



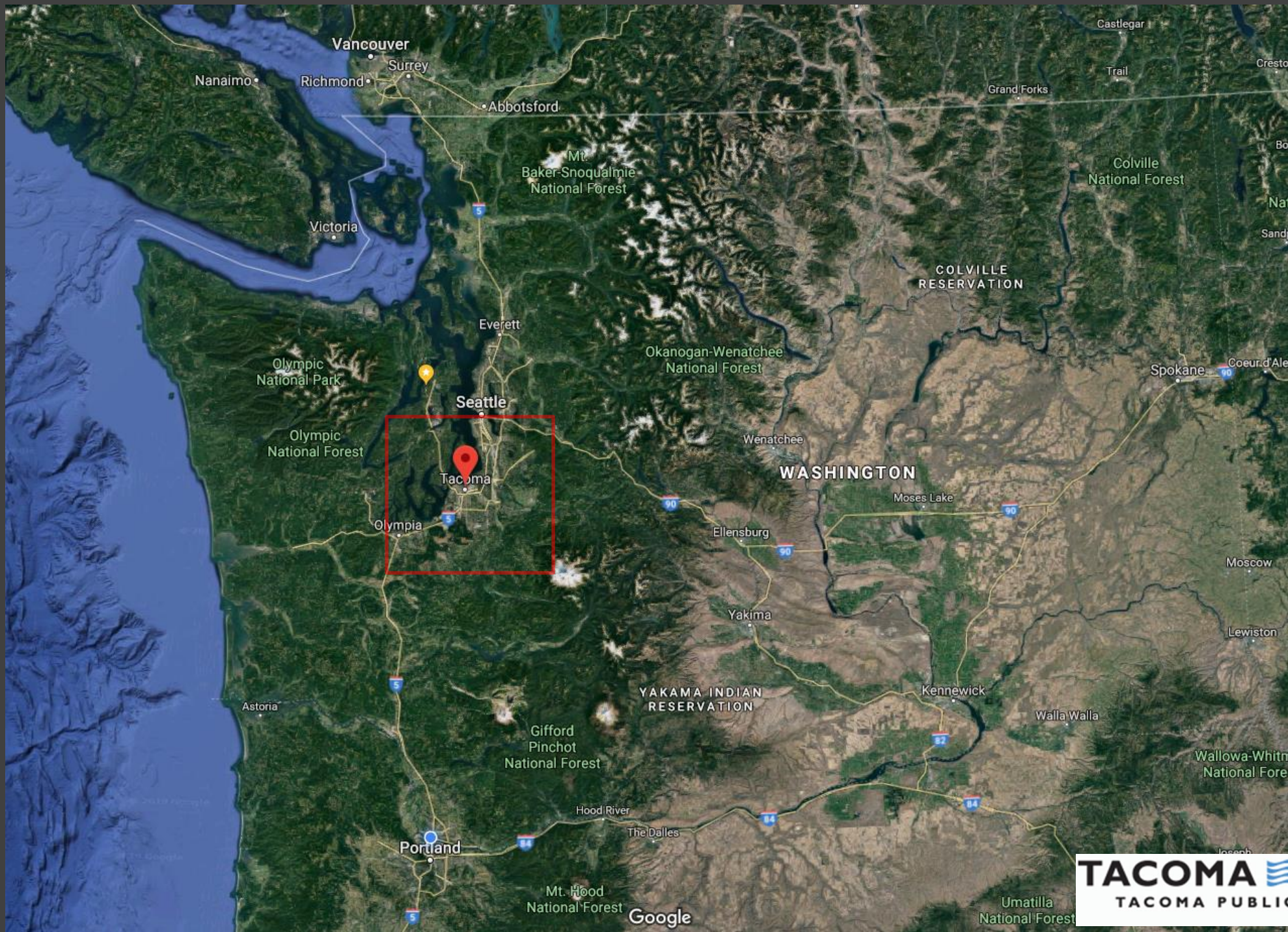
Advanced Metering Infrastructure (AMI) In Tacoma

Matt Hubbard, P.E.
PNWS-AWWA Section Conference
Vancouver, WA
May 3rd, 2019



●●● Agenda

1. Utility Background
2. What is AMI?
3. Why transition to AMI? (Business Case & Benefits)
4. Vendor Selection
5. Customer Communications
6. Water AMI Specifics
7. Key Takeaways



