Agenda
Utility Advisory Committee Meeting
Tuesday, November 14, 2023
Richland City Hall ~ Council Chambers
625 Swift Boulevard

Committee Members: Chair Lo Presti, Vice-Chair Larkin and Members Miller, Porter, Richmond and Staven

Council Liaisons:	Council Liaison: VanDyke
	Council Liaison Alternate: Jones
Staff Liaison:	Whitney

Regular Meeting - 3:00 p.m.

Call to Order/Attendance:

Approval of Agenda: (Approved by Motion)

Approval of Minutes: (Approved by Motion)

Approval of September 12, 2023 Meeting Minutes

Public Comments:

Items of Business:

2. Status - Each City Utility (15 minutes each)
   - Tom Huntington, Fire Chief
     Pete Rogalsky, Public Works Director
     Clint Whitney, Energy Services Director

3. Tri-Cities 115kV Transmission Network Load Modeling & NW Regional Resource Forecast (20 minutes)
   - Clint Whitney, Energy Services Director

4. Energy Environmental Economics (E3) - Draft Net Energy Metering Report (20 minutes)
   - Clint Whitney, Energy Services Director

5. Advanced Metering Infrastructure (AMI) Project Status (10 minutes)
   - Clint Whitney, Energy Services Director

Unfinished Business:

Other Informational Items:

6. Capital Work Plan Update - October 2023
   - Clint Whitney, Energy Services Director

7. Forward Agenda
   - Clint Whitney, Energy Services Director

Adjournment

Richland City Hall is ADA accessible. Any individual who has difficulty attending the meeting in-person may request to provide comments remotely. (Ch. 42.30 RCW) Requests for sign interpreters, audio equipment, and/or other special services must be received 48 hours prior to the meeting by calling the City Clerk's Office at 509-942-7389.

UTILITY ADVISORY COMMITTEE AGENDA ITEM COVERSHEET

Meeting Date: 11/14/2023 Agenda Category: Approval of Minutes

Prepared By: Clint Whitney, Energy Services Director

Subject:
Approval of September 12, 2023 Meeting Minutes

Department:
Energy Services

Recommended Motion:
Approve the minutes of the UAC meeting held on September 12, 2023.

Summary:

Fiscal Impact:

Attachments:
1. 2023.09.12 Draft UAC Minutes

MINUTES
UTILITY ADVISORY COMMITTEE REGULAR MEETING
Tuesday, September 12, 2023
Richland City Hall ~ Council Chamber
625 Swift Boulevard

Utility Advisory Committee Regular Meeting – 3:00 pm.
Vice Chair Larkin called the meeting to order at 3:00 pm.

Attendance: Vice Chair Dave Larkin, Committee Members Daniel Porter and Harry Staven were present. Also present were Staff Liaison and Energy Services Director Whitney, Public Works Director Rogalsky, Fire Battalion Chief (BC) Van Beek, Administrative Assistant II Mata, and Ted Light from Lighthouse Energy Consulting.

Committee members Charles Lo Presti and Roy Miller were excused.

Approval of Agenda

MEMBER PORTER MOVED AND MEMBER STAVEN SECONDED THE MOTION TO APPROVE THE AGENDA AS PUBLISHED. THE MOTION CARRIED 3-0.

Minutes

1. Approval of the July 11, 2023 Utility Advisory Committee Regular Meeting Minutes.

MEMBER PORTER MOVED AND MEMBER STAVEN SECONDED THE MOTION TO APPROVE THE JULY 11, 2023 MEETING MINUTES. THE MOTION CARRIED 3-0.

Public Comments

None.

Items of Business

2. Status of Each City Utility

BC Van Beek provided updates relating to the Medical Utility budget, call volumes for 2023, new staffing recruits, Fire Station 76 progress, and supply chain concerns. American Heart Association awarded Richland Fire and Emergency Services with the Mission Lifeline award. BC Van Beek responded to questions from Members.

Director Rogalsky shared updates relating to the annual water sampling program, AMI electronic and water meter installation, and rebranding which will appear on wrapping installed on solid waste collection trucks. Director Rogalsky responded to questions from Members.

Director Whitney provided an Electric Utility update relating to AMI electric and water meter installations. He shared how supply chain issues for materials continue to impact all utilities. Director Whitney mentioned a bid will be posted to repair cable on Birch Street as there have already been 4 outages year-to-date. The findings and corrective actions related to greenhouse gas emissions audit were also shared. There were no questions by Members.

3. 2023 Conservation Potential Assessment (CPA) and Demand Response Potential Assessment (DRPA) Reports

Ted Light presented 2023 CPA and DRPA reports and answered member questions. Director Whitney asked for support from the members to recommend the CPA and DRPA revised report assessments be adopted by council.

MEMBER PORTER MOVED AND MEMBER STAVEN SECONDED THE MOTION FOR UAC SUPPORT OF RECOMMENDING COUNCIL ADOPT THE REVISED 2023 CPA AND DRPA REPORT ASSESSMENTS. THE MOTION CARRIED 3-0.

4. Solid Waste Regional Services (SWRS)

Director Rogalsky presented the SWRS. Key points covered were landfill capacity, the operation of a landfill gas polishing system, and legislation changes requiring for organic waste to be removed from landfill disposal. Director Rogalsky shared that this is an opportunity to develop a new organic waste processing facility, and the City could be a leader for the SWRS for the Tri-Cities region. Director Rogalsky asked members for feedback. Feedback was provided. Director Rogalsky answered member questions.

Unfinished Business

None.

Other Informational Items

The following informational handouts were provided to Members:

5. Capital Work Plan Update – August 2023
6. 2023 Conservation Potential Assessment and Demand Response Potential Assessment Reports
7. Horn Rapids Landfill Expansion Life Technical Memorandum
8. Organic Solid Waste Collection and Processing PowerPoint
9. Landfill Planning - Solid Waste Regional Services

Adjournment

Vice Chair Larkin adjourned the meeting at 5:05 pm.

Prepared by: _____
Arturo Mata, Administrative Assistant II

Reviewed by: _____
Clint Whitney, Energy Services Director

Approved by: _____
Charles Lo Presti, Chair

DATE APPROVED:

DATE PUBLISHED:

UTILITY ADVISORY COMMITTEE AGENDA ITEM COVERSHEET

Meeting Date: 11/14/2023 Agenda Category: Items of Business

Prepared By:

Subject:
Status - Each City Utility (15 minutes each)

Department:
Energy Services

Recommended Motion:
This item is informational only.

Summary:
A representative from each of the City's utilities will provide a status update.

Fiscal Impact:

Attachments:

UTILITY ADVISORY COMMITTEE AGENDA ITEM COVERSHEET

Meeting Date: 11/14/2023 Agenda Category: Items of Business

Prepared By:

Subject:
Tri-Cities 115kV Transmission Network Load Modeling & NW Regional Resource Forecast (20 minutes)

Department:
Energy Services

Recommended Motion:
This item is informational only.

Summary:
BPA has provided a recent load modeling of the Tri-Cities 115kV network. The 115kV network has a current summer capacity of approximately 1200 MW with June, July and August having the highest loading. On June 28, 2021, when the temperature in Richland was 115F, the Tri-Cities 115kV network load was approximately 1300 MW. BPA's load forecast uses a two-year average plus 1.5% load growth assumption.

BPA has four transmission upgrade projects in various states of progress to increase the 115kV system capacity locally to greater than 1575 MW with the upgrade projects projected to be complete by the winter of 2027. Until then, the local transmission network is expected to be stressed with localized constraints, particularly during the June through August periods.

Resource capacity issues can also be a concern from a power generation resource perspective. The Pacific Northwest Utilities Conference Committee (PNUCC) recently completed the Northwest Regional Forecast of Power Loads and Resources for August 2023 through July 2033. The report is for the greater northwest area. Figure 6 on page 9 shows a troubling trend during the summer months with a projected decrease in generating resources while loads and planning reserve margin are projected to increase. While the planning reserve margin provides a buffer, forecasted loads may exceed available NW peak capacity resources beginning in 2027.

The PNUCC report is concerning. However, BPA still projects to have adequate power resources to meet public power's 10 year load forecast needs.

On 11/8/2023, Utah Associated Municipal Systems (UAMPS) and NuScale Power issued a statement that the Carbon Free Power Project, using the NuScale design and planned to be constructed at Idah National Lab, has been canceled. The project faced increasing cost estimates from inflationary pressures and increased uneasiness from utilities subscribing to the output. The news release is available at: Utah Associated Municipal Power Systems (UAMPS) and NuScale Power Agree to Terminate the Carbon Free Power Project (CFPP) | NuScale Power.

Fiscal Impact:
No fiscal impact.

Attachments:
1. 2023 BPA Tri-Cities Load Analysis
2. 2023 PNUCC NW Regional Forecast - Page 9 - Figure 6 Peak Capacity Load and Resources

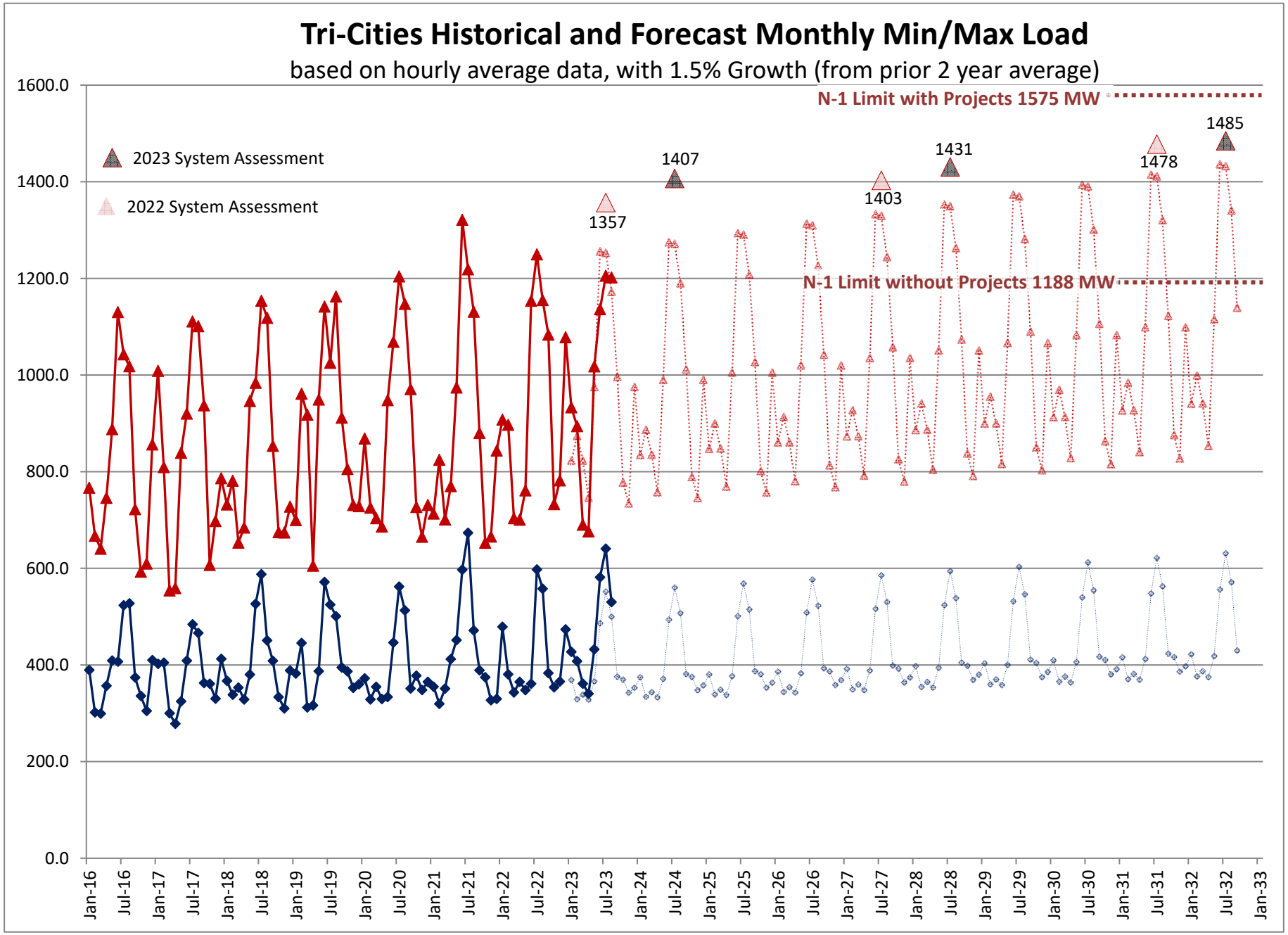
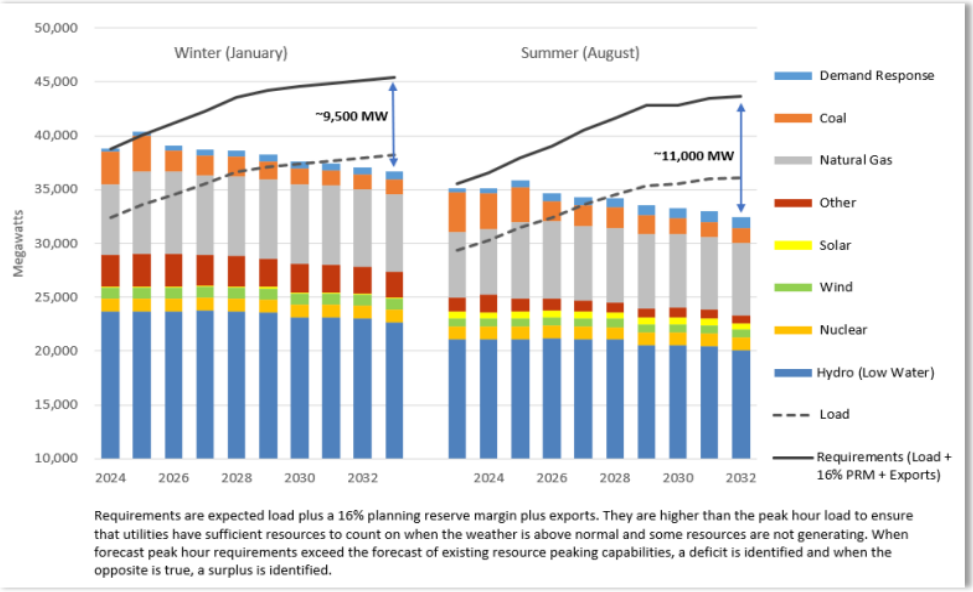

Tri-Cities Historical and Forecast Monthly Min/Max Load
based on hourly average data, with 1.5% Growth (from prior 2 year average)
N-1 Limit with Projects 1575 MW
N-1 Limit without Projects 1188 MW
2023 System Assessment
2022 System Assessment
1357
1407
1403
1431
1478
1485
1600.0
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
Jul-25
Jan-26
Jul-26
Jan-27
Jul-27
Jan-28
Jul-28
Jan-29
Jul-29
Jan-30
Jul-30
Jan-31
Jul-31
Jan-32
Jul-32
Jan-33

Figure 6: Peak Capacity Load/Resource Picture



Requirements are expected load plus a 16% planning reserve margin plus exports. They are higher than the peak hour load to ensure that utilities have sufficient resources to count on when the weather is above normal and some resources are not generating. When forecast peak hour requirements exceed the forecast of existing resource peaking capabilities, a deficit is identified and when the opposite is true, a surplus is identified.

