Tariff Design Primer

DRAFT

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Final Comprehensive Market Design Cost Review

How capacity market costs are generated

- Capacity Auctions: all capacity costs are a result of capacity purchased from capacity assets
  - Base auction: three years prior to deliver
  - Rebalancing auctions: 18 months and 3 months prior to delivery
- How much capacity is bought
  - The AESO will determine a capacity value for all assets

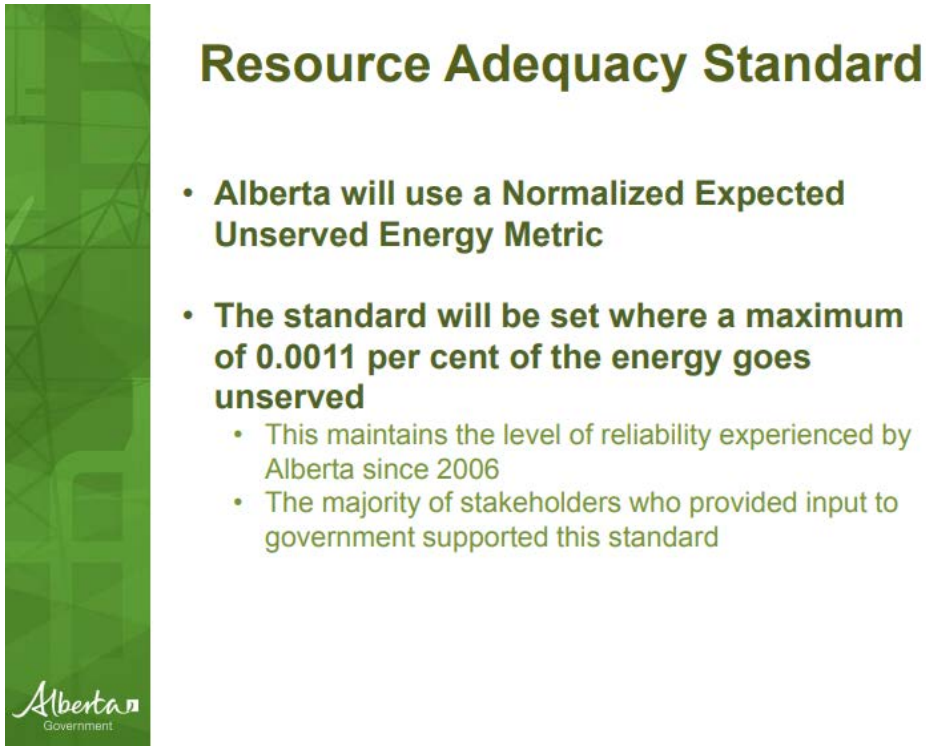
Steps to mitigate costs

- Rebalancing auctions
  - Allows AESO to reduce capacity purchases through sales of capacity if the expected need of capacity is reduced over time
- Performance assessments offsets
  - When capacity is not available or delivered as expected, the AESO will receive a capacity payment “refund”
  - The “refund” is paid to the AESO after over performers have received bonus payments
- Market power mitigation
  - There is a must offer requirement for all generation assets
  - Firms that have the ability to influence price higher to the benefit of their capacity portfolio will be subject to offer restrictions

