EV Charging Station Pilot Rate

Ray Johnson Power Management Assistant Power Manager Melissa Buchler Rates, Planning, & Analysis Power Analyst

August 8, 2018



EV Charging Station Pilot Rate

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Rationale & Proposal

Section 1



Rationale & Proposal

City Council passed a request for resolution in support of electric vehicle initiatives

Proposed pilot rate is one of the Tacoma Power initiatives aligned with the Tacoma City Council request for Resolution in Support of Electric Vehicle Initiatives.

- 33	Reg. #15-0497	
Y	RESOLUTION NO. 40016	
	BY REQUEST OF DEPUTY MAYOR IBSEN AND COUNCIL MEMBERS BEALE, CAMARATA, AND USHKA	
2 3 4 5 6	A RESOLUTION expressing the Giry Council's support of initiatives to feater better conditioned and the second seco	
1	WHEREAS rapidly increasing electric vehicle ("EV") sales in the United	
	States will have positive impacts for our communities in the form of fewer	
10	greenhouse gas emissions from the transportation sector, improved air quality, and	
11	reduced fuel costs, and	
12	WHEREAS staff from the Environmental Services Department, Office of	
13	Environmental Policy and Sustainability, and Tacoma Public Utilities, Light Division	
14	(d.b.a. "Tacoma Power"), have been exploring a range of actions that would	
18	incentivize and improve necessary infrastructure to support EV adoption, and	
17	WHEREAS Tacoma Power has begun work on the Transportation	
18	Electrification Initiative, and will develop a Transportation Electrification Plan that	
19	identifies EV chaming solutions, among other strategies, to support electrification of	
20	transportation and environment and	
	WHEREAS, additionally, Tacoma Power is exploring electrification of	
23		
24	earsportation instatives, such as a residential charger incentive pilot program and	
25	appoint connects charging instancese, by working with electric vehicle	
26		
	Next COLT day MCPute	

Electrification of Transportation Benefits our Community:

- Reduces transportation fuel costs
- Lowers Tacoma's carbon footprint
- Improves local air quality

Electrification of Transportation Benefits Tacoma Power Customers:

• Helps counter load & retail revenue decline, which keeps rates low for Tacoma Power customers



Rationale & Proposal

Through tariffs, utilities play an important role in electric vehicle adoption

From Rocky Mountain Institute-EVgo Fleet & Tariff Analysis:

- "Public direct current fast chargers (DCFC) are anticipated to play an important role in accelerating electric vehicle (EV) adoption and mitigating transportation sector greenhouse gas (GHG) emissions."
- "The high cost of utility demand charges is a significant barrier to the development of viable business models for public DCFC network operators".
- "It is critical that utility tariffs for EV charging support, rather than stifle, the shift to EVs. Utilities, their regulators, and EV charging station owners and operators must work together to provide all EV drivers—especially those without home and workplace charging options—access to reliable EV charging.".





Under standard utility rate tariffs, DC fast chargers are subject to a demand charge

DCFC in Tacoma Power Territory

Public Direct Current Fast Chargers are currently classified as General Service, or Schedule G, customers.

Schedule G is a three part rate

- Customer Charge (fixed per Month)
- Demand Charge (variable per kW)
- Energy Charge (variable per kWh)

Challenge

Although Tacoma Power customers would benefit from additional DC fast chargers, our current rate offerings create a significant barrier to DC fast charger investment, and reduce the expansion of this service to the consuming public.



Rationale & Proposal

The impact of demand charges is highly dependent on charging station utilization



Load Factor (Utilization)

TACOMA TACOMA PUBLIC UTILITIES **Rationale & Proposal**

Tacoma Power proposes a pilot rate for Electric Vehicle DC Fast Charging Stations

Proposed schedule allows public charging stations to gradually transition into a demand charge under a flexible pilot construct.

Proposed pilot anticipates and helps Tacoma Power plan for expected increase in demand for DC Fast Charging station services.

Proposed pilot is modeled after the Public DC Fast Charger Optional Transition Rate (Schedule 45) adopted by PacifiCorp in Oregon and Washington



Section 3



DC Fast Chargers increase annual Electric Vehicle utilization by more than 25%



An Electric Vehicle Charger is a **"gas pump" for electric vehicles.** It supplies power to an electric vehicle for the purpose of recharging the electric vehicle's battery.

	Level One	Level Two	DC Fast
Location(s)	Home	Home & Public	Public
Charging Time	Slow 8 to 15 Hours	Moderate 3 to 8 Hours	Fast 20 to 60 Minutes
Peak Demand	Low Less than 2 kW	Medium 2 to 20 kW	High 20 kW or More
Voltage	Standard Outlet 1-Phase, 120 Volt	Commercial or Home Appliance Outlet 1-Phase, 208 Volt or 240 Volt	Commercial or Industrial Outlet <i>3-Phase, 208 Volt or 480 Volt</i>

NOTE: to qualify for service under the proposed pilot, installation must include at least one charger classified as DC Fast Charge

DC Fast Charging Stations have very high electricity demands



An Electric Vehicle Charging Station is **a "gas station" for electric vehicles**. Potential configurations of a four-stall public charging station are illustrated below.

