# Bulk and Regional Tariff Design Stakeholder Engagement Session 2

September 24, 2020

# Notice

In accordance with its mandate to operate in the public interest, the AESO will be audio recording this session and making the session recording available to the general public at www.aeso.ca. The accessibility of these discussions is important to ensure the openness and transparency of this AESO process, and to facilitate the participation of stakeholders. Participation in this session is completely voluntary and subject to the terms of this notice.

The collection of personal information by the AESO for this session will be used for the purpose of capturing stakeholder input for the Bulk and Regional Tariff Design engagement sessions. This information is collected in accordance with Section 33(c) of the *Freedom of Information and Protection of Privacy Act*. If you have any questions or concerns regarding how your information will be handled, please contact the Director, Information and Governance Services at 2500, 330 – 5th Avenue S.W., Calgary, Alberta, T2P 0L4, by telephone at 403-539-2528, or by email at privacy@aeso.ca.

# COVID-19 update

- The AESO’s top priorities are the health and well-being of our employees and stakeholders and continuing to meet the electricity needs of all Albertans
- All business meetings with external stakeholders will be via phone or webinar indefinitely (this includes stakeholder engagement sessions)
- Based on stakeholder feedback, the AESO’s own security assessment and the use of Zoom for governments, post-secondary institutions and other companies, the AESO has decided for now to continue using Zoom for our stakeholder engagements until such time that face-to-face engagements are allowed
- The AESO will continue to monitor developments and provide updates to our stakeholders as necessary
- For additional information, please visit the AESO website at [www.aeso.ca](http://www.aeso.ca) and follow the path Stakeholder Engagement > COVID-19

# How to Ask Questions

# Using Zoom – asking questions

- All attendees join the webinar in listen-only mode and the host will have attendee cameras disabled and microphones muted
- When asking or typing in a question, please state
  - **The organization you work for and your first and last name**
- Two ways to ask questions if you are accessing the webinar using your computer or smartphone
  - If you would like to ask a question during the Q&A portion, click the icon to raise your hand and the host will see that you have raised your hand. The host will unmute your microphone, you in turn will need to unmute your microphone and then you can ask your question. Your name will appear on the screen but your camera will remain turned off.
  - You can also ask questions by typing them into the Q&A window. Click the “Q&A” button next to “Raise Hand.” You’re able to up-vote questions that have been already asked.

# Using Zoom – where to access controls

- Using a 2-in-1/PC/MAC Computer
  - Hover your cursor over the bottom area of the Zoom app and the Controls will appear.
  - Click “Raise Hand” and the host will be notified that you would like to ask a question.
  - Click “Lower Hand” to lower it if needed.
  - You can also ask questions by tapping the “Q&A” button and typing them in. You’re able to up-vote questions that have been already asked.
- Using a Smartphone
  - Tap “Raise Hand.” The host will be notified that you've raised your hand.
  - Tap “Lower Hand” to lower it if needed.
  - You can also ask questions by tapping the “Q&A” button and typing them in. You’re able to up-vote questions that have been already asked.

# Using Zoom – where to access controls

- If you are accessing the webinar via conference call
  - If you would like to ask a question during the Q&A portion, on your phone's dial pad, hit *9 and the host will see that you have raised your hand. The host will unmute your microphone, you in turn will need to unmute your microphone by hitting *6 and then you can ask your question. Your number will appear on the screen.
- Phone controls for attendees
  - To raise your hand, on your phone's dial pad, hit *9. The host will be notified that you've raised your hand.
  - To toggle between mute and unmute, on your phone's dial pad, hit *6.

# Stakeholder participation

The participation of everyone here is critical to the engagement process. To ensure everyone has the opportunity to participate, we ask you to:

- Listen to understand others' perspectives
- Disagree respectfully
- Balance airtime fairly
- Keep an open mind

# Welcome and Introductions

# Agenda

| Time | Agenda Item | Presenter |
|---|---|---|
| 9:00 – 9:15 | Welcome, introduction, purpose and session objectives | AESO |
| 9:15 – 10:00 | Overview of engagement process<br>• Share overall *2020-2021 Plan for ISO Tariff-Related Activities*<br>• Understand approach and revised engagement schedule for bulk and regional tariff | AESO |
| 10:00 – 10:30 | Review current rate design<br>• Review of 12-CP methodology and understand its limitations and implications<br>• Work completed since March 2020 | AESO |
| 10:30 – 10:45 | Break | |
| 10:45 – 12:20 | Introduce and discuss bookends<br>• Overview of bookends<br>• Discuss the emerging 'sweet spot'<br>• Discuss initial implications | AESO |
| 12:20 – 12:30 | Next steps and Session 3 overview | AESO |
| 12:30 – 1:00 | Lunch break | |
| 12:30 – 1:15 | Energy Storage treatment options and considerations | AESO |
| 1:15 – 2:00 | Technical clarity on rate design bookends<br>• Details on rate design bookends provided as reference materials<br>• Opportunity to ask questions for technical clarity | AESO |

# Registration (as of September 17, 2020)

- Alberta Direct Connect Consumers Association (ADC)
- Alberta Newsprint Company (ANC)
- Alberta Utilities Commission (AUC)
- AltaLink Management Ltd.
- Arcus Power
- BECL and Associates Ltd.
- BluEarth Renewables
- Canadian Renewable Energy Association (CanREA)
- Capital Power Corporation
- Capstone Infrastructure > Whitecourt Power
- Cenovus Energy
- City of Medicine Hat
- Consumers Coalition of Alberta (CCA)
- DePal Consulting Limited
- Department of Energy
- Dow Chemical Canada ULC
- Eco Renewables Corporation
- ENMAX Corporation
- FortisAlberta
- Greengate Power Corporation
- Guidehouse
- Heartland Generation Ltd.
- Industrial Power Consumers Association of Alberta (IPCAA)
- Industrial Power Producers Society of Alberta (IPPSA)
- Lionstooth Energy
- Palezieux Regulatory Solutions Inc.
- Suncor Energy Inc.
- The Office of the Utilities Consumer Advocate (UCA)
- TransAlta Corporation
- Turning Point Generation
- URICA Asset Optimization
- Wolf Midstream

# Overview of Engagement Process

# AESO Stakeholder Engagement Framework

# Tariff modernization

- The AESO recently published its *2020-2021 Plan for ISO Tariff-Related Activities*
  - Path: Rules, Standards and Tariff > Tariff > Tariff Modernization
- The Plan provides an overview of the ISO tariff-related activities that we intend to progress and engage on in Q4 2020 and in 2021 and includes additional information on the intent and proposed process for tariff modernization
- We value stakeholder input and **invite you** to provide your feedback to the AESO on the Plan in the Stakeholder Comment Matrix 2020-2021 ISO Tariff-Related Activities Plan by October 6, 2020

# Tariff modernization (cont.)

## 2020-2021 ISO Tariff-Related Activities Schedule

| Classification | Tariff-Related Initiatives | 2020 Q4 | | | 2021 Q1 | | | 2021 Q2 | | | 2021 Q3 | | | 2021 Q4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| Tariff Modernization | **AESO Tariff Structure and Process Improvement**<br>Determine ways to modernize the ISO tariff with the intent to simplify the tariff and regulatory process to enable more adaptability, clearer cost or price signals and regulatory efficiency to support the transformation of Alberta's electricity system | A | C | C | C | Implement as part of ongoing tariff applications | | | | | | | | | | |
| | **Bulk and Regional Rate Redesign (with Energy Storage) (Phase 1)**<br>Evaluate the bulk and regional rate design, with a focus on addressing issues caused by 12-CP; tariff treatment for energy storage is also included in this rate design initiative | D | D | D | D | D | D | R | R | R | R | R | R | R | R | R |
| | **Customer Contribution Policy and POD Cost Function (Phase 2A)**<br>Evaluate directions provided by AUC Decision 22942 relating to Point of Delivery Cost Function and Optional facilities/good electricity industry practice (Phase 2A); Review of broader Customer Contribution Policy and ISO tariff investment objectives and potential changes | | | C | C | D | D | D | D | D | R | R | R | R | R | R |
| 2018 ISO Tariff Implementation | **2018 ISO Tariff Compliance Filing and Implementation**<br>Seek approval for the 2018 ISO Tariff compliance filing which will implement approved changes into the ISO tariff and provide updated 2020 rates | R | I | I | I | | | | | | | | | | | |
| | **Transmission Interconnection Costs: Substation Fraction and DFO Flow-through**<br>Address 'unlimited liability' issue for DCG in ISO Tariff substation fraction methodology | R | R | R | R | R | I | I | I | I | I | | | | | |
| | **Revise Section 505.2: Performance Criteria for Refund of GUOC**<br>Align ISO rule with 2018 GTA ISO tariff provisions | D | D | R | I | | | | | | | | | | | |
| | **System versus Connection Project Criteria (Phase 2B)**<br>Respond to directions in AUC Decision 22942 regarding developing criteria for the initiation of system and connection projects and criteria for categorizing 'grey area' system projects | C | C | C | D | D | D | D | D | D | R | R | R | R | R | R |
| | **Other Matters Arising from AUC Decision 22942 (Phase 3)**<br>Develop application to address remaining direction from AUC Decision 22942 relating to Power Factor Deficiency, Contract Level Adjustments, SAS Request Provisions and Relocation Costs | | | | | C | C | D | D | D | R | R | R | R | R | R |
| Tariff Implementation | **2021 ISO Tariff Update (2021 Rates)** | R | R | R | I | I | I | | | | | | | | | |
| | **2020 Deferral Account Reconciliation** | | | | | | | | | R | R | R | I | I | | |
| | **2022 ISO Tariff Update (2022 Rates)** | | | | | | | | | | | | | R | R | R |

**Legend**: Analysis (**A**), Conception (**C**), Development (**D**), Regulatory (**R**), Implementation **(I)**

# Phased approach to tariff filing

- To promote a more agile and adaptable approach, the AESO intends to file modules (phases) to meet Commission Directions
- The phases and their proposed filing dates include:
  - **Phase 1: Bulk and Regional Rate Redesign (to be filed by March 31, 2021) * focus of this engagement ***
  - **Phase 2A:** Point-of-delivery (POD) cost function, investment policy and optional facilities (to be filed by June 30, 2021)
  - **Phase 2B:** Criteria for system versus connection projects and "grey area" costs (to be filed by June 30, 2021)
  - **Phase 3:** Other Directions (Decision 22942-D02-2019) including power factor deficiency, contract level adjustment provisions, system access service request provisions, and relocation principles (to be filed by June 30, 2021)

# Overall approach for bulk and regional tariff design stakeholder engagement

The AESO intends to:

i. Engage with stakeholders to allow stakeholders' needs and interests to be consistently, transparently and meaningfully considered in the development of a rate design proposal for bulk and regional cost recovery;

ii. Engage with stakeholders regarding the objectives to be examined and evaluated in the development of a rate design proposal for bulk and regional cost recovery;

iii. Supply stakeholders with analysis tools for bulk and regional cost recovery impact analysis;

iv. Seek and identify for the Alberta Utilities Commission (AUC) areas of agreement and disagreement in the AESO rate design proposal to accelerate the regulatory approval process; and

v. File with the AUC an application for bulk and regional rate design by March 31, 2021.