CUSTOMERS

101,871 total customers

RESIDENTIAL



94,707

COMMERCIAL/INDUSTRIAL



7,164

TACOMA CITY LIMITS

63%

INSIDE

37%

OUTSIDE

334,700 People served directly

SUPPLY

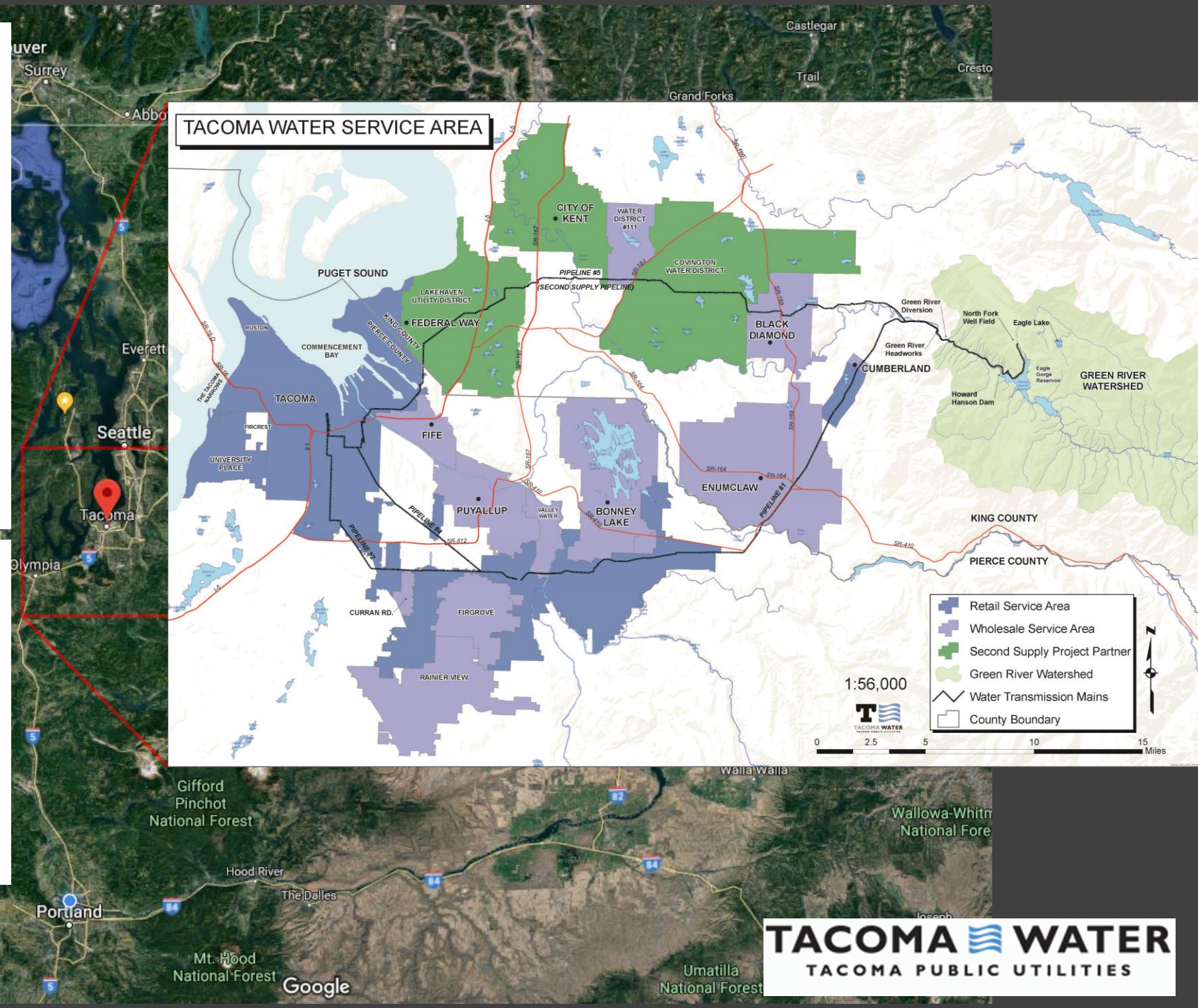
 in million gallons per day

95%

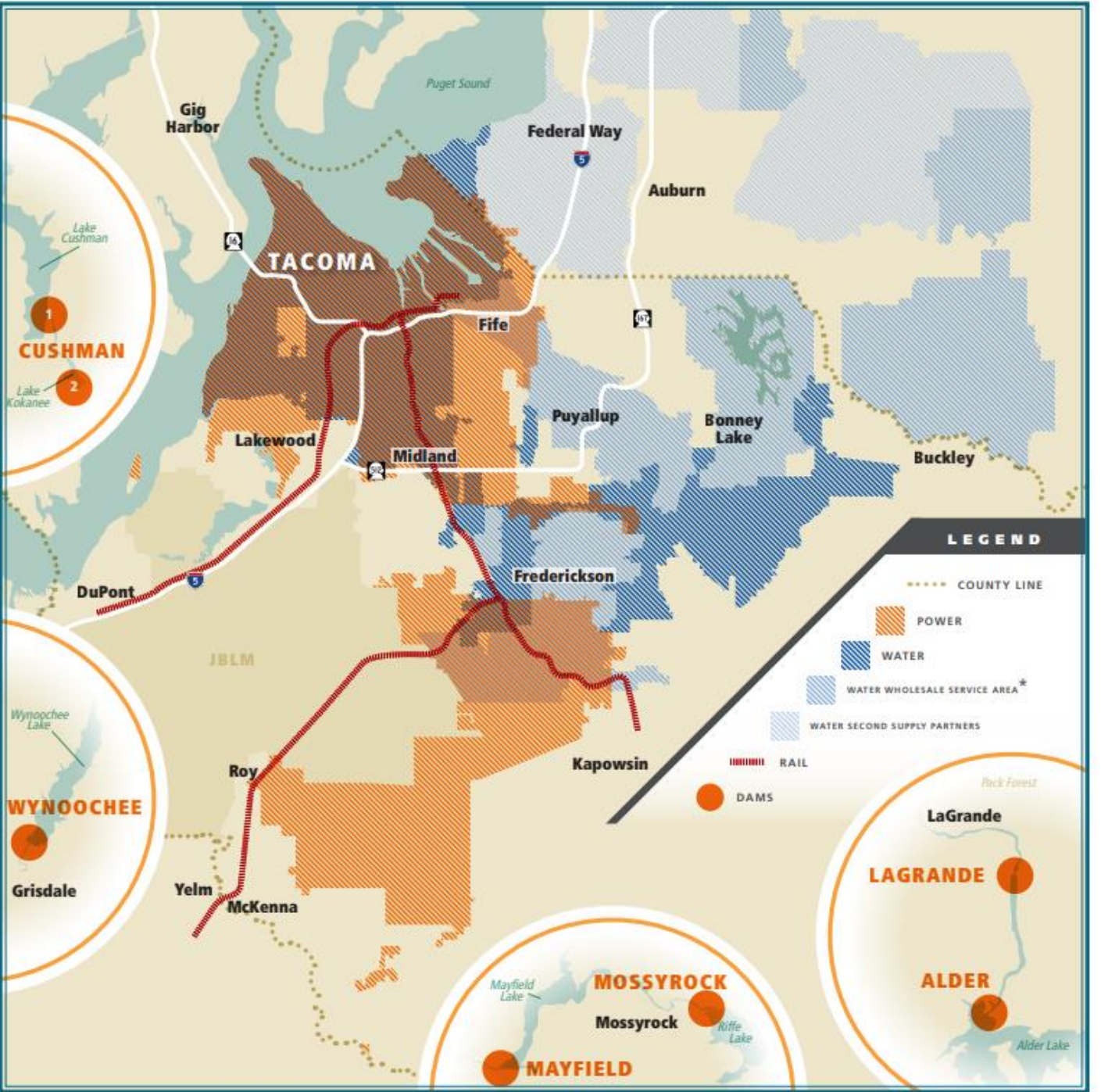
GREEN RIVER
UP TO 150 MGD

5%

LOCAL WELLS
50 mgd

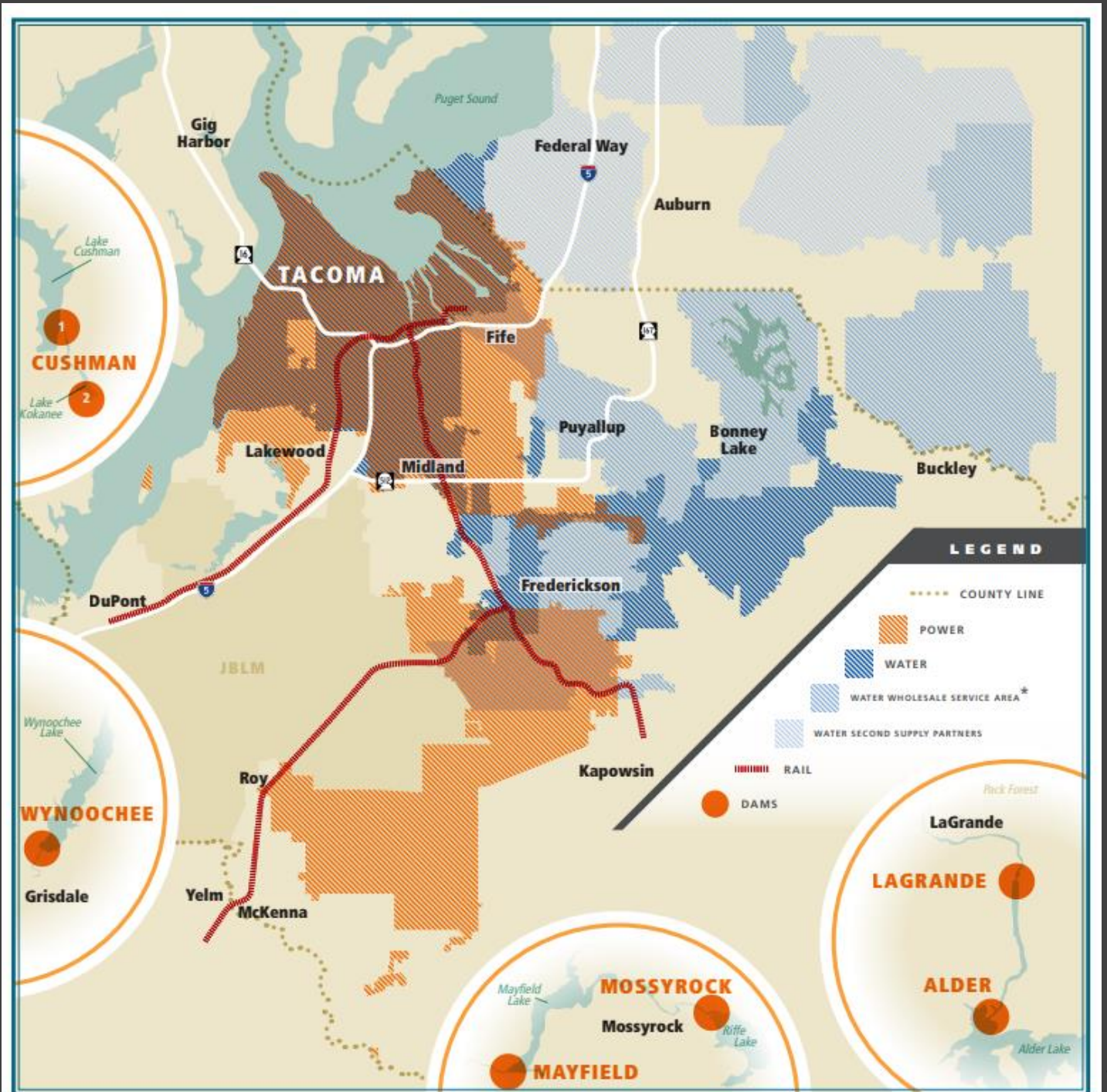


Tacoma Public Utilities:



Tacoma Public Utilities:

- Power
 - 180,000 meters
 - 180 mi² of service area
- Water
 - 110,000 meters
 - 117 mi² of service area
- Rail
 - 140 miles of track



