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Office of
Consumer Services
UTAH DEPARTMENT OF COMMERCE

MARGARET W. BUSSE
Executive Director

MICHELE BECK
Director

To: The Public Service Commission of Utah

From: The Office of Consumer Services
Michele Beck, Director
Alyson Anderson, Utility Analyst

Date: August 28, 2023

Subject: Docket 21-035-16

In the Matter of: Collaborative Stakeholder Process for Rocky Mountain Power's Grid Modernization and Rate Design

INTRODUCTION

On July 28, 2023, the Public Service Commission (PSC) issued a request for comments on the Division of Public Utilities (DPU) Status Report — GRID Modernization Collaborative Workgroup, which recommended that the PSC end the Collaborative Stakeholder Process and issue a request for comments. The Office of Consumer Services (OCS) provides the following comments pursuant to that request.

BACKGROUND

On March 17, 2021, the PSC initiated this docket in accordance with its December 30, 2020, Order in Docket No. 20-035-04 to establish a collaborative stakeholder process related to grid modernization and rate design. The Stakeholders began workgroup presentations and discussions in July 2021 and continued through June 2023. On July 27, 2023, the DPU submitted its Status Report –GRID Modernization Collaborative Workgroup and Attachment A with the collaborative presentations.

OCS COMMENTS

The OCS participated in all workgroup discussions and arranged for Strategen Consulting LLC to present information on Cost-of-Service Studies: Distribution Systems on January 10, 2022. This presentation was excluded from DPU Attachment A as "not approved from public view". Due to a technical error, the OCS's approval did not reach the DPU in time to be included in Attachment A. However, the OCS does approve the inclusion of the presentation and the presentation slides are attached as Attachment 1 to these comments. The OCS appreciates the time and effort of the parties presenting to the collaborative and agrees it has reached its conclusion. Despite a lack of consensus among the stakeholders on specific topics, the OCS found the collaborative process both worthwhile and informative.

cc:

Jana Saba, Rocky Mountain Power

Ajay K Kumar, Rocky Mountain Power

Chris Parker, Division of Public Utilities

Service List

Docket 21-035-16

Collaborative Stakeholder Process for Rocky Mountain Power's Grid Modernization and Rate Design

Office of Consumer Services

Attachment A

Cost of Service Studies: Distribution System

Strategen Consulting, LLC | January 10, 2022

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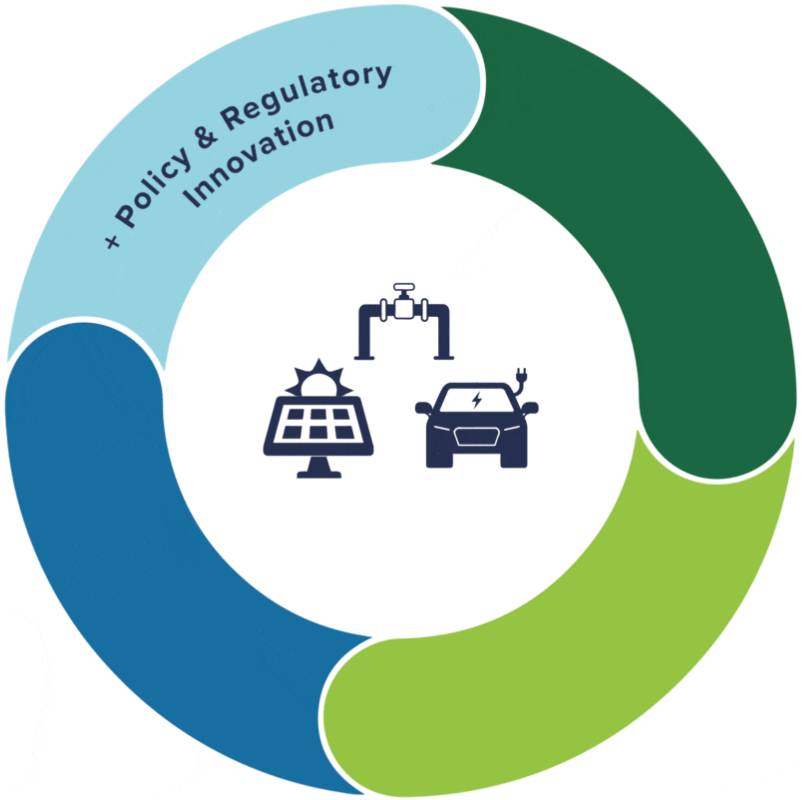

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Introductions

RON NELSON

Senior Director

Ron is a Director at Strategen and a subject matter expert in Advanced Rate Design and Cost of Service Studies. Ron leads a team that provides expertise and expert testimony on numerous topics including multi-year utility rate plans, performance incentive mechanisms, cost of service modeling, residential and commercial rate design, renewable energy program design, DER interconnection cost allocation and recovery, and DER integration.

Today's Topics

+ **Updating Cost Study Approaches**

  What are the key changes to power systems that are affecting traditional cost allocation?

  How will modern cost studies affect advanced rate design?

  Where have we seen advanced rate design be implemented and what are the key takeaways?

+ **Modernizing Cost of Service Studies**

  What are embedded modern cost of service studies?

  What are some implications of system changes to cost studies?

