

# Residential Solar Plan

## **Joint Study Session of the Tacoma City Council and the Tacoma Public Utility Board**

Clay Norris

September 12, 2017

# Tacoma City Council Resolution

Req. #17-0369

## **RESOLUTION NO. 39699**

BE IT RESOLVED BY THE COUNCIL OF THE CITY OF TACOMA:

Section 1. That the City Council hereby requests the Tacoma Public Utility Board (“Board”) to develop a plan to increase the use of residential solar in the City of Tacoma, which plan will address economic inequality and ensure an equitable increase in the number of residential solar users from all income levels.

Section 2. That the Board shall present its plan to the City Council no later than October 1, 2017.

# Residential and Low-Income Solar Plan Summary

Plan Element	Increase Res. Solar Use	Address economic inequality - -Increase LI Res. Solar Use
Joined Washington State New Voluntary Solar Incentive Program	✓	✓
Expand Marketing, Customer Outreach and Education	✓	✓
Modify SAP Process to Accommodate Solar	✓	✓
Work with Strategic Partners to Find Solutions for Low-Income Solar Access		✓
Provide Incentive Package for Low-Income Customers: Inspection fees and REC Value		✓
Low-Income Zero Interest Loan		✓
Advocate for State Legislation Changes to Increase State Support for Low-Income & Community Solar	✓	✓
Pursue Multi-Family Pilot		✓
Revamped Evergreen Options		✓
Evaluate New Community Solar Project	✓	✓

# Agenda

Background

Plan Development

**The Plan – Part 1 Increasing Solar Overall**

**The Plan – Part 2 Increasing Low-Income  
Access to Solar**

Other Considerations

Summary and Discussion

**BACKGROUND**

# Solar Incentives Are Falling

The Federal Tax Credit drops from 30% in 2019 to 10% in 2022

The reauthorized (2017) state production incentives are less generous

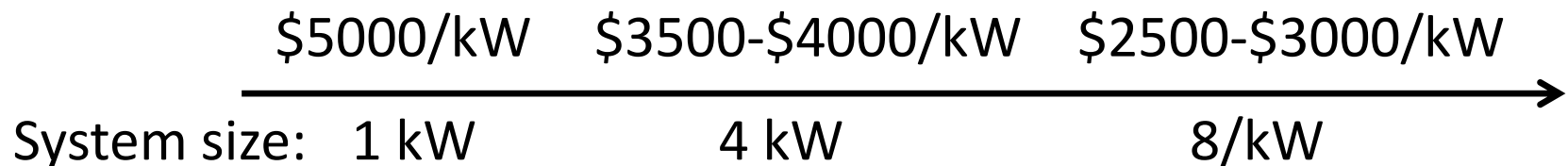
- Participant incentive levels are much lower and end after 8 years
- The total incentive a participant can receive capped at 50% of system cost

## For Solar Systems With Made in WA components

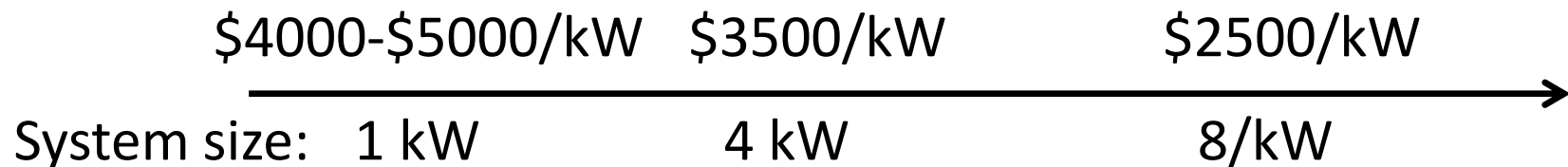
	Residential	Community	Commercial	Shared Commercial
2016	\$0.54/kWh	\$1.08/kWh	NA	
2017	Transitioning to new incentive on October 1, 2017			
2018	\$0.21/kWh		\$0.11/kWh	
2019	\$0.18/kWh		\$0.08/kWh	
2020	\$0.15/kWh		\$0.05/kWh	
2021	\$0.12/kWh		\$0.04/kWh	