UTILITY ADVISORY COMMITTEE AGENDA ITEM COVERSHEET

Meeting Date: 11/14/2023 Agenda Category: Items of Business

Prepared By:

Subject:
Energy Environmental Economics (E3) - Draft Net Energy Metering Report (20 minutes)

Department:
Energy Services

Recommended Motion:
This item is informational only.

Summary:
The Association of Washington Cities (AWC) and Washington Public Utility District Association (WAPUDA) invited the City to participate in a Net Energy Metering (NEM) study of photovoltaic systems to analyze the cost/benefits and to inform future policy decisions. Attached is a draft report of the NEM study performed by a consultant, Energy+Environmental Economics (E3). The final report is expected later in 4Q23 and will be included in the January UAC meeting packet.

The City's participation in the study was limited to summary information about solar installations in the City. There were six other utilities that provided detailed information on solar installations, with the utilities representing a mixture of community-owned utilities and investor-owned utilities across Washington.

A summary of the key information in the draft NEM report:

1. The document presents draft results from an evaluation of the costs and benefits of net energy metering (NEM) programs in Washington state. The evaluation focuses on 6 major utilities and uses this to estimate statewide impacts.
2. From the perspective of solar customers, NEM provides bill savings but long payback periods of 15-24 years. 12% of NEM systems are in highly impacted communities.
3. From the ratepayer perspective, NEM compensation exceeds the value of solar to the utility, resulting in a cost shift and rate increases for non-solar customers. Annual cost shifts range from $44-118/kW among the studied utilities.
4. From a societal perspective, NEM provides additional benefits like reduced emissions and land use impacts. However, the analysis finds NEM solar does not pass the Societal Cost Test due to the high cost of installing systems.
5. Next steps include finalizing the analysis based on feedback from utilities and stakeholders. The final report will be released in mid-December.

Fiscal Impact:
There is no fiscal impact.

Attachments:
1. WA Utilities NEM Evaluation - DRAFT Results 2023-10-31

WA Utilities NEM Evaluation

Draft Results

October 31, 2023

Lindsay Bertrand
Sierra Spencer
Paul Picciano
Ari Gold-Parker
Arne Olson

Energy+Environmental Economics

Agenda

- Evaluation Objectives and Scope
- Overview of Evaluation Tasks
- Draft Results
- Conclusions
- Next Steps

Since we have a lot of content to get through, please hold comments and questions until the end of the presentation, or put them in the chat so we can make sure to revisit them.

Evaluation Objectives and Scope

Objectives

- Evaluate the benefits and costs associated with customer solar systems interconnected under Washington's current net energy metering (NEM) programs
- Help inform future policy proposals for NEM in Washington

Questions to Address:

- What are the benefits and costs of a new solar system interconnected today under NEM?
- What are the benefits and costs of the full population of NEM solar and how do they evolve over time as more customers adopt NEM solar?

Scope

- The evaluation focuses on Washington's current NEM programs and does not include evaluations of, or proposals for, new tariff options
- E3 performed a detailed analysis of six "detailed study utilities" and leveraged this analysis to estimate statewide impacts
- The evaluation considers the impacts of current NEM programs on participants, non-participating ratepayers, the full class of utility ratepayers, and society at large

Utility	Ownership Type
Avista	Investor-owner utility
Inland Power and Light Co.	Cooperative
Kittitas County PUD No. 1	Public utility district
Puget Sound Energy	Investor-owner utility
Seattle City Light	Municipal
Snohomish PUD	Public utility district

Overview of Evaluation Tasks

Energy+Environmental Economics

Task 1: Stakeholder engagement and technical advisory group (TAG)

- **The TAG facilitator, Gridworks, convened a TAG consisting of representatives from stakeholder groups to provide a forum for all stakeholders to provide input for this study**
- **In the first two TAG meetings, the TAG provided feedback on proposed benefits and costs, study inputs, and proposed methodology**
  - The TAG identified a list of benefits and costs to evaluate as part of this study
    - E3 compared this list to other studies to ensure it was comprehensive
  - E3 will address all benefits and costs identified by the TAG in the evaluation report
  - E3 considered TAG comments when developing study inputs and the evaluation methodology
- **In the third TAG meeting (November 14th), the TAG will provide feedback on draft results**
  - Gridworks will summarize feedback, which E3 will integrate into the final analysis and report

Task 2: Develop database of NEM solar systems

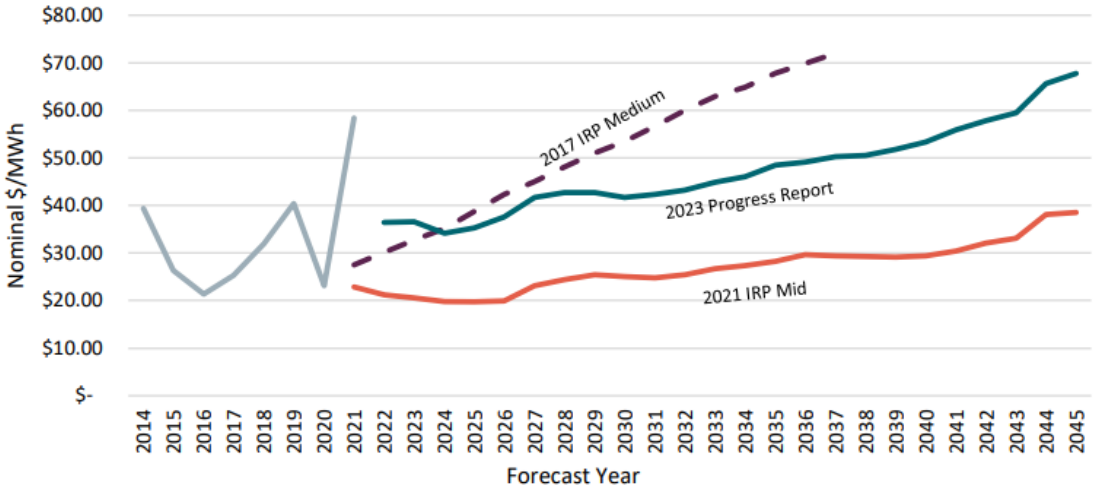
- E3 worked with the detailed study utilities to develop a NEM systems database with key data regarding each customer solar system interconnected under the existing NEM programs
- Each detailed study utility provided data including solar system size, interconnection year, customer class, property type, low-income program enrollment, census tract ID, and electricity consumption
- The detailed study utilities agreed to a list of data items to include in a public-facing database released to the TAG
- The customer solar system data from the database was used to evaluate the costs and benefits of current NEM programs for this evaluation

Data Item	Included in Public Database?
Customer ID	Yes
Utility	Yes
Solar System Size (kW-DC and kW-AC)	Yes
Interconnection Year	Yes
Customer Class	Yes
Zip Code	No
City	No
Rate Schedule	No
Property Type	Yes
Paired Battery? (Yes/No)	Yes
LIHEAP Enrollment	No
Utility-specific Low-income Program Enrollment (Yes/No and Program Name)	No
Enrolled in Payment Program	No
Customer Arrearage	No
Census Tract ID (2010 Census)	Yes
Environmental Health Disparities Rank, Overall and Socioeconomic (1-10)	Yes
Property Ownership (owned vs. rented)	No
Leased or Owned Solar System?	No
Paired Battery Size (kWh)	No
Solar System Cost Before Tax Credits (if owned system)	No
Pre-interconnection Annual Load	No
Post-interconnection Annual Load	No

Task 3: Evaluate solar benefits and costs

- **E3 evaluated the benefits and costs of customer solar systems interconnected under Washington's current NEM programs**
- **To support the development of utility avoided costs, the detailed study utilities provided data related to energy, generation capacity, transmission and distribution capacity, and greenhouse gas (GHG) avoided costs**
  - E3 used the provided data and other industry resources to develop a forecast of utility avoided costs from 2023-2045
- **E3 quantified and monetized benefits and costs where possible and will provide a qualitative analysis of the remaining benefits and costs**

Example Data Source: PSE Mid-C Wholesale Electricity Price Annual Average Price Forecast



Source: PSE 2023 IRP Progress Report

Task 4: Evaluate existing NEM programs

- **E3 developed a NEM evaluation model to evaluate Washington's existing NEM programs**
- **E3 classified the benefits and costs of NEM solar based on who benefits or incurs costs**
- **Results metrics**
  - Cost-effectiveness tests: Participant Cost Test (PCT), Ratepayer Impact Measure (RIM), Total Resource Cost test (TRC), Societal Cost Test (SCT)
  - Participant metrics: customer bill savings, payback period
  - Non-participant metrics: solar avoided costs, cost shift from participants to non-participants, non-participant rate impacts, low-income bill impacts

Perspectives for the Evaluation of Benefits and Costs

NEM Customer (Participant)

- Values that accrue to NEM customers who installed the solar system
- Includes bill savings, upfront system costs, and incentives

Utility Ratepayer

- Values that accrue to all electric ratepayers of the utility
- Considers all factors that impact electricity rates

Society

- Values that accrue to all residents in the state of Washington
- Considers environmental and other societal values

Tasks 5 and 6

Task 5: Review tariff options for customer generation

- **E3 is developing a memo that provides a brief qualitative review of tariff options for customer generation that are being considered in other U.S. jurisdictions**
  - This task does not include an evaluation of potential future tariff designs for customer solar in Washington
- **The memo will be sent to the detailed study utilities and the TAG in mid-November**
- **Feedback from the utilities and the TAG will be incorporated into the evaluation report**

Task 6: Final report

- **E3 will develop a public-facing report detailing the methodology and results of the study, including stakeholder engagement and key feedback provided by the TAG**
- **The detailed study utilities and the TAG will provide feedback on the draft results, which E3 will incorporate into the evaluation report**

Draft Results

Methodology

Customer Bill Impacts: leverages NEM systems database to estimate customer bill impacts of solar adoption, given utility rates and assumed utility solar profiles, yielding average bill savings per kW for detailed study utilities

Utility Avoided Costs: incorporates reductions in utility costs due to customer solar adoption

Societal Avoided Costs: incorporates monetized benefits to society from customer solar adoption due to avoided land use and emissions reductions

NEM Evaluation Model

+ Estimates 20-year costs and benefits for customer solar adopters starting in 2024 for residential customers on existing NEM tariffs, for detailed study utilities, rest-of-state, and statewide
+ Rest-of-state bill savings approximated using average electricity rate, with statewide bill savings calculated as the NEM capacity-weighted average of the detailed study utilities and the "rest-of-state"
+ Bill savings assumed to escalate based on historical growth rates (~3%/year nominally)
+ Produces impact metrics spanning several perspectives: NEM customers (participants), ratepayers (residential and low-income), total resource, and societal

NEM Participant Impacts:

- First-year bill savings ($/year)
- Simple payback period (years)
- Participant Cost Test (PCT)

Ratepayer Impacts:

- Current rate impact (cents/kWh)
- Current low-income bill impact ($/month)
- Cost shift forecast, with and without legislative minimum ($/year)
- Ratepayer Impact Measure (RIM)

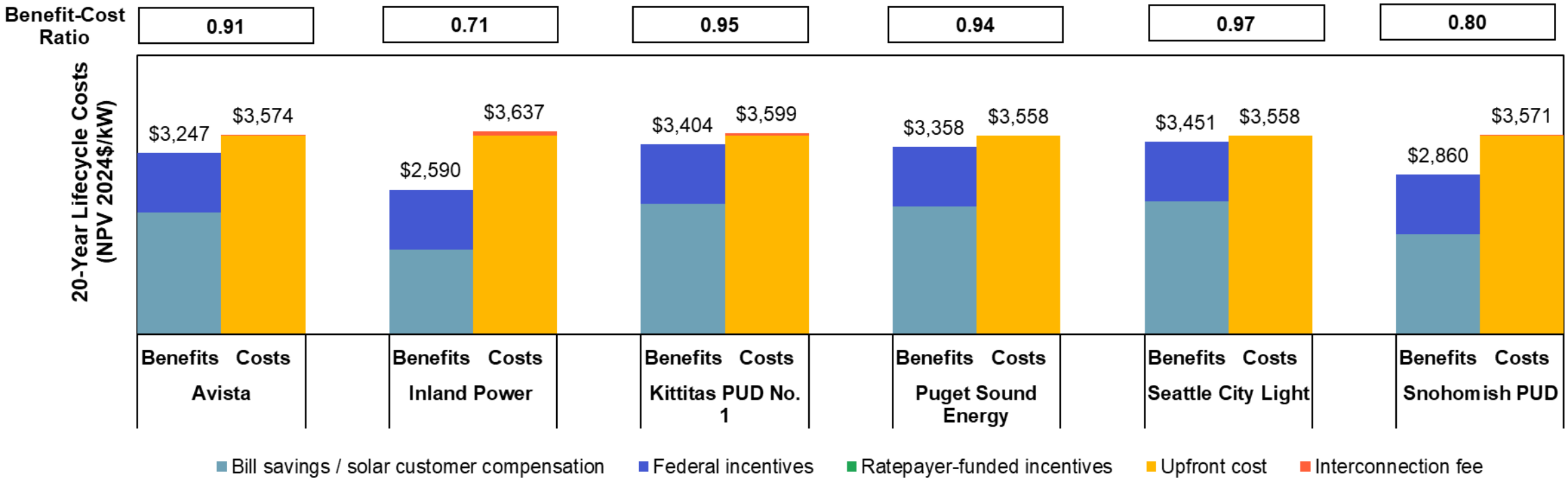
Total Resource & Societal Costs

- Total Resource Cost test (TRC)
- Societal Cost Test (SCT)