# Overview of process schedule

| Session 1<br>March 13, 2020 | Session 2<br>Sept. 24, 2020 | Session 3<br>Oct. 22, 2020 | Session 4<br>Dec. 2, 2020 | Session 5<br>Jan. 28, 2021 |
|---|---|---|---|---|
| **Session objectives** | **Session objectives** | **Session objectives** | **Session objectives** | **Session objectives** |
| • Present rate design options for bulk and regional cost recovery with rate objectives assessment<br>• Provide rate design analysis tools<br>• Review, respond to clarifying questions and collect initial input on options | • Review and gain acceptance on process and approach to complete a rate design<br>• Understand current state rate design<br>• Reconfirm tariff rate design objectives and balance of trade-offs<br>• Understand rate design bookends<br>• Identify initial implications of rate design bookends<br>• Understand energy storage treatment options and considerations<br>• Provide technical clarity around rate design bookends | • Stakeholders to present and discuss alternative rate design options, including energy storage options and implications<br>• Understand which rate design options stakeholders support and why | • Clarify and refine the preferred rate design, including energy storage treatment<br>• Discuss and evaluate mitigation options<br>• Begin to discuss implementation considerations | • Present and collect feedback on the emerging application (to be filed by March 31, 2021)<br>• Share and discuss the implications of the rate design proposal and mitigations<br>• Understand outstanding stakeholder concerns |

# Session purpose and objectives

- Session purpose
  - The purpose of this session is to re-engage in discussions on the bulk and regional tariff design
- Session objectives
  - Review and gain acceptance on process and approach to complete a rate design
  - Understand current state rate design
  - Reconfirm tariff rate design objectives and balance of trade-offs
  - Understand rate design bookends
  - Identify initial implications of rate design bookends
  - Understand energy storage treatment options and considerations
  - Provide technical clarity around rate design bookends

# Questions?

# Current State

# Background and recent developments

- The AESO developed tariff design options that were consulted on with external stakeholders in March 2020
  - Mixed feedback generally indicating that different options do better on different objectives and balancing will be required
  - Request for further details on methods, calculations, evaluations, and resulting customer level bills
- Since then COVID-19, global oil markets, distribution system inquiry and self-supply (with export) have introduced new considerations

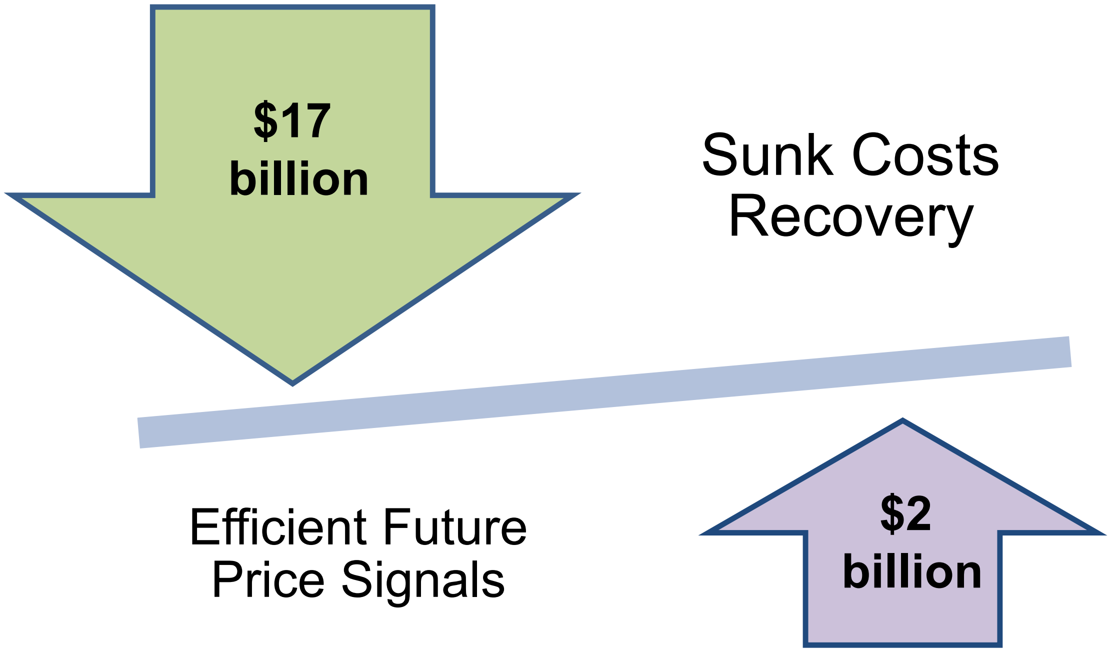
# Current state

- The importance and urgency of an effective and efficient bulk and regional rate continues to grow
- With increasing transmission costs as transmission reinforcements have come into service, the 12-CP rate which recovers bulk transmission costs (approximately 50 per cent of wires costs) has grown dramatically
- This increased price signal has driven consumer behavior that has led to a decline in the 12-CP billing determinants and resulting cost recovery in 2019
- This is evidence that customers respond to the current 12-CP pricing signal; however, as the transmission system is reinforced and available for use, this price signal has diverged from the value it creates for the system

# Current state (cont.)

- Further, with this changed behavior the costs that certain consumers are avoiding still need to be recovered, and so other customers are charged. This results in:
   i. Higher charges to customers that cannot respond to the signal and avoid the coincident peak;
   ii. An inefficient signal that is driving increased behavior to reduce consumption, or develop on-site generation to self-supply, during the 12-CP hours without a corresponding reduction in system costs as they are mainly sunk; and
   iii. Artificially increasing interest from distribution-connected generation (DCG) by the value of DCG credits provided by DFO tariffs which are calculated based on ISO tariff charges.

# Need to balance: Sunk costs recovery with efficient future price signals




- Ultimately, this is a task of rebalancing sunk costs recovery (cost responsibility) with efficient price signals to minimize future transmission costs
  - All sites benefit or receive value from grid connection
  - Site consumption behavior in the future will not reduce the amount of sunk costs to be recovered

# Questions?

# Break

# Tariff Design Bookends Assessment

# Design objectives

| Objective | Description |
|---|---|
| **Reflect Cost Responsibility** | Cost recovery is based on the benefit and value transmission customers receive from the existing grid |
| **Efficient Price Signals** | Price signal to alter behavior to avoid future transmission build |
| **Minimal Disruption** | Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted |
| Simplicity | Simplicity and clear price signals while achieving design objectives |
| Innovation and Flexibility | ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers |

* Proposed rate design must fit within current legislation

# Design objectives

| Objective | Current State |
|---|---|
| **Reflect Cost Responsibility** | |
| **Efficient Price Signals** | |
| **Minimal Disruption** | |
| Simplicity | |
| Innovation and Flexibility | |

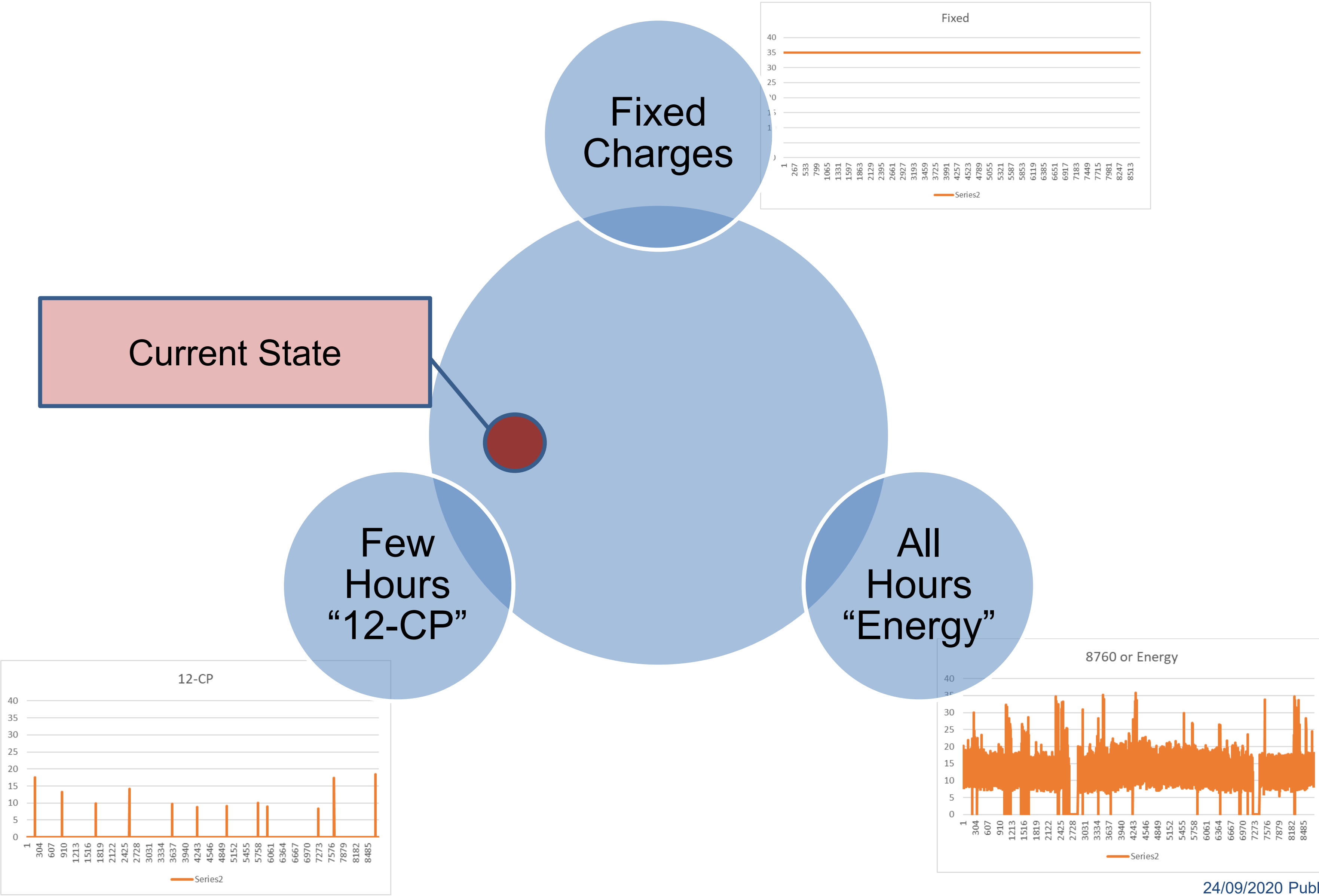
Legend:

Achieves objective

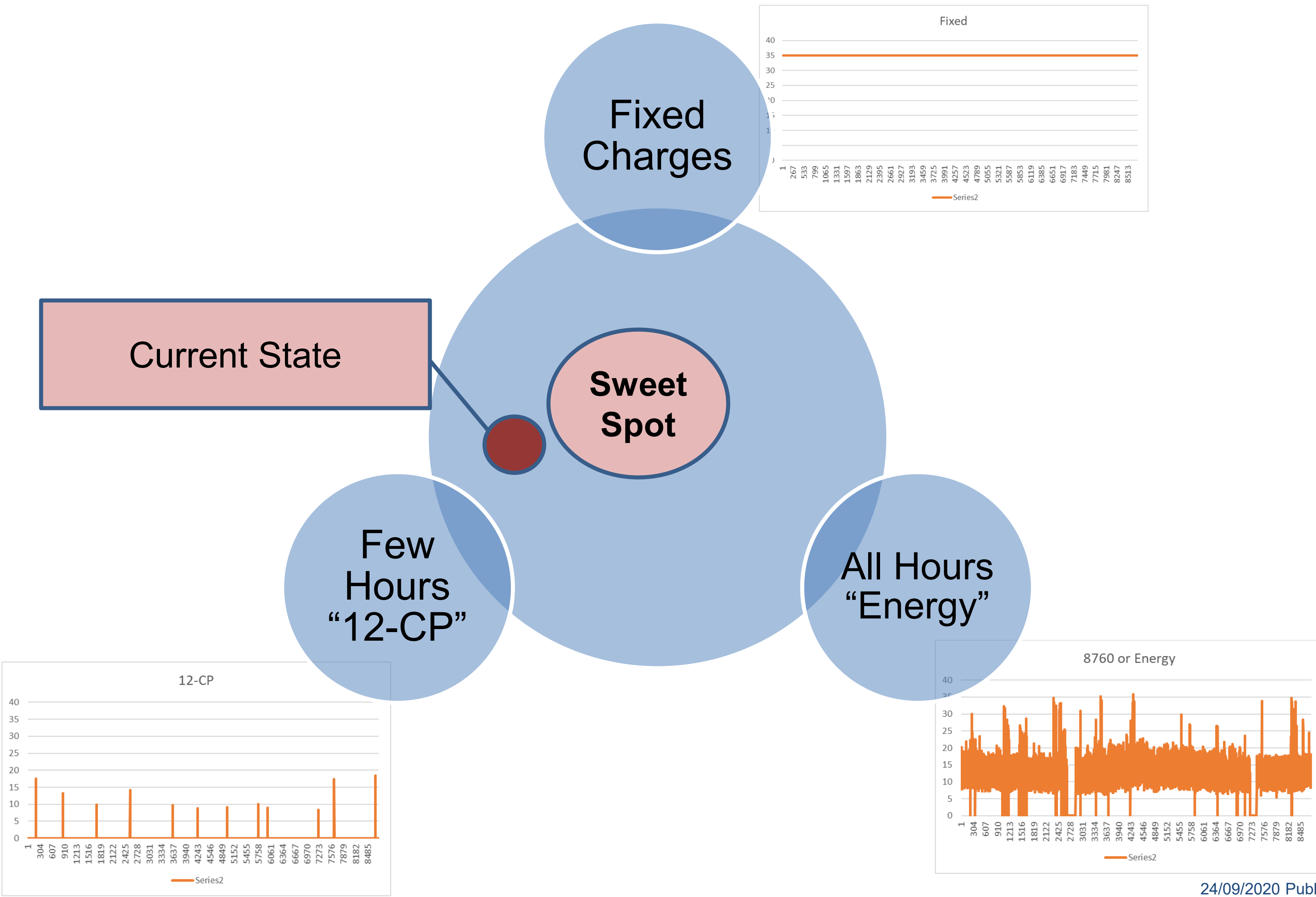
Partially achieves objective

Does not achieve objective

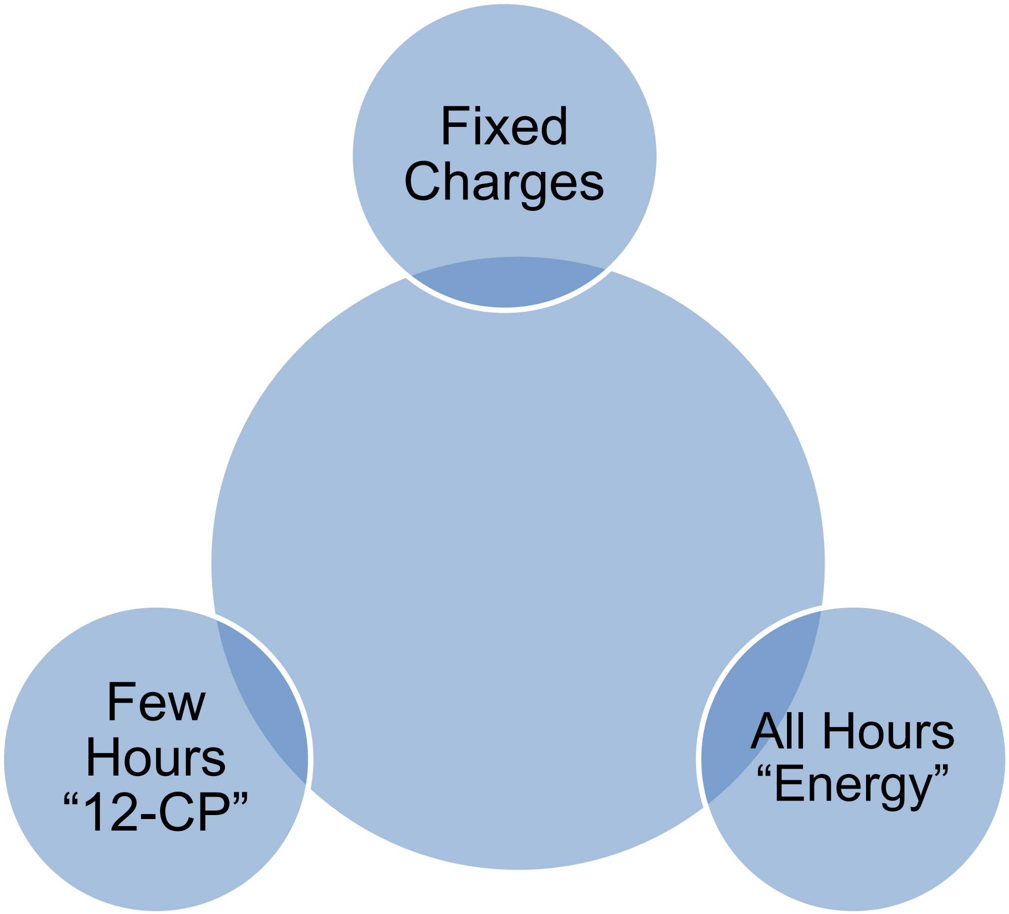
# Tariff design boundaries



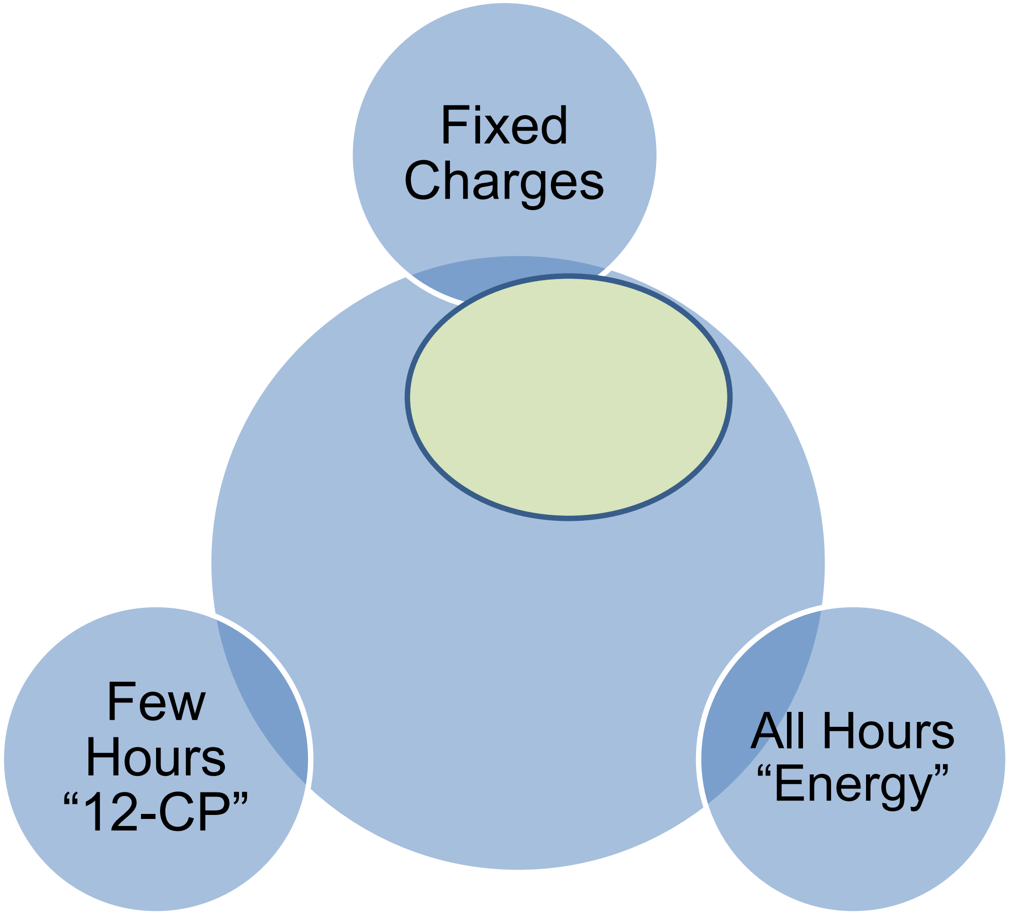
# Tariff design – Sweet spot



# Sweet spot



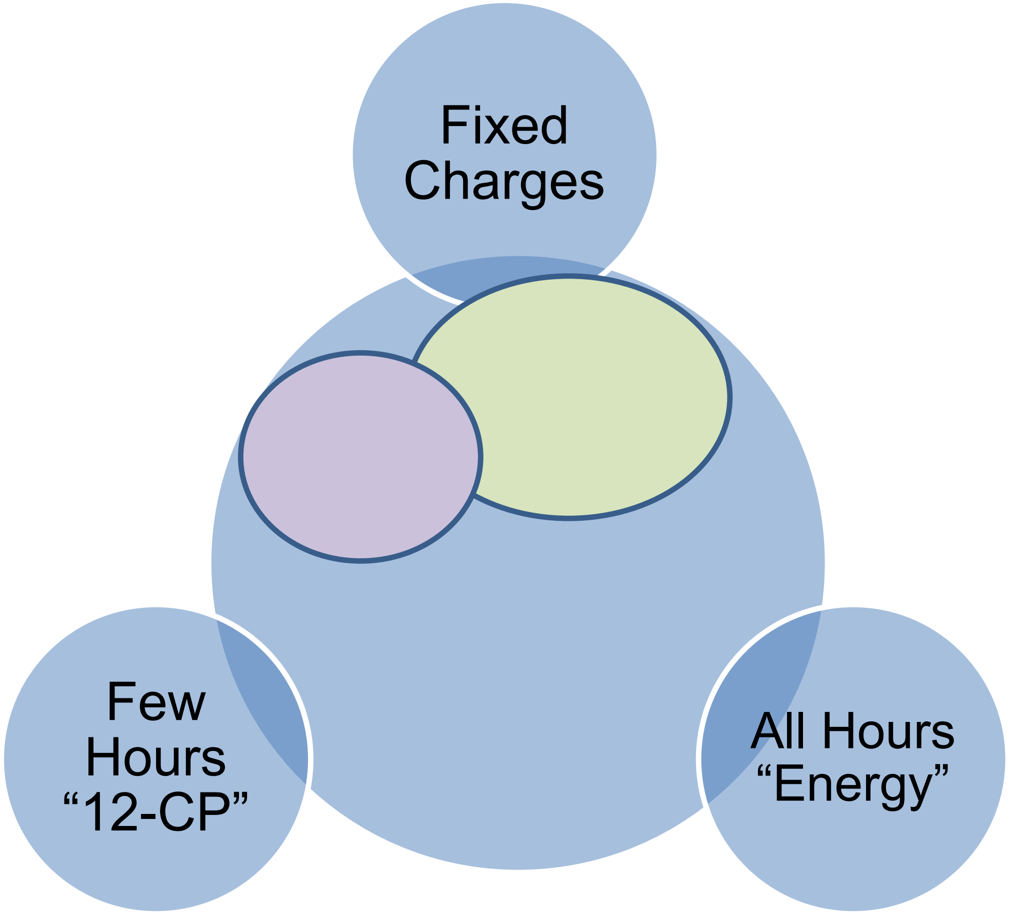
# Sweet spot




### Cost responsibility

- Value of grid connection to be recognized to assure appropriate cost recovery of today’s grid

# Sweet spot



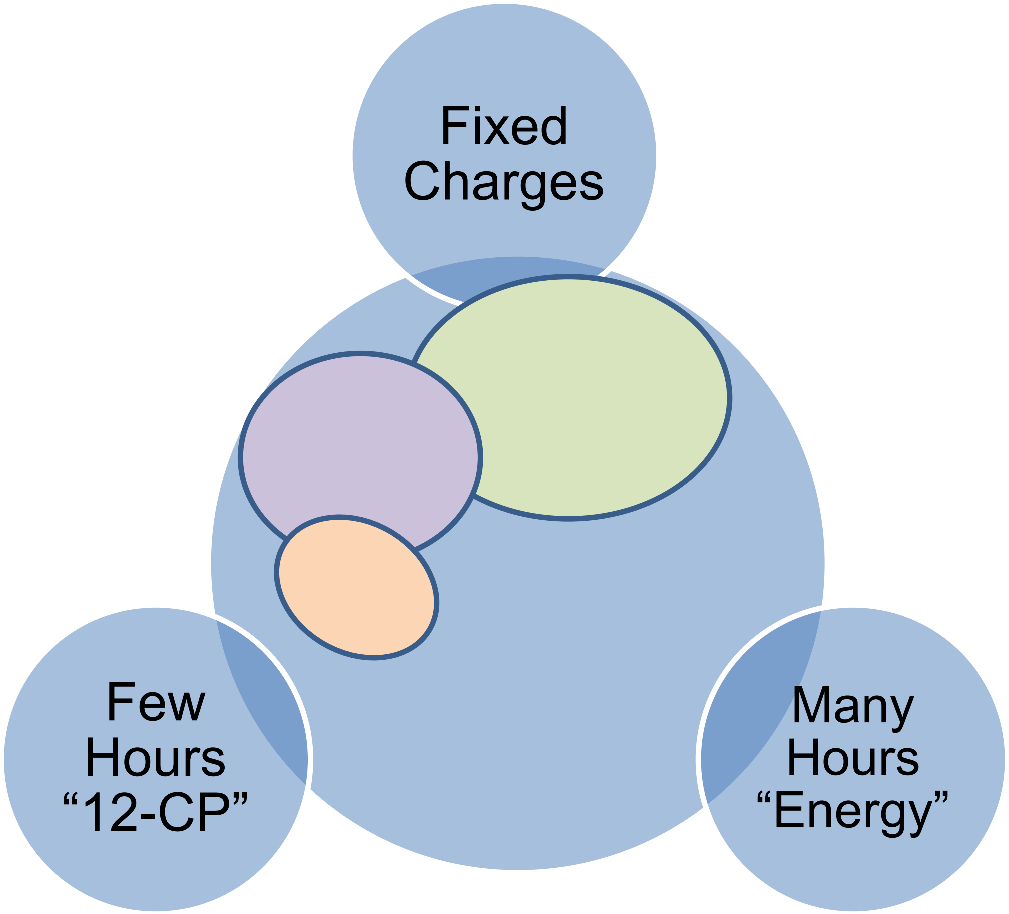

### Cost responsibility

- Value of grid connection to be recognized to assure appropriate cost recovery of today's grid