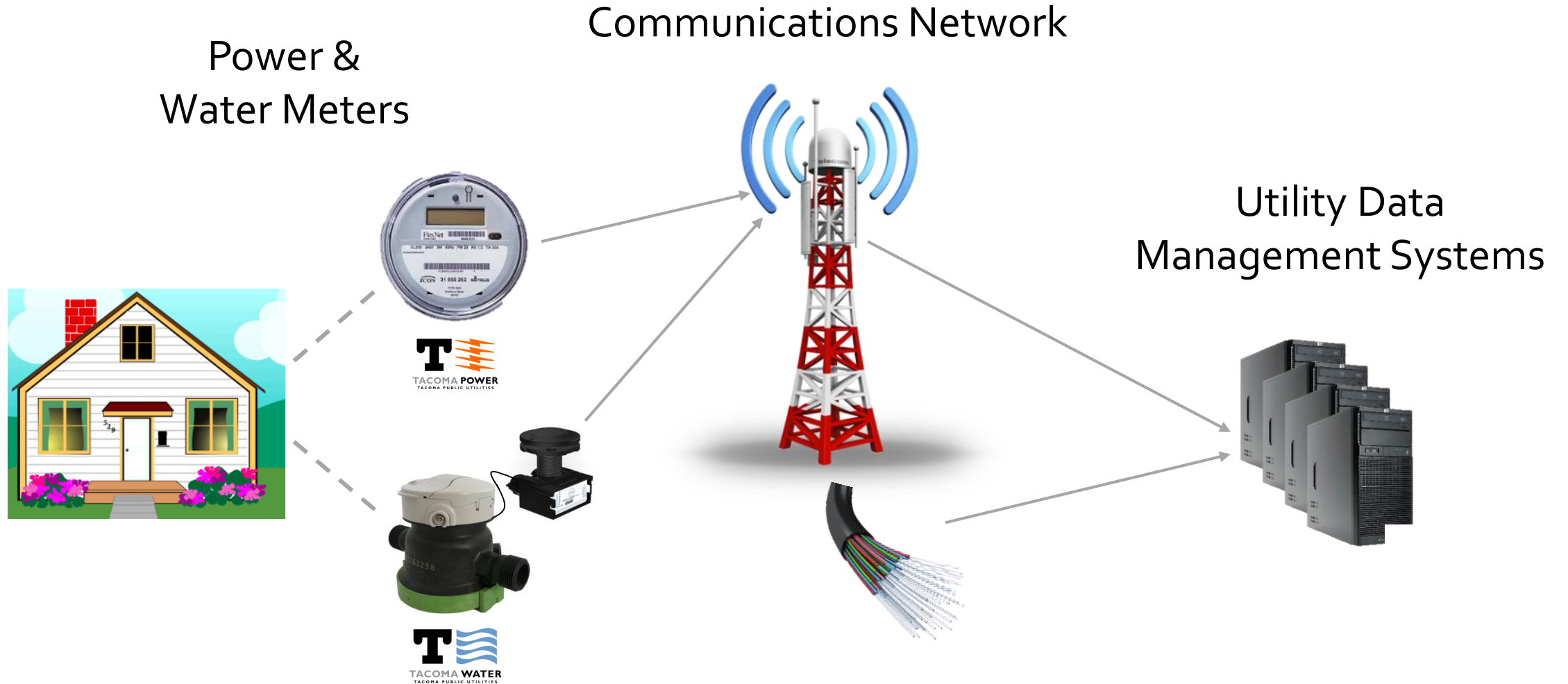
●●● What is AMI?

Composite technology:

- ***Meters***
- ***Communications networks***
- ***Software systems***

Automates the collection of meter data and provides a two-way connection between customers and the utility.

What is AMI?



AMR vs AMI

AMR: Automated Meter Reading

- One-way data transmission system (meter to office)
 - *analog phone logs (Tacoma: early 1990's-2013)*
 - *cellular phone networks (Tacoma: 2013-present)*
 - *drive-by*

AMI: Advanced Meter Infrastructure

- Two-way data transmission system (meter to office and office to meter)

Why? Digital business is the new

Digital Natives

NETFLIX Uber

Digital Adapters



Digital Deniers



Digital transformation is about

● ● ● leveraging modern technology to:

Provide equitable access for all TPU customers



Drive Tacoma's economy & develop TPU's workforce

Protect & steward the environment



Improve TPU's resiliency & reliability



●●● Utility customers have high expectations!

Immediacy



Convenience & ease of use



Simplicity



Self-service ability



Familiarity



Creativity

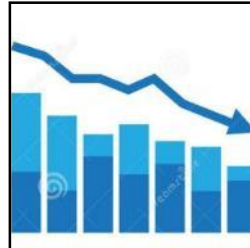


••• AMI Technology is Mature



Based on industry standards

Deployment costs decreasing



Secure & reliable

- *Over 70% of US electric meters have been upgraded to smart meters*
- *75% of US water utilities are planning to make smart water investments in the next 24 months*
- *Existing metering technology becoming obsolete*

••• AMI Customer Benefits

Phased approach over time:

- *Value my time*
- *Value my money*
- *Value my preferences*
- *Value me*



Your Control, Choice, and Convenience

Access more usage data anytime to manage your use and costs.



Your Control, Choice, and Convenience

Access more usage data anytime to manage your use and costs.



Automated Meter Reading

More accurate, timely bills based on real-time data.



Monthly Billing

Advanced meters will allow a switch to monthly utility bills, which most people prefer.



Enhanced Personal Privacy

No need for regular physical access to read your meter.



Easier Move In, Out, and Reconnection

Remote turn on and off of electric service saves you time.



Expanded Ways to Save

Providing data about your use increases your ability to save money, water, and energy.



Faster Outage and Leak Detection

Locating and fixing issues helps us restore service to you sooner.



Flexible Payment Options

More options over time include prepay for electric service and custom due dates.



Improved Operational Efficiency

Better information about our systems helps us manage costs.



Reduced Environmental Impact

Fewer vehicle miles traveled for meter reading, basic field services, and outage detection lowers our carbon footprint.