Participant Cost Test (PCT) Results

- Participant benefits include bill savings and incentives
- Participant costs include upfront system costs and interconnection fees
- Results are dependent on assumptions such as the analysis lifetime, discount rate, customer electricity consumption, system capacity factor, upfront costs, and incentives

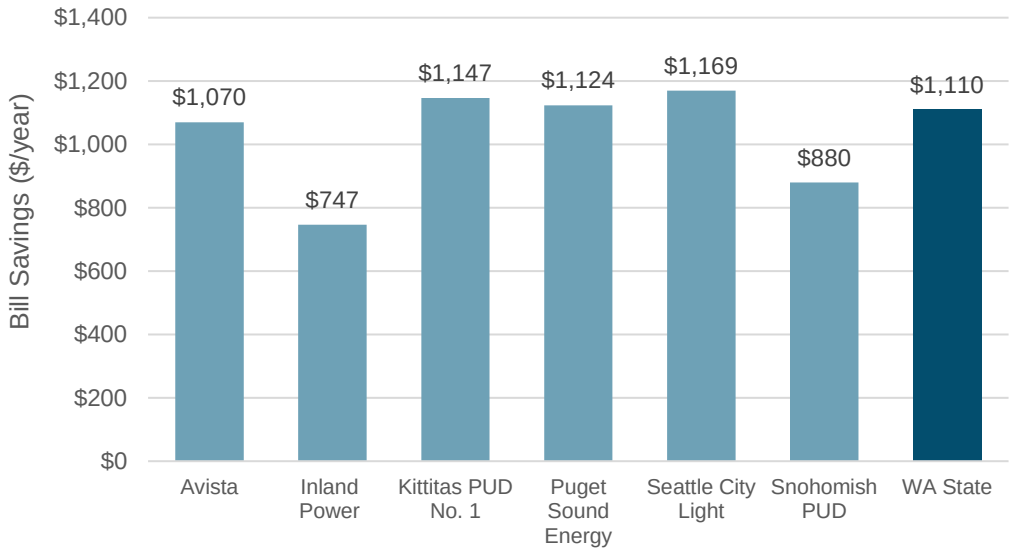
Participant Cost Test (PCT) by Utility



Summary of NEM Customer Impacts

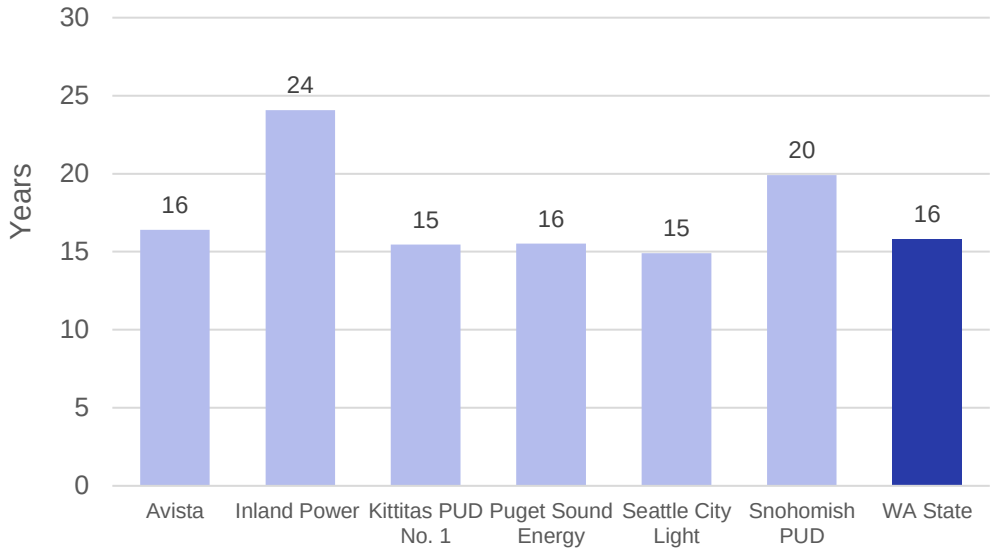
- First-year bill savings range from about $100 to $170 per kW-AC
- Modeling assumes a solar system cost of ~$2,500/kW-AC after investment tax credit (ITC)
- Which customers are benefitting? Among the six utilities, 12% of solar systems are installed in "Highly Impacted" census tracts per the WA Environmental Health Disparities Map

First-Year Bill Savings for Example 7 kW System ($/year)



Simple Payback Period (Years)

Upfront cost (net of incentives) divided by first-year bill savings

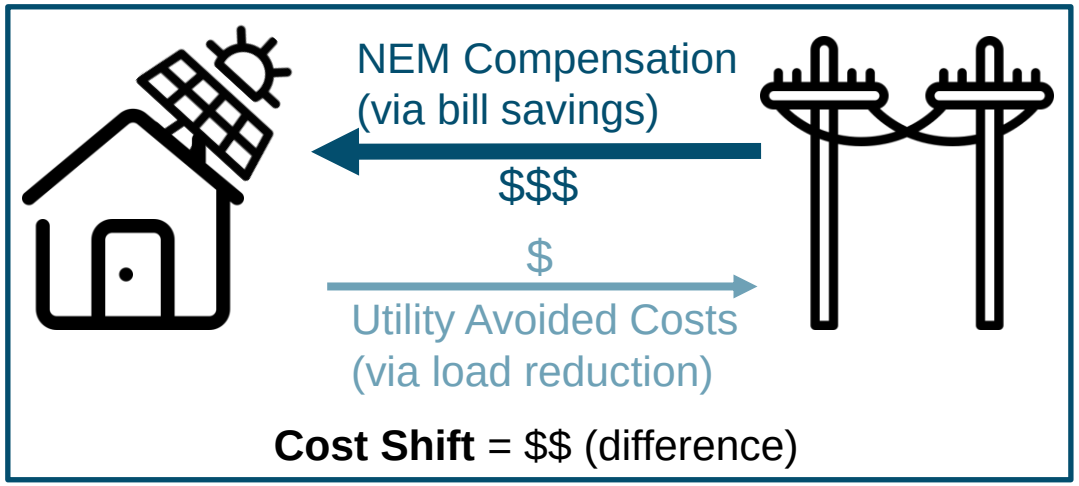


Summary of Additional NEM Customer Benefits

TAG Benefit Description	E3 Qualitative Evaluation
Customer hedge against fossil fuel volatility (commodity prices, technology costs, utility bills)	NEM participants benefit from reduced risk of utility bill increases tied to volatile energy markets and fossil fuel prices. While month-to-month variability in bills and savings from solar generation will occur, this still limits exposure to the relative volatility of potential rate hikes.
Resilience benefit from rooftop solar alone	Standalone NEM solar is not likely to be configured in a way to allow for direct home use in the event of an outage, so this is not an inherent benefit of customer solar alone. Customer solar systems paired with a battery may provide resilience benefits during outages, which would vary significantly between individual NEM customers.

Ratepayer Benefits and Costs

+ **Ratepayer benefits are changes that lead to a reduction in electricity rates**
  - These benefits are also known as "utility avoided costs," *i.e.*, electricity system cost savings that reflect the system value of marginal load reduction or customer generation
  - Reductions in system costs are passed onto electricity customers via rate reductions
+ **Conversely, ratepayer costs are changes that lead to an increase in electricity rates**
  - As above, this would reflect *increased* utility costs, which lead to increased rates
  - This may also reflect reductions in utility revenues due to reduced bill payments, as reduced revenues would need to be recovered through rate increases
+ **The *cost shift* metric is tied to ratepayer benefits and costs**
  - Cost Shift = Participant Bill Reductions – [Net] Utility Avoided Costs
  - If participant bill reductions are greater than system cost savings, rates need to increase to recover the full revenue requirement



Utility Avoided Cost Framework

Ratepayer Perspective

BPA Tier 1 Rate *(encompasses Energy and Generation Capacity, with no incremental value for GHG reduction)*

OR

Energy *(including monetized GHG costs)*
+
Generation Capacity

Weighted by (1 - % clean generation)

+

Levelized Cost of Energy (LCOE) of Utility-scale Solar *(encompasses Energy and Generation Capacity, with no incremental value for GHG reduction)*

Weighted by % clean generation

Adjusted for losses and converted to $/kW-year

+

Transmission and Distribution Costs

BPA Tier 1 Rate is used when a utility's Tier 1 allocation covers their net energy requirement

Energy + Generation Capacity are used for the share of each utility's generation that does not come from renewable sources and is not provided by BPA Tier 1

LCOE of Utility-scale Solar is used for the share of each utility's generation that comes from renewable sources (100% after 2030) and is not provided by BPA Tier 1

Key Avoided Costs Assumptions

Additional Details Provided in Appendix

Ratepayer Perspective

+ **BPA Tier 1: if a utility's Net Requirement is less than their Rate Period High Water Mark (RHWM), a reduction in net load due to NEM solar will reduce their allocation of Tier 1 energy. Thus, the Tier 1 rate is the marginal cost.**

+ **Percent clean generation: used to weight Energy + Generation Capacity and LCOE of Solar values**
  - All BPA-reliant utilities have 100% renewable generation as of 2021 per their Washington Department of Commerce disclosures
  - Avista and PSE have ~40% clean energy now, which is assumed to increase linearly to 100% by 2030

+ **Energy prices: Mid-Columbia market price forecast from PSE**

+ **Generation Capacity**
  - Biodiesel peaker as the marginal capacity resource, data from PSE (similar to cost of ammonia turbine from Avista)
  - Effective load carrying capability (ELCC) of utility-scale solar during season of peak need provided by the Western Resource Adequacy Program (WRAP): 3% for the winter season

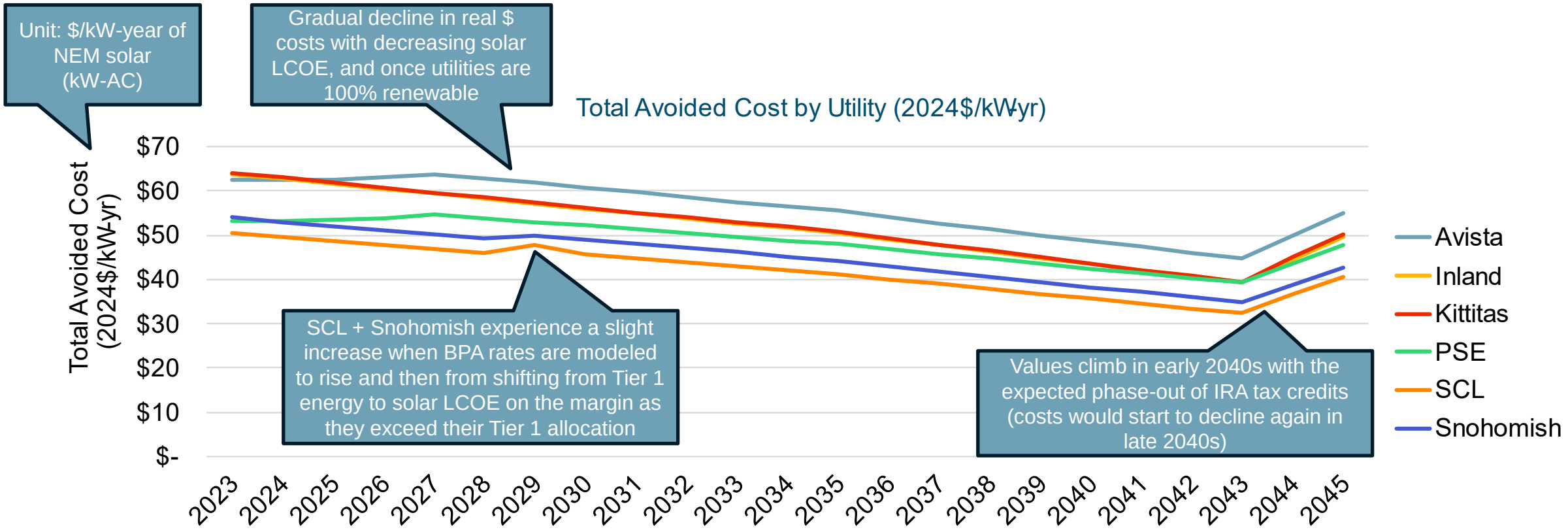
+ **LCOE of Solar: LCOE for utility-scale solar in eastern WA (incorporating a production tax credit) from the National Renewable Energy Laboratory (NREL) Annual Technology Baseline (ATB)**

+ **Transmission and Distribution (T&D)**
  - T&D capacity cost values provided by the utilities, or in BPA documents for the utilities relying on BPA transmission
  - Peak capacity allocation factor (PCAF) methodology used to allocate costs over the top 500 hours of load for each balancing area

+ **Customer solar profiles and utility-scale solar capacity factor: sourced from the NREL PVWatts tool and ATB**