	Configuration 1	Configuration 2	Configuration 3	Configuration 4
Number of				
DC Fast Chargers	One 150kW	Two 150kW, 150kW	Three 350kw, 150kW, 150kW	Four 350kW, 350kW, 150kW, 150kW
Level 2 Chargers	Three 20kW, 20kW, 20kW	Two 20kW, 20kW	One 20kW	
Total Potential Demand*	210kW	340kW	670kW	1MW
Total Realized Demand	57-153kW	92-247kW	182-487kW	272-727kW

*realized demand depends on vehicle charging limitations, state of charge at time of plug-in, and station utilization.

Higher charging demands require more utility resources

In power, time is a factor. Over different periods of time, Level One and DC Fast Chargers consume the same amount of energy.



TACOMA PUBLIC UTILITIES

Utility rates are designed to collect the cost of high demands through demand charges



General Service (Schedule G)

Schedule G serves general power customers with load exceeding 50kW.

- Customer Charge (\$80.00 per Month)
- Energy Charge (\$0.049959 per kWh)
- Demand Charge (\$8.51 per kW)



Small General Service (Schedule B)

Serves non-residential loads not exceeding 50kW.

- Customer Charge (\$24.40 per Month)
- Energy and Delivery Charges (\$0.079203 per kWh)

NOTE: prices indicate Recommended 2020 rates. These rates are subject to change.



The proposed pilot transitions DC Fast Charging Stations into demand charges



Fast Charge Service (Schedule FC)

- Rate structure mirrors a Public DC Fast Charger Optional Transition
 Rate adopted by PacifiCorp in Oregon and Washington
- Rate prices are derived from Tacoma Power's Small General Service and General Service rate schedules

Charge	Over 13-Year Transition Period (2019– 2031)
per Month	remains the effective Schedule G per Month charge \$80.00 per Month
per kWh	transitions from Schedule B per kWh charges to Schedule G per kWh charge \$0.079203 in 2019 to \$0.049959 in 2031
per kW	introduces Schedule G per kW charge <i>\$0.00 in 2019 to \$8.51 in 2031</i>

NOTE: illustrated prices hold Recommended 2020 rates constant. These rates are subject to change.



Rates Over 13-Year Transition Period

Schedule FC Energy Charge and Demand Charge over 13-Year transition period 2019-2031



NOTE: Illustrated prices hold Recommended 2020 rates constant. These rates are subject to change.



Tacoma Power Rates Comparison

Comparison of Standard Schedules with Proposed Schedule FC over 13-year transition period 2019-2031



NOTE: Illustrated prices hold Recommended 2020 rates constant. These rates are subject to change.



Proposed Pilot Rates are Competitive

Effective Price per kWh of Electric Vehicle Charging Station

assumes change in state-of-charge at 60%, station utilization rate at 35%, 100kWh battery capacity, and 153kW DCFC charging demand



**Illustrates average of Schedule 28 (Standard General Service) and Schedule 45 (Public DC Fast Charger Optional Transition Rate) in Year 1 **Illustrates respective utility's Standard General Service rates as of July 24, 2018*



Information collected through the pilot will inform Tacoma Power's future rate offerings



- To qualify for the rate, Electric Vehicle Charging Stations must...
- Have separately metered service
- Be broadly available to the general public
- Have at least one DC fast charger
- Demand no more than 1 megawatt of load



Pilot is limited to...

- 13 Years, January 1, 2019 December 31, 2031
- 25 public DC Fast Charging Stations, on a first-come, first-served basis



Bi-annual reports will include...

- Locations of participating stations
- Aggregated utilization and sales statistics





With Board support, proposed pilot will be part of Tacoma Power's general rate case and will become effective on January 1, 2019





Section 4



In power, time is a factor

The energy used by one 100-watt lightbulb lit for ten hours is the same as the energy used by ten 100-watt lightbulbs lit for one hour. The demand of ten 100-watt lightbulbs lit for one hour is ten times the demand of one 100-watt lightbulb lit for ten hours.



TACOMA PUBLIC UTILITIES

Over the pilot period, an Energy Charge Adder is transitioned out

The energy charge adder is calculated by subtracting Schedule G per kWh charges from Schedule B per kWh charges.

The table at right illustrates the energy adder calculation for a standard Schedule G customer.

Calculation of Energy Charge Adder				
\$ 0.079203				
\$ 0.049959				
\$ 0.029244				

Over the 13 year transition period, the energy charge adder discount goes from 0% to 100%. As the energy charge adder discount grows, the energy charge adder is transitioned out.





Schedule FC Energy Charge Adder Discount & Energy Charge over 13-year transition period

TACOMA DUBLIC UTILITIES

Over the pilot period, a Demand Charge is transitioned in

At the start of the pilot, the Schedule FC Demand Charge is fully discounted. In other words, the Schedule FC per kW charges are \$0.00.

Over the 13 year transition period, the demand charge discount decreases. As the demand charge discount decreases, the demand charge is transitioned in.