  How can the evolving power system be better reflected in the cost to serve and rate design?

+ **Modern Cost Study Issues on the Distribution Level**

  How do we address modern issues at the distribution level?

  Why is Integrated Grid Planning important?

  What is AMI and why is it important to modern grid planning and cost studies? How should AMI costs be functionalized and allocated?

+ **Recommendations**

  What are some best practices for cost studies and AMI?

Why Update Cost Study Approaches?

Key Changes to Power Systems Affecting Cost Allocation

Renewables

Renewable resources are replacing fossil fuels; replaces variable fuel costs with invested capital

Peaking Resources

Peaking resources are becoming closer to load centers which lowers the need for transmission line investments

Storage & Variable Costs

Improving storage technology has turned storage into a new peaking resource that lowers variable costs

Customer-Sited Resources

Increase in customer-sited resources such as storage and solar in the modern grid

Smart Grid Systems

Smart grid systems including energy efficiency and demand response

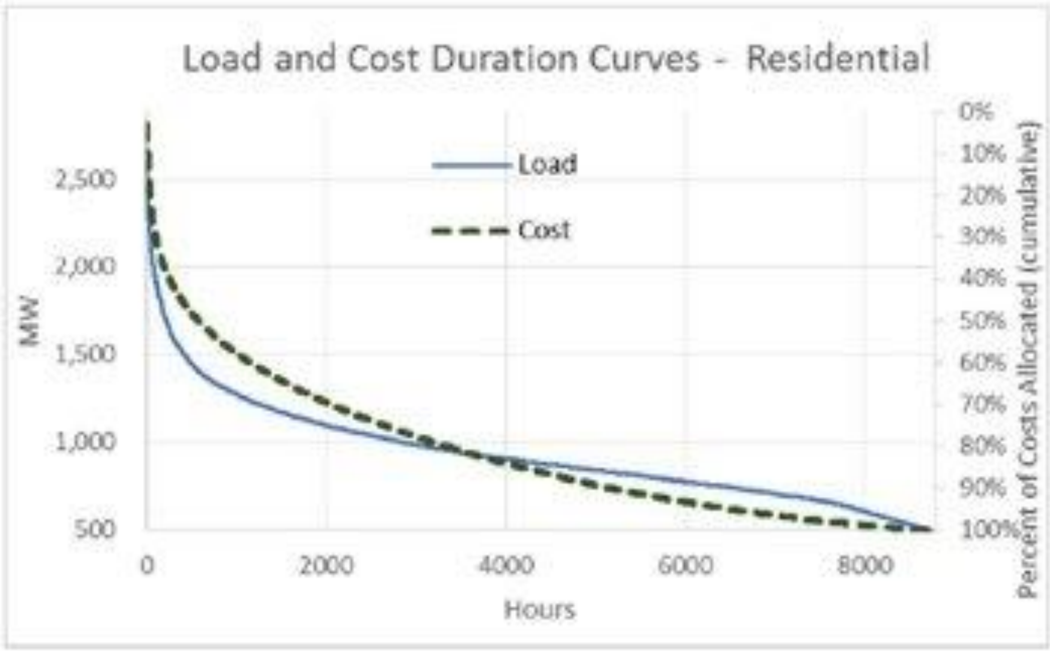
There are several significant changes occurring within power systems

Source: Regulatory Assistance Project (2020), Electric cost allocation for a new era: A manual.

Modernizing Cost Studies Informs Advanced Rate Designs

+ Advanced rate designs, such as time-of-use, critical peak pricing, can benefit from cost approaches that focus on temporal cost causation
  - Many of the advanced rate designs developed recently are created using data from outside the CCOSS

2	Off	0.589	0.603	3%
3	Off	0.563	0.583	3%
4	Off	0.555	0.572	3%
5	Off	0.570	0.585	3%
6	Off	0.617	0.632	2%
7	Mid	0.697	0.699	0%
8	Mid	0.773	0.758	-2%
9	Mid	0.828	0.802	-3%
10	Mid	0.867	0.832	-4%
11	Mid	0.916	0.884	-3%
12	Mid	0.942	0.905	-4%
13	Mid	0.965	0.933	-3%
14	Mid	0.976	0.959	-2%
15	Mid	0.984	0.972	-1%
16	On	0.993	0.974	-2%
17	On	0.999	0.985	-1%
18	On	1.000	1.006	0%
19	On	0.984	0.995	1%



Temporally differentiating costs in multiple ways will aid in developing time-varying rates

Advanced Rate Design at Xcel Energy

Fresh Energy Proposed C&I Volumetric TOU Rates

On-peak	3 p.m. to 8 p.m. on non-holiday weekdays	$0.0780 per kWh
Off-peak	12 a.m. to 6 a.m. every day	$0.0187 per kWh
Base	All other hours	$0.0405 per kWh
Critical Peak Pricing	Available for 75 hours per year	$0.5588 per kWh

Xcel Residential TOU Pilot Rate Design

Proposed TOU Pilot Energy Rates with Standard Rate Comparison		TOU Ratio		Rates - Cents per kWh Average Monthly	June - September	October-May
TOU Pilot Rate						
On-Peak	3PM-8PM Weekdays	4.20		23.821	25.949	22.385
Mid-Peak	Other Hours	1.95		11.070	12.125	10.430
Off-Peak	12AM-6AM All days	1.00		5.676	5.676	5.676
Standard Flat Rate				12.386	13.437	11.742

