 1 and 10 mile scale	USDA[lxxxviii]
Low Income and Low Food Access 1 and 20 mile scale	USDA[lxxxix]
Low Income and Low Food Access Considering Vehicle 20 mile scale	USDA[xc]
Low Vehicle Access and beyond ½ mile scale	USDA[xci]

PSE added data from the University of Washington Center for Health and Global Environment and the U.S. Department of Housing and Urban Development to identify factors associated with high heat risk and housing quality. To further improve its model, PSE added data from the U.S. Forest Service assessing wildfire risk. PSE incorporated an analysis of deep poverty into its Deepest Need analysis discussed further below. PSE also acquired data mapping racially restricted covenants in PSE's Service Area from the University of Washington Civil Rights and Labor History Consortium, however this factor was not used in the cumulative vulnerability index. The data set is better aligned with the recognition quadrant of the Energy Equity Project model and PSE will bring that before the EAG for further discussion.

Table I.3 lists the added factors from Condition 9 and 10. UW CHanGE has expertise in public health, therefore PSE used their variables which consolidate the individual features of human health that put people at higher risk for illness or death due to extreme heat. These are consolidated in the factors "Physical Condition is Vulnerable" and "Preexisting Conditions is High." These measures also serve as indicators of general health conditions to increase the consideration of sensitive populations as part of vulnerability.

There are two factors that measure climatic effects from exposure to extreme heat. The first "Local Environment is Not Protective" considers landscape features such as lack of trees, landscape amplifies heat, and higher populations of outdoor workers. The second, "Heat Hazard is High" includes measures of atmospheric conditions in extreme heat events. PSE also selected the factor "Social Isolation for Older Adults is High" from the UW CHanGE dataset, as older adults are particularly susceptible to adverse outcomes in extreme heat events.

Table I.3: List of new vulnerability factors

New vulnerability factor (reported at block group unless noted otherwise)	Source
Physical Condition is Vulnerable	CHanGE[xcii]
Preexisting Conditions is High	CHanGE[xciii]
Local Environment is Not Protective	CHanGE[xciv]
Heat Hazard is High	CHanGE[xcv]
Social Isolation for Older Adults is High	CHanGE[xcvi]
Wildfire Exposure Risk	US Forest Service[xcvii]
Count of HHs with Housing Problems and 30% Housing Burden (Owner)	US Dept. Housing and Urban Development[xcviii]
Count of HHs with Housing Problems and 30% Housing Burden (Renter)	US Dept. Housing and Urban Development[xcix]

Table I.4 lists the factors included in PSE's revised vulnerability classification methodology. Using these factors, PSE followed the steps of finding the percentile rank for each factor across block groups, assigning that percentile rank to a 1 – 5 range and summing the results for each block group across all

the factors to determine a cumulative vulnerability score. Finally, PSE divided that range into terciles of high, medium, and low.

As reported in Chapter 3:

- 74% of the census block groups retained the same vulnerability classification after the updates were made
- 12% of the block groups increased in vulnerability
- 14% decreased in vulnerability

These changes are not concentrated in any single part of the electric service territory. In the new classification approximately 33% of PSE customers are in high vulnerability block groups, 36% in medium vulnerability block groups, and 31% in low vulnerability block groups. Considering the results, PSE finds the geography of higher levels of vulnerability to be consistent from the first approach to the new approach. PSE is supplementing its measure of cumulative vulnerability and classified vulnerable populations with its identification of customers in Deepest Need, and the areas of higher vulnerability in its Equity Investment Zones.