# Solar Costs Are Also Falling

## Indicative costs (all-in) at end of 2016

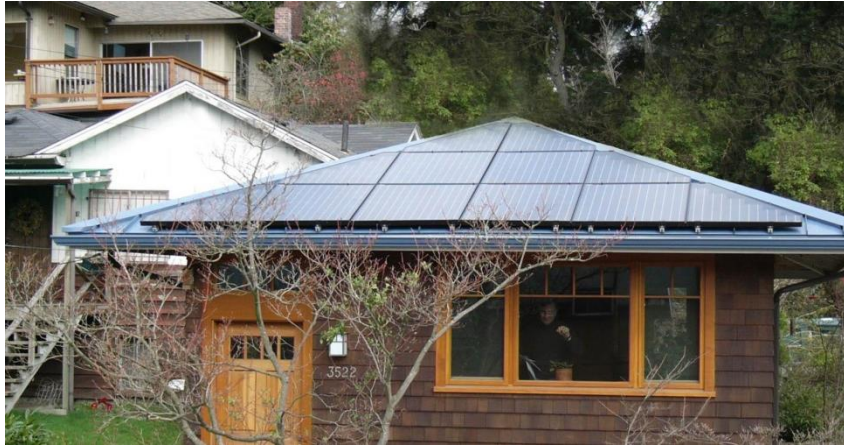


## Updated indicative costs



# Example Solar Systems

1.5 kW System



4 kW System



6 kW System



# Example 20-Year Solar System Economics: Solar Customer Perspective

## 6kW Solar System\*

Initial cost (\$3.25/W) -\$19,750

Estimated total cost (in today's dollars) to  
replace the system inverter in year 10 -\$1,360

Estimated total value (in today's dollars) of:

a. 8 years of "2018" state incentives \$8,370

b. 20 years of bill savings \$7,410

c. Federal tax credit \$5,700

**Overall value (in today's dollars) ~\$370**

\* All "Example Solar System Economic Analysis" assume systems operate at a 12% capacity factor

# Example 20-Year Solar System Economics: Low-Income Solar Customer Perspective

## 4kW Solar System

Initial cost (\$3.50/W)	−\$14,250
Estimated cost (in today's dollars) to replace the system inverter in year 10	−\$830
Estimated value (in today's dollars) of:	
a. 8 years of “2018” state incentives	\$4,560
b. 20 years of bill savings	\$3,040
c. Federal tax credit	<u><del>\$3,900</del></u> *
<b>Overall Cost (in today's dollars)</b>	<b>−\$7,480</b>

\* IRS data indicate that few tax payers earning less than \$50,000 pay federal income tax.

# PLAN DEVELOPMENT

# Consultation During Plan Development

- Brainstormed ideas internally (Tacoma Power)
- PUB feedback during presentation of initial elements
- On-line research
- Consulted with Tacoma Public Utilities groups
  - Market Development
  - Customer Solutions
  - Legal Department
- Reached out to local solar installers
- Raised the issue with other utilities
- Reached out to other stakeholders
  - Tacoma Housing Authority
  - Bonneville Environmental Foundation
  - WA Department of Commerce
  - Spark Northwest (formerly NW SEED)
  - Smart Electric Power Alliance (SEPA)