Xcel Proposed C&I Volumetric & Demand TOU Rate

TOU Periods and Energy Rates

Peak	3 p.m. to 8 p.m. on non-holiday weekdays	$0.05054 per kWh
Off-peak	12 a.m. to 6 a.m. every day	$0.00810 per kWh
Base	All other hours	$0.02686 per kWh

System Demand Rates

	Summer (Jun-Sept)	Winter (Dec-Mar)	Shoulder (other months)
Peak	$6.25 per kW	$4.25 per kW	$0.00 per kW
Base	$8.75 per kW	$6.00 per kW	$6.00 per kW

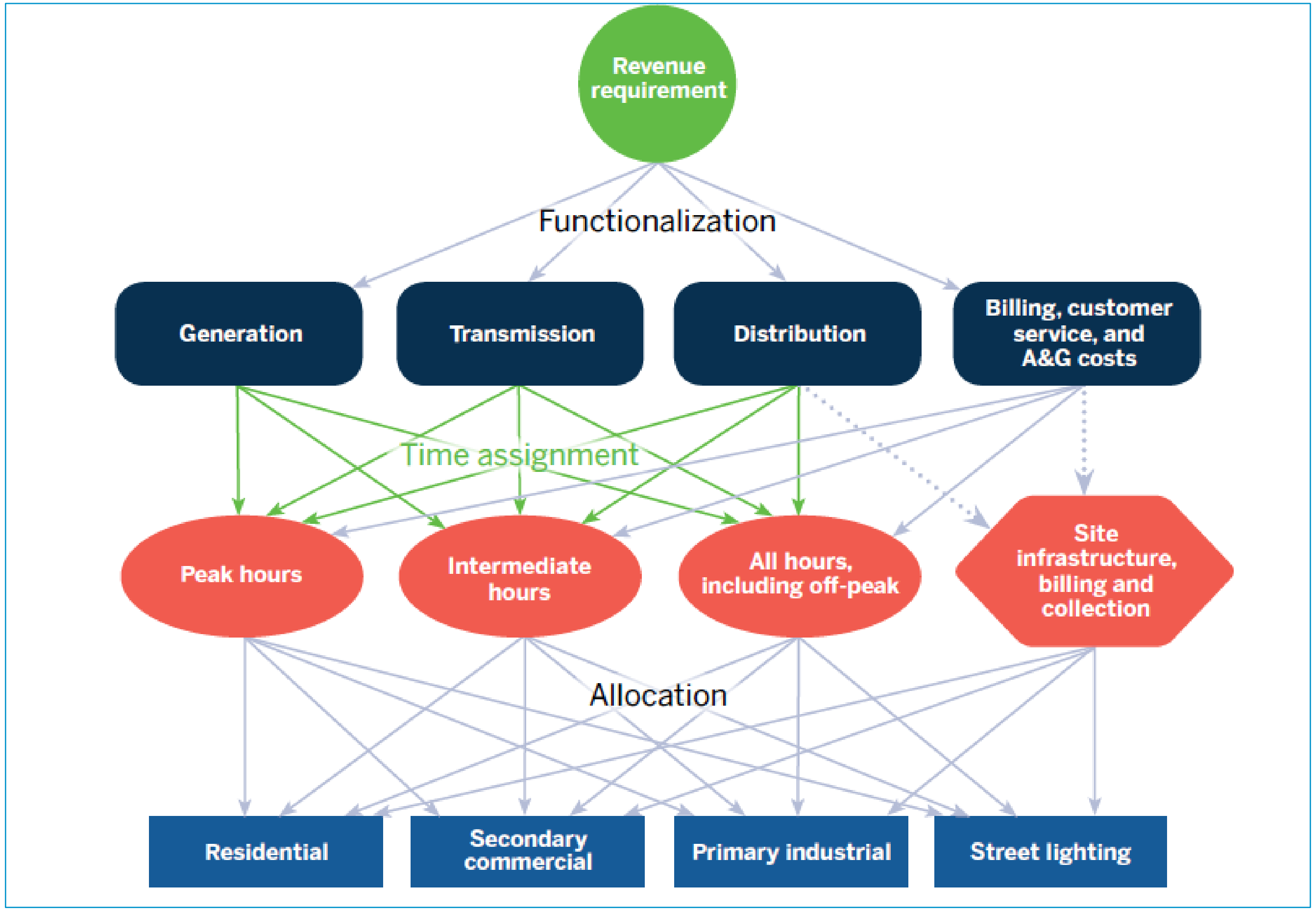
Distribution Demand Rates

Secondary Voltage	$2.00 per kW
Primary Voltage	$1.52 per kW
Transmission Transformed Voltage	$0.64 per kW

Source: Docket Nos. 17-775 and 20-88

Modernizing Cost of Service Studies

Modern Embedded Cost of Service Study



Key change is that during the classification stage, time assignments are made to determine cost allocations

Source: Regulatory Assistance Project (2020), Electric cost allocation for a new era: A manual.