Table I.4 List of revised vulnerability factors

Revised vulnerability factor (reported at block group unless noted otherwise)	Source
Percent of Energy Burdened Customers	PSE[c]
Percent of Customers Experiencing Disconnection	PSE[ci]
Percent of Customers in Arrears	PSE[cii]
Count of HHs with Housing Burden (Owner)	ACS[ciii]
Count of HHs with Housing Burden (Renter)	ACS[civ]
Percentage of HHs with 2 or More Occupants/Room (Renter)	ACS[cv]
Percent of Estimated Customers Renting Home	PSE/Experian[cvi]
Percent of Estimated Customers Owning Home	PSE/Experian[cvii]
Percent of 6 Person HHs	ACS[cviii]
Percent of 7 or more Person HHs	ACS[cix]
Percent of HHs with Non-Family Members	ACS[cx]
Percent of HHs BIPOC	ACS[cxi]
Percent of Customers Estimated 65 and at or below 80% AMI	PSE/Experian[cxii]
Percent of Customers with High School Diploma/GED or less	PSE/Experian[cxiii]
Percent of HHs Receiving Public Assistance	ACS[cxiv]
Percent of HHs with Children Present	ACS[cxv]
Percent of Population with no Health Insurance	ACS[cxvi]
Percent of Population with a Disability (tract level)	ACS[cxvii]
Number of Hospital Discharges	WA DOH[cxviii]
Percent of HHs with Limited English Speaking Ability	ACS[cxix]
Percent of Labor Force Unemployed	ACS[cxx]

Revised vulnerability factor (reported at block group unless noted otherwise)	Source
Estimated People/Families At or Below Federal Poverty Level	ACS[cxxi]
Percent of HHs with no Internet Access	ACS[cxxii]
Percent of HHs with Commute of 35 Miles or More	ACS[cxxiii]
Rate of Deaths from Cardiovascular Disease (tract level)	WA DOH EHD[cxxiv]
Percent of Low Infant Birth Weights (tract level)	WA DOH EHD[cxxv]
Low Income and Low Food Access ½ and 10 mile scale	USDA
Physical Condition is Vulnerable	CHanGE[cxxvi]
Preexisting Conditions is High	CHanGE[cxxvii]
Local Environment is not Protective	CHanGE[cxxviii]
Heat Hazard is High	CHanGE[cxxix]
Social Isolation for Older Adults is High	CHanGE[cxxx]
Count of HHs with Housing Problems and 30% Housing Burden (Owner)	HUD[cxxxi]
Count of HHs with Housing Problems and 30% Housing Burden (Renter)	HUD[cxxxii]
Wildfire Exposure Risk	US Forest Service[cxxxiii]

2. Deepest need

PSE performed additional analyses to address the requirements for the order or correct reference to both condition 9 and 10. In discussions with NW Energy Coalition, Front & Centered and their outside consultant provided an initial recommendation for defining deepest need to include a layered approach of vulnerable population, customers at or below 100% FPL, high energy burden, high arrearages and high rates of disconnections. The first analysis was related to condition 9 where PSE was asked to include additional individual factors at the highest level of vulnerability as a requirement to rank the block group in the highest third of cumulative vulnerability. The second analysis responded to the request from interested parties to map several criteria including areas of high arrearages, disconnects and several other factors. In both analyses, suggested indicators were used at a block group scale to classify compounding levels of vulnerability and these methodologies yielded results where a large part of the service area was classified at a high magnitude of vulnerability. PSE found that working with factors at the block group or tract level to classify individual or smaller groups of customers with compounding factors was not yielding the desired outcome of identifying the most vulnerable customers. PSE shared these results with The NW Energy Coalition and Front and Centered and listened to concerns and feedback to design a revised approach to identify Deepest Need customers.

PSE used energy burden at the individual customer level for greater spatial precision and selected a threshold of severe energy burden[1] or 10% or more of income allocated to household energy expenses.

Next PSE used a clustering algorithm tool to identify neighborhoods of customers at the severe energy burden threshold. The tool forms groups or clusters of customers near each other and assigns them membership in the same group if they are in a closer or denser pattern in contrast to more dispersed or spread-out customers. This resulted in the identification of 666 clusters of Deepest Need throughout PSE's Electric Service Area.

In addition to these clusters of customers, PSE also considered customers with severe energy burden at longer distances among points as one might find in more rural locations. PSE included customers with severe energy burden residing in the block groups with severe energy burden counts in the top half of the distribution. These customers were included in the definition of Deepest Need. This clearly identifies about 68,000 customers in Deepest Need based on the severe energy burden threshold and their spatial distribution to indicate communities.