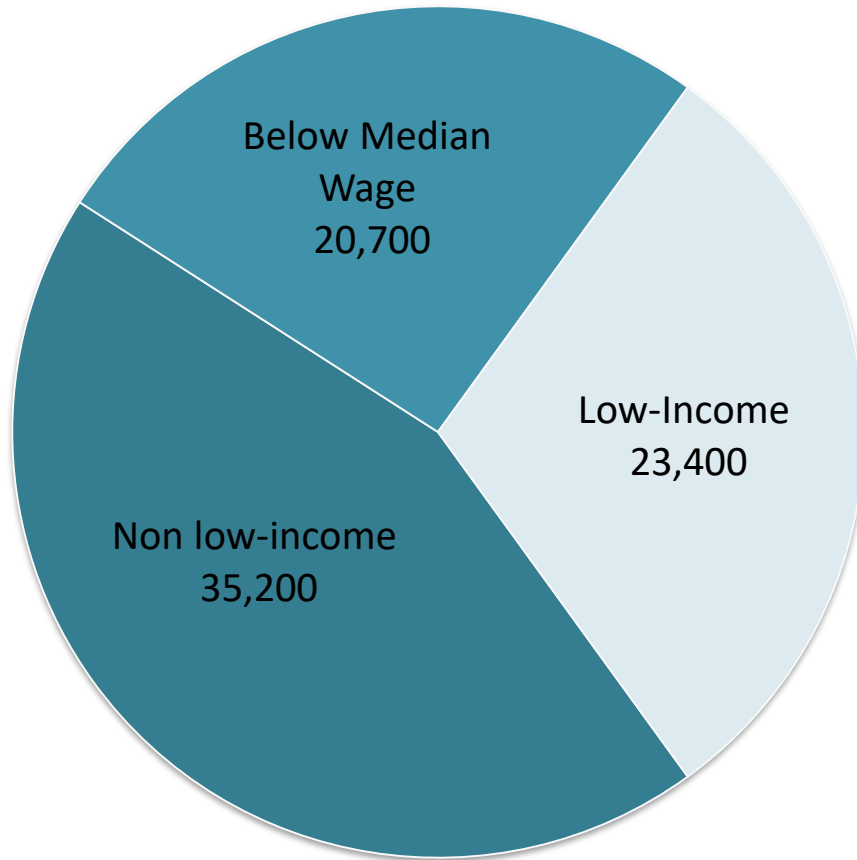
# Low-Income Eligibility

Plan to follow the criteria used by Tacoma Power's Conservation Resource Management to establish low-income eligibility:

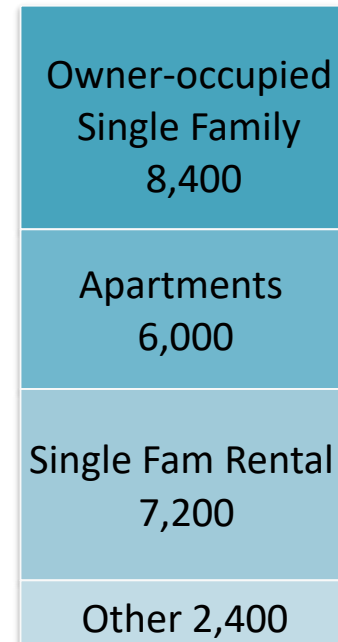
- Earning less than 60% of state median income by household size
  - \$25,000/year for a single person household
  - \$50,000/year for a family of 4
  - \$75,000/year for a family of 7
- Multi-family building low-income criteria
  - 50% of residents must be low-income
  - Certified through Tacoma Power
  - Tacoma Housing Authority qualified tenants