AMI Customer Benefits Roadmap

Phase 1: Delivered Functionality

To be completed by end of 2021

- 1. Basic meter to bill
- 2. Basic meter data reporting
- 3. Monthly billing
- 4. Customer meter options policy
- 5. Support for existing manual prepay process

- 1. Enhanced customer portal
- 2. Consumption data available via new portal

- 1. Remote meter reading
- 2. Remote disconnect/reconnect
- 3. Automated service order creation

Customer Benefits Key

Reliability & Resiliency

Billing & Payment

Convenience

Phase 2: Delivered Functionality

To be rolled out between 2021 and 2023

- 1. Enhanced prepay functionality (via customer portal)

- 1. Enhanced outage notifications
- 2. Abnormal consumption notifications
- 3. Emergency water leak notifications

- 1. Asset analytics use cases
- 2. Engineering analysis & systems planning use cases
- 3. Enhanced voltage monitoring
- 4. Revenue protection

Enabled Functionality

*Features enabled by AMI not in program scope
To be prioritized after 2023*

- 1. New real-time rate models
- 2. Support for multi-service prepay (water, sewer, trash)
- 3. Choose your own bill date

- 1. Enhanced SAP contact center tools via CIC upgrade
- 2. Enhanced demand & load forecasting
- 3. Enhanced grid & outage mgmt. operations
- 4. Distribution automation
- 5. Smart City integration

2020

2021

2022

2023

2024 and beyond...

●●● Business Case (50 pages plus analysis)

TPU Total Cost: Approx. \$85M (including contingency)

Power: Approx. \$52M

Water: Approx. \$33M

Customer Costs, Average Residential

Water Inside City: \$0.11 per month

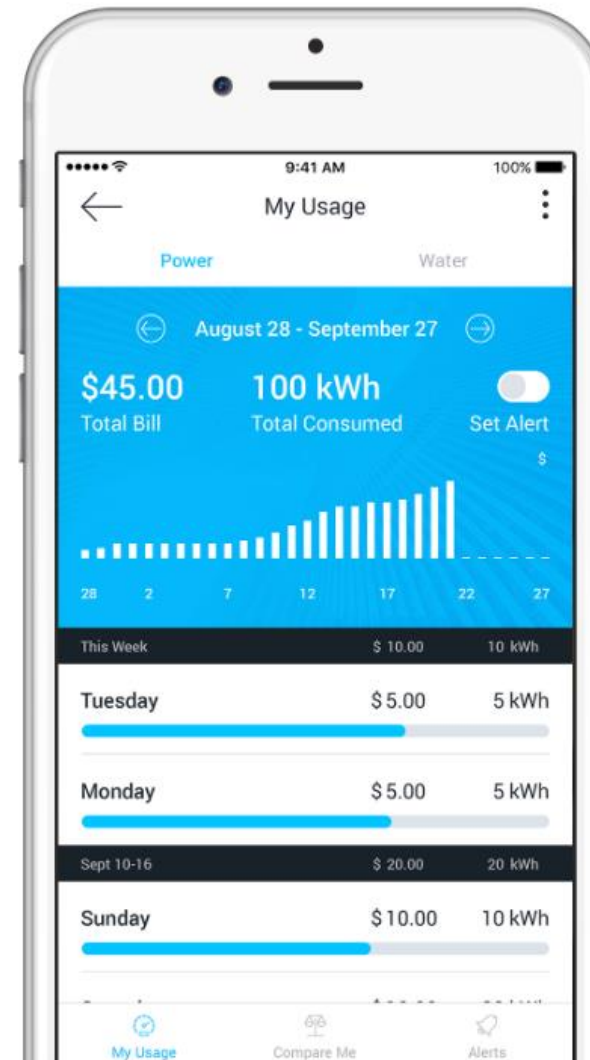
Water Outside City: \$0.13 per month

Power: \$0.08 per month

Business Case

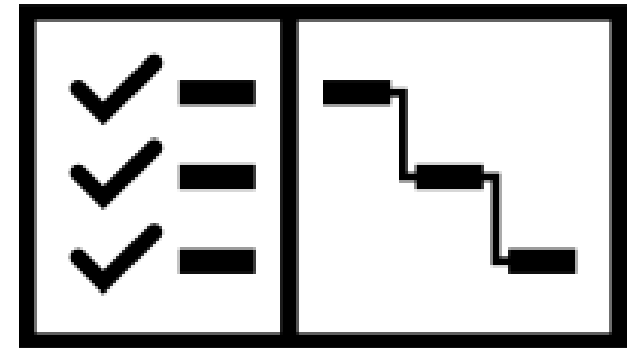
Key "Soft Benefits"

