Value of Solar and Distribution System Planning

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Docket No. 14-035-114 Net Metering Workshop Session I

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Topics

- Some initial framing
- Distribution planning
- Trending issues in distribution planning
- Implications for solar cost benefit

Utility Perspective

What are the costs and what are the benefits of net metering?

To the utility system?

Past, present, or future?

As seen in the revenue requirement, however that might have been approved from time to time?

What are the questions?

Ratepayer Account Perspective

Do ratepayers on the net metering tariff pay any costs directly related and unique to this tariff option?

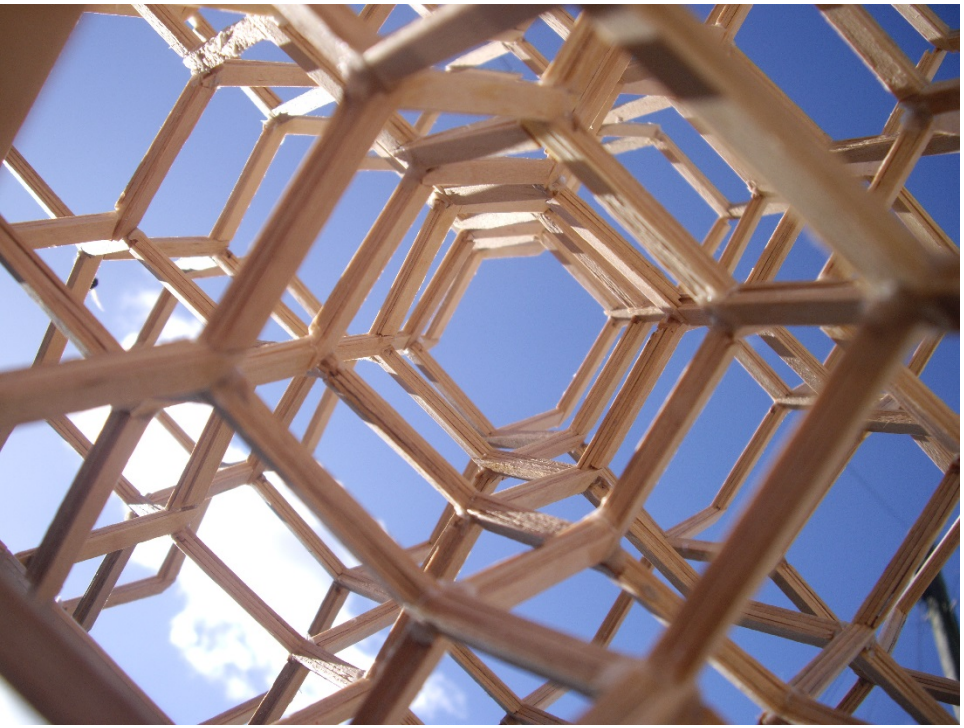
How do/will any costs of net metering get allocated to other tariffs?

How do/will any benefits of net metering get allocated to other tariffs?

How do the characteristics of net metered accounts fit within the range of characteristics of all of the accounts covered by the tariffs to which net metering is available?

Not today's topic

Elements of a framework to answer the utility perspective questions



Inputs

- Categories of data on past conditions and what that data means
- Categories of forecasted data about future conditions, the assumptions upon which such forecasts can be developed, and what the forecasted data means

Outputs

A clearly stated list of the questions the framework will answer – what will the framework help the Commission and parties to know and with what caveats – and a map of how the inputs and operations produce each output

Operations

- What manipulations of the inputs will occur in the process of producing the outputs?
- How will the framework manage interactions between the inputs?

We know that some of outputs – questions – will relate to Rocky Mountain Power's distribution system. For example:

- What benefit does net metering bring to the current costs of the system and could it bring to such future costs?
- What cost does net metering place on the current cost of the system and could it place on such future costs?
- What changes in the system planning or operation or in the characteristics of net metering could increase those current or future benefits and decrease any costs?

A Box For Another Day
Who receives the benefits and pays for the costs?

But to get to those outputs, we're going to need to know about the inputs and operations that relate to distribution design and planning.

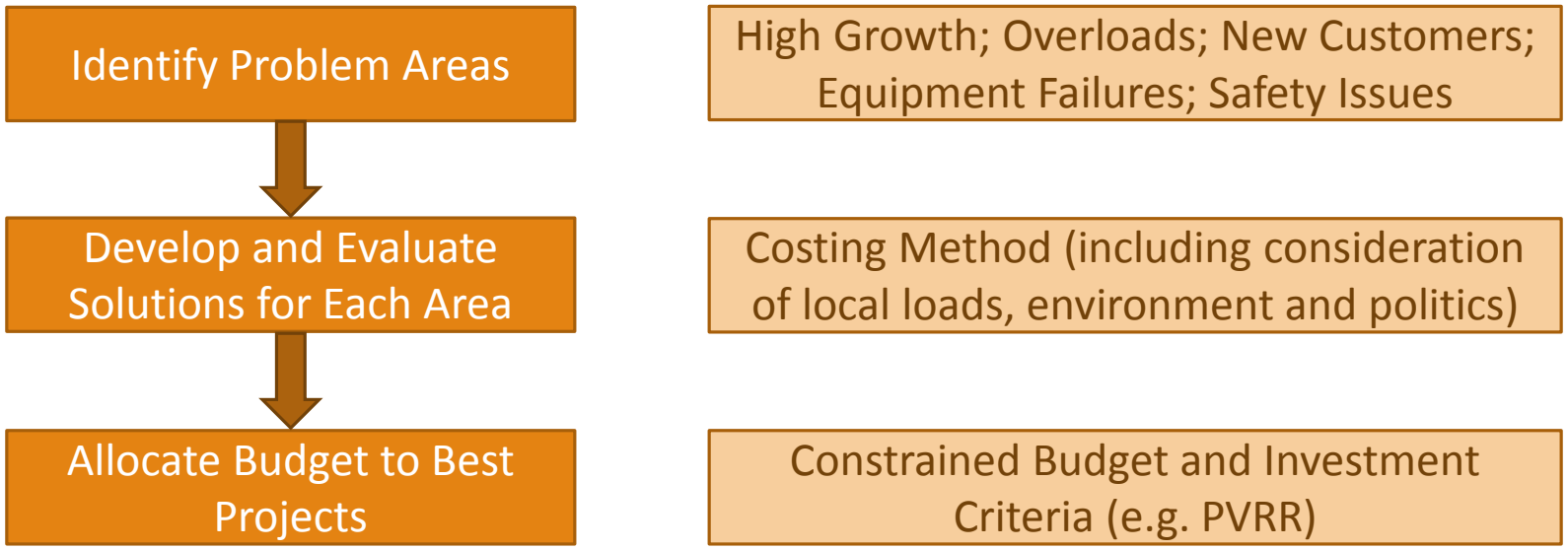
A regulatory layperson's understanding of distribution design

- Size the service drop according to the installed service panel for the building
- Size the transformer for the group peak of the buildings it covers
- Size the distribution circuit for the area peak of the transformers attached to it
- Size the substation for the regional peaks of all the distribution circuits attached to it
- Modify any of the above as increased peaks appear at the applicable level of aggregation such that that part of the system continues to meet safety and reliability criteria

Is this different for Rocky Mountain Power?

A regulatory layperson's understanding of distribution planning

Plan up to 5 years in advance but authorize (through budgeting) only one year at a time and even then some budgeted projects can slip into the following year.



Is this different for Rocky Mountain Power?

Implications

- If peak load on a given transformer, distribution line or substation is flat or declining, that equipment is “not a problem” (unless it is failing for some reason).
- If peak is rising at the level of one of these types of equipment, more than one customer account may be (likely is?) responsible.
- Distribution system capacity is not designed or planned to shrink, only to increase.
- The distribution system is not designed or planned to make use of distributed resources – current methods do not look for solutions or install/require installation of equipment to achieve the greatest possible distribution system value from distributed generating resources.

Are these implications true for Rocky Mountain Power?

From a black box to a **better** box. . .

Several jurisdictions are adopting rules to bring distribution system planning into the type of open, transparent processes now commonplace for transmission and large-scale generation planning.

2014 National Electricity Amendment (Distribution Network Planning and Expansion Framework) Rule 2012 No. 5

- Requires a Distribution Annual Planning Report
- Topics:
  - Description of network assets and operating environment
  - Forecasts of load; T-D connection points; system limitations
  - Identification and justification for planned projects
  - Results of any joint planning with other distribution or transmission systems
  - Performance statistics
  - Asset management approach
  - Demand management activities
  - Investments in metering or information technology
- Requires a strategy for engaging non-network providers and considering non-network solutions for any identified system limitation; publication of this strategy and a facility by which parties can register their interest in being notified of developments related to distribution planning and expansion.

California Docket R.14-08-013 Rulemaking

- Provides guidance for required distribution resource plans
- Contents
  - Integration capacity and locational value analysis
  - Optimal location benefit analysis
  - DER growth scenarios
  - Barriers to DER deployment: integration; ability to provide benefits; distribution system operational and infrastructure capability
- Data sharing requirements including privacy protections
  - Distribution characteristics at substation and feeder
  - EV and charging station numbers
  - DG population and characteristics (such as production curves)
  - Backup generator and CHP installations

Others

- Hawaii
- New York
- Massachusetts
- PEPCO and New Jersey, Maryland, and Delaware
- And more to come . . .

Why?

Because the question is not just what are the costs and benefits of distributed generating resources, whether or not they participate in net metering, but what costs are there today that **could** be mitigated or disappear and what benefits **could** emerge or grow?

For example, smart inverters are capable of providing many benefits to the grid, including voltage and reactive power support, system-level frequency and voltage support, local PV production variability support, and increased situational intelligence for grid operators. What is needed to bring these benefits into planning and then implementation?

Cost-benefit should not be about getting an **answer**.
It should be about figuring out which parts of a dynamic situation to move to **improve the result**.

Ultimately,

- ***Past*** utility system investment costs are sunk and we can't change them, even though we must still allocate them.
- ***Current*** costs and benefits are emerging from the interactions of individual decisions to own distributed generation and operate electricity-using equipment with the past utility investments and current utility operating behaviors.
- ***Future*** costs and benefits will emerge from what we put in place to create them.