At the end of the transition period, the Schedule FC demand charge equals the Schedule G demand charge.





Schedule FC Demand Charge Discount & Demand Charge *over 13-year transition period*

TACOMA DUBLIC UTILITIES

The table below provides Schedule FC rates over the 13-year transition period

	Discount		Resulting Charge		
Year	Energy Adder	Demand	Customer	Energy	Demand
2019	0%	100%	\$ 80.00	\$ 0.079203	\$ 0.00
2022	10%	90%	\$ 80.00	\$ 0.076279	\$ 0.85
2023	20%	80%	\$ 80.00	\$ 0.073354	\$ 1.70
2024	30%	70%	\$ 80.00	\$ 0.070430	\$ 2.55
2025	40%	60%	\$ 80.00	\$ 0.067505	\$ 3.40
2026	50%	50%	\$ 80.00	\$ 0.064581	\$ 4.26
2027	60%	40%	\$ 80.00	\$ 0.061657	\$ 5.11
2028	70%	30%	\$ 80.00	\$ 0.058732	\$ 5.96
2029	80%	20%	\$ 80.00	\$ 0.055808	\$ 6.81
2030	90%	10%	\$ 80.00	\$ 0.052883	\$ 7.66
2031	100%	0%	\$ 80.00	\$ 0.049959	\$ 8.51

Note: illustrated prices do not account for biennial rate adjustments



Tesla Demand with DC Fast Charger

Data below was collected by FleetCarma data loggers. The blue line plots the vehicles state of charge. The orange line plots the demand flow of the battery. When the orange line goes up, the battery is gaining charge. When the orange line goes down, the battery is losing charge.



Leaf Demand with Level II Charger

Data below was collected by FleetCarma data loggers. The blue line plots the vehicles state of charge. The orange line plots the demand flow of the battery. When the orange line goes up, the battery is gaining charge. When the orange line goes down, the battery is losing charge.



RATE & FINANCIAL POLICY RECOMMENDATIONS



Board Study Session

August 8, 2018

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Policy Recommendations

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Timeline

Section 1

2019/2020 TPU Rates & Budget Timeline



Public Outreach



Staff requests policy guidance before public outreach process begins mid-August

Policy Recommendations

Section 2



Low-Income/Senior/Disabled

2017 Year End Achievements	2017/18: \$2,000,000 (budgeted/appropriated) 2017: \$227,620 (actuals at year-end)	2017/18: \$275,000 (budgeted/appropriated) 2017: \$47,110 (actuals at year-end)
Notes & Other Considerations	Cost of program is allocated to all classes.	Cost of program is only allocated to the Residential Class.
Summary of Additional Analysis	Different allocation methods for low-income and senior/disabled assistance programs (e.g. entire cost of program allocated to the Residential Class) result in rate increases of less than 1 percentage point. Reference PUB Action Item 14 & Action Item 15 Memos	Different allocation methods for low-income and senior/disabled assistance programs (e.g. cost of program allocated to all classes) result in up to a 0.2% rate difference. Reference PUB Action Item 14 Memo
Staff Recommendations	We propose modernizing the existing language to address programs available through utility assistance programs: "The needs of low-income, senior, and disabled electric customers will be considered when establishing rate levels, providing bill assistance, and offering financial education."	We propose modernizing the existing language to address programs available through utility assistance programs: "The needs of low-income, senior, and disabled water customers will be considered when establishing rate levels, providing bill assistance, and offering financial education."

Debt Coverage Ratios







Current Policy	"The Utility will maintain a minimum Debt Service Coverage Ratio of approximately 1.5 based on net revenues including surplus power sales consistent with water supply planning noted in subsection 5 below or at higher levels consistent with sound financial practice in the electric industry. The Utility will plan to a minimum Debt Service Coverage Ratio of 1.8 based on net revenues including surplus sales estimated using median water availability or at higher levels consistent with sound financial practice in the electric industry." [IV.A.3.]	"Senior Debt Service Coverage will be maintained above 150% ,exceeding Tacoma Water's bond covenant requirement of 125% . All In Debt Service Coverage will be maintained above 125% ." [III.B.3.]	
2017 Year End Achievements	2017: 2.82x 2018: 2.77x (projected)	Senior Debt 2017: 2.32x 2018: 2.19x (projected)	All-In Debt 2017: 1.32x 2018: 1.18x (projected)
Staff Recommendation	None at this time.	We propose a reduction in All In Debt Service Coverage from 1.25x to 1.00x during periods of spending down cash reserves: "Senior Debt Service Coverage will be maintained above 1.50, exceeding Tacoma Water's bond covenant requirement of net revenue at least 1.25 times annual senior debt service. All-In Debt Service Coverage will be maintained above 1.25 except when cash reserves are budgeted to meet the annual revenue requirement, when it will be maintained above 1.00."	