- *Customer Satisfaction*
- *Operational Benefits*
- *Enabled Future Benefits*
- *Digital Transformation*

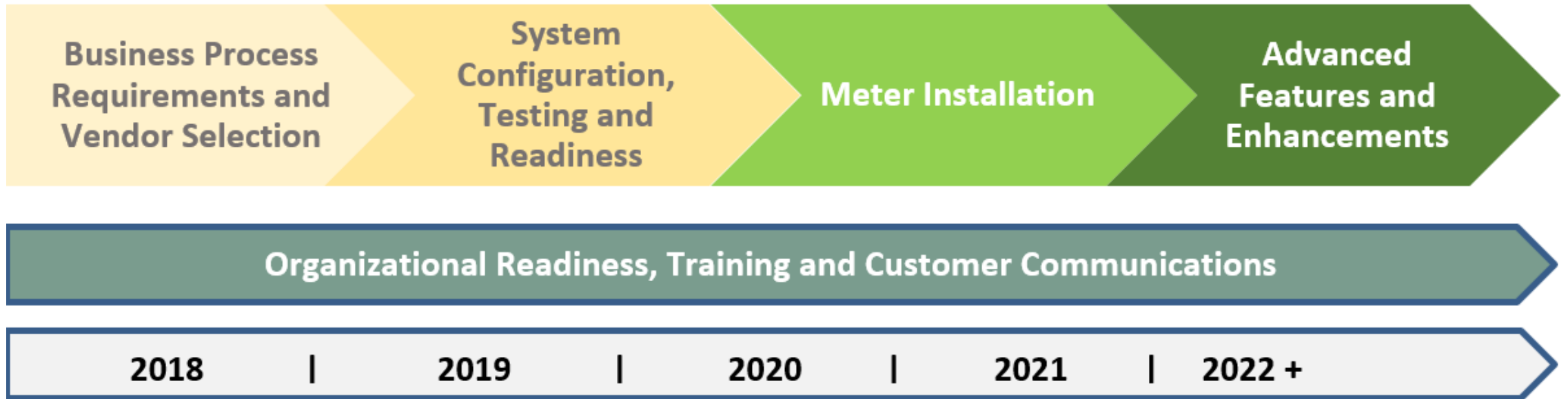


TPU's AMI Program Scope

- ✓ Installation of approximately 180,000 electric meters and 110,000 water meters & modules
- ✓ Installation of the AMI network (60-70 base stations)
- ✓ Implementation of a meter data management system
- ✓ AMI to SAP integration
- ✓ Transition to monthly billing
- ✓ Deployment of a customer usage portal
- ✓ All applications and functionality associated with Phase 1 and 2 of the AMI roadmap



Program Timeline



Customer Communication

- *Website*
- *FAQs*
- *Ongoing Public Utility Board Presentations*
- *Neighborhood Council Meetings*
- *Franchise Service Area Jurisdictions*
- *Meter Deployment Communication Plan*

[MyTPU.org/AdvancedMeters](https://www.mytpu.org/AdvancedMeters)



rev. 3/27/19

TACOMA PUBLIC UTILITIES Advanced Meter Project

The Tacoma Public Utilities (TPU) Advanced Meter Project will provide you with greater control, choice, and convenience. Starting in mid 2020, TPU will begin upgrades to its electric and water meters with modern digital technology that brings many new customer benefits over time, including monthly billing, remote electric service reconnection, more options to control your costs, improved reliability through faster outage and leak detection, and more flexible payment options in a safe and secure way.

TPU has been a trusted service provider in the region for more than 125 years and will continue to provide you with the reliable, affordable, and environmentally-responsible service you expect by replacing and upgrading aging meters. With technology that is used in more than 75 million households nationwide, the advanced meter project enables a shift to a modern digital utility, making operations more efficient and helping the environment through reduced carbon emissions.

Your benefits over time

 Your Control, Choice, and Convenience Access more usage data anytime to manage your use and costs.	 Automated Meter Reading More accurate, timely bills based on real-time data.
 Monthly Billing Advanced meters will allow a switch to monthly utility bills, which most people prefer.	 Enhanced Personal Privacy No need for regular physical access to read your meter.
 Easier Move In, Out, and Reconnection Remote turn on and off of electric service saves you time.	 Expanded Ways to Save Providing data about your use increases your ability to save money, water, and energy.
 Faster Outage and Leak Detection Locating and fixing issues helps us restore service to you sooner.	 Flexible Payment Options More options over time include prepay for electric service and custom due dates.
 Improved Operational Efficiency Better information about our systems helps us manage costs.	 Reduced Environmental Impact Fewer vehicle miles traveled for meter reading, basic field services, and outage detection lowers our carbon footprint.

