Potential Elements of a Plan to Increase Residential Solar Power and to Address Equity Concerns

Public Utility Board Study Session

Clay Norris

July 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.

We Expect Residential Solar Generation To Grow



Presentation Overview

- 1. Background
 - a. What solar brings to Tacoma Power
 - b. Solar Economics
- 2. Plan Ideas
- 3. Board Guidance

BACKGROUND What Solar Brings to Tacoma Power

Load Resource Balance

Tacoma Power Does Not Need New Resources to Serve Load



Energy Use by Tacoma Power Customers is Highest on Winter Nights

Monthly Residential Energy Use and Solar Production (4 kW System) Hourly Residential Energy Use and Solar Production on Cloudy Winter Days



Tacoma Power's Resource Portfolio is Very Renewable and Nearly Carbon Free



0.02% Solar

Note: Tacoma Power and WA state figures from 2015 data from the WA Depart of Commerce US numbers from the US Energy Information Agency

BACKGROUND Solar Economics

Solar Generation Systems are Subject to Significant Economics of Scale

Smaller Systems cost more per kW than Larger Systems



Customer Perspective: Solar Generation Provides Three Categories of Financial Benefit

- **1. Net Metering** the electricity not purchased from the utility
- 2. Federal Tax Credit 30% of total installation costs
 - Authorized through October 2021
- **3. WA Production Incentives** HB 5939 passed on the last day of the third special session. For residential incentives, the bill:
 - Ended the previous \$0.54/kWh incentive on June 30, 2017
 - Established new incentive rates that depend on year certified and end after 8 years (or when the cumulative incentive payments equal 50% of the total system price)
 - 2018 \$0.21/kWh (with WA components)
 - o 2019 \$0.18/kWh
 - o 2020 \$0.15/kWh
 - o 2021 \$0.12/kWh
 - June 30, 2021 incentive ends

The State Incentive and Federal Tax Credit Provide Most of Solar's Financial Benefits

Cumulative Customer Benefits (per kW)



Small systems never return their cost
Median size systems do so after year 10
Larger systems in about year 5

Solar Economics Are Better Elsewhere

	Summer /Winter	1kW Solar System			
Utility	Residential Rates \$/kWh	Annual Production (kWh)	Approximate Value of Production		
Тасота	0.07687	1093	\$ 84		
PSE	0.10717	1093	\$ 117		
Seattle	0.12880	1093	\$ 141		
Portland (PGE)	0.11840	1141	\$ 135		
Sacramento (SMUD)	0.1291/0.1128*	1507	\$ 180		
San Francisco (PG&E)	0.27612	1536	\$ 424		
Los Angeles (LADWP)	0.2312/0.1649*	1558	\$ 362		
Phoenix (SRP)	0.1311/0.0793*	1712	\$ 167		
Las Vegas (NV Energy)	0.3768/0.0546*	1750	\$ 299		

*The summer period varies among utilities but typically runs from June-September

Utility Perspective: Solar Acquisition Creates Rate Pressure



Conservation Is Better Situated to Meet the Needs of Tacoma Power Customers

Criteria	Solar	Conservation	
Utility Need for Resources*	No	Long-term	
Meets Daily Peak	No	Yes	
Meets Seasonal Peak	No	Yes	
Carbon Free Resource	Yes	Yes	
Keeps Rates Low**	No	Long-term	
Prevents Cost Shifts to Non- participating Customers	No	Some	

* Because solar provides minimal energy in the winter
** Conservation reduces both winter energy use and peak use

POTENTIAL PLAN ELEMENTS

"... [T]he Tacoma Public Utility Board to develop a plan to increase the use of residential solar in the City of Tacoma... [and] address economic inequity and ensure an equitable increase in the number of residential solar users..."