Modern Cost of Service Studies: Key Features

- Assigning costs to time periods of use; that is, critical peak, on-peak, midpeak, etc.
- Using time-differentiated cost analysis to allocating costs to different customers that use the same system
- Recognizing that energy efficiency and demand response allow for savings that need to be reflected in costs
- Categorizing the different types of generation with consideration for when a type is relied on
- Accounting for the changes in utilization of some utility assets

Modern cost of service studies better reflect customer usage and subsequent cost assignments

Source: Regulatory Assistance Project (2020), Electric cost allocation for a new era: A manual.

Modern COS Studies: Practical Implications of System Changes

Historically	Today
+ **Capital costs for generation resources are largely classified as demand-related** - Utilities, in some jurisdictions, argument high demand ratios for Company owned renewables	+ **Capital costs for generation resources are increasingly energy-related and demand allocations should be based on more peaks, not overly focused on one** - E.g., ELCC = capacity %
+ **Traditional focus on narrow demand peaks**	+ **Modern focus on broader and more peaks and energy requirements** - Loss of load probability (LOLP) is extremely granular

Traditional production classification requires rethinking as resource attributes change

Example: Changes to Transmission Planning

Historically	Today
+ Planning for a winter or summer peak was the predominant method to assess system reliability and determine need for transmission projects	+ Planning assessments now factor in additional load periods other than system peak conditions + Planning and procurement processes respond to increasing renewables, DERs, aging transmission, and coal retirements

"Planning for just a summer and/or winter peak no longer captures all of the reliability needs necessary to meet these dynamic and changing system conditions for other loading periods of the year."

- Dominion Energy filing, 2019

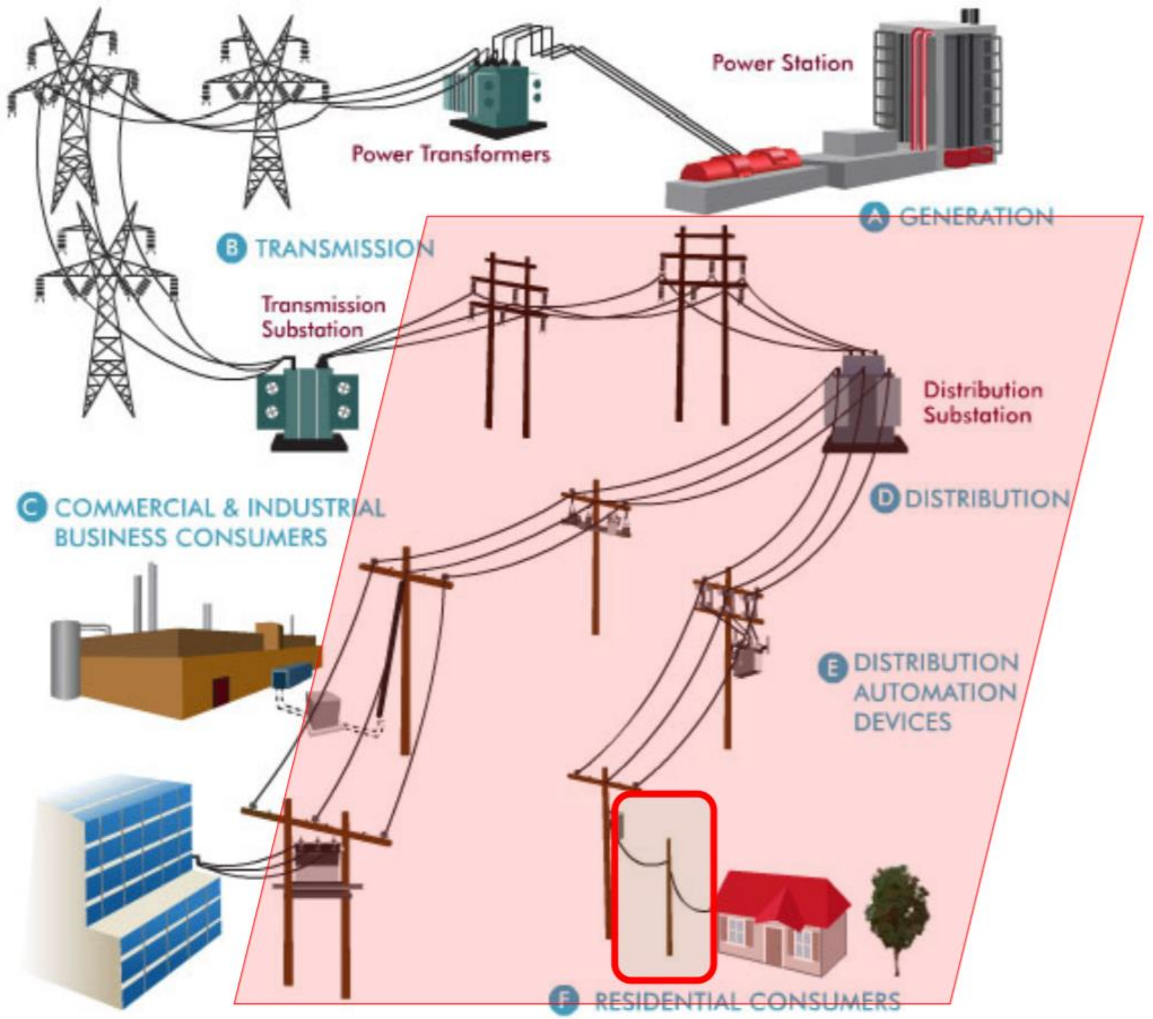
Traditional transmission cost drivers have changed – same for generation

Source: Virginia Electric and Power Company Response to June 14, 2019 Deficiency Letter; Docket No. ER19-1661-001.