[MyTPU.org/AdvancedMeters](https://www.mytpu.org/AdvancedMeters)



Vendor selection approach

- Engaged consultants to facilitate vendor selection process
- The selection panels were comprised of key subject matter experts
- Vendors were equally evaluated via competitive RFP process



Selected AMI Vendors



Power & Water Meters



AMI Base Station(s)



AMI head-end system

- *Power & Water Meter Supplier*
- *Meter Communication Network Infrastructure*
- *Head-end System (HES) data collector*
- *Sandbox Deployment*



Customer Information System

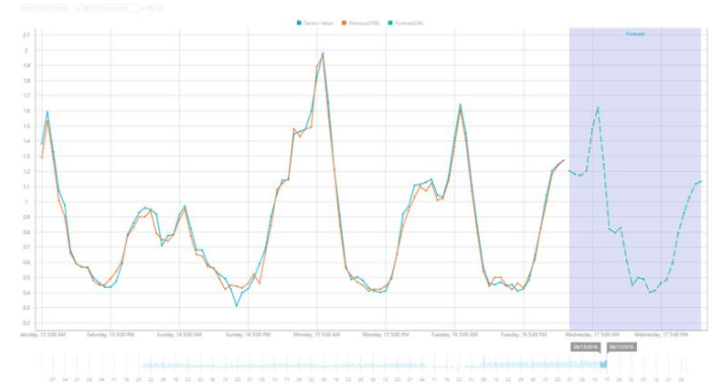


A Siemens Company

Meter Data Mgmt. System

Water AMI Use Cases

- Data, billing, and rates
- District metered areas
- Near-real time data for hydraulic modeling
- Remote non-meter sensors (Sensus Gateway)
 - Water quality
 - Pressure
 - Tank level
- Remote connect/disconnect
- Conservation
- Customer alarms
- Operational alarms



Water Meter Replacement Strategy

Existing Meter Category	Description	Approximate Meter Count	Recommended Methodology to Make Meters AMI Compatible
1	Meters that need to be replaced due to being at end of life (consumption or age) or are non-retrofitable.	48,698	All meters will be replaced with new AMI compatible meters and AMI communication modules.
2	Meters that are not at end of life and are already AMI compatible. (These are mostly larger and more expensive meters).	1,832	Only the AMI communication module will be installed.
3	Meters that are not at end of life and are non-AMI compatible, but can be retrofitted with a new register to be made AMI compatible.	55,506	All meters will be replaced with new AMI compatible meters and AMI communication modules.

Water Meter Replacement Strategy

Category 3 Methodology to Make Meters AMI Compatible	Description	Estimated Cost
A	A minimum cost option, which consists of a mixture on a case by case basis of replacing some meters and retrofitting others with a new register based on the lower of the two estimated costs.	\$28,435,969
B (Recommended)	A second option is to replace all meters with AMI compatible meters.	\$28,668,529
C	A third option is to retrofit all meters not at end of life with new registers.	\$28,733,871
D	A maximum cost option is to replace all meters including the already compatible larger meters.	\$29,410,035

●●● Challenges Unique to Water AMI

- **Uncertain and varying historical installation practices:**
 - Many types of meters (7 styles, 10 manufacturers, 12 sizes, 47 models)
 - Many types/materials of meter boxes and lids (>15)
 - Yokes and yoke height in meter box
- **RF Signal strength penetrating meter boxes**
- **Battery life and the number of data reads/transmissions**
- **Bell-weather meter placement**
- **Overlapping service areas for vendor to deploy meters**
- **More lengthy installations than electric meters**
- **Public health considerations during installation**





●●● Key Takeaways

- **Plan early and seek advice**
- **Be forward thinking**
- **Understand costs (AMI estimates and delay impacts)**
- **Understand schedule interdependencies**
- **Prepare for business changes AND communicate them**

Questions

Matt Hubbard, P.E.
Tacoma Water
System Planning Engineer
mjhubbard@cityoftacoma.org
(253) 502-8501



Installing new meters - at last. The \$1.27 million installation program began in April 1954 and was completed 13 months later.

●●● Most Common AMI Questions

Details included in online FAQs and Quick Facts Sheet:

- *Economic Impacts*
- *Health and Safety*
- *Privacy and Security*
- *Meter Opt-Out Policy*