Once the group of customers were selected at the severe energy burden threshold, PSE layered the compounding factors identified from the collective sources of Condition 10, the EAG, and interested parties. The compounding factors are listed in Table 1.5.

Table 1.5 List of compounding factors for deepest need

Compounding Factor	Source
Customers with high arrearages	PSE[cxxxiv]
Higher rates of disconnections	PSE[cxxxv]
Higher concentrations of customers renting homes	PSE/Experian[cxxxvi]
Higher populations of customers belonging to BIPOC communities	ACS[cxxxvii]
Longer commutes	ACS[cxxxviii]
Limited English	ACS[cxxxix]
Poor housing quality	HUD[cxl]
Rural U.S. Census designation	U.S. Census[cxli]
Extreme heat risk factors (Climate)	CHanGE[cxlii]
Extreme heat risk factors (Landscape)	CHanGE[cxliii]
Human Physical Health vulnerability factors	CHanGE[cxliv]
Preexisting Medical conditions	CHanGE[cxlv]
Higher social isolation for older adults	CHanGE[cxlvi]
Higher risk for wildfire	U.S. Department of Forestry[cxlvii]
Intersection with Tribal Land Parcels	WA Department of Ecology[cxlviii]

1. Severe Energy Burden is not referenced in CETA as a required threshold, but used by the American Council for an Energy-Efficient Economy. See American Council for an Energy-Efficient Economy, How High Are Household Energy Burdens? An Assessment of National and Metropolitan Energy Burden across the United States (Sept. 2020).

As described in Chapter 3, PSE's collective engagement teams will supplement these quantitative data analysis elements with qualitative information providing perspective for engagement prioritization and appropriate supportive resources.

i. The aggregated count of energy burdened (6% or greater EB) customers per census block group sourced from PSE's Customer Information System (CIS).
ii. The percentage of energy burdened (6% or greater EB) customers per census block group sourced from PSE's CIS.
iii. The number of customers experiencing a disconnection per block group source from PSE's CIS.
iv. The percentage of customers experiencing a disconnection per block group source from PSE's CIS.
v. The number of customers that owe $70 or more and are more than 30 days past due on their payment per block group sourced from PSE's CIS.
vi. The percentage of customers that owe $70 or more and are more than 30 days past due on their payment per block group sourced from PSE's CIS.
vii. PSE found there were many 1:many relationships within its data that may have been attributed to scenarios where a property manager may have been managing the accounts for multiple units within a housing location. It removed the instances of multiple records for this factor. Count of customers in arrears as defined in the count of customers in arrears factor. Sourced from PSE's CIS.
viii. PSE found there were many 1:many relationships within its data that may have been attributed to scenarios where a property manager may have been managing the accounts for multiple units within a housing location. It removed the instances of multiple records for this factor. Percentage of customers in arrears as defined in the percent of customers in arrears factor. Sourced from PSE's CIS.
ix. Tabulated from the 2019 American Community Survey detailed census table B25091 MORTGAGE STATUS BY SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME IN THE PAST 12 MONTHS.
x. Tabulated from the 2019 American Community Survey detailed census table B25070 GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME IN THE PAST 12 MONTHS.
xi. American Community Survey 2019.
xii. The count of renters per census block group as indicated by market research data purchased from Experian estimates of housing tenure.
xiii. The percentage of renters per census block group as indicated by market research data purchased from Experian estimates of housing tenure.
xiv. The count of owners per census block group as indicated by market research data purchased from Experian estimates of housing tenure.
xv. The percentage of owners per census block group as indicated by market research data purchased from Experian estimates of housing tenure.
xvi. The percentage of households (HHs) in the block group that report 2 persons from the 2019 American Community Survey.
xvii. The percentage of households (HHs) in the block group that report 3 persons from the 2019 American Community Survey.
xviii. The percentage of households (HHs) in the block group that report 4 persons from the 2019 American Community Survey.
xix. The percentage of households (HHs) in the block group that report 5 persons from the 2019 American Community Survey.
xx. The percentage of households (HHs) in the block group that report 6 persons from the 2019 American Community Survey.
xxi. The percentage of households (HHs) in the block group that report 7 or more persons from the 2019 American Community Survey.
xxii. The percentage of HHs in the block group that report as nonfamily from the 2019 American Community Survey.
xxiii. The difference of 1 - the percentage of White population per block group from the 2019 American Community Survey.
xxiv. The percentage of population identifying as White per block group from the 2019 American Community Survey.
xxv. The percentage of population identifying as Black per block group from the 2019 American Community Survey.
xxvi. The percentage of population identifying as American Indian or Alaska Native per block group from the 2019 American Community Survey.
xxvii. The percentage of population identifying as Asian per block group from the 2019 American Community Survey.
xxviii. The percentage of population identifying as Hawaiian or Pacific Islander per block group from the 2019 American Community Survey.
xxix. The percentage of population identifying as non-Hispanic per block group from the 2019 American Community Survey.
xxx. The percentage of population identifying as Hispanic per block group from the 2019 American Community Survey.
xxxi. The percentage of population identifying as Some Other Race per block group from the 2019 American Community Survey.
xxxii. The percentage of population identifying as Two or More Races per block group from the 2019 American Community Survey.
xxxiii. The percentage of population identifying as Two Races including Some Other Race per block group from the 2019