Rate Stability

Current Policy	Electric Rate & Financial Policy does not have a specific objective regarding rate stability. However, staff supports the current practice of making small and consistent rate adjustments to be used for planning purposes.	"Section D. Water Rates Should Be Stable and Understandable 1. To the extent possible, rate adjustments will not exceed general inflationary trends."
Staff Recommendation	We propose modernizing the existing language to set an objective that seeks to stabilize rates and better align with Water's rate and financial policies: "Section I. Rate Setting Objectives J. Rate Stability To the extent possible, rate adjustments should be as level across years and not exceed general inflationary trends."	None at this time.



Class Rate Increase Cap





Class Rate Increase Cap (cont'd)

Staff Recommendation	 We propose modernizing the existing language to address caps for class rate increases and to align with Water's rate and financial policies: "Section IV. Financial Targets and Rate Setting Practices B. Rate Setting for Traditional Retail Electric Services 3. Rate Design h. Rate adjustments may be phased-in over a limited time period and may be used if a disproportionate change in rate levels is expected for certain classes. Inter-class revenue requirements adjustments significantly in excess of the system average may be allocated proportionally to the remaining customer classes. A gradual approach may be used for the subsidized class to set subsequent rate increases until cost-of-service rates are reestablished." 	None at this time.

Appendix

Section 3

RATE & FINANCIAL POLICY REVIEW



Board Study Session

May 9, 2018

Operating Fund Balance





Current Policy	"Rates will be set at levels to provide projected cash balances equivalent to a minimum of 90 days of current budgeted expenditures." [IV.A.1.] "While this policy includes minimum requirements for liquidity and debt service coverage, it is the goal of Tacoma Power to maintain or improve current debt ratings, and the utility will maintain higher levels of coverage and liquidity as required to achieve this goal." [IV.]	"Rates shall be set at levels such that projected current fund (fund 4600) cash balances will be equal to 60 days of current budgeted expenditures." [III.B.5.]
2017 Year End Achievements	2017 Minimum 90 Days: \$94.8 million 2017 Target 180 Days: \$162.5 million 2017 year-end cash: \$189.2 million or 209 days 2018 year-end cash: \$189.8 or 207 days (projected)	2017/18 Minimum 60 Days: \$15.30M 2017 year-end cash: \$58.75M or 221 days 2018 year-end cash: \$55.42M or 208 days (projected)
Changes for Consideration	None at this time.	None at this time.

Rate Stabilization Fund





Current Policy	 "Tacoma Power will maintain a Rate Stabilization Fund as a means of managing potential volatility in Rates and augmenting reserve policies. Funds are intended to mitigate the need for large changes in rates from one year to the next. The Fund also may be used as a rate stabilization account for purposes of the ordinances authorizing Tacoma Power debt and provides that amounts withdrawn from the Fund are deducted from revenues in the year they are deposited into the Fund and counted as revenues in the year withdrawn from the Fund." [V.A.] 	Although Tacoma Water does not have a traditional rate stabilization fund, we do have a rate stabilization account. The current balance includes deferred SDC revenues recognized as needed to boost debt service coverage. Additional deposits may be made to the account as needed within 90 days after the close of the year for inclusion in the debt service coverage calculations. We do not recommend the creation of a traditional rate stabilization fund because we have set our policy level of reserves to manage potential volatility in revenues and to meet working capital needs.
2017 Year End Achievements	Balance \$48M	Balance \$35.5M
Changes for Consideration	Staff is considering adding probabilistic rigor to the Rate Stabilization Fund calculation and may propose policy changes for future biennia.	None at this time. However, we intend to recognize revenue in the SDC fund over time and eventually dissolve the account.

Low-Income/Senior/Disabled





	"The needs of low-income electric customers will be considered when establishing rate levels." [I.G.]	"A discounted water rate will be considered to help low- income/elderly and low-income/handicapped water customers." [III.C.16.]
	"The level of annual funding for low-income assistance will be determined by the Public Utility Board." [IV.B.1.b.]	
Current Policy	"A modified electric rate will be considered to help low-income senior or low-income disabled electric customers pay their bills." [IV.B.2.a.1.]	
	"The costs and benefits of the current discounted rate for the low-income/senior and low-income/disabled, together with other low-income programs, will be evaluated, along with an analysis of other utility programs that provide assistance to the low-income customer. The low-income rate may be discontinued at the discretion of the Public Utility Board if it is determined that the rate discount is not an effective method of providing assistance to the low-income customers." [IV.B.3.g.]	

Low-Income/Senior/Disabled (cont'd)





2017 Year End Achievements	2017/18: \$2,000,000 (budgeted/appropriated) 2017: \$227,620 (actuals at year-end)	2017/18: \$275,000 (budgeted/appropriated) 2017: \$47,110 (actuals at year-end)		
Notes & Other Considerations	Cost of program is allocated to all classes.	Cost of program is only allocated to the Residential Class.		
Changes for	We propose modernizing the existing language to address programs available through utility assistance programs:	We propose modernizing the existing language to address programs available through utility assistance programs:		
Consideration	"The needs of low-income, senior, and disabled electric customers will be considered when establishing rate levels, providing bill assistance, and offering financial education."	"The needs of low-income, senior, and disabled water customers will be considered when establishing rate levels, providing bill assistance, and offering financial education."		