### Efficient price signals

- If market participants can adjust load behavior that reduces future cost build (efficient price signals), the overall reduction in costs should be shared with those market participants

# Sweet spot




## Cost responsibility

- Value of grid connection to be recognized to assure appropriate cost recovery of today's grid

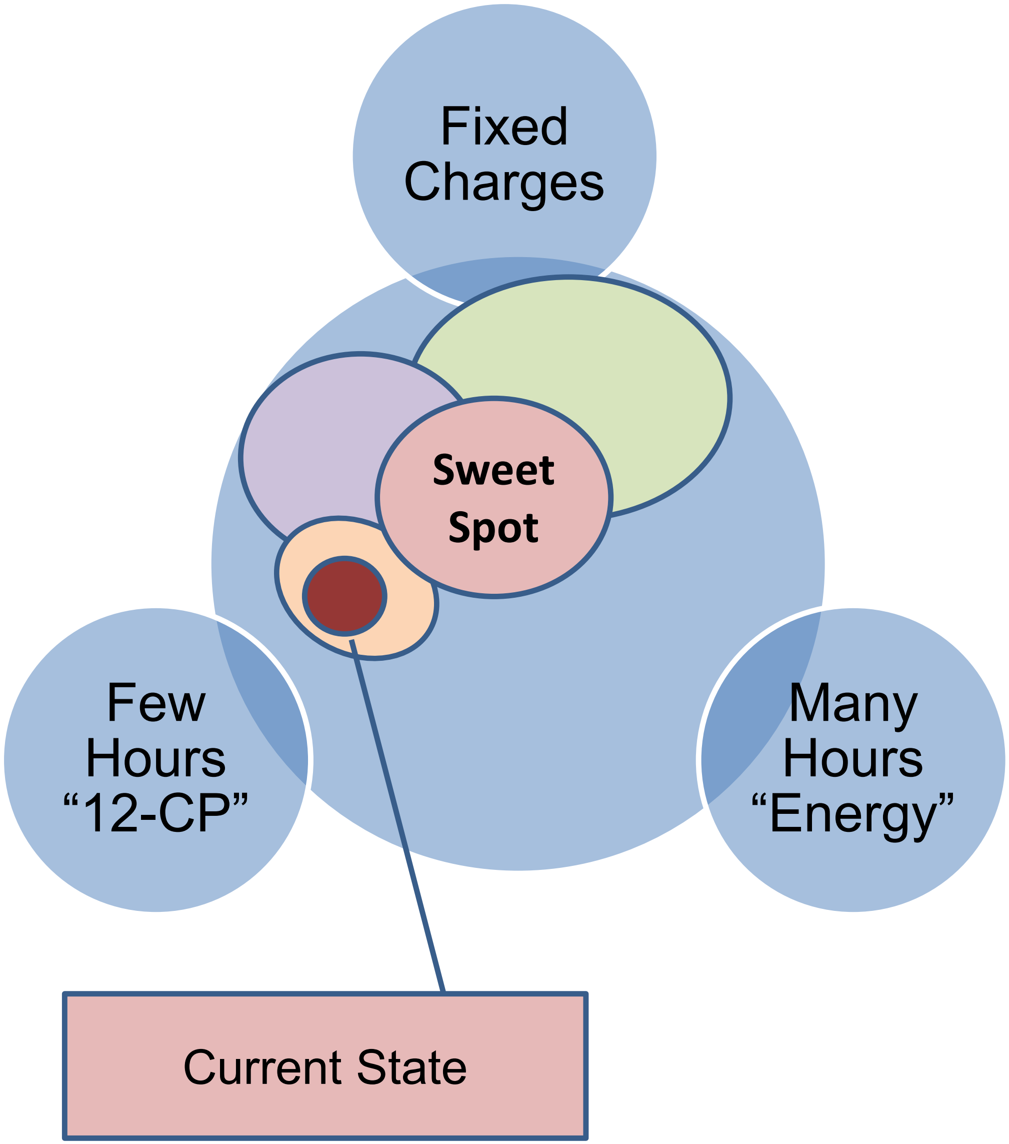
## Efficient price signals

- If market participants can adjust load behavior that reduces future cost build (efficient price signals), the overall reduction in costs should be shared with those market participants