American Community Survey.

xxxiv. The percentage of population identifying as Two Races excluding Some Other Race per block group from the 2019 American Community Survey.

xxxv. The number of customers estimated at age 65 or older who also are estimated at or below 80% Area Median Income (AMI) from market research data purchased from Experian.

xxxvi. The percentage of customers estimated at age 65 or older who also are estimated at or below 80% Area Median Income (AMI) from market research data purchased from Experian.

xxxvii. The percentage of the population reporting retirement income from the 2019 American Community Survey.

xxxviii. The count of customers estimated to have a high school diploma/GED from market research data purchased from Experian.

xxxix. The percentage of customers estimated to have a high school diploma/GED from market research data purchased from Experian.

xl. The percentage of HHs receiving public assistance as reported from the 2019 American Community Survey.

xli. The percentage of HHs with children present as reported from the 2019 American Community Survey.

xlii. The percent of the population with no insurance as reported by table B271010 Types of Health Insurance Coverage by Age from the 2019 American Community Survey.

xliii. The percent of the population with a disability as reported by subject table S1810 at the tract level from the 2019 American Community Survey.

xliv. A measure of mental health per census block group. This data from the Tree Equity Score Resource https://treeequityscore.org/ maintained by American Forests and is derived from the 2018 detailed tables of the American Community Survey. It is described as: the self-reported mental health challenges of people in the block group (a percentage). The 2019 detailed tables in this topic area were empty for PSE area block groups.

xlv. From WA Department of Health Comprehensive Hospital Abstract Reporting System (CHARS). Hospital discharges reported at the zip code level. Using a spatial join in GIS these scores were inferred at the block group level based on the maximum possible value as a proxy for rates of hospitalization. Note this methodology was updated in 2023 to tabulate the sum of the reported scores per zip code and then take the maximum value for the intersections of the zip code values and census block groups.

xlvi. The percent of the households with limited English Speaking as reported by table C16002 from the 2019 American Community Survey.

xlvii. The percentage of civilian labor force unemployed/civilian labor force in labor force as reported by table B23025 from the 2019 American Community Survey.

xlviii. The percent of estimated people/families below federal poverty level as reported by Tabel DP03_018PE from the 2019 American Community Survey.

xlix. The count of customers with no digital engagement as indicated by the customer record of no digital channel interaction from PSE's CIS.

l. The percentage of customers with no digital engagement as indicated by the customer record of no digital channel interaction from PSE's CIS.

li. The percentage of HHs with not internet subscriptions as reported by table B28011 from the American Community Survey.

lii. From the Tree Equity Score data set maintained by American Forests. 2018: the average temperature of the block group on a hot summer's day. Used as a proxy for heat island determination until a better data set is available.