TACOMA POWER RATES Customer Charge Considerations

Christina Leinneweber Rates, Planning & Analysis Senior Utilities Economist

August 8, 2018



Tacoma Power Rates: Customer Charge Considerations Table of Contents





History

Power Rates Customer Charge Policy Section 1



Customer Charge Policy: History



2. Ration Electricity from Existing Power Plants with High Inclining-Block Rates

The power challenge of the 20th Century was providing the social and economic benefits of electricity equitably across America. Public-works projects funded by government institutions like the Tennessee Valley Authority and the Bonneville Power Authority created a pool of power available even in poor rural areas, while regulatory frameworks were created to ensure that monopoly service providers did not abuse their market position. Because the most expensive component of the system was the construction of new power plants, reducing consumption through peak-use pricing or inclining-block rates was a policy imperative.



Customer Charge Policy: History



The power challenge of the 21st Century will be implementing new technologies to enable a sustainable, low-carbon economy. Utilities no longer control decisions about the electric system, as private corporations own much of the technology driving grid transformation and citizen-consumers increasingly demand options to control their own electricity future. Clear, cost-based pricing is imperative to provide the information all parties need to make rational, sustainable decisions about their electric usage.

2. Encourage use of electricity to displace carbon.

electricity or grid connection.



Load, Cost, and Revenue Patterns

Power Rates Customer Charge Policy Section 2



Tacoma Loads are Declining Now





New Load Patterns in a New Century



In 1990, the Energy Information Administration (EIA) predicted American energy consumption would be 4.3 PWh by 2010. The actual figure was 3.7 PWh. The US is currently not predicted to reach 4.3 PWh of load until 2041.

Load growth declined markedly across the nation starting in 2000.



Seasonal Volatility in Retail Revenue



High variable costs result in strong seasonal revenue patterns.

Fixed charges provide more stabile revenue for utility and more predictable bills for customers.



Customer Benefit from Bill Stability



⁺\$5.00/month, \$0.092961/kWh

High variable costs result in high winter bills, especially for bimonthly-billed customers.

Low-income customers in particular have difficulty managing bill volatility.



Cost Structure



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TACOMA DUBLIC UTILITIES

Retail versus Wholesale Spread Widens





Pattern Holds in Residential Revenue Alone





Changes in Traditional Utility Service

Potential "Death Spiral"

- Decreasing energy sales mean fewer kWhs over which to recover fixed costs.
- New grid technologies (distributed generation [DG], electric vehicles [EVs], batteries) require distribution-system upgrades.



• **Higher** "fuel" **price** for those considering EVs, heat pumps, or other **carbon substitutes**

High

- Higher rates for those who cannot afford DG
- Less revenue for the utility to support distribution system upgrades to support new technology
- Less public input on the grid's future as the electric system is privatized



Carbon

Power Rates Customer Charge Policy Section 3



Deep Decarbonization



Paris Climate Goal ≤2°C

Deep Decarbonization Pathways Analysis for Washington State December 16, 2016



EVOLVED ENERGY RESEARCH

Prepared For: State of Washington Office of the Governor and Office of Financial Management

Prepared By: Ben Haley, Gabe Kwok and Ryan Jones Evolved Energy Research

Dr. Jim Williams Deep Decarbonization Pathways Project





Doesn't less load mean less carbon?

Electricity Savings *≠***Energy Savings**

Conservation reduces carbon when less energy overall is used. It does not reduce carbon when consumers switch from electricity to other fuels, like natural gas.

Carbon impacts can only be calculated when the entire portfolio of a consumer's energy usage is considered.



Electrify for Carbon Reduction

Tacoma Household CO₂ Emissions (*Pounds per Month*)



Electrification of household appliances and vehicles provides the greatest amount of carbon reduction.

A Tacoma home with natural gas heat and a gas-powered car emits 25 times more than an all-electric Tacoma home.

The impact of solar is most meaningful in an all-electric home. Adding solar to a household with efficient electric heat and an electric vehicle reduces emissions 31% (39 lbs/month to 27 lbs/month). For a household with gas heat and a gasoline car, the reduction is only 1.1% (1,114 lbs/month to 1,102 lbs/month).

TACOMA DUBLIC UTILITIES

Increasing Popularity of Gas Heat

Gas heat has become the fuel of choice for many new homes.



Primary Heating Fuel by Year Home Built

Due to perceptions of the low cost of natural gas and the desire for gas cooking, many homebuilders are choosing to install natural gas instead of electric heat. This **increases a home's carbon footprint by about 92%**.

Electric "fuel" prices (variable charges) must remain as low as possible to encourage consumers to choose or remain on electric heat. It is very rare to convert to electric once gas has been chosen.

TACOMA TACOMA PUBLIC UTILITIES

Fixed Charges Incentivize Electrification

Increasing the variable charge increases the cost of electrification.