## Minimal disruption

- As the balance is adjusted from future price signals to cost responsibility, there will be an impact on existing market participants who have invested to respond to today's price signal
  - Likely any move away from "12-CP" will have a cost impact on these customers

# Sweet spot




### Cost responsibility

- Value of grid connection to be recognized to assure appropriate cost recovery of today's grid

### Efficient price signals

- If market participants can adjust load behavior that reduces future cost build (efficient price signals), the overall reduction in costs should be shared with those market participants

### Minimal disruption

- As the balance is adjusted from future price signals to cost responsibility, there will be an impact on existing market participants who have invested to respond to today's price signal
  - Likely any move away from "12-CP" will have a cost impact on these customers

# Boundaries assessment

| Ranked Objective | Current State | Sweet Spot |
|---|---|---|
| **Reflect Cost Responsibility** | 🔴 | 🟢 |
| **Efficient Price Signals** | 🔴 | 🟢 |
| **Minimal Disruption** | 🟢 | 🟢 |
| Simplicity | 🟡 | 🟢 |
| Innovation and Flexibility | 🟢 | 🟢 |

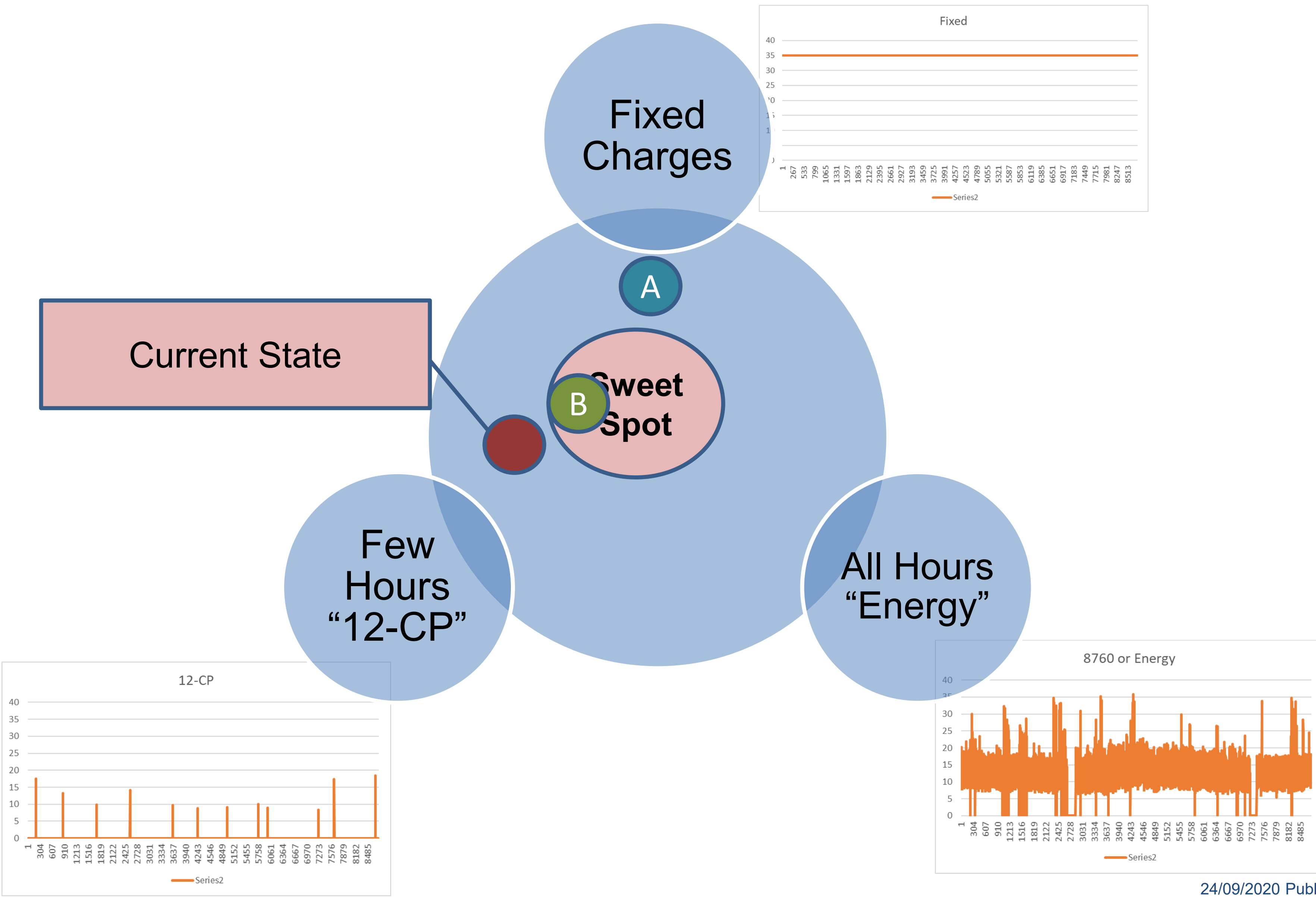
Legend:

- 🟢 Achieves objective
- 🟡 Partially achieves objective
- 🔴 Does not achieve objective

# Proposed bookend A and bookend B technical summary (no modifications)

| Cost Recovery | Bookend A<br>Fixed Charge | Bookend B<br>Peak Charge |
|---|---|---|
| **Cost recovery mechanism for all network costs:** | | |
| Inter-regional (between regions) | Billing capacity (highest metered demand, contract demand, or maximum of both) | Summer and winter weekday CP (approx. 120 hours annually) at time of region peak |
| Intra-regional (within region) | | Billing capacity |
| **Estimated Charge:** | | |
| Billing capacity | $9,700 / MW (est) | $3,100 /MW (est) |
| Coincident Regional Peak (summer and winter weekday daily peak) | | $1,000 /MW (est at 120hrs) |

# Bookends assessment



# Boundaries assessment with no modifications (cont.)

| Ranked Objective | Current State | Sweet Spot | Bookend A | Bookend B |
|---|---|---|---|---|
| **Reflect Cost Responsibility** | 🔴 | 🟢 | 🟢 | 🟢 |
| **Efficient Price Signals** | 🔴 | 🟢 | 🔴 | 🟢 |
| **Minimal Disruption** | 🟢 | 🟢 | 🔴 | 🔴 |
| Simplicity | 🟡 | 🟢 | 🟢 | 🟡 |
| Innovation and Flexibility | 🟢 | 🟢 | 🔴 | 🟡 |

# Initial analysis of rate impacts (without modifications or mitigation)

| | Approximate Amount of Contract Capacity (MW) | Current Total ISO Tariff Charges | Total ISO Tariff Charges Under Bookend A – Fixed Charge | Total ISO Tariff Charges Under Bookend B – Peak Charge |
|---|---|---|---|---|
| | | Transmission Revenue Requirement | | |
| **Heavy 12-CP Responders** | **1,500 MW** | **$80 million** | **$184 million**<br>***+$104 million***<br>***+130%*** | **$165 million***<br>***+$85 million***<br>***+100%*** |
| **Medium 12-CP Responders** | **380 MW** | **$40 million** | **$51 million**<br>***+$11 million***<br>***+35%*** | **$45 million***<br>***+$5 million***<br>***+20%*** |
| **All other customers** | **11,120 MW** | **$2,155 million** | **$2,040 million**<br>***-$113 million***<br>***-5%*** | **$2,065 million**<br>***-$90 million***<br>***-4%*** |
| **Total** | **13,000 MW** | **$2,276 million** | | |

* Rate impact analysis assumes consumer still avoids or reduces consumption in 50% of the CP hours

# Questions?

# Potential Modifications to Achieve Objectives

# List of modifications or levers – Impacts on objectives

- Coincident peak by time of region peak or system peak
- Modified DOS Term/Standby rate
- **More or less coincident peak hours for Bookend B** *example to follow*
- Variations on definition of billing capacity
- Load retention rates
- Transitional implementation
  - From 12 hours to 120 hours in 4 years
  - Adjusting functionalization %
- Alternate bucketing or functionalization of network costs
- Others . . .