liii. From the Tree Equity Score data set maintained by American Forests. 2018: the tree canopy gap of the block group (goal minus canopy).

liv. From the Tree Equity Score data set maintained by American Forests. 2018: the priority index of the block group (a composite of socio-economic factors).

lv. From the Tree Equity Score data set maintained by American Forests. 2018: the tree equity score of the block group analysis of priority and gap factors.

lvi. The percentage of HHs with a commute of 35 minutes or more as reported by the 2019 American Community Survey.

lvii. The magnitude of the rate of deaths by cardiovascular disease as reported by the WA State Department of Health on the 2021 Environmental Health Disparities (EHD) map.

lviii. The magnitude of the rate of low infant birth weights as reported by the WA State Department of Health on the 2021 Environmental Health Disparities (EHD) map.

lix. Low income and low access tract measured at 1 mile for urban areas and 10 miles for rural areas | Flag for low-income and low access when considering low accessibility at 1 and 10 miles as reported by USDA Food Access Research Atlas May 2021.

lx. Low income and low access tract measured at 1/2 mile for urban areas and 10 miles for rural areas | Flag for low-income and low access when considering low accessibility at 1/2 and 10 miles as reported by USDA Food Access Research Atlas May 2021.

lxi. Low income and low access tract measured at 1 mile for urban areas and 20 miles for rural areas | Flag for low-income and low access when considering low accessibility at 1 and 20 miles as reported by USDA Food Access Research Atlas May 2021.

lxii. Low income and low access tract using vehicle access or low income and low access tract measured at 20 miles | Flag for low-income and low access when considering vehicle access or at 20 miles as reported by the USDA Food Access Research Atlas May 2021.

lxiii. Vehicle access, tract with low vehicle access| Flag for tract where >= 100 of households do not have a vehicle, and beyond 1/2 mile from supermarket as reported by USDA Food Access Research Atlas May 2021.
lxiv. PSE found there were many 1:many relationships within its data that may have been attributed to scenarios where a property manager may have been managing the accounts for multiple units within a housing location. It removed the instances of multiple records for this factor. Count of customers in arrears as defined in the count of customers in arrears factor. Sourced from PSE's CIS.
lxv. PSE found there were many 1:many relationships within its data that may have been attributed to scenarios where a property manager may have been managing the accounts for multiple units within a housing location. It removed the instances of multiple records for this factor. Percentage of customers in arrears as defined in the percent of customers in arrears factor. Sourced from PSE's CIS.
lxvi. The percentage of households (HHs) in the block group that report 2 persons from the 2019 American Community Survey.
lxvii. The percentage of households (HHs) in the block group that report 3 persons from the 2019 American Community Survey.
lxviii. The percentage of households (HHs) in the block group that report 4 persons from the 2019 American Community Survey.
lxix. The percentage of households (HHs) in the block group that report 5 persons from the 2019 American Community Survey.
lxx. The percentage of population identifying as White per block group from the 2019 American Community Survey.
lxxi. The percentage of population identifying as Black per block group from the 2019 American Community Survey.
lxxii. The percentage of population identifying as American Indian or Alaska Native per block group from the 2019 American Community Survey.
lxxiii. The percentage of population identifying as Asian per block group from the 2019 American Community Survey.
lxxiv. The percentage of population identifying as Hawaiian or Pacific Islander per block group from the 2019 American Community Survey.
lxxv. The percentage of population identifying as non-Hispanic per block group from the 2019 American Community Survey.
lxxvi. The percentage of population identifying as Hispanic per block group from the 2019 American Community Survey.
lxxvii. The percentage of population identifying as Some Other Race per block group from the 2019 American Community Survey.
lxxviii. The percentage of population identifying as Two or More Races per block group from the 2019 American Community Survey.
lxxix. The percentage of population identifying as Two Races including Some Other Race per block group from the 2019 American Community Survey.
lxxx. The percentage of population identifying as Two Races excluding Some Other Race per block group from the 2019 American Community Survey.
lxxxi. The percentage of the population reporting retirement income from the 2019 American Community Survey.
lxxxii. The count of customers with no digital engagement as indicated by the customer record of no digital channel interaction from PSE's CIS.
lxxxiii. The percentage of customers with no digital engagement as indicated by the customer record of no digital channel interaction from PSE's CIS.
lxxxiv. From the Tree Equity Score data set maintained by American Forests. 2018: the average temperature of the block group on a hot summer's day. Used as a proxy for heat island determination until a better data set is available.
lxxxv. From the Tree Equity Score data set maintained by American Forests. 2018: the tree canopy gap of the block group (goal minus canopy).
lxxxvi. From the Tree Equity Score data set maintained by American Forests. 2018: the priority index of the block group (a composite of socio-economic factors).
lxxxvii. From the Tree Equity Score data set maintained by American Forests. 2018: the tree equity score of the block group analysis of priority and gap factors.
lxxxviii. Low income and low access tract measured at 1 mile for urban areas and 10 miles for rural areas | Flag for low-income and low access when considering low accessibility at 1 and 10 miles as reported by USDA Food Access Research Atlas May 2021.
lxxxix. Low income and low access tract measured at 1 mile for urban areas and 20 miles for rural areas | Flag for low-income and low access when considering low accessibility at 1 and 20 miles as reported by USDA Food Access Research Atlas May 2021.
xc. Low income and low access tract using vehicle access or low income and low access tract measured at 20 miles | Flag for low-income and low access when considering vehicle access or at 20 miles as reported by the USDA Food Access Research Atlas May 2021.
xci. Vehicle access, tract with low vehicle access| Flag for tract where >= 100 of households do not have a vehicle, and beyond 1/2 mile from supermarket as reported by USDA Food Access Research Atlas May 2021.
xcii. A composite factor measuring the contributing factors of: children 5 years or younger, adults aged 65 and older, rate of pregnancies. Data shared with PSE and used with permission from the University of Washington Center for Health and Global Environment. Climate Health and Risk Tool available at: https://climatesmarthealth.org
xciii. A composite factor measuring the contributing factors of: diabetes, heart attack (myocardial infarction), stroke, poor