Low-Income Customers Face Solar Barriers

- Housing
 - Ownership
 - Structural/Roof integrity
 - Manufactured homes
 - Multi-family (common roofs)
 - Renter churn
- Restrictive Incentives
 - Community solar incentive cap
 - Roof-top solar incentive cap

- Market Access
 - Credit: Home equity loans require good credit or higher interest payments
 - Installer interest
 - Consumer protection
- **Source**: Low-income Solar Policy Guide, Center for Social Inclusion (2016)

Idea #1: Partner with Outside Entities

- WA Dept. of Commerce leading a federally funded effort (Solar Strategies) looking for ways to overcome barriers to low income solar access
 - Focus on Social Justice/equity
 - Commerce recognizes the special challenges that Tacoma Power and other WA utilities face with high proportions of low-income customers

Idea #2: Seek Low Income Bonus Incentives in Future Solar Legislation

- TPU has been working with other utilities and advocates on legislation to continue to provide solar financial incentives
 - TPU advocating for a bonus incentive for low-income customers

Idea #3: Revamp Evergreen Options to Include Bonus Scoring for Low-Income Housing Projects

- Since 2001 Tacoma Power has offered a voluntary program where by customers can pay a little extra to purchase a quantity of new renewables such as wind and solar
- Tacoma Power is revamping the program so that part of the proceeds can be used for local small renewable energy projects –most likely solar – for non-profit organizations
- Subscribers will vote to decide among applications for funding

Idea #4: Partner With Solar Installers

Explore options to leverage solar price reductions for lowincome customers similar to our ductless heat pump (DHP) effort

- DHPs were not cost-effective at the going installed retail price
- We <u>DID NOT</u> ask trade allies to lower their price
- We <u>DID</u> explain to trade allies that a cost above \$3500 was not cost-effective which prevented Tacoma Power from providing financial incentives
- Installers decided on their own to lower prices for DHPs

Idea #5: Provide Zero Interest Loans for Low Income Customers

Follow the same loan approval process as is used for conservation loans:

- Loan secured by property lien
- Utility bill payment history used to determine eligibility

Idea #6: Prepay Value of Energy to Reduce Initial Cost

Avoided energy costs for the first 20 years in service.

Estimated value: \$700/kW

 Payment secured by property lien – to ensure Tacoma Power gets the energy prepaid

Idea #7: Buy RECs from Low Income Customers Up-front to Reduce Initial Cost

The value of the avoided REC purchases for the first 20 years in service.

Estimated value: \$150/kW

 Payment secured by property lien – to ensure Tacoma Power gets the RECs that were prepaid

Idea #8: Multi-Family Pilot Project

- Combine ideas 5, 6, and 7 for multi-family property owners
- With larger system, current federal and state incentives and tax depreciation benefit, we estimate owner would have slight financial benefit
- Require owner to distribute energy benefits to tenants
- Will require assistance with SAP from the City of Tacoma



Board Guidance

- Reaction to staff ideas?
- Other suggestions?
- Other elements of solar plan?

Thank You!

Tacoma Power Transportation Electrification Initiatives

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The Benefits of Electric Vehicles Are Well Recognized

LOWER OPERATING COST

Electricity is a less expensive transportation fuel (per mile) EVs need less maintenance waste

NATIONAL SECURITY

Domestic source of energy

ENVIRONMENT

Improved air quality Improved water quality Most cost-effective way to reduce GHG emissions



The Future of the EV Market Is Uncertain

Investments face typical early market risks:

- Competing technologies

 Charging systems
- Product longevity

 Vehicle/battery life
- Supporting infrastructure

 Charging network
- Safety
- Government support
- Market acceptance & consumer preference
 - Range anxiety
 - SUVs/Trucks
 - o Noise



Many Factors Influence the EV Decision



Product	Economics		Range		Customer exposure	
Vehicle availability	Vehicle price		Charging network		Education and	
Features (e.g., seat number, self driving, sun roofs) Production constraints (e.g., rare earth metals)	Electric rates		Improvements in		outreach	
	Gov. incentives		battery technology			
	Gasoline price					
	Maintenance cost					
			Misce	ella	ineous	
			Carbon	re	gulations	
No Utility Influence		Pa Accom	ark m	ing odation		
			Styling	an	d image	

Some Utility Influence

Direct Utility Influence

Presentation Overview

- 1. Past Efforts to Encourage EVs
- 2. Ongoing Efforts to Encourage EVs (including legal and economic analysis)
- 3. Future Efforts to Encourage EVs

Past Efforts to Encourage EVs

TPU's Early Support for EVs

- Purchased first hybrid vehicle in 2003
 Current fleet includes 59 hybrids, PHEVs and BEVs
- Assessed load impact in 2010 IRP
- Used federal ARRA grant money to help fund a 2011 public charging station pilot program
 TPU's main campus
 - TPU's Old Town substation