				<u>High Fixed</u>	<u>High Variable</u>
EXAMPLE RATE EFFECTS		Customer (\$/month) Energy (\$/kWh)		\$ 25.00	\$ 5.00
				\$ 0.032165	\$ 0.042486
		Delivery (\$/}	(Wh)	\$ 0.040154	\$ 0.050475
	kWh per month	High Fixed Charge	High Variable Charge	e Dif	ference
Moderate Base Usage	700				
plus EV*	+294	\$ 96.89	\$ 97.41	\$ 0.5	2 0.5%
plus Electric Heat [†]	+468	\$ 109.47	\$ 113.5	9 \$ 4.1.	1 3.8%
plus EV & Electric Heat*†	+762	\$ 130.74	\$ 140.9	2 \$ 10.1	.8 7.8%

*a Nissan Leaf driving 12,000 miles per year at 3.4 miles per kWh

[†]a heat pump using 4,621 kWh/year for space heating and a heat pump water heater using 996 kWh/year for water heat

Carbon Impacts of Rate Design Choice

Variable Rate Tradeoff



Price signal discouraging lowcarbon fuel choices.



Conservation

Power Rates Customer Charge Policy Section 4



How much does price matter? I-937: "Societal Test"

Tacoma Power is required to acquire a certain amount of conservation each year. The target is set using a "societal test" of cost-effectiveness. This formula does not include the level of retail rates. Therefore, **Tacoma Power will seek to acquire the same amount of conservation regardless of rate design or level.**



How much does price matter? Elasticity of Demand

The responsiveness of individual consumers to price increases is measured by economists as the "elasticity of demand." If the elasticity of demand for electricity is low ("inelastic"), consumers do not reduce usage (conserve) very much even when prices are raised. Most studies find that electric demand is very inelastic; when rates increase by 1%, then consumers conserve between 0.05% and 0.81%.

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How much does price matter? Conservation is Driven by Programs.

Due to the low elasticity of demand, raising rates is not an efficient way of encouraging conservation. If policymakers wish to expand conservation efforts, they should focus on expanding direct consumer programs (rebates, retrofits, et cetera) and lobbying for tougher codes & standards.



Incentive for Conservation Remains

Residential Retail Revenue



*estimate at recommended customer charge increase



Low-Income

Power Rates Customer Charge Policy Section 5


Income Does Not Determine Usage



Only 1% of the variation in Tacoma Power's customers' electric use can be explained by estimated income.

Tacoma Power's internal studies have **failed to find systematic correlations between estimated income level and electric usage**.



In **Tacoma Power's service territory**, air conditioning is relatively rare, and many homes, particularly older homes, are heated electrically. It is **much harder for low-income residents to forego heating** than air conditioning.



While some low-income individuals live in small apartments with low usage, others live in single-family homes with high usage. Regardless of home type, **lowincome housing units tend to be less efficient** than high-income ones.



Fixed Charges Limit Rate Increase Amount

Under a fixed-charge increase, the dollar value of the increase for all customers is fixed. Under a variable-charge increase, some high users can see extremely high dollar increases.

Consider the example of a small user of 600 kWh/month and a large user of 1800 kWh per month.

The small user pays \$7.61/month more under an higher-fixed rate design, while the large user pays \$17.16/month more under an higher-variable rate design. The negative impact of the variable rate design is 225% higher.

Example	Higher Fixed Charge*	Higher Variable Charge†	Difference
Low	\$ 68.39	\$ 60.78	\$ (7.61)
High	\$ 155.17	\$ 172.33	\$ 17.16



Fixed Charges Reduce Seasonality

High variable charges lead to seasonal bill volatility.

In the hypothetical rate design below, the **high-variable rate design is up to 7% higher** than the high-fixed rate design. This is during the winter months, when low-income and unbanked customers are most likely to have difficulty paying their bills.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL	MIN	MAX
Monthly Usage	1,369	1,436	1,157	1,108	937	820	697	657	686	701	969	1,132	11,671	657	1,436
High Fixed*	\$124	\$129	\$109	\$105	\$93	\$84	\$75	\$72	\$75	\$76	\$95	\$107	\$1,144	\$72	\$129
High Variable [†]	\$132	\$139	\$113	\$108	\$92	\$81	\$70	\$66	\$69	\$70	\$95	\$110	\$1,145	\$66	\$139
Difference	\$8	\$10	\$4	\$3	\$(1)	\$(3)	\$(6)	\$(6)	\$(6)	\$(6)	\$0	\$3		\$(6)	\$10
	7%	7%	4%	3%	-1%	-4%	-7%	-9%	-8%	-7%	0%	3%		-9%	7%

*\$25.00/month, \$ \$ 0.072319/kWh

⁺\$5.00/month, \$0.092961/kWh



Fixed Charges Reduce Seasonality





Policy Decision

Power Rates Policy Decision Section 6



Staff Recommendation







Customer Charge Increase Recommended

Staff recommends increasing the customer charge by 85¢ in 2019 and 2020 to implement a 0.9% annual rate increase for the residential class.