# Tacoma Power Household Earnings

## City of Tacoma Only



### Breakdown of Low-Earning Households

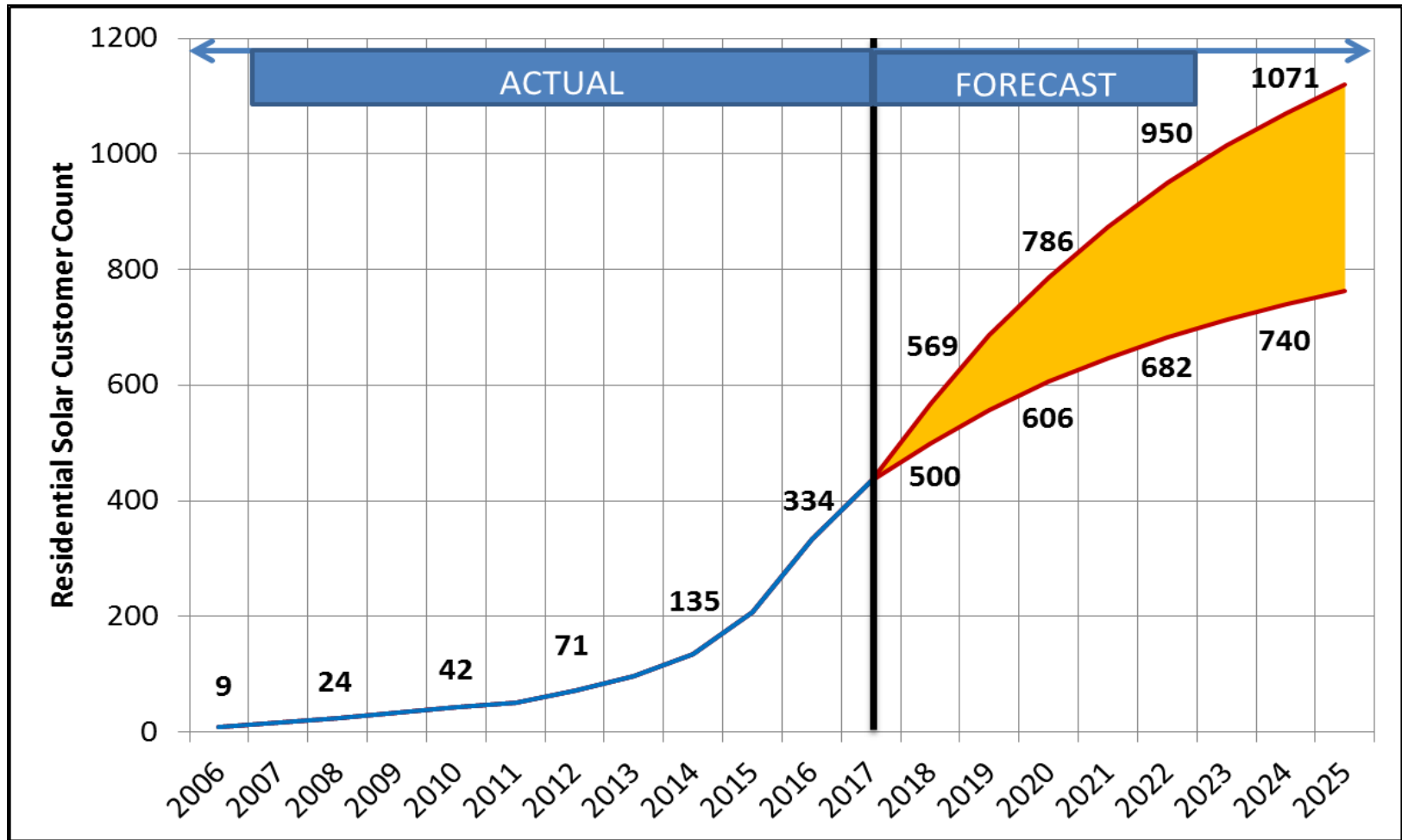


**Source:** Internal calculations based on 2014 & 2016 Tacoma Public Utilities customer survey

# **THE PLAN – PART 1**

## **Increasing Overall Residential Solar**

# Residential Roof-Top Solar Counts Are Anticipated to Continue to Grow



# Washington State New Voluntary Solar Incentive Program

 TACOMA POWER TACOMA PUBLIC UTILITIES	3628 South 35 <sup>th</sup> Street Tacoma, Washington 98409-3192
TACOMA PUBLIC UTILITIES	

September 6, 2017

Jacob Fey  
Director  
WSU Energy Program  
905 Plum Street  
PO Box 43165  
Olympia, WA 98405

Submitted via email: [SolarProgram@energy.wsu.edu](mailto:SolarProgram@energy.wsu.edu)

Dear Mr. Fey:

Thank you for your letter requesting notification of Tacoma Power's intent to participate in Washington's new Renewable Energy System Incentive Program.