mental health. Data shared with PSE and used with permission from the University of Washington Center for Health and Global Environment. Climate Health and Risk Tool available at: https://climatesmarthealth.org

xciv. A composite factor measuring the contributing factors of: percentage of outdoor workers, percentage of mobile homes, probability of air conditioning, tree canopy cover, and impervious surface. Data shared with PSE and used with permission from the University of Washington Center for Health and Global Environment. Climate Health and Risk Tool available at: https://climatesmarthealth.org

xcv. A composite factor measuring the contributing factors of: maximum temperature hazard, minimum temperature hazard, and relative heat hazard. Data shared with PSE and used with permission from the University of Washington Center for Health and Global Environment. Climate Health and Risk Tool available at: https://climatesmarthealth.org

xcvi. A measure of the older adults determined to be socially isolated, posing greater risk to extreme heat related illness and death. Data shared with PSE and used with permission from the University of Washington Center for Health and Global Environment. Climate Health and Risk Tool available at: https://climatesmarthealth.org

xcvii. Data sourced from United States Deparment of Agriculture, U.S. Forestry Service at: https://data.nal.usda.gov/dataset/wildfire-hazard-potential-united-states-270-m-version-2020-3rd-edition

xcviii. United States Department of Housing and Urban Development Comprehensive Housing Affordability Strategy 2015 – 2019.

xcix. United States Department of Housing and Urban Development Comprehensive Housing Affordability Strategy 2015 – 2019.

c. The aggregated count of energy burdened (6% or greater EB) customers per census block group in PSE's CIS.

ci. The percentage of customers experiencing a disconnection per block group source from PSE's CIS.

cii. The percentage of customers that owe $70 or more and are more than 30 days past due on their payment per block group sourced from PSE's CIS.

ciii. Tabulated from the 2020 American Community Survey detailed census table B25091 MORTGAGE STATUS BY SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME IN THE PAST 12 MONTHS.