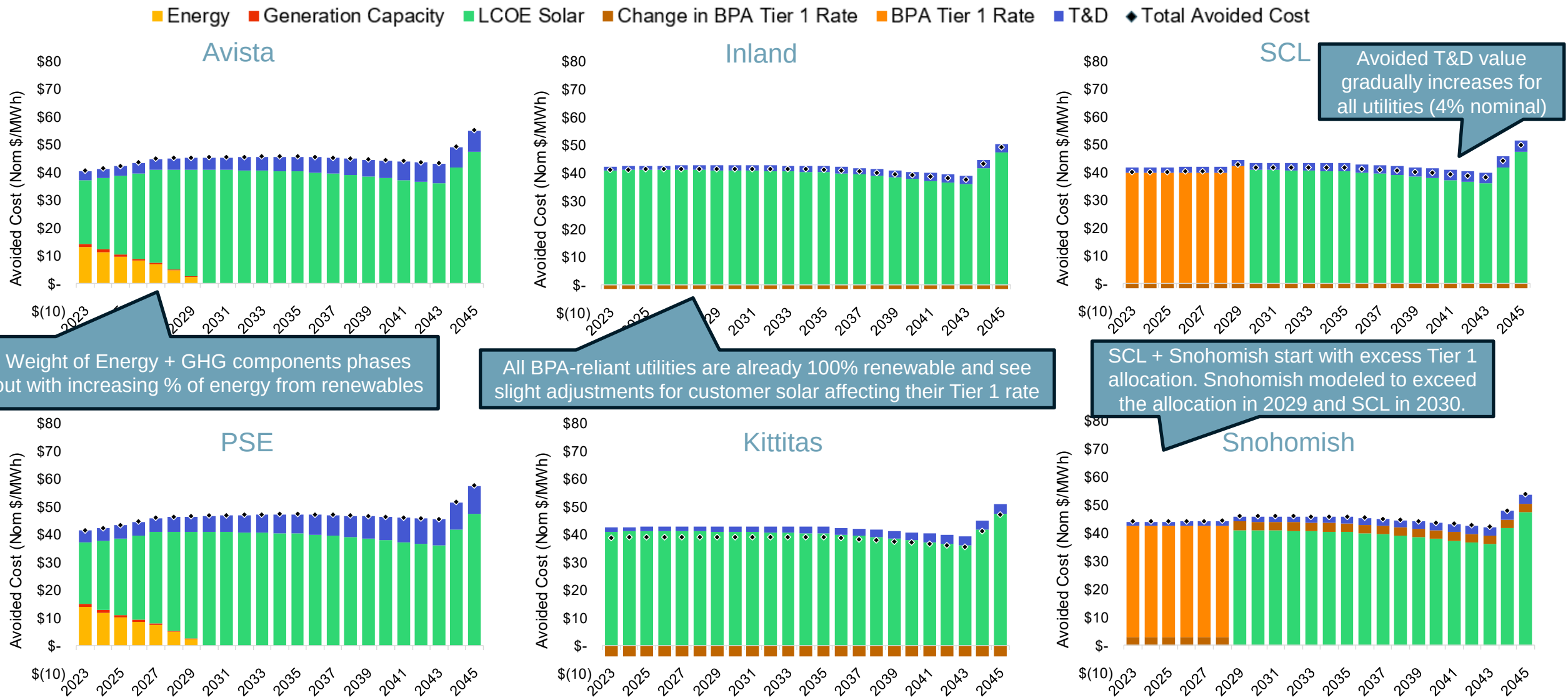
Comparison of Avoided Costs

Ratepayer Perspective



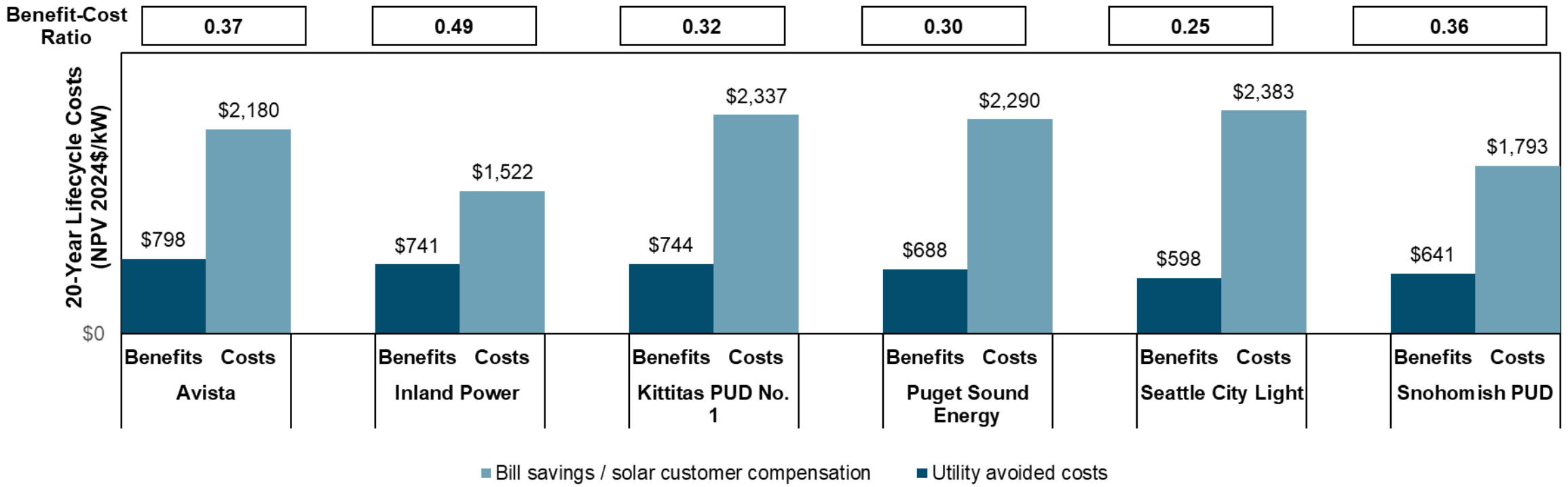
Avoided Cost (Weighted) by Component

Ratepayer Perspective



Ratepayer Impact Measure (RIM) Results

Ratepayer Impact Measure (RIM) by Utility



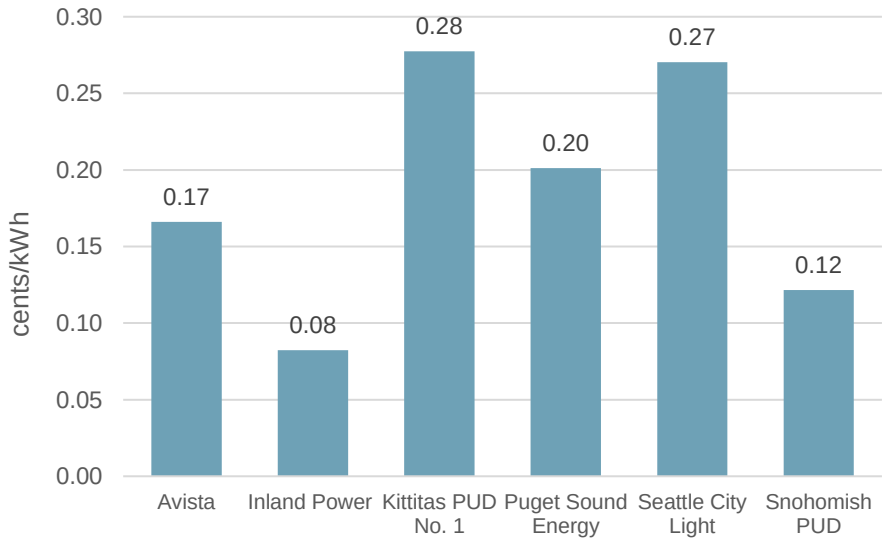
Summary of Ratepayer Impacts

How much NEM solar is installed?

	Avista	Inland Power	Kittitas PUD No. 1	Puget Sound Energy	Seattle City Light	Snohomish PUD
NEM Solar Installed (kW)	21,240	3,408	723	115,946	44,452	26,130
Estimated NEM Generation (MWh/year)	32,033	5,193	1,172	146,064	54,806	31,438
Estimated NEM Solar % of Total Electricity Usage	1.1%	0.7%	1.7%	1.2%	1.6%	0.8%

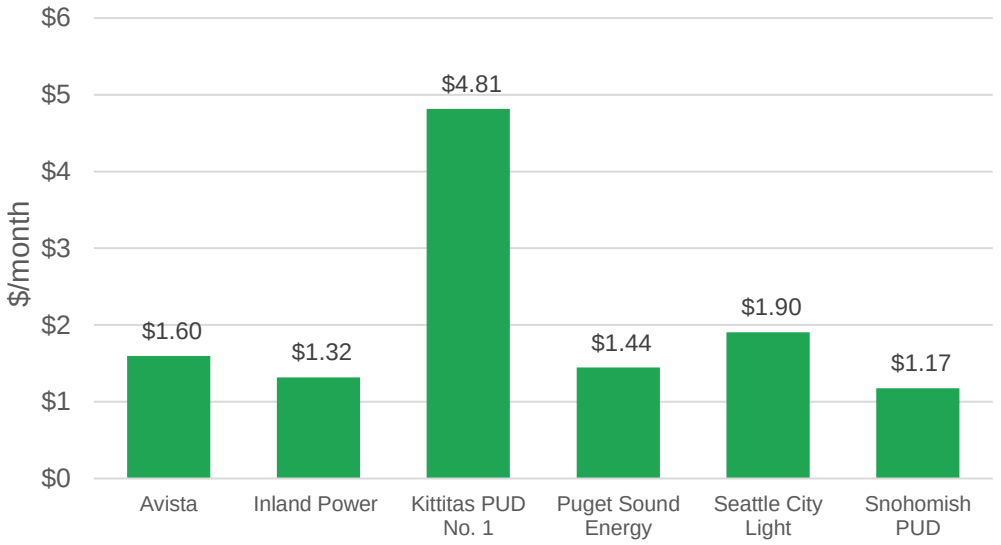
2024 Estimated Residential Rate Impact

Cents/kWh rate increase for all residential ratepayers due to compensation to NEM solar customers



2024 Estimated Low-Income Bill Impact ($/month)

*Monthly bill increase for an average low-income customer due to compensation to NEM solar customers**

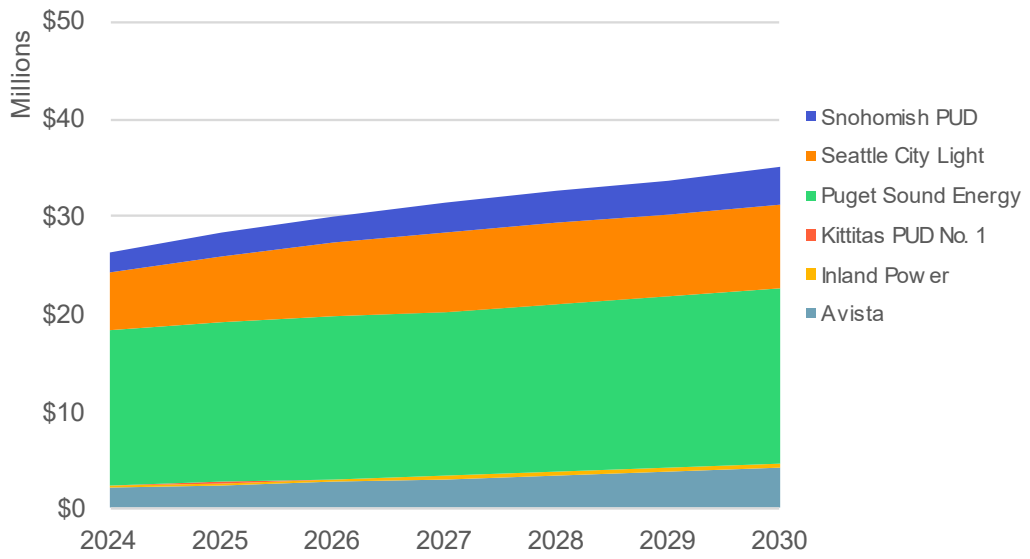


**Average low-income customer usage provided by each utility. If not provided, the average customer usage was used.*

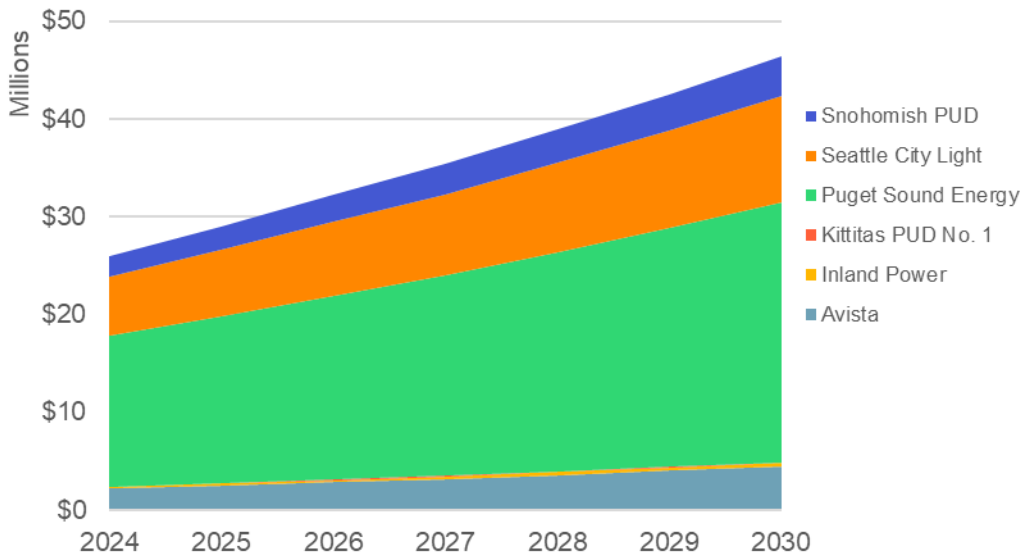
Cost Shift Results (Residential)

- Total residential cost shift over time with and without legislative NEM minimum
- Shown for detailed study utilities only (62% of total state NEM solar capacity)
- Assumes recent NEM solar growth rates continue for each utility

Total Residential Cost Shift Forecast
No changes to legislative NEM minimum



Total Residential Cost Shift Forecast
Legislative NEM minimum removed



Summary of Additional Ratepayer Benefits

TAG Benefit Description	E3 Qualitative Evaluation
Secondary effects that customers use more electricity at optimal times for the grid (EV charging) or increases electrification in the home	This is not a benefit of NEM solar on tiered rates. If customer solar is paired with a battery and the tariff provides adequate price signals via time-of-use (TOU) rates, customers could be incentivized to use electricity at optimal times for the grid. In this case, this is really a benefit of the tariff and storage rather than customer solar on its own. However, customer solar adoption may correlate with or result in customer education and engagement with energy issues, leading to adoption of measures such as electrification.
Driver for new technology - will enable virtual power plants	Standalone NEM solar is unlikely to enable virtual power plants because customer energy exports may not occur at optimal times for the grid and therefore cannot be relied on as an independent generation source. Customer solar paired with a battery and tariffs with adequate price signals could help enable virtual power plants.
Frequency regulation - new inverter technology increasingly supports frequency regulation	“Smart inverters” that can support frequency regulation are not yet widely available or in use. Initial deployment for these benefits has been focused on utility-scale plants rather than NEM customer solar. However, gradual requirements for and deployment of smart inverters may increasingly support frequency regulation.
Voltage support - providing voltage support (VAR), including inverter “ride through” ability, is a direct benefit of inverter resources	As noted for frequency regulation, “smart inverters” that can provide voltage support and “ride through” ability are not yet widely available or in use. Increased deployment of smart inverters may provide voltage support.