	Curront	<u> </u>	Staff Recommendation				
RESIDENTIAL	Current COSA		2019	2020	Annual Increase		
Customer Charge	\$ 16.50	\$ 23.30	\$ 17.35	\$ 18.20	+0.85 step		
Energy Charge	0.045351	0.032893	0.045351	0.045351	None		
Delivery Charge	0.034435	0.040857	0.034435	0.034435	None		

ALTERNATIVE		Split 50/50		All Variable			
OPTIONS	2019	2020	Annual Increase	2019	2020	Annual Increase	
Customer Charge	\$ 16.90	\$ 17.30	+0.40 step	\$ 16.50	\$ 16.50	None	
Energy Charge	0.045351	0.045351	None	0.045351	0.045351	None	
Delivery Charge	0.034891	0.035353	+1.3% step	0.035300	0.036186	+2.5% step	



Residential Options Compared

Average Residential Monthly Bill



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Customer Charge Increase Recommended

Staff recommends increasing the customer charge by 95¢ in 2019 and 2020 to implement a 0.7% annual rate increase for the small general class.

SMALL	Querent	0004	Staff Recommendation					
GENERAL	Current	CUSA -	2019	2020	Annual Increase			
Customer Charge	\$ 22.50	\$ 35.21	\$ 23.45	\$ 24.40	+0.95 step			
Energy Charge	0.044616	0.032862	0.044616	0.044616	None			
Delivery Charge	0.034587	0.038942	0.034587	0.034587	None			

ALTERNATIVE		Split 50/50		All Variable			
OPTIONS	2019	2020	Annual Increase	2019	2020	Annual Increase	
Customer Charge	\$ 23.00	\$ 23.00	+0.50 step	\$ 22.50	\$ 22.50	None	
Energy Charge	0.044616	0.044616	None	0.044616	0.044616	None	
Delivery Charge	0.034895	0.035207	+0.9% step	0.035214	0.035852 -	+1.8% step	



Small General Options Compared



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Policy Communication

The Public Utility Board may elect to include language in the Rate & Financial Policy documents pertaining to the customer charge.

With the public outreach beginning in mid-August, staff requests that the Public Utility Board decide the level of the customer charge for the 2019/2020 Biennium.







Policy Language





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	TACOMA PUBLIC UTILITIES	TACOMA PUBLIC UTILITIES
Current Policy	 "Section IV. Financial Targets and Rate Setting Practices B. Rate Setting for Traditional Retail Electric Services 3. Rate Design d. Each rate schedule will contain a monthly customer charge which will reflect, at a minimum, the administrative and billing costs." 	"Section D. Water Rates Should Be Stable and Understandable 4. For revenue stability purposes, customer charges may be designed to recover up to 65 percent of revenue requirements for customer classes with strong seasonal consumption patterns."
Staff Recommendation	 "Section IV. Financial Targets and Rate Setting Practices B. Rate Setting for Traditional Retail Electric Services 3. Rate Design d. Each rate schedule will contain a monthly customer charge which will reflect, at a minimum, the administrative and billing costs in addition to minimum-system costs, consistent with industry practice." 	None at this time.

Appendix

Power Rates Customer Charge Policy Section 7



Overarching Principles of Rate Design



Legal

- Fair
- Just
- Reasonable
- Non-Discriminatory



Industry-Standard

- Revenue Stability
- Cost Causation
- Economic Efficiency
- Equity
- Bill Stability



TPU Principles

- Affordability
- Environment
- Public Involvement



Recommended Increase by Class



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Annual Step Increase

_ Preliminary, subject to change.

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Residential Revenue: Fixed vs Variable





All Retail Revenue: Fixed vs Variable



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Preliminary, subject to change.

All Retail Revenue: Fixed vs Variable



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_ Preliminary, subject to change.

ADVANCED METERING INFRASTRUCTURE (AMI) PUBLIC UTILITY BOARD STUDY SESSION AUGUST 8, 2018



PRESENTATION OBJECTIVES

- Provide an overview of the AMI Program
- Review of RFP vendor selection process
- Provide a summary review of the current program status and upcoming milestones
- Prepare request for approval for amended special project of limited duration resolution at future PUB meeting



PROGRAM OVERVIEW





AMI OVERVIEW

- The meter still measures and reports consumption and demand the way that it always has
- The AMI network delivers information which represents consumption and demand
- The MDMS processes the values into valid and complete information
- CIS still bills from reads provided when needed by MDMS





TECHNOLOGY AND SERVICES SELECTION



AMI VENDOR SELECTION APPROACH

- Engaged consultant to facilitate our vendor selection process
- Developed a Selection Advisory Committee comprised of key divisions within TPU and GG
- All vendors were equally evaluated through a competitive RFP process:





AMI RFP OVERVIEW

ADVANCED METERING INFRASTRUCTURE



RFP SELECTION PROCESS

> Develop, finalize and approve all requirements

- Finalize all attachments
- Review and approve RFP
- Issue RFP
- Develop scoring criteria
- Respond to vendor questions
- Receive and score responses
- Shortlist selection and demonstrations
- Reference checks and final selection

Our goal was to expose the differences between solutions, the challenges of each technology and the value each adds so that we could select the technology best for TPU.