**Legend:**

Achieves objective

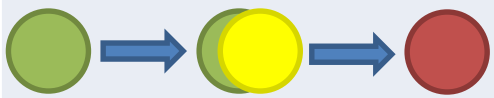
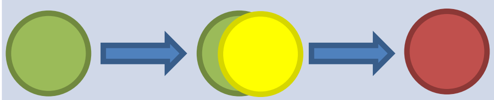
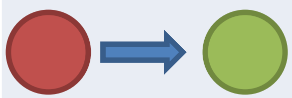
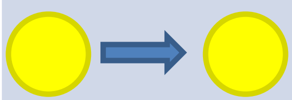
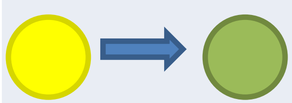
Potentially achieves objective with modification

Partially achieves objective

Potentially partially achieves objective with modification

Does not achieve objective

# Bookend B
# Example: Adjust number of CP hours

| Design element modification | Impact | Assessment |
|---|---|---|
| **Decrease number of CP hours:** | | |
| **Cost responsibility** |  | As the number of CP hours decreases, the ability to avoid costs of the grid as well as paying for the value of the grid connection increases |
| **Efficient price signals** |  | Cost avoidance resulting from decreasing number of CP hours does not result in a proportional amount of reduction in additional future transmission costs |
| **Minimal disruption** |  | Closer alignment with current state 12-CP will result in less bill impact to customers currently avoiding bulk charges |
| Simplicity |  | No change in simplicity of rate design by reducing the number of CP hours |
| Innovation and flexibility |  | Customers are more likely to respond by adjusting load or adding generation if avoiding the transmission charge is more likely |

# Questions?

# Next Steps and Session 3 Overview

# Next steps

- Shortly we will break for lunch and when we return we will:
  - Review and discuss energy storage treatment options and considerations; and
  - Provide stakeholders an opportunity to ask questions on the rate design bookends for technical clarity
    - Details on rate design bookends provided as reference materials
- For those stakeholders who will not be able to join us after lunch, we would like to go over next steps, session feedback and an overview of Session 3 before we break

# Session feedback

- We want to thank you for attending the Bulk and Regional Tariff Design Stakeholder Engagement Session 2 and we would appreciate your feedback on the session
- We value stakeholder feedback and we invite all interested stakeholders to provide their input on this session and the questions set out in the **Stakeholder Comment Matrix Tariff Design Session 2 on or before October 8, 2020**. The matrix will be posted on Sept. 24, 2020 on our website at [www.aeso.ca](http://www.aeso.ca)
  - Path: Stakeholder Engagement > Rules, Standards and Tariff Consultations > Tariff (filter) > Bulk and Regional Tariff Design > Sept. 24, 2020 Session 2
- To limit stakeholder fatigue, we are modifying how we collect your initial feedback on the session by conducting a Zoom poll during the session rather than emailing you a short session survey following the session. The questions remain the same

# Next session

- The next session (Session 3) will be hosted on **Oct. 22, 2020**
- For Session 3, we are looking for interested stakeholders who wish to develop and present an alternative rate design option
  - We invite all interested stakeholders to **express their interest in presenting a rate design option by emailing tariffdesign@aeso.ca by Oct. 2, 2020**
  - More details regarding the alternative rate design option guidelines can be found on our website
  - **Alternative rate design options will be due by Oct. 14, 2020** and will be posted to our website by Oct. 15, 2020
    - Path: Stakeholder Engagement > Rules, Standards and Tariff Consultations > Tariff (filter) > Bulk and Regional Tariff Design > Oct. 22, 2020 Session 3

# Questions?

# Lunch Break

# Energy Storage Treatment Options and Considerations

# How is energy storage unique?

- Energy storage unique features
  - Ability to provide a broad range of specialized technical capabilities or service
  - Ability to be operated across a broad range of states
  - The unique attributes of energy storage facilities are not the same as loads or generators

# How should energy storage be treated in the ISO tariff?

- Considerations for integrating energy storage into the Alberta market framework
  - Capabilities currently required to serve Alberta consumers and maintain reliability are acquired through markets or competitive procurements
  - None of these capabilities are uniquely provided by energy storage
  - Premise: Fair, efficient, and openly competitive (FEOC) in the energy market on unconstrained transmission system facilitates the lowest cost delivery of reliability for Alberta
    - FEOC is premised on fair treatment with competition on a level playing field
  - Cost allocation of transmission costs should consider costs caused and value received from the transmission system
  - Tariff treatment for energy storage should support FEOC and reliability

# Use-cases for energy storage in Alberta

| Use-Case: | Value Provided by ES: | ES Compensated Through: | Use of TX system to create value: | Value to TX system from ES: | Competing Against |
|---|---|---|---|---|---|
| **Energy (Stand alone ES)** | Adjust time of energy delivery to a time of tighter supply/greater need | Higher pool price in hours energy delivered | -Ability to deliver energy to grid<br>-Ability to charge from grid | Same as other generators | Generation; load response |
| **Energy (Hybrid Gen+ES)** | | | -Ability to deliver energy to grid | Same as other generators | Generation; load response |
| **Operating Reserve** | Capacity to dispatch or deliver energy | OR payment + pool price for delivered energy | -Ability to deliver energy to grid<br>-Ability to charge from grid | Same as other OR providers | Generation; load response |
| **NWS (TX deferral)** | Charge to relieve TX constraint | Contract payment | [Ability to charge from grid – but is creating value] | *Creating value for the TX system by charging* | Regulated transmission assets |
| | Discharge to relieve TX constraint | | [Ability to deliver energy to grid- but is creating value] | *Creating value for the TX system by discharging* | Regulated transmission assets |

# March 13: Options* considered for storage

**I. Charge based on flows**

- DTS for inflows and STS for outflows (current tariff)

**II. No DTS costs while providing certain "Market Services" (FERC Order 841 treatment)**

- Not be charged DTS when dispatched by the AESO to provide certain market services
- Full DTS charges when not providing those services

**III. Interruptible service with lower rate, since storage can be off if transmission system is stressed**

- Direct physical control by AESO, asset can be tripped off without notice (AESO has certainty)
- Dispatch control based on bids and offers: Financial incentive to comply (not full certainty)

* Options apply to market assets and not storage as a transmission asset

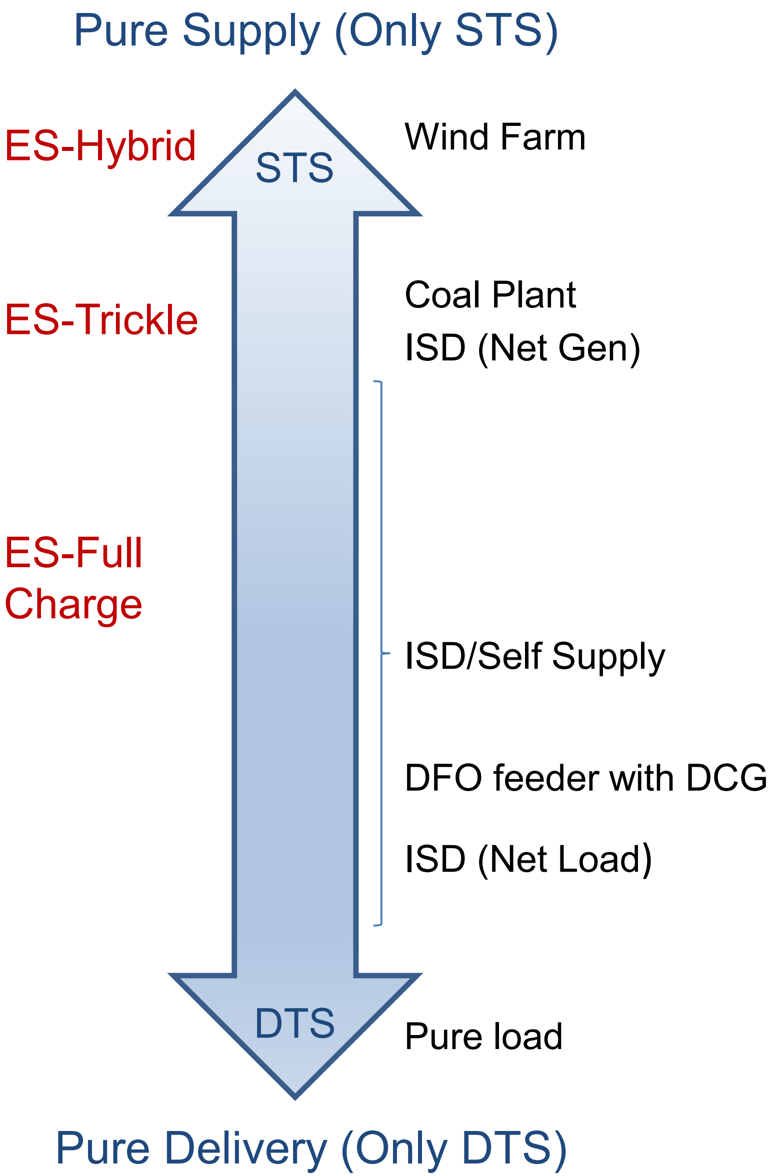
# I. Charge Based on Flows (Current Tariff Treatment)

# Current tariff treatment: 2018 GTA summary and decision items

- AUC approved AESO recommendation: *Rate DTS apply to energy storage facilities in hours when they are withdrawing electricity from the transmission system and Rate STS in hours when they are supplying electricity to the transmission system*
- AUC considered it to be reasonable and supported by current legislation, cost causation, the similarity to behavior of some dual-use sites and the results of the U of C's study
- The AESO relied on Cost Causation argument: if energy storage able to cause costs as per rate definition, should be charged
- AUC noted no one filed evidence on the matter and considers AESO evidence to be uncontested
- The AESO considered that its existing rates may need to be modified or new rates may need to be developed to adequately address the characteristics of energy storage

https://www.aeso.ca/assets/Uploads/22942-X-22942-D02-2019AESO2018ISOTariff-0712.pdf (PDF page 267)

# DTS/STS application: Transmission system point of delivery and supply




- Many users of transmission system have both DTS and STS contracts (see spectrum)
- Contracts provide for a level of service that can be used at any point in time (not limited to % of time)
- Market participant decisions on contract levels are driven by ISO tariff price signals
- Energy storage should face the same price signals as other transmission system users
  - Hybrid, trickle charge and full charge all use transmission system differently

**System Access Service**: means the service obtained by a market participant through a connection to the transmission system, and includes access to exchange electric energy and ancillary services.

**Point of Delivery**: means the point at which electricity is transferred from transmission facilities to facilities owned by a market participant

**Point of Supply**: means the point at which electricity is transferred to transmission facilities from facilities owned by a market participant

**Rate DTS** applies to **system access service** provided at a **point of delivery**

**DTS Charges**: POD; Bulk; Regional; AS; Customer Contribution

**Rate STS** applies to **system access service** provided at a **point of supply**

**STS Charges**: GUOC; Losses; Customer Contribution

# II. No DTS Costs While Providing "Market Services"

# (FERC Order 841 Treatment)

# FERC 841: Tariff approach for storage

- FERC directed Electric storage resources should not be charged transmission charges when they are dispatched by an RTO/ISO to provide a service because:
  - Their physical impacts on the bulk power system are comparable to traditional generators providing the same service; and,
  - Assessing transmission charges when they are dispatched to provide a service would create a disincentive for them to provide the service.
- FERC order 841-A further clarified:
  - “Service” may be defined by each RTO/ISO
  - Any electric storage resource that is charging for the purpose of participating in an RTO/ISO market but is not being dispatched by the RTO/ISO to provide a service should be assessed charges consistent with how the RTO/ISO assesses transmission charges to wholesale load under its existing rate structure.