Summary of Additional Ratepayer Costs

TAG Cost Description	E3 Qualitative Evaluation
Solar integration costs	Customer solar can result in utility costs by increasing the need for intra-hour flexibility, increased power plant standby/station power costs, and higher operations and maintenance costs due to cycling. These costs are expected to be small relative to other cost components.
Grid modernization - the costs of tools and infrastructure used by the utility to support DER at the distribution level	Grid modernization investments are not generally associated with a specific increment of DERs and are instead made strategically to enable the utility to better manage both existing and anticipated DERs. As such, they may be incurred largely on behalf of programs such as NEM but are typically recovered from all customers. These investments can include advanced metering infrastructure (AMI) to more accurately track and monitor DERs, advanced distribution management systems (ADMS) or distributed energy resource management systems (DERMS) tools to coordinate various interconnected resources at the distribution level, as well as other communication and monitoring and control systems.
Utility program administration costs (marketing, administration, evaluation, incentives)	This study accounts for a portion of administration costs including incentives and interconnection fees. Other administrative expenses such as customer education and staff hours that are not individually allocatable to the NEM program are expected to be small relative to incentive and interconnection costs.

Societal Benefits and Costs

- **The societal perspective captures benefits that accrue to society at large. NEM customer benefits and ratepayer benefits can be considered societal benefits as well, but here we focus on other environmental or societal benefits that are not reflected in the other categories.**

- **Key metric = *Societal Cost Test* = [Societal Benefits] / [Societal Costs]**
  - Societal benefits include federal incentives, utility avoided costs, and other societal benefits that can be quantified including reduced land use and reduced emissions
  - Societal costs include upfront system costs

- **Societal benefits are often difficult to quantify as they are not directly monetized and may lack a robust quantification methodology or concrete data to support the estimation of benefits. For any benefits that we are not able to quantify, we will complete a qualitative analysis.**

Monetized Societal Benefits by Utility (in 2024)

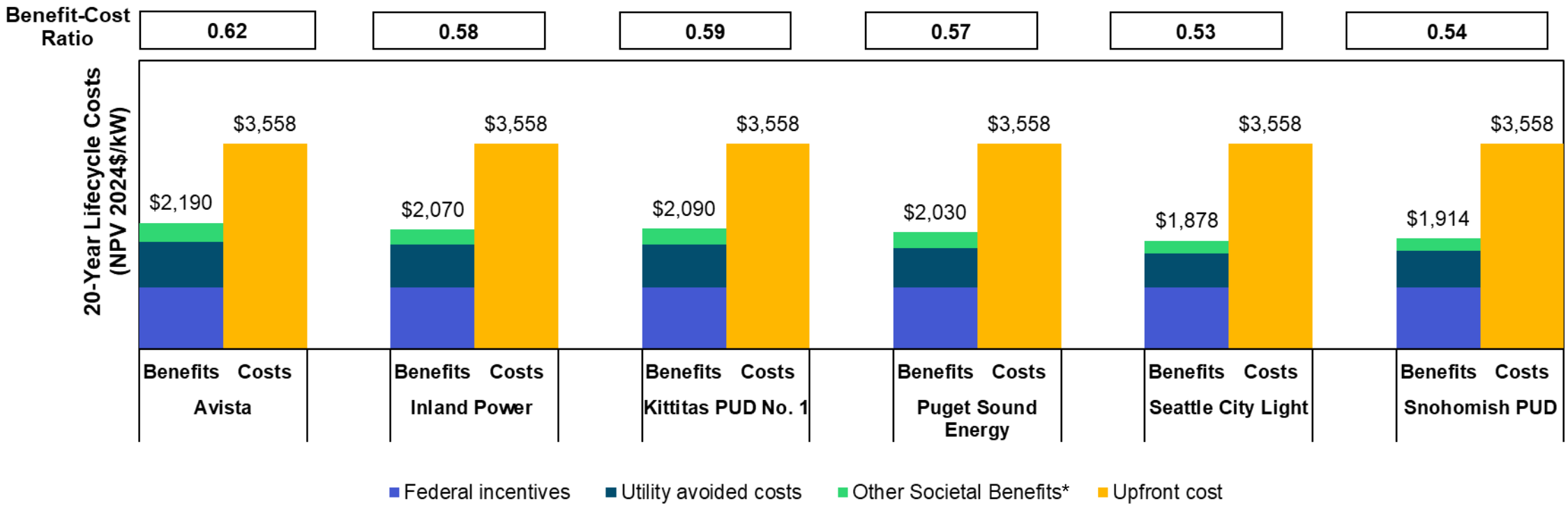
Additional Details Provided in Appendix

- Criteria pollutant emissions reductions estimated using results from AVERT (AVoided Emissions and GeneRation Tool) and COBRA (CO-Benefits Risk Assessment)
- Avoided land use estimated using literature estimates for land use of utility-scale resources and the ecosystem services value of avoided land use for grasslands
- GHG emissions reduction (incremental societal value of avoided GHGs) estimated based on avoided fossil fuel emissions and the social cost of carbon net of the carbon allowance price

Utility	Physical Units per kW-year			Societal Value ($2024/kW-year)		
	Avoided Land Use (acres)	Criteria Pollutant Emissions Reduction (lbs)	GHG Emissions Reduction (tCO2e)	Avoided Land Use	Criteria Pollutant Emissions Reduction	GHG Emissions Reduction
Avista	0.004	0.91	0.10	$10	$5	$19
Inland	0.006	-	-	$16	-	-
Kittitas	0.007	-	-	$17	-	-
PSE	0.003	0.80	0.09	$8	$4	$17
SCL	0.005	-	-	$13	-	-
Snohomish PUD	0.005	-	-	$13	-	-

Societal Cost Test (SCT) Results

Societal Cost Test (SCT) by Utility



*"Other Societal Benefits" only includes benefits that were monetized in this analysis

Summary of Additional Societal Benefits (1/2)

TAG Benefit Description	E3 Qualitative Evaluation
Reduced water consumption - potential for solar panels to shade irrigation canals and thereby reduce evaporation and water loss; also a source of electricity for canal pumps, reducing canals' electric draw from the grid	The direct cost of water saved from reduced thermal generation is included in avoided energy costs. Reduced evaporation and water loss applies to a very small number of NEM solar systems. E3 estimated the societal value of water using utility rebates for water saving measures; the result was negligible and not included as a monetized benefit.
Preserves tribal lands and resources - less solar being forced onto tribal lands. Self-generation can preserve tribal resources and increase tribal sovereignty.	Net benefits or costs cannot be determined without in-depth conversations with tribes that are affected by these developments. E3 is unable to quantify a dollar amount and instead recognizes this as a further potential benefit provided by NEM solar.
Reduced wildfire risk - NEM solar reduces urban loads and allows for de-energizing transmission and distribution lines. Also allows for islanding remote rural customers.	Standalone NEM solar is unlikely to result in reduced wildfire risk. Deenergizing transmission and distribution lines and islanding may be possible with higher penetrations of customer storage.
Increased awareness - raises public awareness for energy issues; onsite generation might encourage residential storage, driver for electrification, reduce the need for demand reduction	E3 recognizes the value that this type of increased engagement can provide to customers and, by extension, the local community or society more broadly. However, E3 is not aware of any methods to quantify a dollar amount on such values and instead recognizes them as a further potential benefit provided by customer solar.

Summary of Additional Societal Benefits (2/2)

TAG Benefit Description	E3 Qualitative Evaluation
Local employment - green jobs, apprenticeship opportunities, local living wage employment and training in the electrical field	While customer solar allocates more money to labor per kW compared to utility-scale solar, E3 is unable to isolate the marginal economic impacts of an increase in customer solar without a larger macroeconomic model.
Federal funds as an economic development engine - attract federal funds to Washington state, particularly the Local Solar for All grant program that will support low- and moderate-income households. Also, the tax credits and rebates from the Inflation Reduction Act will help to grow the Washington economy.	Tax credits and rebates are included in the NEM evaluation model for this study. E3 is not aware of robust methods to quantify a dollar amount for increased economic development but recognizes it as a further potential benefit provided by customer solar.
Leverage private capital - private capital deployed to support clean energy development	While customer solar requires more capital per kW compared to utility-scale solar, E3 is unable to isolate the marginal economic impacts of an increase in customer solar without a larger macroeconomic model.
Investment in disadvantaged communities - jobs and local spending in disadvantaged communities	Disadvantaged communities do not currently see significant benefits from NEM due to low adoption in these communities.
Equity - reduced energy burden for low-income customers	Bill impacts for low-income customers are included in the NEM evaluation model for this study. E3 is not aware of robust methods to quantify a dollar amount for additional societal benefits.

Conclusion and Next Steps

Energy+Environmental Economics

Conclusions

- **From a participant perspective, NEM solar can provide significant bill savings, but our modeling finds relatively long simple payback periods of 15-24 years**
  - Participant results are dependent on assumptions such as the analysis lifetime, discount rate, customer electricity consumption, solar system capacity factor, upfront costs, and incentives
- **Compensation through net energy metering significantly exceeds the value of customer solar to the utility, resulting in a cost shift from solar to non-solar customers**
  - The annual cost shift varies by utility and ranges from $44-118/kW-AC in 2024, estimated to grow to $57-132/kW-AC by 2030
  - Although much lower than the $400-600/kW-AC figures seen under NEM in California, the cost shift in Washington still leads to measurable rate increases for non-participants
  - We estimate this results in low-income bill impacts of $14-57/year among the utilities studied
- **From a societal perspective, NEM customer solar provides additional value beyond that which accrues directly to ratepayers**
  - Social and environmental benefits include reduced criteria pollutants, land impacts, and GHG emissions
  - Even after monetizing these benefits, this analysis finds that NEM solar does not pass the Societal Cost Test due to the high cost of installing NEM solar systems

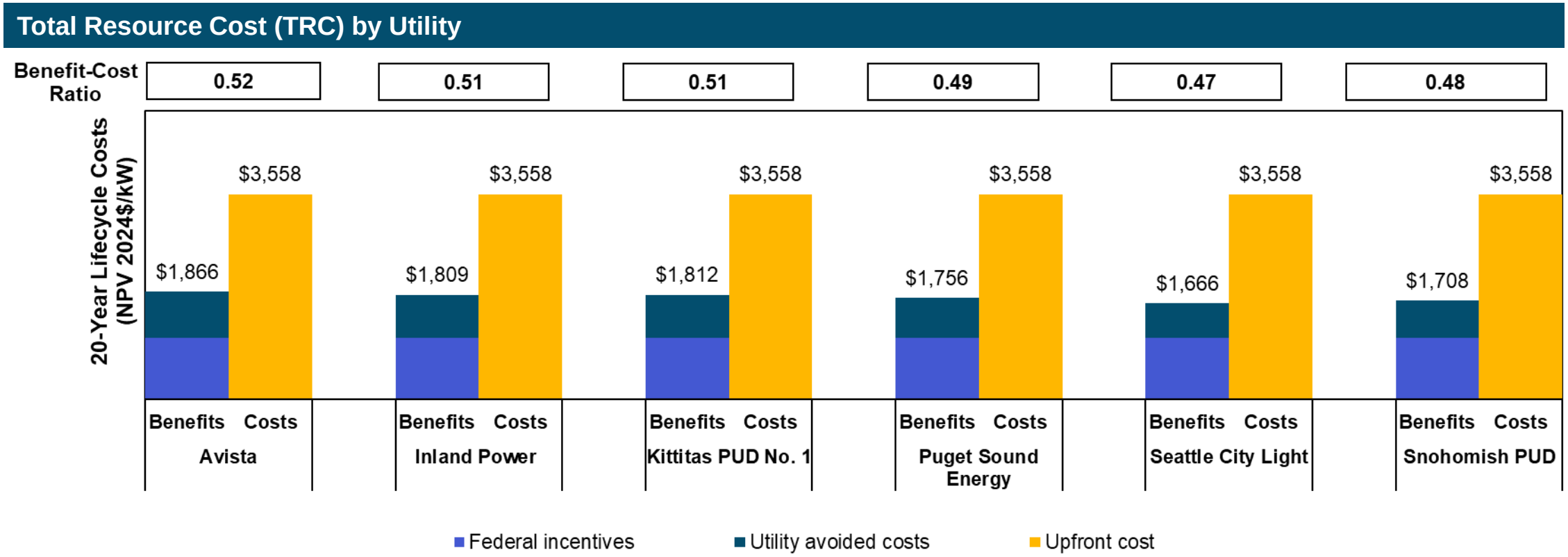
Next Steps

- **November 3rd: deadline for detailed study utilities to provide initial feedback on the draft results presented during today's meeting (for integration into TAG slide deck)**
  - E3 will consider feedback provided by this date when revising the slide deck for the TAG meeting
  - Utilities may continue to provide feedback through December 1st
  - We are particularly interested in feedback on utility avoided costs
- **November 7th: Gridworks to send draft results slide deck to the TAG**
  - This slide deck will be similar to the results shared with the detailed study utilities today
- **November 14th: TAG meeting #3 where E3 will present draft results and receive feedback from the TAG**
- **December 1st: deadline for detailed study utilities and the TAG to submit feedback on the draft results**
- **Mid-December: final report released**