civ. Tabulated from the 2020 American Community Survey detailed census table B25070 GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME IN THE PAST 12 MONTHS.

cv. American Community Survey 2020.

cvi. The percentage of renters per census block group as indicated by market research data purchased from Experian estimates of housing tenure.

cvii. The percentage of home owners per census block group as indicated by market research data purchased from Experian estimates of housing tenure.

cviii. The percentage of households (HHs) in the block group that report 6 persons from the 2020 American Community Survey.

cix. The percentage of households (HHs) in the block group that report 7 or more persons from the 2020 American Community Survey.

cx. The percentage of HHs in the block group that report as nonfamily from the 2020 American Community Survey.

cxi. The difference of 1 - the percentage of White population per block group from the 2020 American Community Survey.

cxii. The percentage of customers estimated at age 65 or older who also are estimated at or below 80% Area Median Income (AMI) from market research data purchased from Experian.

cxiii. The percentage of customers estimated to have a high school diploma/GED from market research data purchased from Experian.

cxiv. The percentage of HHs receiving public assistance as reported from the 2020 American Community Survey.

cxv. The percentage of HHs with children present as reported from the 2020 American Community Survey.

cxvi. The percent of the population with no insurance as reported by table B271010 Types of Health Insurance Coverage by Age from the 2020 American Community Survey.

cxvii. The percent of the population with a disability as reported by subject table S1810 at the tract level from the 2020 American Community Survey.

cxviii. From WA Department of Health Comprehensive Hospital Abstract Reporting System (CHARS). Hospital discharges reported at the zip code level. Using a spatial join in GIS these scores were inferred at the block group level based on the maximum possible value as a proxy for rates of hospitalization. Note this methodology was updated in 2023 to tabulate the sum of the reported scores per zip code and then take the maximum value for the intersections of the zip code values and census block groups.

cxix. The percent of the households with limited English Speaking as reported by table C16002 from the 2020 American Community Survey.

cxx. The percentage of civilian labor force unemployed/civilian labor force in labor force as reported by table B23025 from the 2020 American Community Survey.

cxxi. The percent of estimated people/families below federal poverty level as reported by Tabel DP03_018PE from the 2020 American Community Survey.

cxxii. From detailed census table B28011 INTERNET SUBSCRIPTIONS IN HOUSEHOLD No internet access/Total. In the 2020 American Community Survey.

cxxiii. The percentage of HHs with not internet subscriptions as reported by table B28011 from the 2020 American Community Survey.

cxxiv. The magnitude of the rate of deaths by cardiovascular disease as reported by the WA State Department of Health on

the 2022 Environmental Health Disparities (EHD) map.

cxxv. The magnitude of the rate of low infant birth weights as reported by the WA State Department of Health on the 2022 Environmental Health Disparities (EHD) map.

cxxvi. A composite factor measuring the contributing factors of: children 5 years or younger, adults aged 65 and older, rate of pregnancies. Data shared with PSE and used with permission from the University of Washington Center for Health and Global Environment. Climate Health and Risk Tool available at: https://climatesmarthealth.org

cxxvii. A composite factor measuring the contributing factors of: diabetes, heart attack (myocardial infarction), stroke, poor mental health. Data shared with PSE and used with permission from the University of Washington Center for Health and Global Environment. Climate Health and Risk Tool available at: https://climatesmarthealth.org

cxxviii. A composite factor measuring the contributing factors of: percentage of outdoor workers, percentage of mobile homes, probability of air conditioning, tree canopy cover, and impervious surface. Data shared with PSE and used with permission from the University of Washington Center for Health and Global Environment. Climate Health and Risk Tool available at: https://climatesmarthealth.org

cxxix. A composite factor measuring the contributing factors of: maximum temperature hazard, minimum temperature hazard, and relative heat hazard. Data shared with PSE and used with permission from the University of Washington Center for Health and Global Environment. Climate Health and Risk Tool available at: https://climatesmarthealth.org

cxxx. A measure of the older adults determined to be socially isolated, posing greater risk to extreme heat related illness and death. Data shared with PSE and used with permission from the University of Washington Center for Health and Global Environment. Climate Health and Risk Tool available at: https://climatesmarthealth.org

cxxxi. United States Department of Housing and Urban Development Comprehensive Housing Affordability Strategy 2015 – 2019.