Tacoma Power voluntarily participated in the legacy incentive program, and this letter serves as written confirmation of our intent to participate in the new Renewable Energy System Incentive Program.

Tacoma Power looks forward to working with the WSU Energy Program as the new administrator of the Incentive Program.

Sincerely,  
  
Chris Robinson  
Power Superintendent/COO

Formally notified WSU Energy Program that Tacoma Power elected to participate in the “New Renewable Energy System Incentive Program”

# Expand Marketing, Customer Outreach and Education

- Develop marketing/education strategy for solar programs
  - Include specific marketing strategy for low-income segment
- Improve website to make solar content easier to find
  - Explore incorporating a third party off-the-shelf tool such as the Watt Plan from Clean Power Research
  - Tool provides personal estimates for costs, energy production, tax credits and other incentives.



**Timing:** Fall 2017 – 2018

# WattPlan® Key Features

## Energy

- Automatic rooftop assessment
- Optimal PV system configuration
- Interval data integration
- SolarAnywhere® TGY irradiance data

## Financials

- Rate plan optimization and savings
- Tax credits and rebates
- Lifetime economics
- Side-by-side comparisons

## Community

- PowerClerk® data integration
- Map of installations and metrics
- Peer influence
- Carbon footprint impact

## Next Steps

- Quote validation
- List of qualified installers
- Next step guidance
- Useful links

# Modify SAP Process to Accommodate Solar

- Looking to automate solar customer billing and production credit administration within SAP
  - In certain instances we must manually prepare customer bills
  - State production incentive dealt with by hand
- Performing legal, cost and feasibility analyses for a SAP change
  - May need support from the City

**Timing:** Q2 2018

## **THE PLAN – PART 2**

# **Addressing Residential Solar Equity**

# Work with Strategic Partners to Find Solutions for Low-Income Solar Access

- **Bonneville Environmental Foundation** – Expertise in community renewables project development, project financing, and matching grant programs
- **Washington State Housing Finance Commission** – offers low-interest loans for renewable energy projects
- **Washington State Department of Commerce** – Energy Efficiency and Solar grant program (dependent on passage of state Capital Budget)

**Timing:** Ongoing

# Tacoma Power Incentive Package for Low-Income Customers

Incentive Categories	Incentive levels for a 4kW system
Waive interconnection and other fees	\$240
Pre-pay for 20 years of Renewable Energy Credits	\$600
Zero interest loan program	\$4700
<b>Total</b>	<b>\$5540</b>

**Timing: Q2 2018**

# Zero Interest Loan Program for Low-Income Customers

Use the same mechanisms and participation requirements as CRM's conservation loan program:

- lien on property
- requires good Tacoma Power payment history

Example economics for a \$14,200 loan (4kW system) at zero-interest with an 8 year repayment schedule:

- Customer Perspective A zero interest loan saves the customer nearly **\$900** per year over a bank issued “home improvement” loan at 10% interest. The present value of this savings is about **\$4,700**.
- Utility Perspective A utility loan has both origination costs (e.g., credit research, processing loan, filing lien, deed research, issuing promissory note, site inspections) and ongoing costs (e.g., foregone interest, loan administration). The present value of these costs is about **\$3,900**.