Appendix

Total Resource Cost (TRC) Test Results

- The TRC reflects the benefit-cost ratio from the combined participant and non-participant perspective
- TRC benefits include federal incentives and utility avoided costs
- TRC costs include upfront system costs



NEM Evaluation Model Sources and Assumptions

- **NEM solar capacity:** provided by detailed study utilities and extracted from the Washington State University net metering report for the remaining utilities in the state
- **Solar system capacity factors and profiles:** National Renewable Energy Laboratory's (NREL) PVWatts, based on utility zip codes that have the majority of solar capacity
- **Solar customer loads:** provided by detailed study utilities
- **Solar system capital costs:** Energy Sage
- **Federal incentives:** 30% federal tax credit
- **Utility incentives and interconnection costs:** provided by detailed study utilities
- **Utility retail rates:** 2023 residential retail rates for each utility, by tier and season (when applicable)
- **Annual rate escalation:** based on 10-year compound annual growth rate (CAGR) of average revenues per sales (~2%), plus assumption of expected ongoing costs (~1%)
- **Discount rates:** 7% weighted average cost of capital (WACC) and 5% societal rate (nominal)

Methodology: Energy and Greenhouse Gas (GHG) Avoided Costs

+ **Benefit description:** avoided purchase of energy that would otherwise be needed, including obligations to comply with emissions standards under the Washington Clean Energy Transformation Act (CETA)
  - Societal costs of greenhouse gases are **NOT** included in this benefit if they are not directly monetized as a cost to the utility and its ratepayers
+ **Methodology:**
  - Use hourly wholesale prices the utility would see for buying/selling electricity at the margin, adjusted for losses
    - These prices (from utility market price forecasts) should include obligations to comply with CETA
  - Multiply hourly prices by the profile of customer solar (in kWh-AC produced per kW-AC installed) to arrive at an annual $/kW-year value for each utility
+ **Resources**
  - Utility wholesale electricity price forecasts for Mid-Columbia hub, including cap-and-invest GHG costs
    - Hourly price forecasts were provided by both Avista and PSE in their IRPs. PSE's values were used based on closer alignment with E3's view of future price trends.
  - Solar production profiles for a typical meteorological year (TMY) and for each utility's geography from the National Renewable Energy Lab (NREL)'s PVWatts tool

Methodology: Generation Capacity Avoided Costs

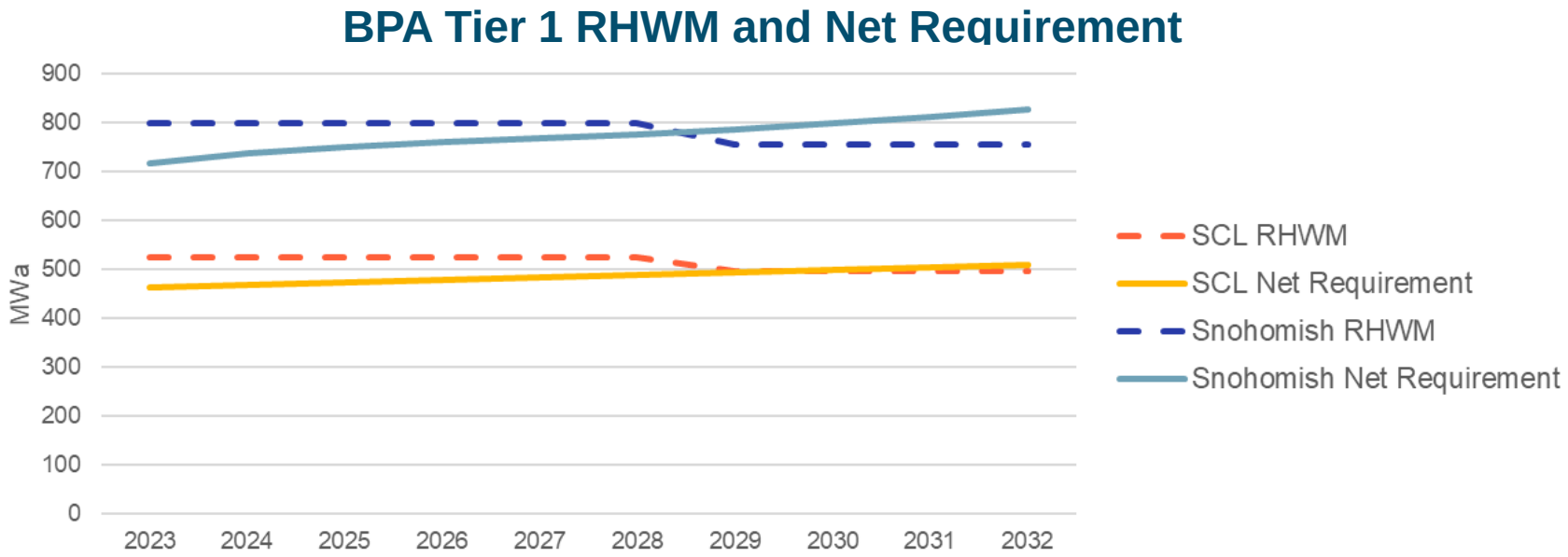
+ **Benefit description:** reduced peak capacity needs and deferral of new generation capacity resources
  - The size of this benefit depends on whether solar generation aligns with hours of reliability need
+ **Methodology**
  - Use levelized cost of capacity for a proxy firm clean resource, such as a biofuel-powered combustion turbine
    – Escalate this cost annually according to the National Renewable Energy Laboratory (NREL) Annual Technology Baseline (ATB) escalation rate for a natural gas combustion turbine
  - Multiply levelized costs of capacity by the effective load carrying capability (ELCC) of utility-scale solar during the season of peak need (3%), which is assumed to be winter for the foreseeable future
    – Multiply the resulting value by the ratio of customer solar's capacity factor (13.7%-17.4%) over that of utility-scale solar (23.4%) to achieve a NEM-applicable capacity value in $/kW-year
+ **Resources**
  - Utility planning documents and cost projections for proxy clean energy resources
    - The levelized cost of capacity for a biodiesel peaker ($136/kW-year as indicated by PSE) was used. This value aligned closely with the cost of an ammonia combustion turbine as presented by Avista for their marginal clean firm resource.
  - Solar ELCC estimates by season from the Western Resource Adequacy Program (WRAP)
  - Capacity factors by utility for customer solar from NREL's PVWatts, and for eastern Washington utility-scale solar from NREL's ATB

Methodology: LCOE of Utility-scale Solar

+ **Benefit description:** reduced energy and capacity need and deferral of new generation resources
  - This metric is used to address these values when a utility's grid is 100% renewable and customer solar is thereby replacing another renewable resource
+ **Methodology**
  - Use levelized cost of energy for utility-scale solar in eastern WA (incorporating a Production Tax Credit)
    - The utilities indicated that a blend of renewable resources (including wind and solar) would serve as the marginal clean energy resource after 2030 or when not reliant on BPA. The LCOE of utility-scale solar was used as a proxy to more closely match both the energy profile replaced by customer solar and the lifecycle environmental impacts as raised by the TAG.
  - Multiply the $/kWh LCOE by the annual kWh-AC output for each kW-AC of customer solar to achieve annual $/kW-year values
+ **Resources**
  - Levelized cost projections of utility-scale solar from NREL's ATB
    - NREL Conservative values are used based on alignment with historical and current market trends
  - Utility planning documents for their preferred clean energy portfolio and cost comparison points
  - Solar production output for a typical meteorological year (TMY) and for each utility's geography from NREL's PVWatts tool

Methodology: BPA Tier 1 Rate

- **If a utility's Net Requirement is less than their Rate Period High Water Mark (RHWM), a reduction in net load due to customer solar will reduce their allocation of Tier 1 energy**
  - When Net Requirement < RHWM, customer solar avoided costs are modeled at the Tier 1 rate
  - When Net Requirement > RHWM, the utility is assumed to purchase energy at market rates, either from BPA (Tier 2 energy) or on the market
  - Only SCL and Snohomish have Net Requirements < RHWM during the study period.
- **RHWMs are assumed to decrease in 2029 due to decreases in BPA system size (primarily from fish and wildlife constraints) and increases in demand for BPA resources. This assumption is from Snohomish's IRP.**



BPA Tier 1 Rate Components

+ **Customer Charges:**
  - Applicable to all customers.
  - Charge is based on Tier 1 Cost Allocators (TOCA) and slice percentage
+ **Demand Charge:**
  - Applicable to Load Following and Block with Shaping Capacity
  - $/kW-month rate, differentiated by month
+ **Load Shaping Charge:**
  - Applicable to Load Following, Block, and the Block portion of Block/Slice
  - $/MWh rate, differentiated by month and by heavy-load hours (HLH) and light-load hours (LLH). HLH are Monday to Saturday, hour ending 7am to 10pm.
  - Billing determinants are calculated as the difference between the customer's monthly load and the customer's allocation of Tier 1 system capability in HLH and LLH based on their TOCA.

	Customer Charge Rate in Dollars per Percentage Point of Billing Determinant		
	Composite	*Non-Slice*	*Slice*
Customer Rate	2,075,946	(364,823)	0

	Customer Charge Billing Determinant for Each Rate		
	Composite	*Non-Slice*	*Slice*
Load Following	TOCA	TOCA	N/A
Block only	TOCA	TOCA	N/A
Block portion of Slice/Block	Non-Slice TOCA	Non-Slice TOCA	N/A
Slice portion of Slice/Block	Slice %	N/A	Slice %

N/A = Not Applicable

$$\text{Tier 1 Cost Allocator (TOCA)} = \frac{\text{Lower of } \textbf{RHWM} \text{ and } \textbf{Net Requirement}}{\textbf{Sum of Customers' RHWMs}}$$

Changes due to customer solar ***only if*** Net Requirement < RHWM

BPA Tier 1 Rate

- **The BPA Tier 1 rate is the marginal energy and capacity cost when a BPA customer's Net Requirement is less than their Rate Period High Water Mark (RHWM)**
  - When this is the case, changes in net load due to customer solar will decrease the total load the BPA customer can purchase on Tier 1 rates
- **The total BPA Tier 1 costs are modeled as remaining unchanged going forward in nominal dollars**
  - The Customer Charge, which collects the majority of Tier 1 costs, has changed little (on average) since 2014
  - The BPA Tier 1 system size decrease modeled in 2029 is assumed to have little impact on total costs and therefore increases the total effective rate in proportion to the system size decrease

Tier 1 Rate

		Customer Charge ($/MWh)			Demand Charge ($/MWh)	Load Shaping Charge ($/MWh)		Discounts ($//MWh)		Total ($/MWh)	Total ($/kW-yr solar)
Utility	Customer Type	Composite	Non-Slice	Slice	Demand	HLH	LLH	LDD	IRD	Total	Total
Inland	Load Following	$ 40.26	$ (7.08)	$ -	$ 2.91	$ 0.30	$ 1.12	$ (3.20)	$ (0.76)	$ 33.55	$ 51.11
SCL	Block Only	$ 40.26	$ (7.08)	$ -	$ -	$ 1.91	$ 2.14	$ -	$ -	$ 37.23	$ 45.91
Kittitas	Load Following	$ 40.26	$ (7.08)	$ -	$ 4.25	$ 1.19	$ 0.61	$ (3.49)	$ -	$ 35.73	$ 57.76
Snohomish	Block/Slice	$ 40.26	$ (3.48)	$ -	$ -	$ (1.02)	$ 1.07	$ -	$ -	$ 36.83	$ 44.31

Change in BPA Tier 1 Rate

+ Customer solar also changes the shape of the customer's load, leading to changes in the demand and load shaping charges of the BPA Tier 1 Rate

- Customer solar has a small impact on demand charges due to relatively low capacity during peak hours, as modeled using monthly ELCC
- Customer solar changes the load shaping charge due to changes in load in HLH versus LLH across months. Modeling also accounts for the change in the customer's allocation of Tier 1 system capacity (TOCA) due to the change in a customer's Net Requirement.

Impact on demand charges are low due to little impact of customer solar on peak loads based on monthly ELCC values.

HLH are during the day, therefore solar production decreases the total HLH Load Shaping Charge. Depending on the utility's existing load shape, this is offset by a corresponding increase to the load shaping charge in LLH.