# Jurisdictional review of proposed FERC 841 implementation

Transmission charges for storage in US jurisdictions generally mirror those of generators when discharging; however, **transmission charges are assessed while charging unless the resource is providing some form of service while charging**.

| Jurisdictions | Storage Transmission Cost Treatment when Providing Services | Proposed Services |
|---|---|---|
| ERCOT | *Storage is not be subject to ERCOT charges and credits associated with ancillary service obligations* | Any AS dispatch |
| CAISO | *Transmission Access Charge (TAC) is not assessed to storage, including pumped hydro if dispatched by CAISO* | Any dispatch |
| MISO | *Storage exempt from transmission charges, normally allocated to load, when they are dispatched to provide ancillary services* | Any AS dispatch |
| SPP | *that incidentally results in charging activity shall not be subject to a bill for transmission service during those actions* | Ramping, Reg, SR, or Supp |
| PJM | *Dispatched Charging Energy is treated like negative generation and is subject to only losses.*<br>*Non-Dispatched Charging Energy is charged load transmission charges.* | AS and energy imbalance dispatch |
| NYISO | *Storage is exempt from transmission charges, normally allocated to load, when they are dispatched to provide ancillary services* | Any AS dispatch |
| ISO-NE | *Applies transmission charges when storage is charging for later resale in wholesale markets and is not providing a service* | DA-RD related services |

# Alberta considerations: FERC 841 treatment

- To assess adopting FERC direction consider:
  - Alberta isn't subject to FERC directions
  - FERC directions sometimes align with Alberta market framework; sometimes not
- Are the physical impacts of energy storage on the bulk power system comparable to those of traditional generators when providing the same service?
  - Comparable when energy storage is discharging to provide a service; needs to be tested when charging to provide a service
  - In assessing ability to provide system access service to customers, DTS and STS contracts are evaluated differently, and impacts to system and solution to resolve vary for DTS/STS

# Alberta considerations: FERC 841 treatment (cont.)

- Would assessing transmission charges when storage is dispatched to provide a service create a disincentive for them to provide the service?
  - Increased cost is a (dis)incentive; is it a efficient price signal?
  - Incents different behavior:
    - Do not provide service;
    - Operate differently;
    - Design alternate configuration
  - What level of cost is fair when considering the competitive playing field for providing this service?
- The implementation of FERC 841 like treatment requires the AESO to land on which of the use-cases (Energy, AS, NWS) should qualify for this treatment

# III. Interruptible Service with Lower Rate

# Interruptible (stall-able) service

- This option assumes storage puts limited pressure on the capacity of the system; and as such, is willing to have an interruptible level of service
- Alberta's transmission system is planned for limited congestion
- Alberta's market mechanism for dealing with limited capacity in real-time is unlike other North American LMP markets. Transmission congestion is not reflected in Alberta's single pool price.
  - Constrained down resources  are not compensated
  - The market price is adjusted down and constrained on energy providers are compensated for the out of merit energy
- An interruptible service would have to be one that prevents storage from charging while under in-flow constraints or discharging under out-flow constraints to avoid the activation of real-time market mechanisms in order to be a valuable service.
- Service available only where there is limited transmission (inverse of DOS)
- Assets under this rate might not qualify for Operating reserves, or  FFRSi
- Service could apply to loads willing to curtail

# Energy storage options summary

| Option | Pros | Cons |
|---|---|---|
| **Charge based on flows** | • No changes required to tariff<br>• Technology agnostic<br>• Aligns with tariff design principles | • Potentially a barrier to stand alone storage economics<br>• DTS refund for NWS may be challenged |
| **No DTS costs while providing "Market Services"** | • Treatment similar to other jurisdictions<br>• Applicable services can be defined<br>• Most popular option with storage proponents<br>• No location requirement | • Varies from current tariff (cost causation) principles<br>• Designed for markets that require ISO unit commitment and locational prices<br>• Not technology agnostic |
| **Interruptible service with lower rate** | • Open to any qualified service provider (loads)<br>• Aligns with tariff design principles | • Incompatible with current Ancillary Services<br>• Qualification restricted by location |

# Design objectives: Storage treatment

| Objective | Description |
|---|---|
| **Reflect Cost Responsibility** | Cost recovery is based on the benefit and value transmission customers receive from the existing grid |
| **Efficient Price Signals** | Price signal to alter behavior to avoid future transmission build |
| Simplicity | Simplicity (in implementation) and clear price signals while achieving design objectives |
| Technology Agnostic | Technology agnostic is a binary assessment of whether the option is specific to energy storage or could be applied more broadly. |
| Fair Open Competition | Remove unfair barriers for storage while not creating an unfair advantage |

* Proposed treatment must fit within current legislation

# Questions?

# Contact the AESO

- ***Twitter:*** *@theAESO*
- ***Email:*** *tariffdesign@aeso.ca*
- ***Website:*** *www.aeso.ca*
- Subscribe to our stakeholder newsletter

# Thank you

# Reference Materials

# Rate Design Bookends

# Bookend summary

- Further considerations on each bookend are provided in the following slides for reference
- Bookend A:
  - Charge all network cost on billing capacity
- Bookend B:
  - Charge inter-regional network cost using summer and winter weekday regional peak (approx. 120 hours); and
  - Charge intra-regional network cost on billing capacity

# Case for Bookend A

1. Load timing does not influence new cost
2. Time varying charge creates energy and ancillary services market distortions, and transfers cost from responders to non-responders
   - Given 1 above, transfers likely are neither effective nor efficient
3. Provide transmission service at least at contract capacity level
   - It is not practical to curtail every customer down to contract capacity in real-time
     - no operational need if there is no adverse transmission or market impact
   - Tariff design is used to incent customers to remain at or below contract capacity
4. Non time varying long run demand charge i.e. billing capacity, adequately allocates cost responsibility
   - Responsibility for some network cost is not directly connected to billing capacity

# Bookend A – Rate calculation

- All network cost charged on higher of long run contract demand or actual highest demand (i.e. billing capacity)
  - long run balances cost responsibility if customer now lowers contract demand or actual highest demand
  - Rolling five years or two years maximums (i.e. ratchets) have been used as proxy for long run. Transition from (fast) growth to decline in billing volumes may support longer terms.
- About $9,700/MW every month for network service
  - Network bill is about 70% of total transmission bill
    - other significant parts being point-of-delivery charge and operating reserves charge

# Bookend A – Outcomes

- Incents managing contract demand and highest metered demand
  – Reduces flow and possibly stress on network close to the customer
- Incents usage up to billing capacity
  – Efficient - higher usage of markets and of network without incurring additional transmission cost
- Incents more permanent demand management investments and operations optimizations
  – Charge can not be reduced by lowering demand in just one month (or in just few hours of one month)

# Bookend A – Implementation

- May incent customers to reduce billing capacity MW, if customer can:
  - Flatten its consumption profile economically; or
  - accept lower reliability of self supply; or
  - can firm up self supply sufficiently; or
  - find an alternate source of energy
- Creates significant bill impact, particularly for the heavy 12-CP responders
  - Customer response could mitigate bill impact
- Implementing Bookend A with minimal disruption would require:
  - Full grand parenting which increases the bill of those not grand parented; or
  - Gradual transition to the same end state, i.e. increase limited to X% per year; or
  - Standby rate possibly along with a form of DOS Term; or . . .

# Case for Bookend B

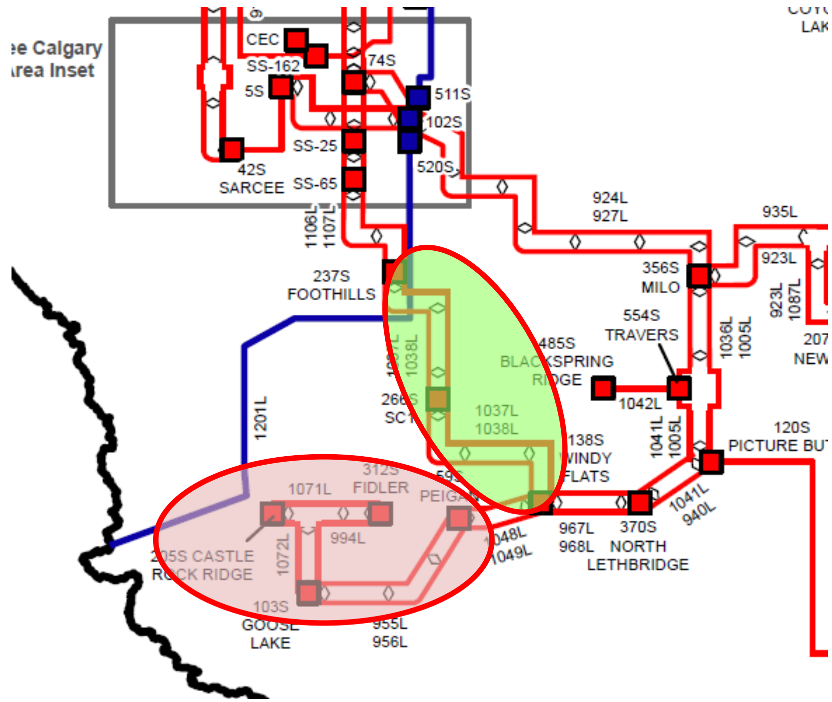
1. Load peak timing can reduce new cost
2. Over time, cost savings outweigh impact on market and non-responders
3. On a forecast basis, peak load hours were a significant driver of significant portion of existing cost
4. Some cost is driven by generation or legislation/regulation. Load can be assigned indirect responsibility since:
   - Market develops new generation in response to load, and
   - Legislation/regulation create requirements on load's behalf
5. Charge in peak load hours is effective in allocating cost responsibility
   - Link to forecasting, planning, need and transmission cost