Capacity Market Procurement Overview

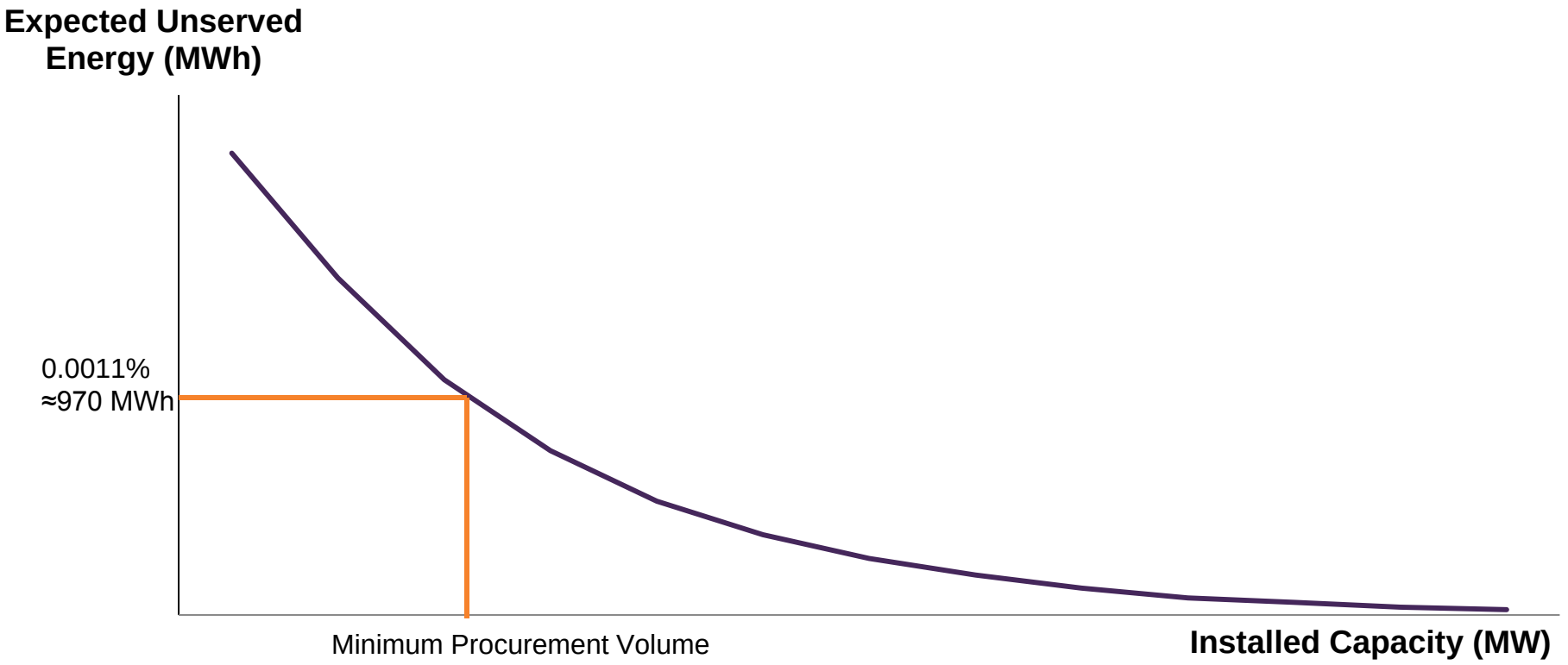
Background - Government Resource Adequacy Standard

- Government policy direction sets out a minimum level of resource adequacy (maximum level of expected unserved energy)
  - Maximum of 0.0011% of energy unserved
    - roughly equivalent to current LTA rule (202.6)
  - Minimum ≠ Target