INITIAL RFP SCORING CRITERIA

Criteria	Weight
AMI Solutions Requirements Compliance	40%
Price	30%
Network Coverage Plans	10%
Executive Summary Project Team	1.00/
Project Team	10%
Project Methodology and Approach	F 0/
Systems Requirements	5%

Landis+Gyr and Sensus were highest two scoring vendors
 Sensus had the lowest price



PRICING RESULTS SIMPLIFIED

Option	Deployment Description	L+G	Sensus
Ontion 1	 Install new electric meters 		
Option 1	 Install modules on all water meters 	\$34,507,310	\$29,916,159
Ontion 2	Install new electric meters		
Option 2	Relplace all water meters	\$48,409,872	\$43,380,569
	 Install new electric meters 		
Option 3	 Install a combo of 60% modules and 		
	40% replacement for all water meters	\$42,848,589	\$33,970,413

Sensus had the lowest price for all options



DECISION: SENSUS!

Differentiators:

- Sensus provides better network coverage and reliability
- Lowest price
- Provides the greatest combined functionality for both Power and Water
- Robust platform to enable future 'Smart Utility' capabilities



SENSUS OVERVIEW

Leading Provider to Utility and Public Service Entities Globally

- 220+ AMI Electric/Water accounts
- Largest Smart Water portfolio
- 37M deployed smart points
- 80M meters deployed
- Strongest R&D investment in industry – 10% of revenue
- 840+ AMI Customers
- \$4.7 billion in revenues





MDMS RFP OVERVIEW

METER DATA MANAGEMENT SYSTEM



WHAT DOES AN MDMS DO?

- The system of record for all meter data
- Normalizes/Isolates AMI from everything else
- Collects, processes, sends billing determinants
- Synchronizes with CIS and maintains synchronization of AMI
- Frames, aggregates, prepares data for other systems
- Collects and analyzes meter events and alarms
- Main integration with SAP
- Identifies meter problems and initiates work request
- Future enhancement as meter data needs grow



INITIAL RFP SCORING

Criteria	Points	Sub Weighting	ltron	Landis+Gyr	Omnetric
Executive Summary	10	40%	2.98	3.38	3.24
Project Team	10	60%	3.65	4.04	3.33
Project Methodology and Approach	10	70%	4.84	5.63	5.19
System Requirements	10	30%	1.64	2.15	2.18
Minimum Requirements Compliance	55	25%	11.25	12.13	10.75
MDM Solution Requirements Compliance	55	75%	25.96	31.14	33.98
Price/Value (Not scored by Evaluators)	20	100%	-	8.70	20.00
Small Business Enterprise (SBE)/Minority and Women's Business Enterprises (MWBE) (Scored by Procurement)	5	100%	_	_	_
Total	100		50.32	67.17	78.66

Omnetric and Landis+Gyr were the two highest scoring vendors

- Omnetric and Landis+Gyr was best team and minimum requirements
- Omnetric has the best functionality and price



DECISION: OMNETRIC!

Differentiators:

- Omnetric has significant SAP integration experience with both power and water utilities
- Lowest price
- Extremely knowledgeable and competent team
- Highly secure environment
- Intuitive user interface



WHO IS OMNETRIC?

Industry leader in SAP integrated Meter Data Management Systems

- Siemens owned company
- 13,000+ SAP partners
- More implementations globally than any other MDMS
- Rated #1 MDMS by Gartner
- Currently process 220M interval reads per day
- Significant Municipality implementation experience within North America

Deployments:

- Jacksonville Electric Authority
- Middle Tennessee
- Burbank Water and Power
- Anaheim Public Utilities
- Huntsville Utilities
- City of Fort Collins
- WPPI Energy
- Silicon Valley Power
- Kansas City Board of Public
 Utilities



STATUS AND SCHEDULE OVERVIEW


RFP SCHEDULE AND UPCOMING MILESTONES

- Begin contract negotiations for the AMI and MDMS RFPs
- Meter Installation Vendor (MIV) RFP development underway; currently conducting general requirements workshops.
- System Integrator (SI) RFP development complete and released to vendors; proposals due on 8/21

Major RFP Milestones	AMI	MDMS	SI	MIV	Next
Begin RFP Development	✓ 1/17/18	✓ 2/20/18	√ 5/23/18	✓ 5/17/18	30
RFP Release to Vendors	✓ 4/4/18	√ 5/2/18	√ 7/10/18	9/25/18	days
Vendor Proposals Due	✓ 5/15/18	√ 6/5/18	8/21/18	11/6/18	
Vendor Short List Selection	✓ 6/14/18	√ 6/25/18	9/19/18	12/7/18	
Vendor Selection	✓ 7/12/18	8/2/18	10/31/18	1/8/19	
Contract Signature/Approvals	10/1/18	10/11/18	1/23/19	3/25/19	



OTHER PROGRAM ACTIVITIES

- Development and implementation of the Organizational Change Management (OCM) Plan and Communications strategy
- Business case refresh
- Finalize business processes
- Develop sandbox scope and implementation plan



OVERALL PROGRAM SCHEDULE

The AMI program is a multi-year effort. We are currently in the Vendor Selection and Procurement phase.



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RAIL

QUESTIONS?