# Case for Bookend B (cont.)

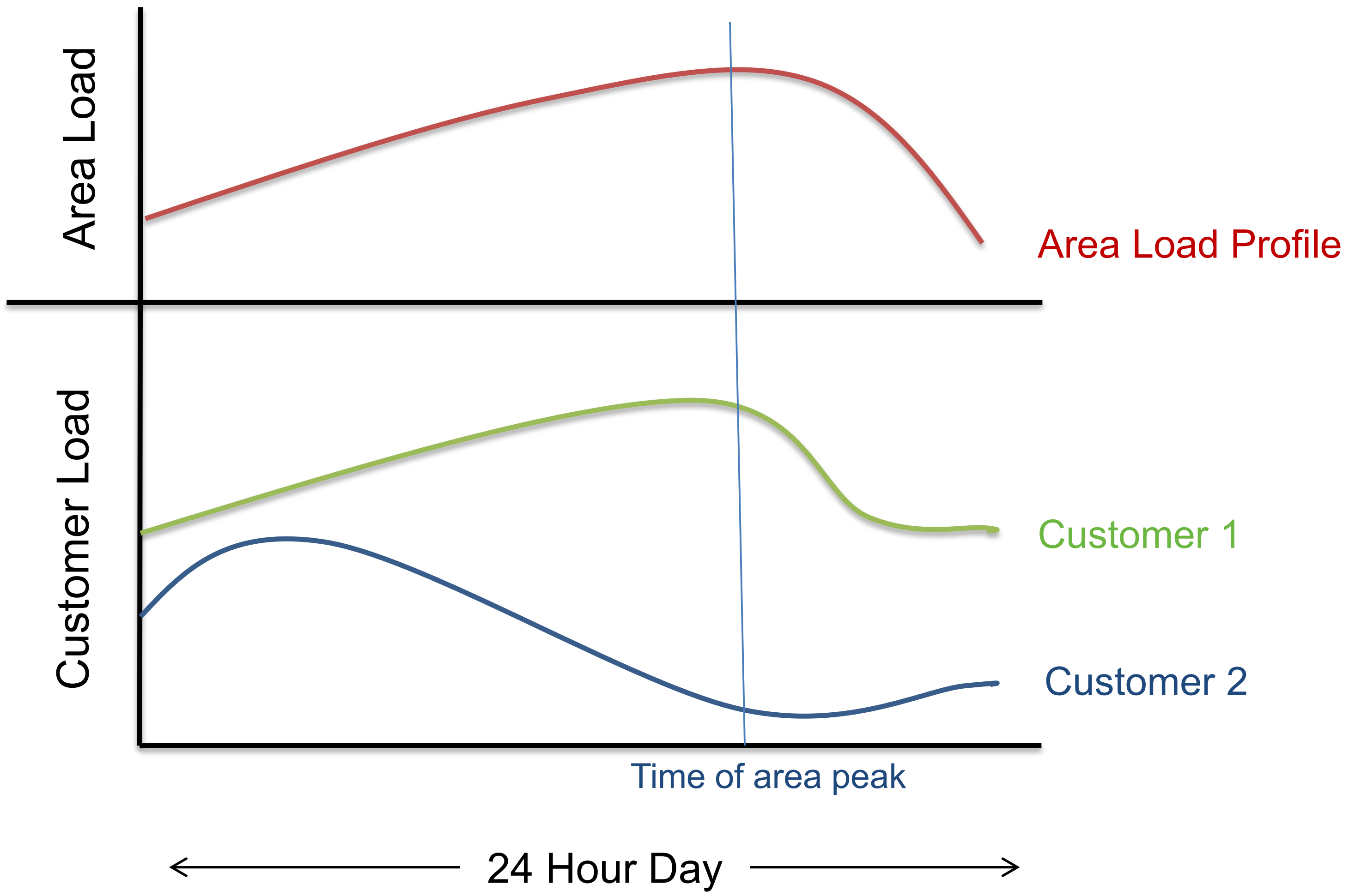
6. Winter and summer peaks matter more than other peaks
   - NW need driven by winter peak
   - Edmonton need driven by localized non-coincident (summer) peak
7. Peak load hour on many weekdays maybe separated by few MW, 10s to 100 MW
   - Managing peak load on many weekdays has more value than managing it on just one day in the month
8. Radial facilities are sized to the customer's highest demand and inter-regional facilities are sized to all of the region's customers taken together (i.e. region's coincident demand, demand at the same time)
   - Managing each region's coincident demand has more value than managing province's coincident demand

# Bookend B – Inter-regional versus intra-regional

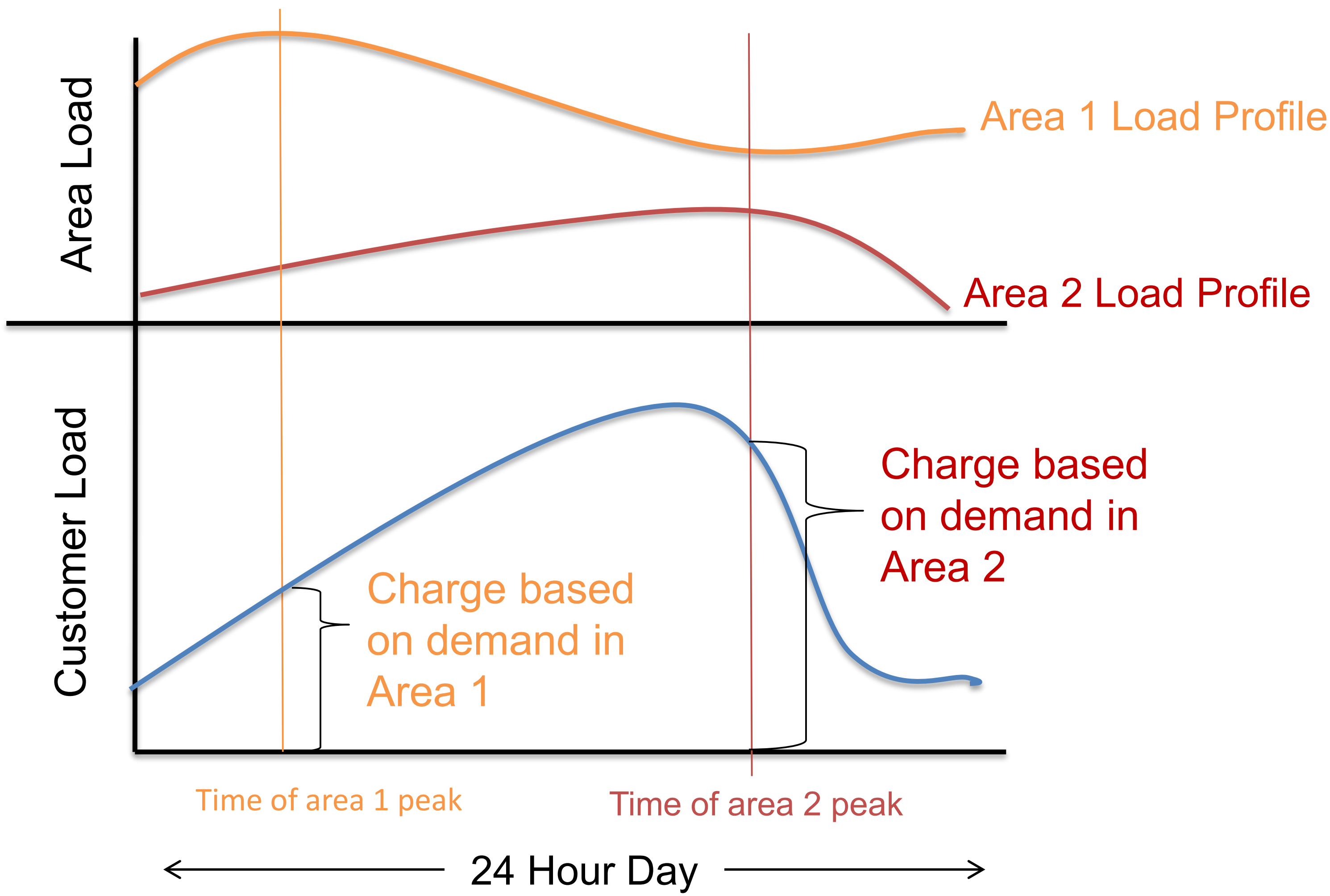
- Inter-regional: takes power from one region to another, example:
  - Foothills path to Calgary (FATD )
- Intra-regional: collects generation and serves load within a specific region, example:
  - SATR network in Pincher Creek



# Customers pay based on consumption at peak



# Customers with same load profile charged differently in different areas



# Bookend B – Rate calculation

- Inter-regional network cost recovered in daily summer and winter weekday (approx. 120 hours) peak demand hour of each region
  - Rate would be about $1,000/MW in peak demand hour of each summer and winter weekday for each region
  - On the day:
    - region 1 may peak at say **2 PM**; Customer in region 1 will pay $1,000/MW of its load at **2PM**
    - region 2 may peak at say **4 PM**; customer in region 2 will also pay $1,000/MW of its load but for its load at **4 PM**.
  - Approximately 120 weekdays (resulting in approx. 120 hours) of summer and winter could be termed 120-CP
- Remaining network cost would be recovered using billing capacity
  - Rate would be about $3,100/MW of billing capacity

# Bookend B – Outcomes

- Incents managing summer and winter weekday peak demand
  - Reduces flow and possibly stress on inter-regional network facilities
- 120-CP is much weaker incentive than 12-CP
  - Reflects difficulty of full or “heavy” demand responders reducing cost
- Low rate likely takes away incentive to self-supply primarily to reduce transmission service charge
  - Except baseload self-supply which inherently runs each weekday in most peak outflow hours and would still net meter
  - Baseload self-supply likely is only economical for customers whose self-supply is integrated into its industrial process
- Maintains Bookend A’s incentive to manage billing capacity
  - Weaker than Bookend A since billing capacity is used to recover only intra-regional network cost, not all network cost

# Bookend B – Implementation

- Requires manageable billing system changes to go from 12-CP to 120-CP
- Maintains structure to make the incentive to manage peak outflow stronger if it turns out to be efficient
- Responders would have to respond in more hours to ensure transmission charge reduction
  - Currently respond in about 200 hours to catch 12-CP hours
  - 120-CP may require response in additional hours
- Without mitigation, will create bill impact, particularly for the heavy CP responders
- Similar to Bookend A, but to much lesser extent, implementing this Bookend B may require:
  - Full grand parenting which increases the bill of those not grand parented, or
  - Gradual transition to the same end state, increase limited to X% per year; or . . .
  - Standby rate possibly along with a form of DOS Term; or . . .

# Thank you