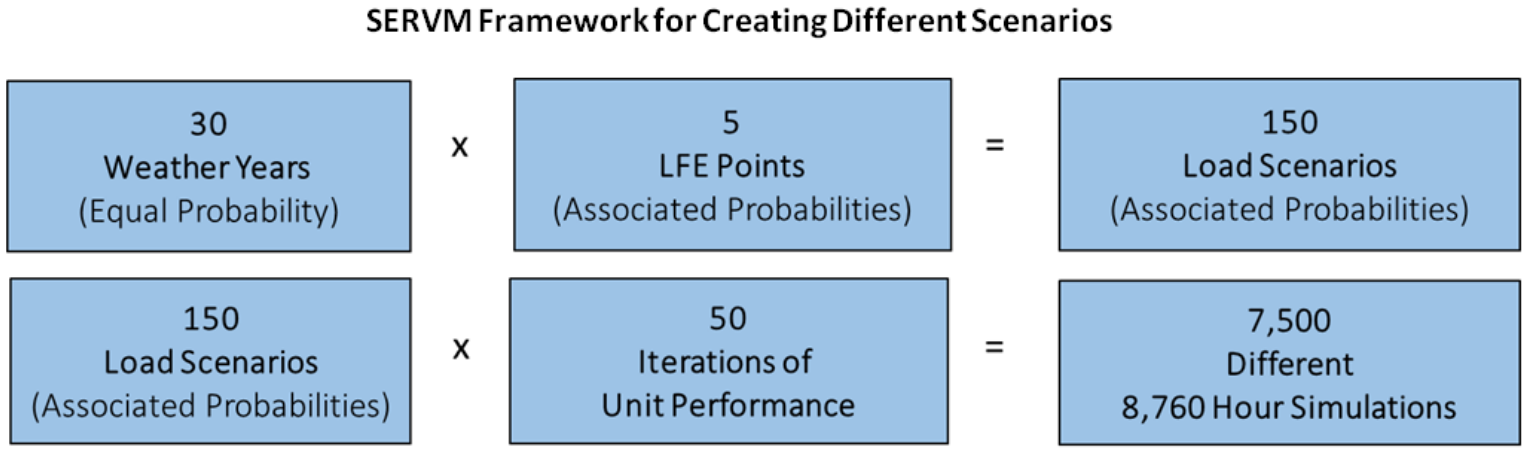
Resource Adequacy Model – What it does

- The Resource Adequacy Model (RAM) determines the tradeoff between capacity (MW) and reliability (MWh) using a probabilistic approach that varies load and generation
- The RAM will be used to determine how much capacity is required to meet the government's Resource Adequacy Standard