The Charging Infrastructure Pilot Investment Was Not Cost Effective

- 10 charge stations
 - \$50k in ARRA grant funding paid for the charging equipment
 - Tacoma Power paid about \$29k
 to install the charging equipment
- As of March 2017, we have
 - Delivered 40,860 kWhs (enough to drive about 160,000 miles)
 - Gross revenue about \$7,500



TPU's Early Support for EVs - con't

- Established Electric Vehicle Leadership Team in 2011
 - Encourage EV adoption of carbon-free, low-cost hydroelectric power as a transportation fuel
 - o Build consumer confidence by providing public charging infrastructure
 - $\circ~$ Build utility knowledge and experience with EVs
- Founding member of the Northwest Utility Transportation
 Electrification Collaborative
 - Learn what utilities can do to change vehicle purchase decisions (programs, incentives, education, other?)
 - Overcome legal challenges to supporting EVs
 - Gain a better understanding of EV economics and technical factors











Legal Analysis

- Washington's constitution prohibits the "lending" or "gifting" of public funds
- In the late 1970s, a constitutional amendment authorized utilities to finance certain conservation programs
 - This authorization is limited to "... conservation purposes in existing structures" which do not result "in a conversion from one energy source to another"
- Programs not meeting the conservation exemption will need:
 - Authorization from another statutory source and must comply with the constitutional prohibition on gifting of public funds

Collaborative Members Hired E3 To Evaluate Transportation Electrification

- Regional analysis
 - E3 also performed individual service territory case studies for Tacoma Power, PSE, SnoPUD, and Chelan PUD



- Costs and benefits calculated on two perspectives
 - <u>Utility ratepayer perspective</u> The amount of support Tacoma Power can provide without creating "gifting" concerns
 - Societal perspective

Tacoma Power Ratepayer Perspective

Best estimate is that EVs provide a slight net benefit of about \$70/over the vehicle life, but with a wide range of uncertainty



Utility Retail Rates and Capacity Values Drive Ratepayer Benefits



Net Ratepayer Benefit

Societal Benefits Larger Than Ratepayer Benefits

Over the next 20 years, a \$1,976 average vehicle lifetime benefit

• Biggest drivers are gasoline prices and incremental vehicle cost



Ongoing Efforts to Encourage EVs

Tacoma Power Joined "Forth"



- Education and outreach
- Coordination with other utilities
- Assistance with grant opportunities



Applied for Grant Funding for Charging Infrastructure



Working on Electric Vehicle Web Portal

Help people to find the perfect EV based on their needs and characteristics

- Comparison tools (carbon and cost)
- Special offers
- Installer contractor list
- Charger and dealership locators

DOE grant reduces cost



Legislative Activity

- Summer/Fall of 2016 Tacoma Power, Snohomish PUD, Seattle City Light, and Chelan PUD work together on two approaches to address legal constraints and authorize public utilities to offer programs and assist customer acquisition of charging equipment
 - Amend energy efficiency statutes
 - Amend greenhouse gas emission statutes
- TPU organized a broad stakeholder group to work on EV legislation (HB 1335)
 - EV legislation failed to move through the Legislature in 2017
 - $_{\odot}\,$ Are reconvening July 13 to work on a joint bill for the 2018 session

Future Efforts to Encourage EVs

Ride and Drive "Pop-Up" Event

Working with the City of Tacoma and Forth to schedule and Ride and Drive event in Tacoma – possibly as early as this Fall

Pop-Up events:

Provide an opportunity to try out electric vehicles without sales pressure

Forth provides:

- EV charging equipment for people to look at
- Informational materials, and
- Coordination with local dealers to secure EVs for test drives.
- Drive-finder tool: <u>https://forthmobility.org/drive-finder</u>















Other Future Activities

Pursue more grant opportunities

- VW settlement (*Electrify America*) looking to fund multiple Level-2 and Level-3 charging stations
 - Electrify America's first meeting with regional utilities is on August 11
- WA Department of Transportation
- Evaluate options to encourage home charging and workplace charging
 - Work with trade allies to support home charging
- Advocate for government support of utility EV programs through carbon credits, REC equivalents, etc.
- Work with Port of Tacoma to pursue shore power
 o Evaluate rate design for charge stations at the Port

Thank You!