Change in Tier 1 Rate due to BTM Solar

		Customer Charge ($/MWh)			Demand Charge ($/MWh)	Load Shaping Charge ($/MWh)		Discounts ($//MWh)		Total ($/MWh)	Total ($/kW-yr solar)
Utility	Customer Type	Composite	Non-Slice	Slice	Demand	HLH	LLH	LDD	IRD	Total	Total
Inland	Load Following	$ -	$ -	$ -	$ 0.0048	$ (0.0245)	$ 0.0234	$ (0.0003)	$ (0.0013)	$ 0.0022	$ 1.98
SCL	Block Only	$ -	$ -	$ -	$ -	$ (0.0039)	$ 0.0044	$ -	$ -	$ 0.0005	$ 2.01
Kittitas	Load Following	$ -	$ -	$ -	$ 0.0809	$ (0.2646)	$ 0.2605	$ (0.0068)	$ -	$ 0.0699	$ 5.94
Snohomish	Block/Slice	$ -	$ -	$ -	$ -	$ (0.0031)	$ 0.0026	$ -	$ -	$ (0.0005)	$ (3.39)

Methodology: Transmission and Distribution Capacity Avoided Costs

+ **Benefit description:** deferred or reduced need for transmission and distribution (T&D) investments (including lines, substations, and equipment - new and/or upgrades)
  - The size of this benefit depends on whether solar generation aligns with hours that drive T&D capacity need
+ **Methodology**
  - Use T&D capacity cost values provided by the utilities or in BPA documentation (for utilities reliant on BPA for transmission)
  - Develop a peak capacity allocation factor (PCAF) to allocate these costs over the top 500 load hours based on system load and then matched to corresponding customer solar generation profiles
  - Escalate resulting $/kW-year values at 4% (nominal) for all utilities per SCL's IRP citation of historic BPA transmission escalation
+ **Resources**
  - Utility marginal cost studies and BPA and Northwest Power and Conservation Council (NWPCC) documents for capacity costs
  - U.S. Energy Information Administration (EIA) for 2022 historical load profiles for each utility's balancing area (normalized to month-hour averages)
    - Inland, Kittitas, and Snohomish are combined under BPA and share the same profile
  - Solar production profiles from NREL's PV Watts tool

Methodology: Reduced GHG Emissions (Societal Benefit)

+ **Benefit description:** *incremental* societal value of avoided greenhouse gas (GHG) emissions from fossil fuels, beyond that already monetized as a ratepayer cost via carbon pricing

+ Methodology

- Determine abatement price ($/MMBtu) of natural gas used for electricity by multiplying the Climate Commitment Act (CCA) carbon allowance price by the carbon content of natural gas
- Determine heat rate (MMBtu/MWh) by dividing hourly electricity prices by (natural gas price + abatement price)
- Multiply heat rate by the carbon content of natural gas for the applicable tCO2/MWh emissions rate
- Multiply hourly emissions rates by the utility-specific customer solar profiles and each utility's percentage of non-renewable generation to achieve annual emissions
- Multiply annual emissions x (social cost of carbon – carbon allowance price) to determine incremental social cost of carbon

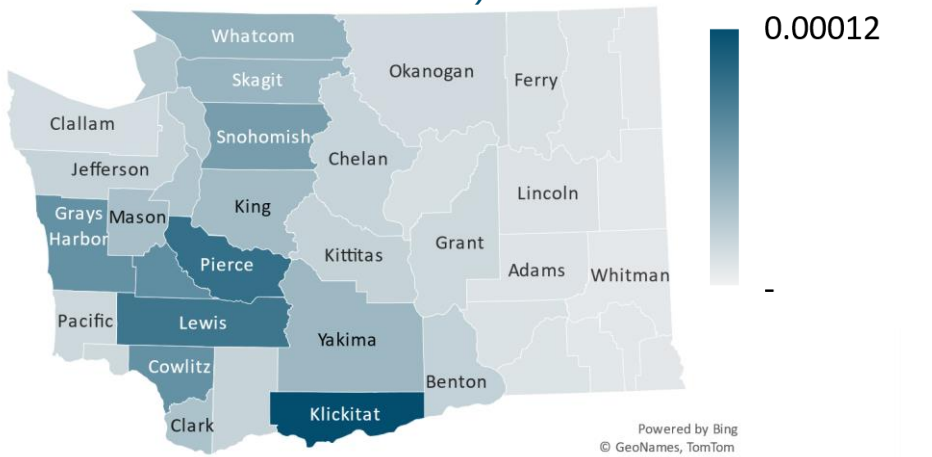
+ Resources

- CCA allowance prices in $/tCO2 determined from PSE's IRP (Appendix H)
- Environmental Protection Agency (EPA) GHG equivalencies calculator for carbon content of natural gas (0.053 tCO2/MMBtu)
- Utility IRP documentation for electricity and gas prices (complete price information was available from Avista)
- Solar production profiles from NREL's PVWatts tool
- Utility percentage of generation from non-renewable sources from Washington Department of Commerce filings
  - These are scaled linearly to reach 100% by 2030
- Proposed social cost of carbon (2% discount rate) from the EPA September 2022 Update

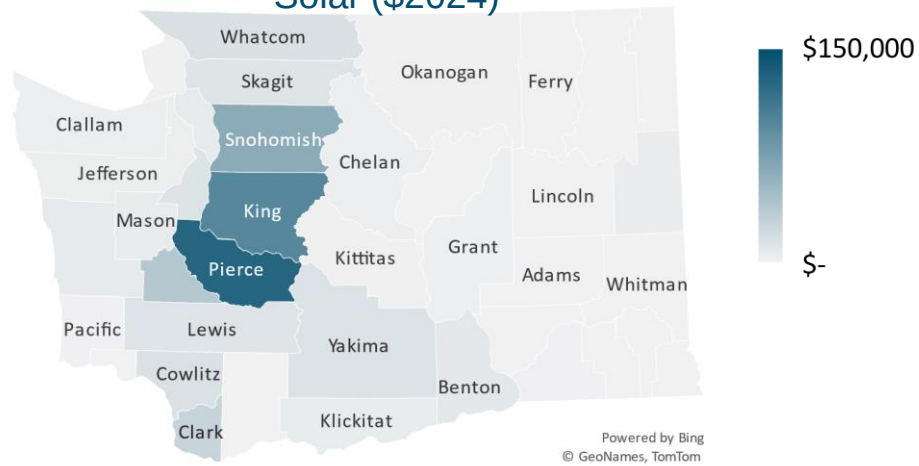
Methodology: Reduced Criteria Pollutants

+ **Benefit description:** NEM solar reduces criteria pollutants from fossil fuel plants
+ **Methodology**
  - Environmental Protection Agency (EPA) tools to calculate criteria pollutant emissions reductions from solar generation and health impact estimates for the state of Washington
  - Comparison of results to those from the Environmental Protection Agency (EPA) benefit per kWh report
  - State average health values per kW are derated by the share of non-emitting resources in each year for each utility
+ **Resources**
  - Emissions reductions from AVERT (**AV**oided **E**missions and Gene**R**ation **T**ool)
  - Health impact estimates from COBRA (**CO**-**B**enefits **R**isk **A**ssessment) based on emissions reductions and population
  - EPA Benefits per kWH report

Change in PM 2.5 Pollutants (micrograms per cubic meter)



Total Health Benefits for 100 MW Additional Solar ($2024)



Methodology: Reduced Land Use Impacts

+ **Benefit description:** value of putting NEM solar in the built environment, preserving land for agriculture, commercial and housing needs, and natural habitats

+ **Methodology**
  - Literature estimates for land use of utility-scale resources and the ecosystem services value of avoided land use for grasslands
    - The value of agricultural and ranch land is included in the sale or lease of the land, and therefore is included in the price of energy
  - Land values per kW are derated by the share of emitting resources in each year for each utility
  - The results provide an upper bound on land value. Many utility-scale solar developments are sited on unvalued land such as brownfields, parking lots, or land with minimal ecological or economic value. Additional information can be found in Washington State University's Least-Conflict Solar Siting study.

+ **Resources**
  - Changes in the Global Value of Ecosystem Services, Costanza et. Al
  - Land-Use Requirements for Solar Power Plants in the United States, NREL

Methodology: Reduced Water Consumption

+ **Benefit description:** utilizing renewables rather than thermal generation saves water used for thermal cooling
+ **Methodology**
  - Energy Information Administration (EIA) thermal plant data to determine the average number of gallons of water per MWh of generation (343 gallons/MWh)
  - Determine implied social cost of water by calculating the rebates offered for water saving measures per gallon of water savings. This value is very small ($0.0001/gallon) so is not included in the modeled benefits.
+ **Resources**
  - Thermoelectric Cooling Water Data, EIA
  - Saving Water Low Toilet Replacement Rebate

UTILITY ADVISORY COMMITTEE AGENDA ITEM COVERSHEET

Meeting Date: 11/14/2023 Agenda Category: Items of Business

Prepared By:

Subject:
Advanced Metering Infrastructure (AMI) Project Status (10 minutes)

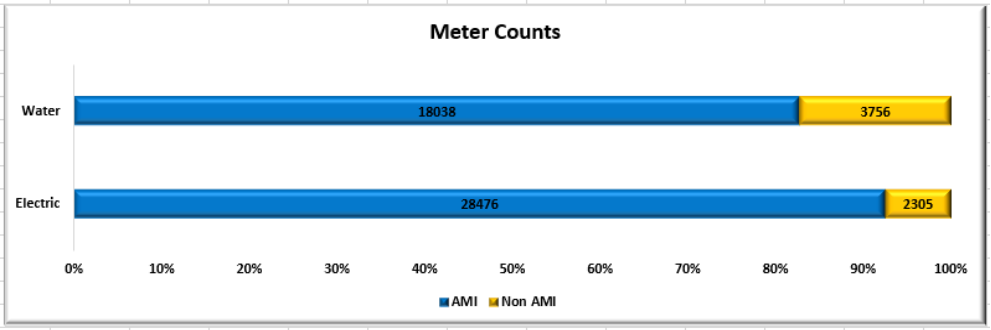
Department:
Energy Services

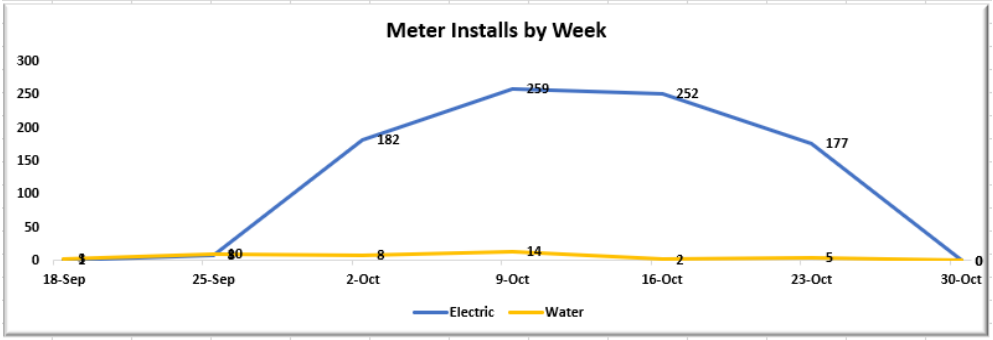
Recommended Motion:
No action required.

Summary:
The AMI project is nearing completion with 82.8% of water meters installed and 92.5% of electric meters installed. Attached is a graph of the current meter installation status.The installation contractor was installing meters in October and planning to resume meter installations later in November. Water meter adapters and the remaining electric and water meters are expected to be delivered and installed between December and February. An electrical outage map and the customer portal are still outstanding for project completion.

Fiscal Impact:
The AMI project is part of the approved and budgeted 2023 capital plans with minimal funding expected to be carried over to 2024.

Attachments:
1. AMI Water and Electric Meter Installation Status


Meter Counts
Water
18038
3756
Electric
28476
2305
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
AMI
Non AMI


Meter Installs by Week
300
250
200
150
100
50
0
259
252
182
177
14
10
8
5
2
1
0
18-Sep
25-Sep
2-Oct
9-Oct
16-Oct
23-Oct
30-Oct
Electric
Water

UTILITY ADVISORY COMMITTEE AGENDA ITEM COVERSHEET

Meeting Date: 11/14/2023 Agenda Category: Other Informational Items

Prepared By: Clint Whitney, Energy Services Director

Subject:
Capital Work Plan Update - September 2023

Department:
Energy Services

Recommended Motion:
No action needed.

Summary:
The 2023 Capital Work Plan (CWP) has an approved budget of $11.1M. The CWP significant areas of capital work include: Advanced Metering Infrastructure (AMI), System Improvements, Renewal & Replacements, Substation Improvements, and Line Extensions. Capital plans are influenced by reliability data and areas of economic development. Capital work is funded from electric rate revenue and revenue bonds. Attached is a summary of the 2023 CWP through August.

While CWP expenditures through August are 42% of the approved budget, the 2023 CWP is planned with more expenditures in the fourth quarter of the year. Associated costs include engineering design for Stevens and Thayer Substation, underground cable replacement for the Richland Airport and View Ridge Estates, as well as the delivery of the Metalclad Switchgear and construction of City View Bank #2 addition. The support of line extensions to new developments or construction is approximately 1/3 of the yearly expected work and which aligns with a substantial slow down in residential and commercial construction permit applications.

Fiscal Impact:
There is no fiscal impact.