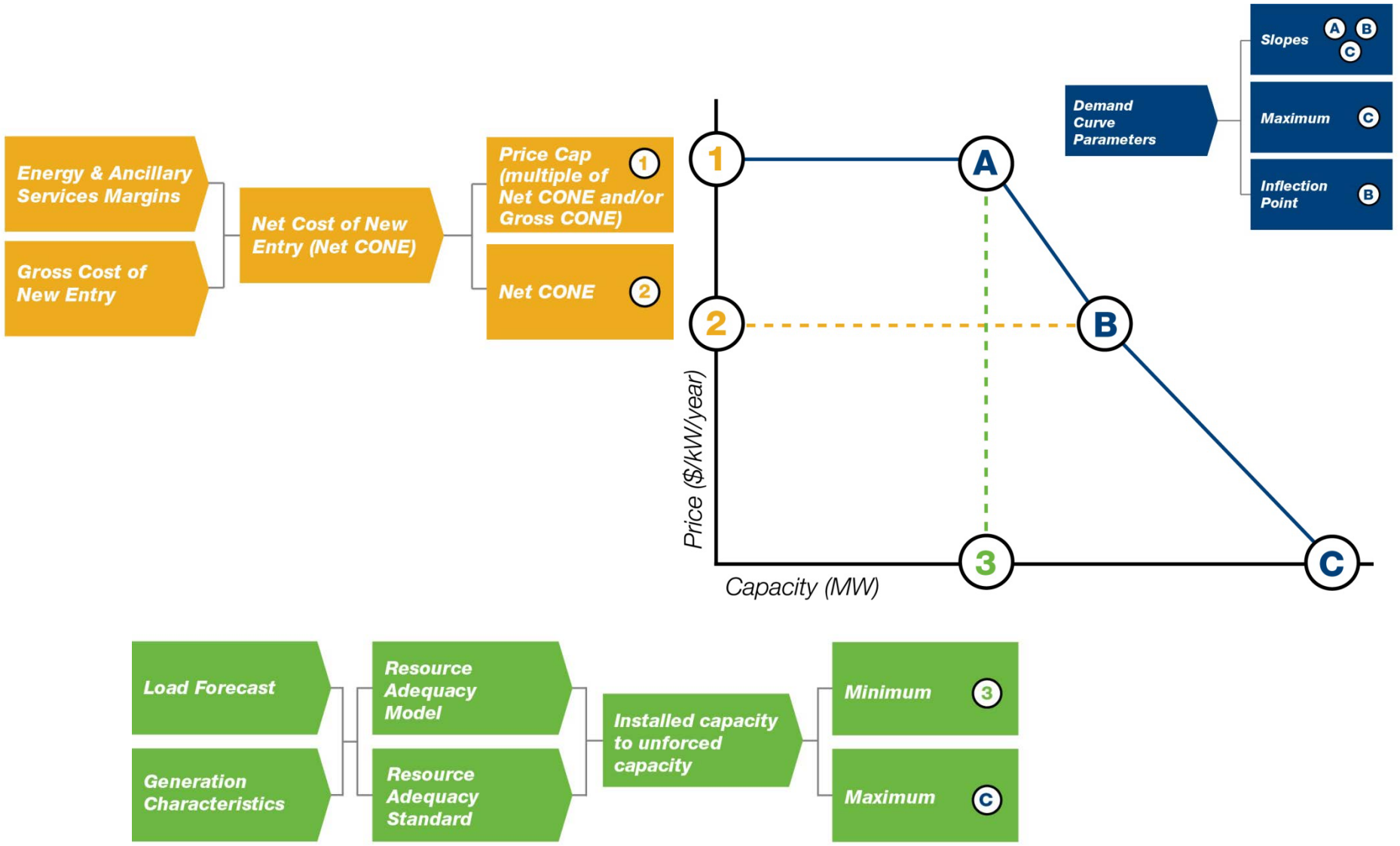


RAM - Model Mechanics

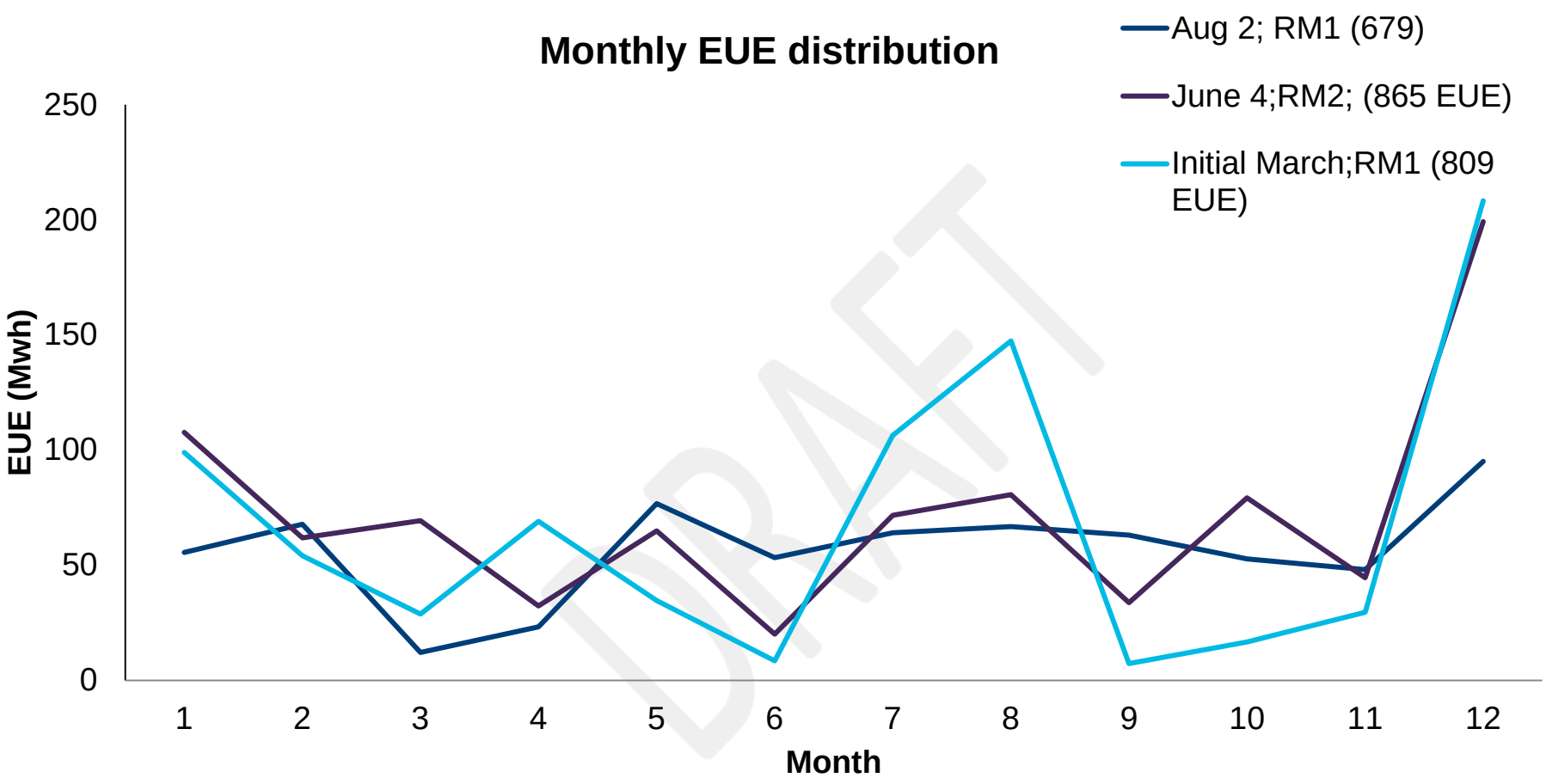
- Construction of scenarios, after a resource mix is defined SERVM runs 7,500 different 8,760 hour simulations
  - 30 weather years (load and renewable profiles)
  - Load forecast economic growth uncertainty (distribution of 5 points)
  - Unit outage modeling, capturing frequency and duration (50 iterations)