Modernizing Cost Study Issues: Distribution Level

Traditional Distribution Classification and Allocation

+ **Basic customer method**
  - Only customers-specific facilities are classified as customer-related (the box outlined in red)
  - Other costs classified as demand-related
+ **Minimum system approach**
  - Costs of a minimum sized distribution system are classified as customer-related
  - Other costs classified as demand-related
+ **Others**
  - e.g., peak and average or straight-fixed variable method
  - Up to 100% of distribution system classified as customer-related (the entire area shaded in red)



Addressing Modern Issues in the Distribution System

	Phase 1	Phase 2	Phase 3	Phase 4
Forecasting	Load forecasting with limited visibility	Load forecasting with standard visibility	Load forecasting with increased visibility	Advanced, integrated granular forecasting
Sourcing Solutions for Grid Needs	DERS not considered to address distribution system needs	Piloting DERs and non-traditional solutions	Evaluation of DERs and non-traditional solutions integrated in IDP process	Streamlined DER solutions sourcing based on locational and temporal value
Transmission/ Distribution/ Generation Integration	Siloed planning processes	Annual, iterative approach	Increasingly iterative approach	Continuous, co-optimized planning processes

Less coordinated or integrated ← **IDP Coordination & Integration** → Fully integrated

Source: Smart Electric Power Alliance (SEPA). *Integrated Distribution Planning: A Framework for the Future.* September 2020

Advanced Metering Infrastructure (AMI)

"AMI is an integrated system of smart meters, communications networks, and data management systems that enables two-way communication between utilities and customers. Customer systems include in-home displays, home area networks, energy management systems, and other customer-side-of-the-meter equipment that enable smart grid functions in residential, commercial, and industrial facilities."

Source: Regulatory Assistance Project (2020), Electric cost allocation for a new era: A manual.

Advanced Metering Infrastructure

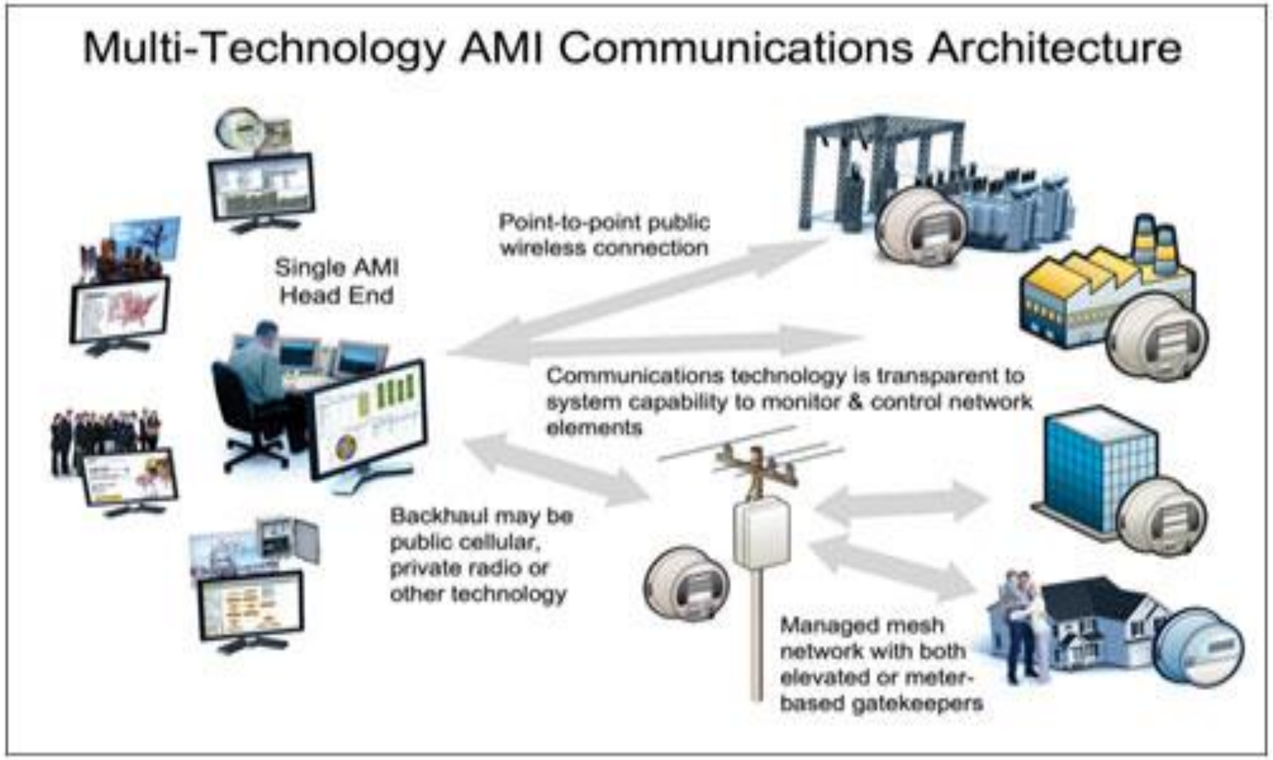
AMI

- Smart meters, communication systems, system control and data acquisition systems, and meter data management systems used to meter customer energy usage with high temporal granularity
- Used by utilities to monitor and manage operating conditions, model validation, manage distribute energy and resource, monitor assets, manage outages, identify unsafe working conditions, etc.
- Reduced line losses, reduced peak loads, improved system planning & transformer sizing, ability to implement rate designs that foster energy efficiency, EV and renewables integration
- Assessing AMI's costs and benefits requires consideration for a number of potential value streams including direct customer benefits as well as accounting for operational and system benefits and costs

AMI enables to utilities to better meter customer energy usage

Data and Functionality

- The digital meter collects and stores kwh readings between 15-60 min according to what the utility requires
- Meter is able to collect and monitor kw, current, volt, var, among other information
- Data is transmitted back to the utility a couple times a day
- Meter comes with two radios, one for customer and one for utility
- 1st radio (900 Mhz) is to communicate back to the utility (over a mesh network)
- 2nd radio (2.4 Ghz) is to communicate locally into the home



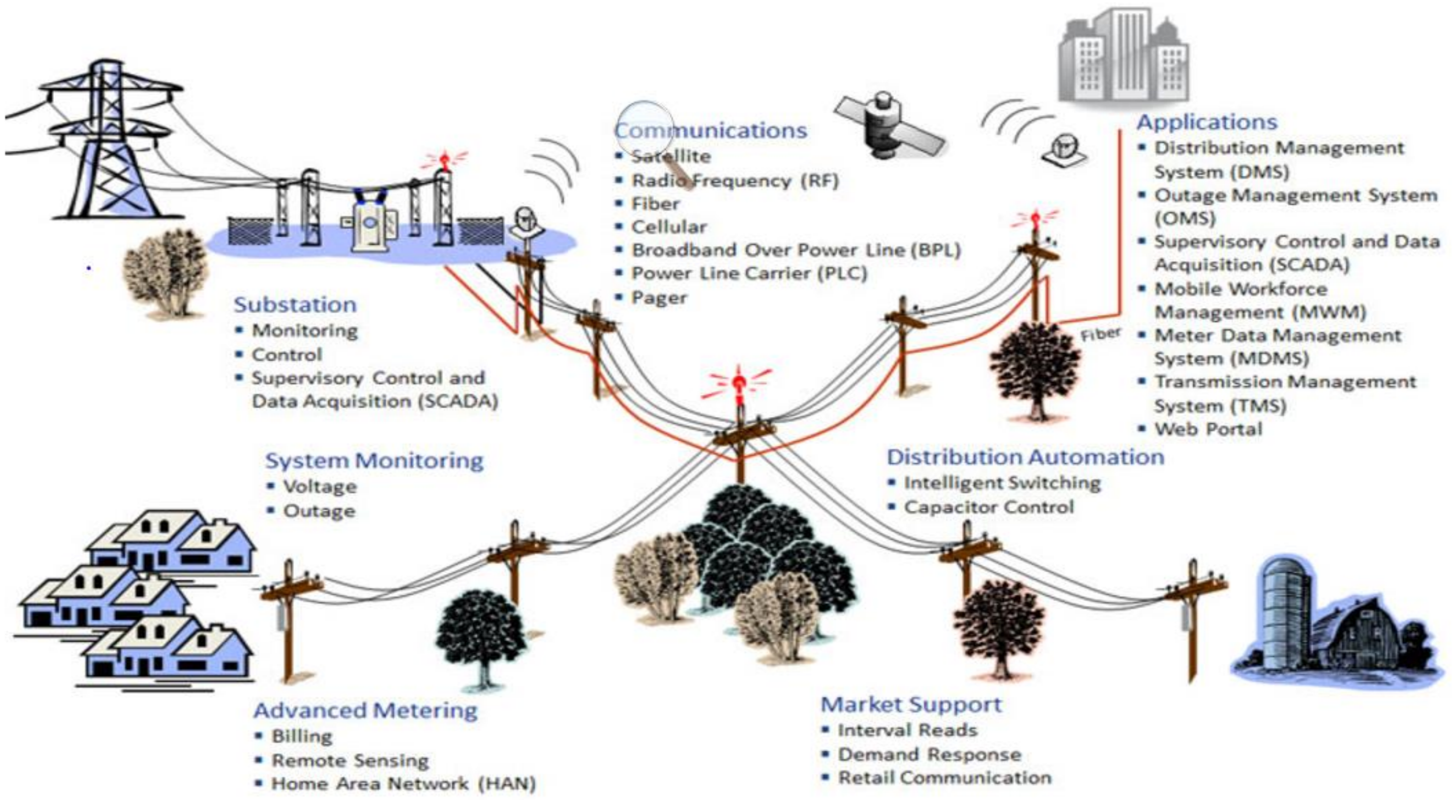
Graphic Source: https://madhavuniversity.edu.in/advanced-metering-infrastructure.html

Changes to Metering Cost Treatment

Historically	Today
+ **Meters have been classified as customer-related because they are dedicated customer infrastructure for billing** - Technology = metal disk spinning in a circle	+ **Modern meters enable granular data collection that can facilitate broad system benefits beyond the individual customer** - Advanced metering infrastructure (AMI) allows for demand management, volt/VAR control, etc., which can yield energy and capacity benefits to the power system - Given multiple applications for advanced meters, it may no longer makes sense to treat them as purely customer-related

Traditional meter cost treatment could be rethought as meter functionality changes

AMI is part of a series of networks



AMI cost causation resembles numerous other investments on the distribution and transmission system

Modernized Grid to Address Modern Demands and Issues

Image via iStock

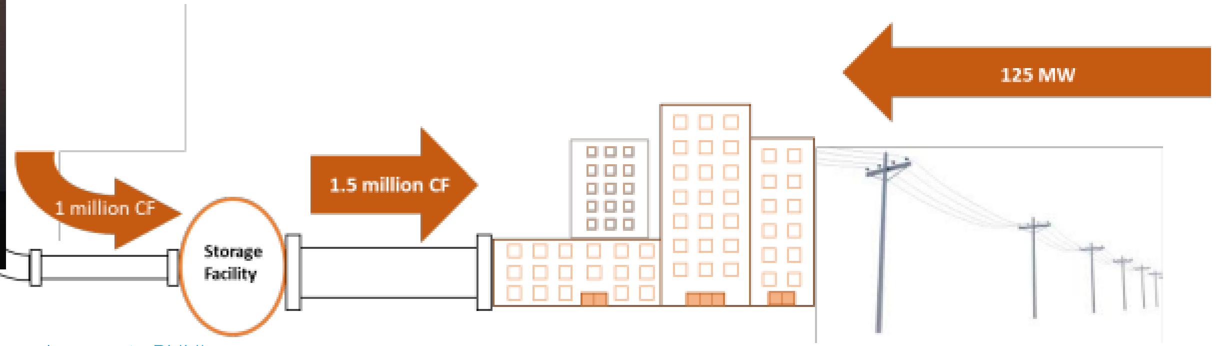


Image via PNNL

As storage increases on the power system costs become increasingly driven by average energy requirements

Recommendations on AMI

+ It is important that the approach to the functionalization of AMI is re-examined to address the fact that AMI goes beyond traditional meters as it is utilized at the generation, distribution, and transmission levels

+ Functionalization must reflect the utilization of AMI which is why we recommend functionalizing AMI as (1/3) generation, (1/3) transmission, and (1/3) distribution

+ Once RMP provides a business case and cost-benefit analysis a more analytically based approach could be determined

Questions?

Thank you

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Additional Slides for Discussion

Recommendations for AMI Integration

+ 1. Defining AMI and Developing Guiding Principles

- Need to develop a specific definition for AMI
- Establish guiding principles for AMI and grid modernization investments

+ 2. Electric Grid Status

- Evaluate the status of the electric grid to determine steps necessary to meet State's energy goals

+ 3. Grid Architecture and Interoperability

- Evaluate the State's grid architecture
- Interoperability must be a central part of developing an integrated grid

+ 4. Grid-Facing Technologies

- Conduct assessments regarding the modern distribution network and the necessary technologies and regulations needed for the development of a modern distribution network

+ 5. Customer-Facing Technologies

- Determine how customer-facing technologies and strategies can allow customers to increase electricity efficiency and cost savings and integrate DER

+ 6. Costs and Benefits

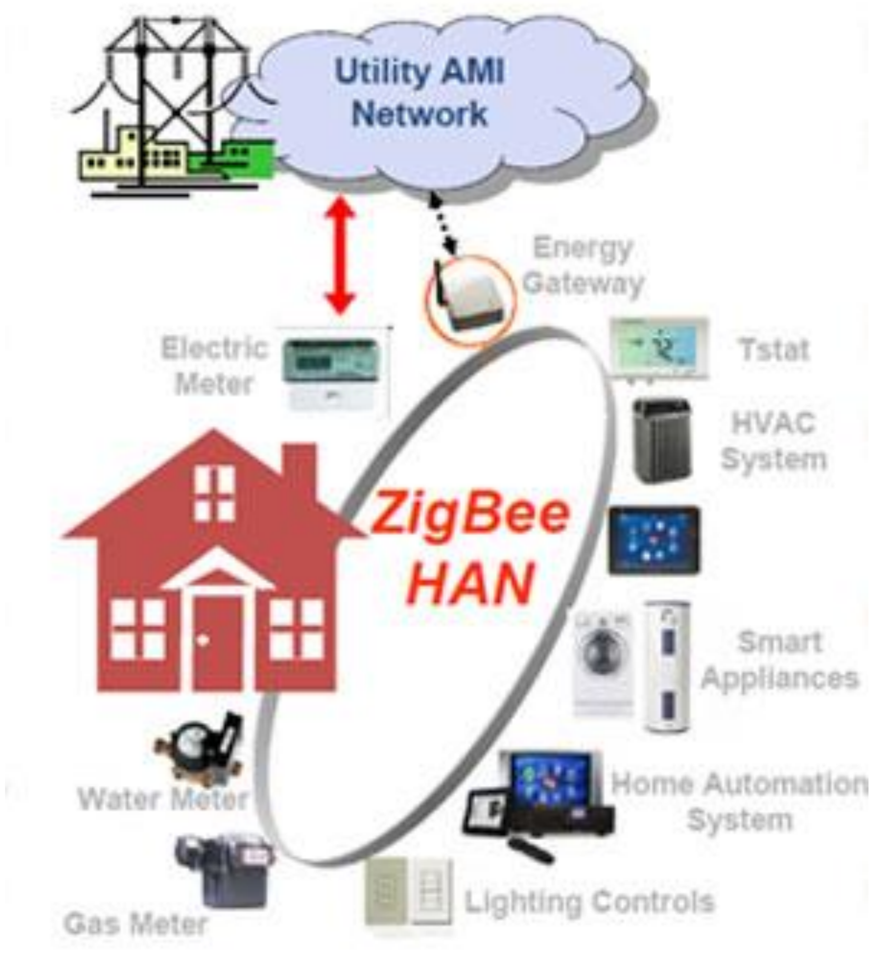
- Develop a framework to analyze the cost effectiveness of grid modernization technologies and practices
- Determine the impacts on reliability, increased customer choice, and reduced environmental impacts

AMI requires a clear roadmap for integration

Source: Regulatory Assistance Project (2020), Electric cost allocation for a new era: A manual.

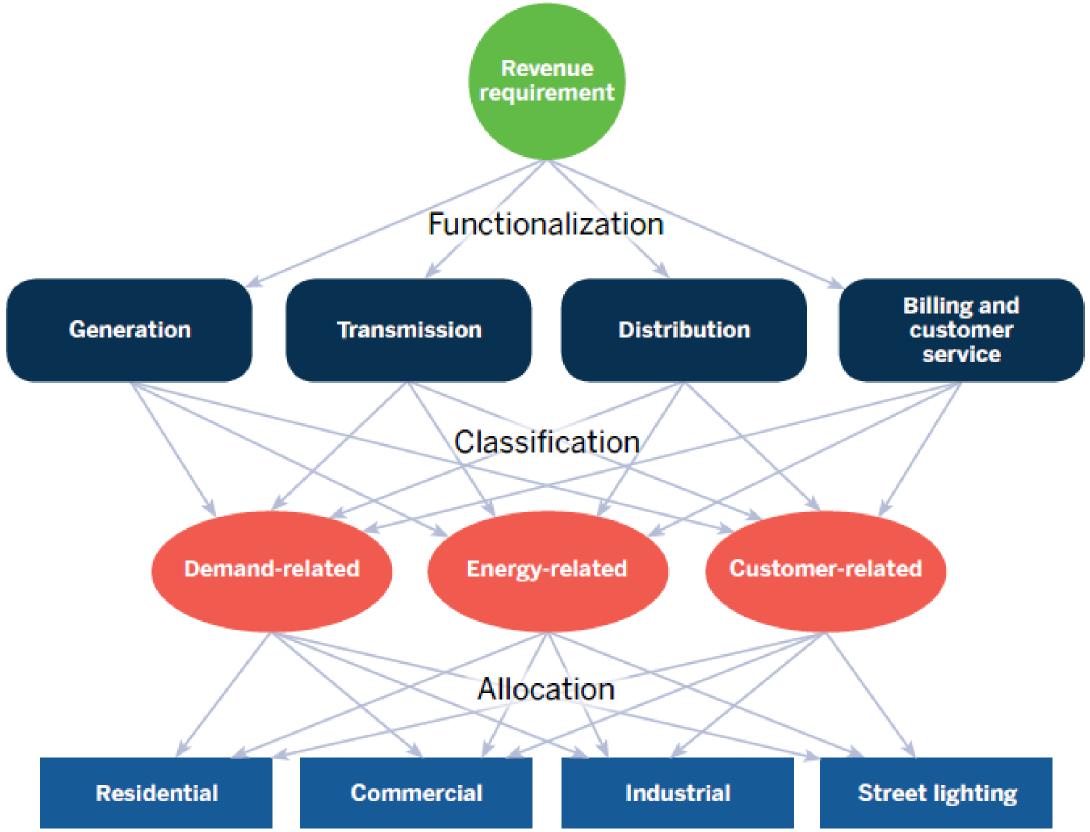
Home Area Network (HAN)

+ **Smart Meters come with two radios**
  - One to send information back to the utility
  - One to send information into customer premise
+ **HAN radio capable of sending information every 7 seconds**
  - Usage
  - Other meter data
+ **Requires Zigbee-certified (IEEE 2030.5) equipment**
  - Router
  - In home display
+ **HAN can provide usage, rate, and cost information received from meter and utility via AMI network**



Traditional Embedded Cost of Service Study

- Functionalization – the process which separates utility's costs into function categories
- These functions include generation, transmission, distribution, billing & customer service, general plant & administrative & general expenses, and public policy program



- Classification – the process which classifies functions by their causes
- Most costs are classified as demand-, energy-, or customer-related

- Allocation – The process which assigns cost categories to an allocation factor
- ex. Residential, secondary commercial, primary industrial, and streetlighting

Traditional embedded cost of service studies include functionalization, classification, & allocation

Source: Regulatory Assistance Project (2020), Electric cost allocation for a new era: A manual.