# Work with Strategic Partners to Find Solutions for Low-Income Solar Access

- **Washington State Department of Commerce** – Federal grant to develop Solar Plus Strategies for WA & OR
  - Tacoma Power has been formally invited to join Solar Plus
- **Regional Workshop** – Work with Commerce and Spark NW to host a regional workshop this fall focused on strategies to deliver solar benefits to low-income customers and communities
  - Participants could include solar installers, utilities, consumer advocates, property owners and state planners

**Timing:** Fall 2017 – Spring 2018

# Community Solar is Not Cost-Effective Under the New State Incentive Program

## 100kW Solar System, 20 year life, Built in 2018

Initial cost (\$2.00/W)	-\$200,000
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Estimated total cost (in today's dollars) for:

a. Inverter replacement in year 10	-\$11,200
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b. 8 years of Com Solar Administration	-\$14,000
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c. 20 years of O&M	-\$22,300
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Estimated total value (in today's dollars) of:

a. 8 years of "2018" state incentives	\$92,100
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b. 20 years of energy production	\$47,500
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c. 20 years of REC benefits	<u>\$18,100</u>
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<b>Overall Cost</b>	<b>-\$89,800</b>
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# Advocate for Legislation to Increase State Support for Low-Income and Community Solar

Build a stakeholder coalition to effect legislative changes specific to community solar projects and residential solar projects benefiting low-income customers:

1. Lift the cap on total state production incentives to 100% of system cost (currently 50%); **AND**
2. Double the “base” state production incentives

With these amendments, community solar becomes cost-effective for Tacoma Power’s customers

- We contemplate a project design whereby low-income participants (up to 10% of the project) receive “units” at a price subsidized by other participants

**Timing:** Q3 2017 – 2018+

# Pursue Multi-Family Pilot Projects

## For-Profit Partner

- Work with owners of low-income multi-family housing
- Owner installs solar system
- Tacoma Power provide REC and energy value incentives and zero interest loan
- Owner receives the state incentive, federal tax credit, and federal tax depreciation
- Owner distributes a portion of the net metering (energy) benefits to tenants
- Project a small financial benefit to the owner

## Non-Profit Partner

- Work with non-profit entities (e.g., Tacoma Housing Authority)
- Non-profit partner unable to directly use federal tax credit
- Non-profit partner only needs to break-even financially



**Timing: 2018**

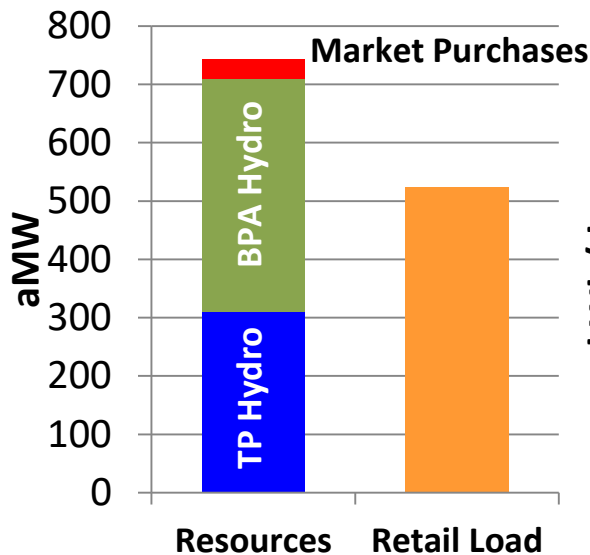
# Revamp Evergreen Options to Include Bonus Scoring for Low-Income Housing Projects

- Since 2002 Tacoma Power has offered a voluntary program whereby customers can pay a little extra to purchase a quantity of new renewables such as wind
- Tacoma Power has revamped the program so that part of the proceeds can be used for local small renewable energy projects –most likely solar – for non-profit organizations
- Evaluation scoring has 35% weight on community benefits, including extra points if the organization helps low-income
- Subscribers will vote to decide among applications for funding
  - 1 project in 2017 and 2 in 2018 (~\$50k/project)

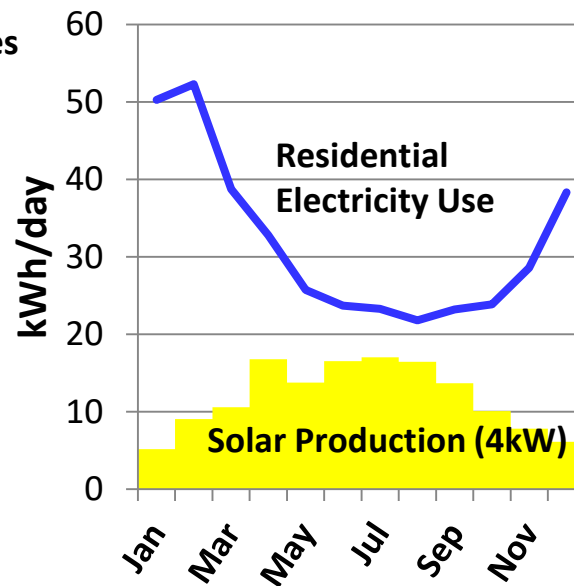
**Timing:** Complete

# OTHER CONSIDERATIONS

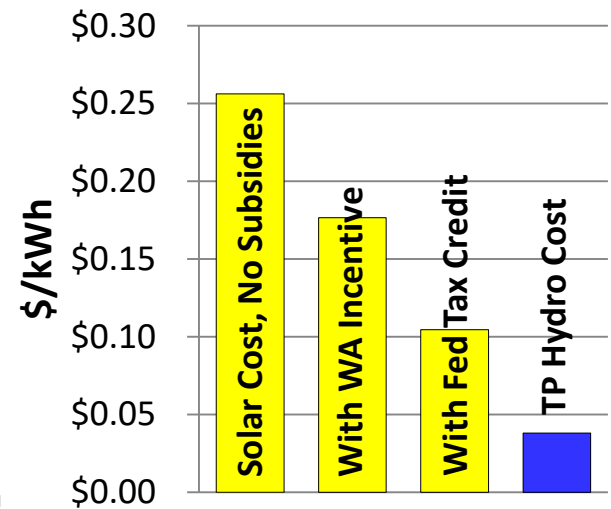
# Solar Generation is Not the Best Resource for Tacoma Power



Tacoma Power has an excess of renewable hydro power



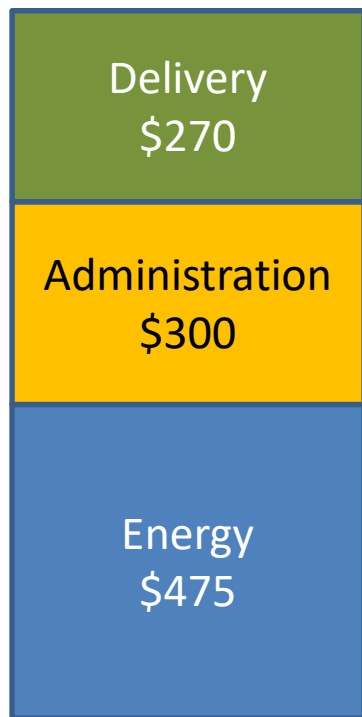
Solar generation is ill-timed relative to customer demand



Solar Power is far more expensive than Tacoma Power's renewable hydro resources

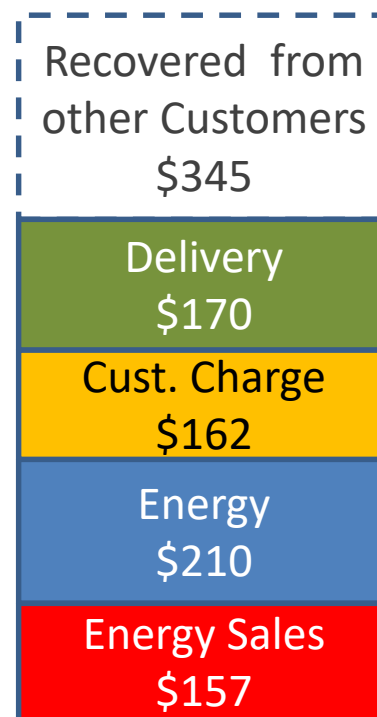
# Solar Generation Shifts Existing Costs

**Utility Cost** to  
serve a “Typical” Residential  
Customer (11,300 kWh  
annual load)



Total Annual Cost ~\$1045

**Utility Revenue** from a  
“Typical” Residential Customer  
with a 6kW solar system  
(residual load 5000kWh)



Total Annual Revenue ~\$700

# Solar Plan Imposes New Costs

Plan Element	Annual Cost	Cost per Participant
General Utility Costs		
Join State New Voluntary Solar Incentive Program	\$0	
Expand Marketing, Outreach and Education (WattPlan)	\$12,000	\$90
Modify SAP Process to Accommodate Solar (est.)	\$12,500	\$90
Work with Strategic Partners on Low-Income Solar Access	Staff Time	
New Community Solar Project (100 kW)	NA	NA
Advocate for State Legislation Changes	Staff Time	
Utility Cost by Participation		
Wave Inspection Fees and Pre-Pay for RECse	\$29,400	\$840
Low-Income Zero Interest Loan	\$134,750	\$3850
Pursue Multi-Family Pilot	Staff Time	
Revamped Evergreen Options	\$0	
Total	\$134,750	\$4870

# SUMMARY & DISCUSSION

# Example “Post Plan” 20-Year Solar System

## Economics: Low-Income Customer Perspective

### 4kW Solar System built in 2019

Initial cost (\$3.40/W)	-\$13,900
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Cost (in today's \$s) to replace inverter in year 10	-\$900
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Estimated total value (in today's dollars) of:

a. 8 years of “2019” state incentives	\$3,900
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b. 20 years of bill savings	\$3,000
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c. <del>NPV of federal tax credit</del>	<del>\$3,800</del>
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d. Tacoma Power incentives	<u>\$5,500</u>
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<b>Overall cost prior to legislative action</b>	<b>-\$2,200</b>
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Value of 8 years of bonus state incentive (x2)	<u>\$3,900</u>
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<b>Overall value with legislative action</b>	<b>\$1,700</b>
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## Example “Post Plan” 20-Year Solar System

## Economics: Community Solar Project (2019)

## 100kW Solar System, 20 year life, built in 2019

Estimated total costs (in todays dollars) for construction,  
inverter replacement, administration and O&M   -\$247,500

Estimated total value (in today's dollars) of:

- |                                       |                 |
|---------------------------------------|-----------------|
| a. 8 years of “2019” state incentives | \$91,100        |
| b. 20 years of energy production      | \$47,500        |
| c. 20 years of REC benefits           | <u>\$18,100</u> |

**Cost prior to legislative action** **-\$90,800**

Estimated total value (in today's dollars) of legislative actions:

- |                                                   |                 |
|---------------------------------------------------|-----------------|
| a. Increasing cost recovery cap to 100%           | \$39,300        |
| b. 8 years of bonus “2019” state incentive (x2.5) | <u>\$52,900</u> |

**Overall value with legislative action 1,400**

# Residential and Low-Income Solar Plan Summary

Plan Element	Increase Res. Solar Use	Address economic inequality -- Increase LI Res. Solar Use
Joined Washington State New Voluntary Solar Incentive Program	✓	✓
Expand Marketing, Customer Outreach and Education	✓	✓
Modify SAP Process to Accommodate Solar	✓	✓
Work with Strategic Partners to Find Solutions for Low-Income Solar Access		✓
Provide Incentive Package for Low-Income Customers: Inspection fees and REC Value		✓
Low-Income Zero Interest Loan		✓
Advocate for State Legislation Changes to Increase State Support for Low-Income & Community Solar	✓	✓
Pursue Multi-Family Pilot		✓
Revamped Evergreen Options		✓
Evaluate New Community Solar Project	✓	✓

**Thank You!**