Demand Curve Overview



Updated Draft – Results Monthly

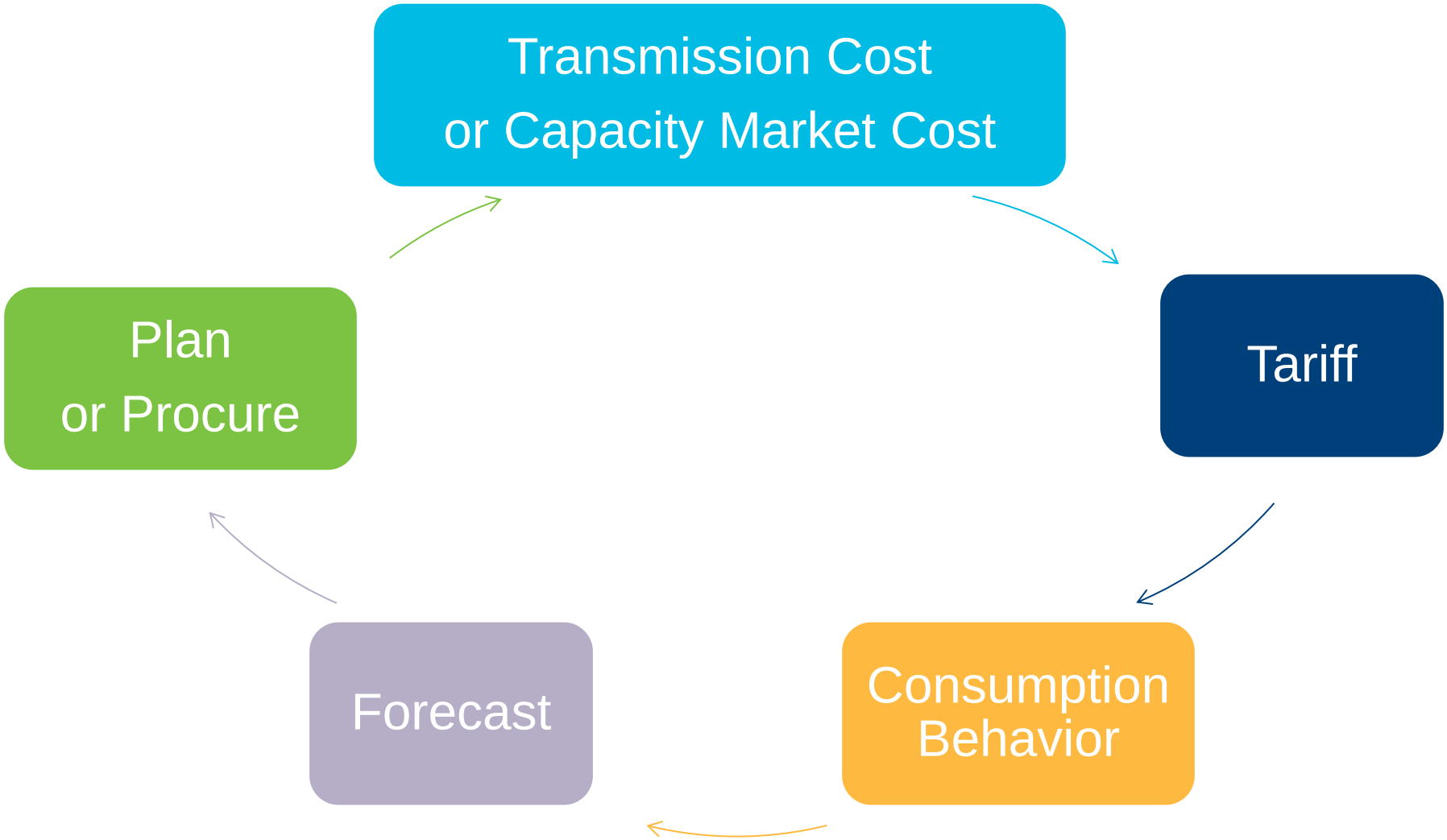


- The AESO can assess output from the RAM to determine which hours, days, months, etc. have the most/least EUE to help inform cost allocation blocks

Questions?

Tariff Design
Introduction

Tariff design model



Tariff design model (cont'd)

- Cost causation based tariff design
  - Relies on identifying what is causing the cost
  - Then price signal targets consumption behavior that cause cost
    - Important to align all price signals for all costs recovered by the tariff (transmission and, in future, capacity market) to support efficient consumption
- Then resulting change in behavior defers or lowers or eliminates future cost

Tariff Design Components

- Functionalization
- Classification
- Allocation
- Rate design
- Billing determinants
- Bill impact mitigation
- Deferral accounts

Functionalization

- Functionalization: grouping costs together based on what caused them.
  - Transmission
    - Transmission system comprises of thousands of elements
    - To simplify the task of determining what caused these thousands of elements, or will cause similar elements in the future, these elements are grouped together based on the “function” they serve
    - After removing radial point of delivery or supply elements, can rest of transmission elements be grouped together into function? If so how?
  - Capacity market – Can costs be functionalized? If so how?

Classification

- Classification: dividing functionalized costs between consumer demand and energy consumption.
- Within each function, cost can be caused by different aspect of consumption, such as:
  - Peak demand
  - Co-incident peak demand
  - Contract demand
  - Energy
  - Number of customers
  - Per day, etc.
- For a given function, classification determines which aspect of consumption is causing what proportion of the cost.

Classification (cont'd)

- Which **transmission** function(s) should be classified? If so how?

- Which **capacity** market function(s) should be classified? If so how?

Allocation

- Customers can be grouped together into few clearly distinct rate classes based on their hourly usage profile over the year(s)
- Each rate class would then have a different cost causation profile
- Allocation is the exercise of dividing functionalized and classified costs between rate classes
- Findings from functionalization and classification exercises inform the allocation exercise

Billing Determinants

- Billing determinants are the result of a calculation that produces a customer's consumption/demand for a defined period of time
- Common Billing Determinants
  - Coincident peak – peak demand by a group during a defined period of time
  - Total energy – total consumption during a defined period of time
  - Highest metered demand – peak demand by a single customer during a defined period of time
  - Contract demand – contract level
  - Weighted energy – total consumption by multiple defined periods of time

Rate Design

- After cost has been functionalized, classified and allocated to a rate class, a rate must be designed to recover this cost from this rate class
- Functionalization, classification, allocation and rate class behavioral and economic profile information is utilized to create a rate
  - Price signal that is expected to be most effective in meeting the goal
- For capacity market costs, rate design would have to based on weighted energy
  - I.e. time of use (super-peak, on-peak, off-peak)

Bill Impact Mitigation

- Rates should be stable and predictable to allow consumers to plan and respond efficiently
- For load only consumers, total electric energy bill increase of 10% or more is considered excessive (i.e., rate shock)
- If change in tariff design causes rate shock then mitigation plan maybe required
- In past the Commission has directed the AESO to subsidize such affected consumers by collecting the shortfall from all consumers
- Not applicable to capacity market bills at this time

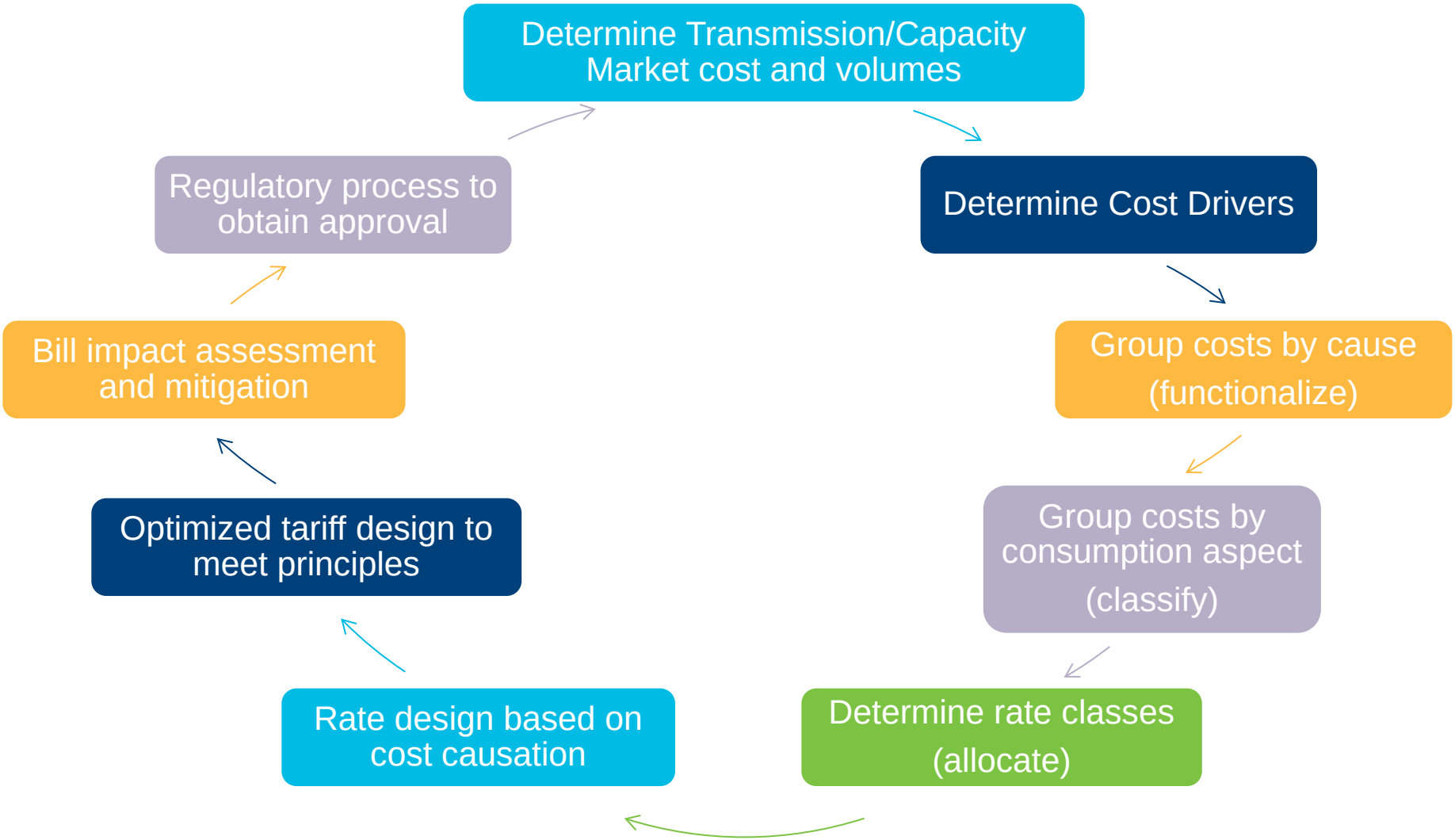
Bill Impact Mitigation (cont'd)

- If change in tariff design causes rate shock:
  - Transmission system and transmission costs would not change but bills can change significantly
  - Which bill impact should be mitigated?
  - What should be the term of any mitigation?
  - Does tariff design remain valid with any such mitigation?

Bill Impact Mitigation (cont'd)

- If tariff design changes significantly:
  - Should market participants be provided a notice if tariff design is changing significantly?
  - What is an appropriate notice period?
  - How would such advance notice change market participant behavior?
  - Does tariff design remain valid with any such change in behavior?

Tariff design exercise



Deferral Accounts

- Tariff design is a forward looking exercise using forecast cost, forecast consumption and behavior and other such information
- Difference between actuals and forecast is dealt with in deferral accounts
- Transmission tariff uses tariff application, tariff update, quarterly correction, and after the fact annual correction model
- What is an appropriate model for the capacity market tariff?

Sample Designs - Transmission

Assumes total annual revenue requirement of about $2 billion

Billing Determinant	Value	Rate
Co-incident peak	97,698 MW	$20,650/MW
Total energy	61,303 GWh	$33/MWh
Highest metered demand (no ratchet)	122,370 MW	$16,486/MW
Billing capacity demand (90% two year ratchet)	156,984 MW	$12,851/MW
Weighted Energy (Weightings of 1:2:3) - Super (4pm-8pm) - On Peak - Off-peak (10pm-8am)	 10,905 GWh 26,773 GWh 23,624 GWh	 $55/MWh $37/MWh $18/MWh

Sample Designs – Capacity Market

Assumes total annual revenue requirement of $1 billion

Billing Determinant	Value	Rate
Weighted Energy (Weightings of 1:2:3) - Super-peak (4pm-8pm) - On-peak - Off-peak (10pm-8am)	 10,905 GWh 26,773 GWh 23,624 GWh	 $27/MWh $18/MWh $9/MWh
Weighted Energy (Weightings of 0:1:4) - three blocks as above	 10,905 GWh 26,773 GWh 23,624 GWh	 $57/MWh $14/MWh $0/MWh
Weighted Energy (Weightings of 1:4) - On-peak (4pm-8pm) - Off-peak	 10,905 GWh 50,398 GWh	 $43/MWh $11/MWh

Key Observations

- Some recent large transmission projects have been caused by generation and by government mandate:
  - Consumers did not directly cause these projects and any of their response would not have deferred or eliminated these projects
- Consumers have responded to prior and current tariff by investing in on-site generation and modifying consumption patterns

Key Observations (cont'd)

- Costs have risen by multiples within last 20 years and are expected level out
- Generation capacity market, small scale renewable generation and community generation may further incent on-site generation
- Consumers are demanding service with different levels of quality (interruptible, non-firm etc.)

How should we proceed?

- What questions do we have?
- What do we want to know?
- What work does this lead to?
  - Historical data
  - Economic data
  - Forecast data
- Balancing scope, resourcing and timeline

Thank you