cxxxii. United States Department of Housing and Urban Development Comprehensive Housing Affordability Strategy 2015 – 2019.

cxxxiii. Data sourced from United States Department of Agriculture, U.S. Forestry Service at: https://data.nal.usda.gov/dataset/wildfire-hazard-potential-united-states-270-m-version-2020-3rd-edition

cxxxiv. PSE identified areas of high arrearages by using the past due balance threshold from the upper tercile of the distribution, which was greater than $200. Next PSE tabulated the proportion of customers in this condition per census block group. Finally, PSE designated census block groups at and above the 80th percentile for proportion of customers in this condition as areas of high arrearages.

cxxxv. Because PSE did not conduct disconnections during the COVID pandemic, data from the preceding period was used to establish areas with high rates of disconnection. PSE selected the period from 01/01/2017 to 12/31/2019 for its pre-COVID baseline. It identified disconnected customers and tabulated the proportion of them per census block group. Finally, PSE selected census block groups at or above the 80th percentile of this distribution as areas with high rates of disconnection.

cxxxvi. The percentage of renters per census block group as indicated by market research data purchased from Experian estimates of housing tenure.

cxxxvii. The difference of 1 - the percentage of White population per block group from the 2020 American Community Survey.

cxxxviii. The percentage of HHs with not internet subscriptions as reported by table B28011 from the 2020 American Community Survey

cxxxix. The percent of the households with limited English Speaking as reported by table C16002 from the 2020 American Community Survey.

cxl. United States Department of Housing and Urban Development Comprehensive Housing Affordability Strategy 2015 – 2019.

cxli. 2020 US Census urban and rural blocks groups mapped to 2010 US census block groups. Block groups containing >50% rural blocks, were deemed a rural block group.

cxlii. A composite factor measuring the contributing factors of: maximum temperature hazard, minimum temperature hazard, and relative heat hazard. Data shared with PSE and used with permission from the University of Washington Center for Health and Global Environment. Climate Health and Risk Tool available at: https://climatesmarthealth.org

cxliii. A composite factor measuring the contributing factors of: percentage of outdoor workers, percentage of mobile homes, probability of air conditioning, tree canopy cover, and impervious surface. Data shared with PSE and used with permission from the University of Washington Center for Health and Global Environment. Climate Health and Risk Tool available at: https://climatesmarthealth.org

cxliv. A composite factor measuring the contributing factors of: children 5 years or younger, adults aged 65 and older, rate of pregnancies. Data shared with PSE and used with permission from the University of Washington Center for Health and Global Environment. Climate Health and Risk Tool available at: https://climatesmarthealth.org

cxlv. A composite factor measuring the contributing factors of: diabetes, heart attack (myocardial infarction), stroke, poor mental health. Data shared with PSE and used with permission from the University of Washington Center for Health and Global Environment. Climate Health and Risk Tool available at: https://climatesmarthealth.org

cxlvi. A measure of the older adults determined to be socially isolated, posing greater risk to extreme heat related illness and death. Data shared with PSE and used with permission from the University of Washington Center for Health and Global Environment. Climate Health and Risk Tool available at: https://climatesmarthealth.org

cxlvii. Data sourced from United States Department of Agriculture, U.S. Forestry Service at: https://data.nal.usda.gov/dataset/wildfire-hazard-potential-united-states-270-m-version-2020-3rd-edition

cxlviii. Spatial data downloaded from Washington State Department of Ecology at:
https://hub.arcgis.com/datasets/waecy::tribal-lands/explore
Originator: Rich Kim, Washington State Department of Ecology, Spatial Database Administrator
Publication Date: 20191121
Title: ECY_BND_TribalLands
Geospatial_Data_Presentation_Form: vector digital data