Attachments:
1. RES CWP REPORT-October 2023

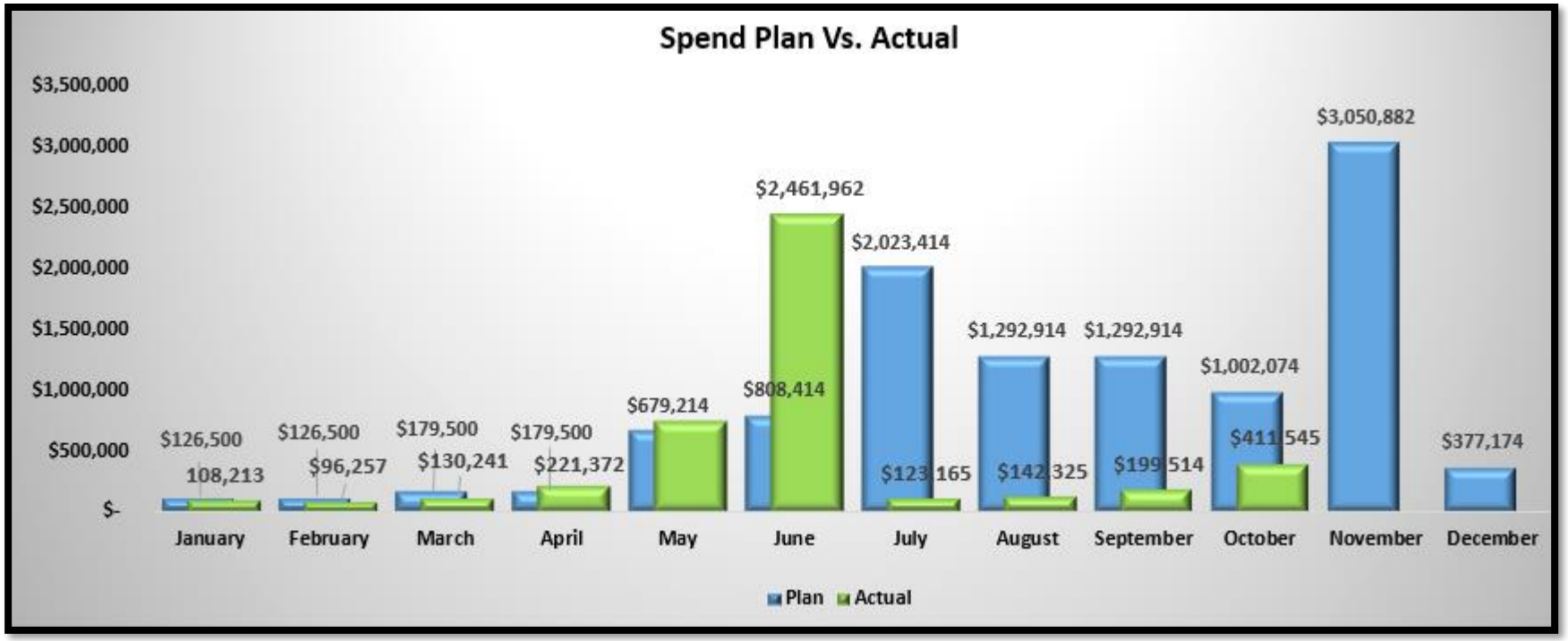
Richland Energy Services
Capital Work Plan
October 2023

CWP Costs for October

	Approved 2023 Budget	2023 Estimated Costs	Actual	Remaining	October
⊞ Line Extensions	$2,120,000	$ 2,120,000	$ 886,222	$ 1,233,778	$ 54,403
⊞ System Improvements	$1,028,000	$ 1,028,000	$ 717,944	$ 310,057	$ 65,957
⊞ Renewal and Replacement	$3,198,000	$ 3,198,000	$ 586,408	$ 2,611,592	$ 290,557
⊞ Purchase Southwest Service Area Infrastructure	$212,000	$ 212,000	$ -	$ 212,000	$ -
⊞ Substation Improvements	$4,581,000	$ 4,581,000	$ 2,457,608	$ 2,123,392	$ 629
Grand Total	$11,139,000	$ 11,139,000	$ 4,648,182	$ 6,490,818	$411,545

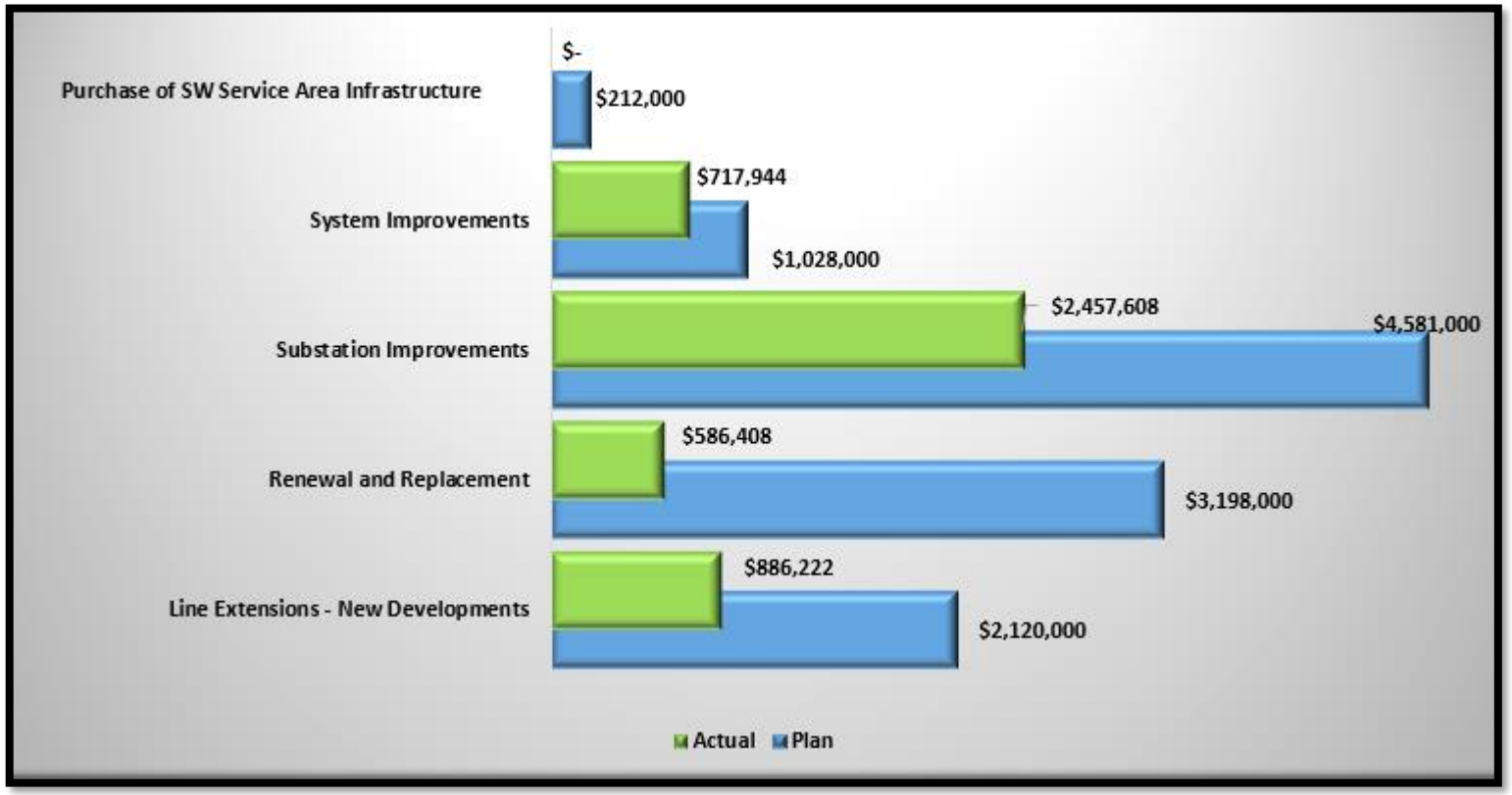
Cost Performance YTD:	$4,648,182
Cost Performance remaining:	$6,490,818
YTD % Complete	42%

CWP Monthly Spend Vs. Actuals

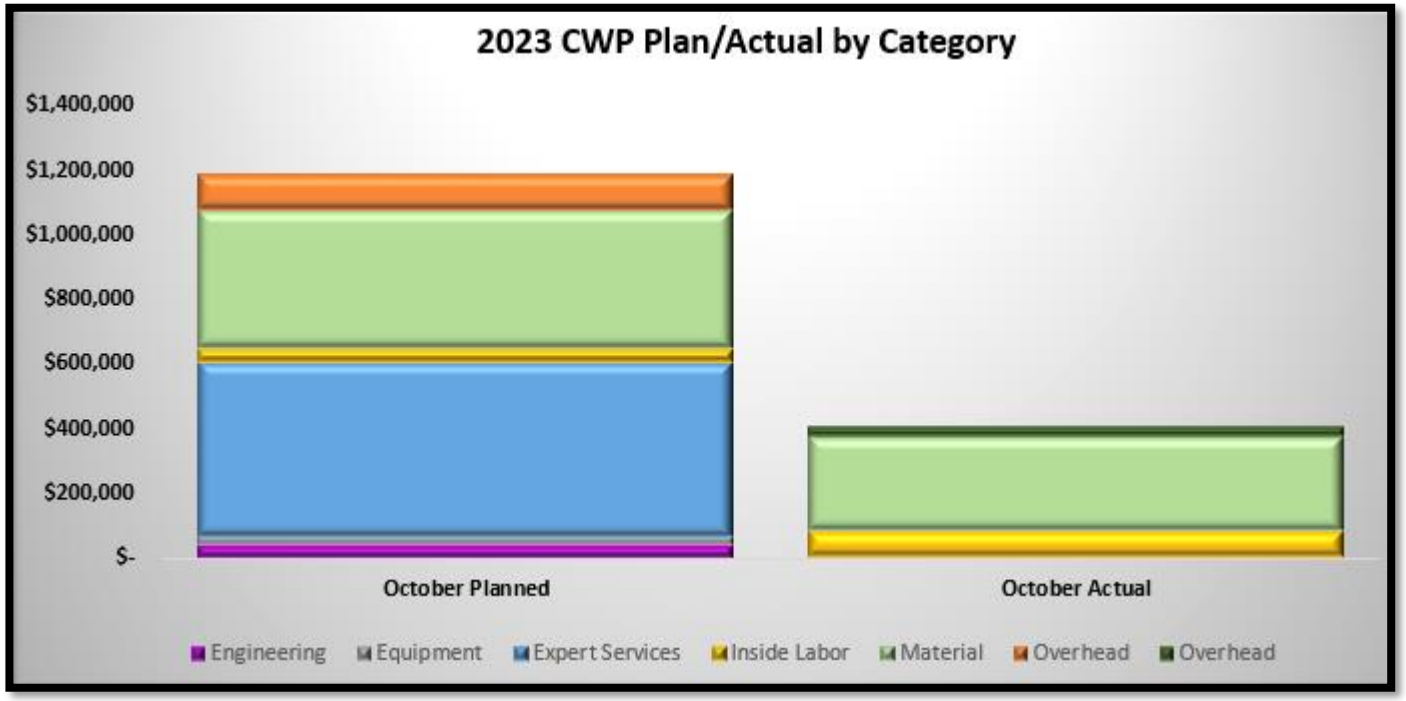


% Complete of Overall Spend Plan		
To-Date Projected	$	7,710,944
To-Date Actual	$	4,648,182
Variance	**($3,062,762)**	**60%**

Costs by Category



CWP Cost Types



Cost Type	October Planned	October Actual
Engineering	$ 46,942	$ 9,784
Equipment	$ 19,773	$ -
Expert Servic	$ 538,857	$ -
Inside Labor	$ 49,266	$ 78,621
Material	$ 236,392	$ 289,990
Overhead	$ 110,844	$ 33,052
Total	**$ 1,002,074**	**$ 411,447**

CWP Project Costs for October

	Approved 2023 Budget	2023 Estimated Costs	Actual	Remaining	October
Line Extensions	**$2,120,000**	**$ 2,120,000**	**$ 886,222**	**$ 1,233,778**	**$ 54,403**
System Improvements	**$1,028,000**	**$ 1,028,000**	**$ 717,944**	**$ 310,057**	**$ 65,957**
METER INSTALLATION MATERIALS	$0	$ -	$ 370,392	$ (370,392)	$33,465.75
NEW & ALT SVCS - UNDERGROUND	$498,000	$ 498,000	$ 275,560	$ 222,440	$32,268.72
RES OH UG ENG DESIGN DWGS	$0	$ -	$ 12,116	$ (12,116)	$0.00
SKYLINE DR DEVELOPMENT; NEW PRIMARY AND SEC	$0	$ -	$ 9,643	$ (9,643)	$0.00
Fusion Substation Transmission Line	$530,000	$ 530,000	$ -	$ 530,000	$0.00
Constuction Assembly Standards	$0	$ -	$ 30,069	$ (30,069)	$0.00
1663 Fowler, Relocate Aprox 550ft 3 750MCM out of	$0	$ -	$ 19,941	$ (19,941)	$0.00
Renewal and Replacement	**$3,198,000**	**$ 3,198,000**	**$ 586,408**	**$ 2,611,592**	**$ 290,557**
Thayer Substation - Bank 1 Rebuild and 115kV Bus O	$318,000	$ 318,000	$ 13,834	$ 304,166	$1,048.28
Stevens Substation - Bank 1 Rebuild and 115kV Bus (	$318,000	$ 318,000	$ 23,794	$ 294,206	$3,046.18
2023 Pole Replacement Program	$646,000	$ 646,000	$ -	$ 646,000	$0.00
1937 Forest, RR old 1-0AL and move XFR to Street	$0	$ -	$ 1,811	$ (1,811)	$226.01
1006 ADAMS ST; REPLACE EX OH POLELINE	$0	$ -	$ 19,260	$ (19,260)	$0.00
1412 RICHE CT; RENEW/REPLACE OH SYSTEM	$0	$ -	$ 26,276	$ (26,276)	$0.00
1902 Airport Way, Renew Replace Boring Contract Ri	$1,916,000	$ 1,916,000	$ 292,688	$ 1,623,312	$286,236.31
Purchase Southwest Service Area Infrastructure	**$212,000**	**$ 212,000**	**$ -**	**$ 212,000**	**$ -**
Substation Improvements	**$4,581,000**	**$ 4,581,000**	**$ 2,457,608**	**$ 2,123,392**	**$ 629**
Demand Response by Voltage Reduction (DR by VR)	$0	$ -	$ 630	$ (630)	$0.00
Gateway Substation 2021 Project	$0	$ -	$ 6,896	$ (6,896)	$0.00
City View Bank 2 Addition	$4,293,000	$ 4,293,000	$ 2,446,758	$ 1,846,242	$628.53
City View Extension 131, EXT 3P 750 Aprox 2000ft fro	$288,000	$ 288,000	$ 918	$ 287,082	$0.00
Substation PLC Replacement (Sandhill Crane, City Vi	$0	$ -	$ 2,406	$ (2,406)	$0.00
Grand Total	**$11,139,000**	**$ 11,139,000**	**$ 4,648,182**	**$ 6,490,818**	**$411,545**

UTILITY ADVISORY COMMITTEE AGENDA ITEM COVERSHEET

Meeting Date: 11/14/2023 Agenda Category: Other Informational Items

Prepared By: Clint Whitney, Energy Services Director

Subject:
Forward Agenda

Department:
Energy Services

Recommended Motion:
This is informational only.

Summary:
January:

- Election of UAC Chair and Vice Chair
- Electric Rate Increase Recommendation
- E3 Net Metering Final Report
- Low Income Program

Fiscal Impact:
There is no fiscal impact.

Attachments: