2023 COS Methodology Review
Draft report presentation

May 17, 2023

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Powering our future®

FOR TODAY'S MEETING

- Remember to mute your microphones.
- Disable camera
- If you have a question, use the raise your hand function or type it in the chat.

- Reminder: this meeting is being recorded.

"Before we get started, for privacy reasons I want to advise that the session is being recorded for future reference/clarity as required. The recording will be stored on the Cost of Service Methodology Review webpage at www.saskpower.com. It will remain in this site until it no longer serves a business purpose and/or has met its retention period. By staying in the Teams meeting, you are consenting to being recorded for the purposes outlined.

After the session, the link to the recording will be shared once it is downloaded and saved."

LAND ACKNOWLEDGEMENT

This meeting is hosted from the traditional territory of the Treaty 4 nations and the home of the Métis.

We make this acknowledgment in the spirit of reconciliation because we are all treaty people as we each make our homes in a traditional territory of the Indigenous people of Canada.

Fallen power lines

- Always assume that wires are energized.
- Stay at least 10 metres away and call 911.
- Do not try to move a downed power line.

If you are in a vehicle:

- Stay inside vehicle.
- If it’s not safe to stay inside vehicle, keep feet together and hold arms tightly at your sides.
- Jump clear without touching vehicle.
- Hop away from vehicle with feet together.

Review of SaskPower's Cost Allocation and Rate Design Methodologies – Draft Report

John Todd and Andrew Blair

May 17, 2023

Agenda

1. **Project Description**
2. Background on Cost Allocation Methodology
3. Elenchus Review and Recommendations
4. Survey Responses
5. Next Steps

Elenchus

- John Todd, President
  - Founded 1980
  - Cost of Service (CARD) studies for BCUC, OEB, Régie and many utilities across Canada
  - SaskPower COS review in 2012 and 2017
- Andrew Blair joined Elenchus in 2016
  - Prior responsibilities included cost allocation

www.elenchus.ca

Project Description (SaskPower RFP)

- Review SaskPower's Cost Allocation Methodology
- Examine Functionalization, Classification and Allocation Methodologies
- Survey Canadian and US Utilities' practices
- Make Recommendations to SaskPower
- Draft Report April 28
- **Presentation May 17**
- Final Report June 30

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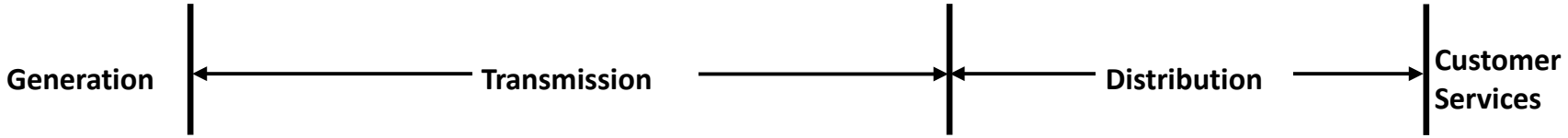
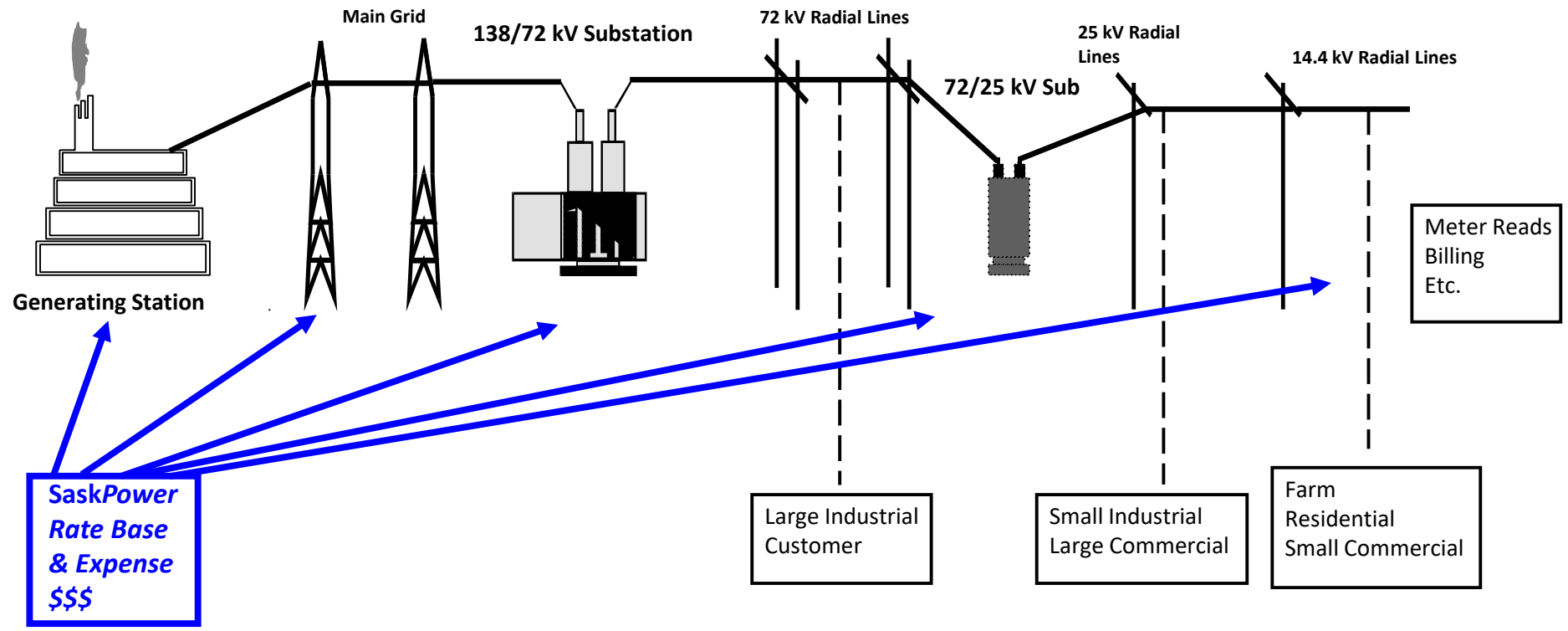

Generation
Transmission
Distribution
Customer Services


Main Grid
138/72 kV Substation
72 kV Radial Lines
25 kV Radial Lines
14.4 kV Radial Lines
72/25 kV Sub
Generating Station
Meter Reads
Billing
Etc.
SaskPower
Rate Base
& Expense
$$$
Large Industrial
Customer
Small Industrial
Large Commercial
Farm
Residential
Small Commercial

Cost Allocation Methodologies

- Directly allocated costs - Exclusive use by class (rare)
- Shared Utility Assets and Expenses
  - We all benefit from sharing
  - Electrons flow through common infrastructure
- Cost Causality is main criterion
  - Mostly apportioned based on relative “use”
  - E.g., meters measure energy (kWh) use
- Goal is Fair and Reasonable Rates
  - Causal costs=> allocated costs =>Target/ideal rates
  - Rate design is a subsequent step

Cost Allocation Methodology Steps

- Functionalization, includes:
  - Generation, Transmission, Distribution, Customer Service
- Categorization or classification
  - Energy, Demand, Customer
- Allocation
  - Use Cost Drivers: kWh, kW, customer count (Weighted)

Functionalization

- Group similar assets and expenses
  - Reflects SaskPower's System of Accounts, including:
    - Generation Stations with many sub-functions
    - Transmission Line: differentiated by voltage, towers, wires, etc.
    - Distribution Lines, feeders by voltage, customer connections, meters, etc. (each by type with different costs)

Example Functionalization

- Generation (17 stations)
  - 37% coal; 24% natural gas; 16% hydro; and more
- Transmission
  - Power Customers (72 kV)
  - Connects generation to distribution & large users
- Distribution
  - Residential, farms, business below 750 V
- Customer Service

Classification

- Demand-related costs
  - Facilities determine **CAPACITY** of energy flows
  - Higher capacity requires larger “pipe”
- Energy-related costs
  - More energy consumed means more fuel to produce
- Customer-related costs
  - More customers require more meters and customer service agents; differs by class

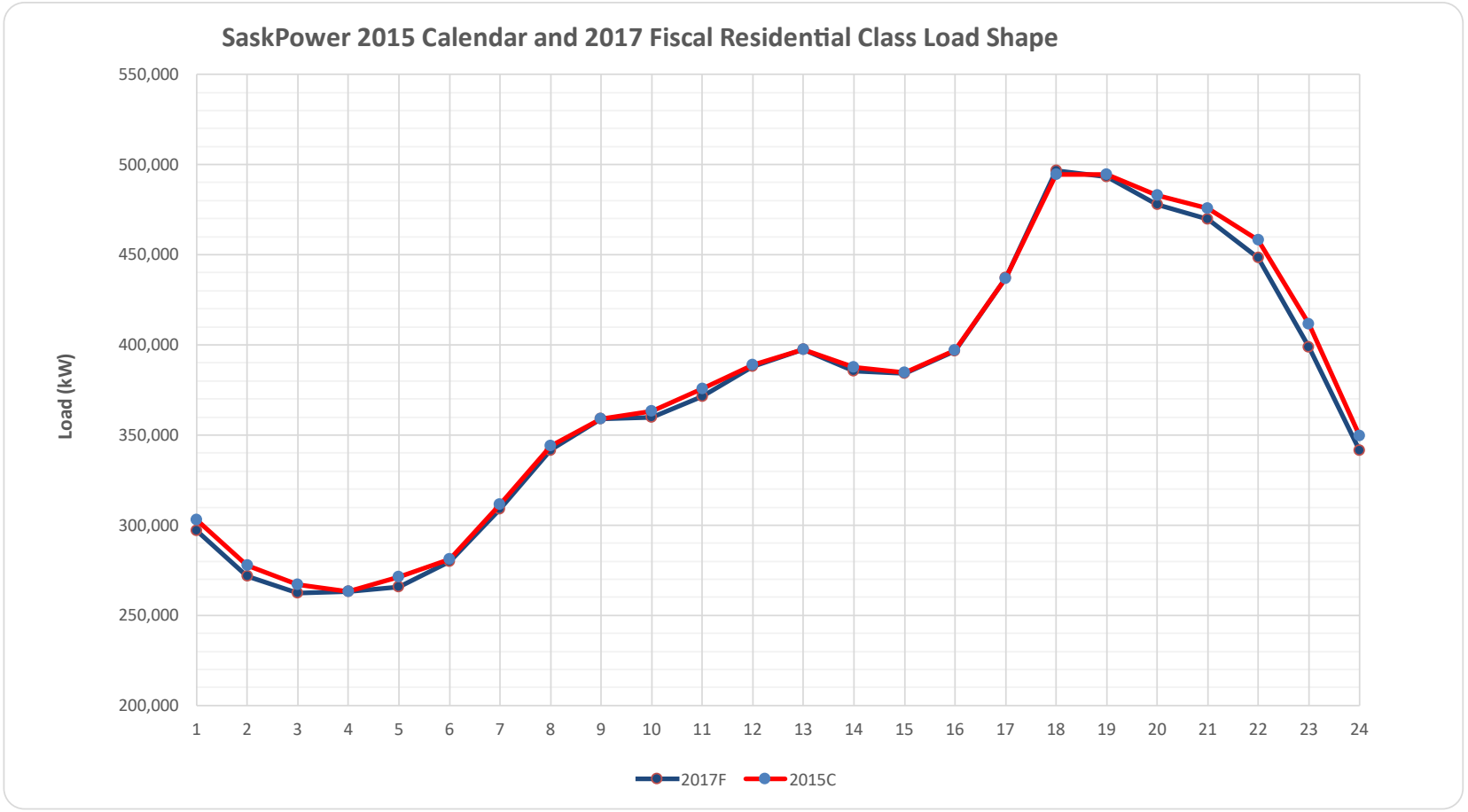
Allocation

- Costs allocated to SaskPower customer classes
  - Primary Allocators (costs shared by proportionate use)
    - kWh (energy including losses)
    - kW (demand including losses)
    - # of customers
    - Weighted # of customers
    - Direct Assignment (Streetlights)
  - Produces total allocated costs by customer class
  - Compare to class revenue => revenue/cost ratios

Cost Allocation Results

- Revenue to cost ratios (RCRs) by customer group
  - Target RCR is 1.00
  - Above 1.00 – providing subsidy
  - Below 1.00 – receiving subsidy
  - But allocation is not precise
  - Hence, goal is RCR in a **range = 0.95 to 1.05**
- Using this range
  - Reduces volatility in rates due to anomalous fluctuation
  - Allows for adjusting without “rate shock”
- Adjusting RCRs is the starting step for **Rate Design**
- Additional step is monthly/demand/energy charges

Demand, Energy & Peak Demand (2015 vs 2017)



Generally Accepted Rate Making Principles – Cost Allocation and Rate Design

- Bonbright Principles (1961 and 1988)
  - Regulators restructure – but cover the same concepts
- Aka: **Attributes of a sound rate structure**
  - Revenue Related Attributes
  - Cost Related Attributes
  - Practical Related Attributes

SaskPower Principles

Based on Bonbright:

- Meeting revenue requirement
- Fairness and equity
- Economic efficiency
- Conservation of resources
- Simplicity and administrative ease
- Stability and gradualism

Bonbright restructured but covers the same concepts

Agenda

1. Project Description
2. Background on Cost Allocation Methodology
3. **Elenchus Review and Recommendations**
4. Survey Responses
5. Next Steps

Elenchus' Review Approach

- Survey of other jurisdictions
- Review model and documentation
- Exchange of information with SaskPower staff
- Compare with standard practice based on survey and Elenchus experience

Cost of Service Methodology

- SaskPower follows traditional approach
  - Models currently use 2021 data
- Previous reviews documented:
  1. NARUC Electric Utility Cost Allocation Manual (1992)
  2. Many “acceptable” methods – what best reflects that operational factors of each utility
  3. Main methodologies used in North American jurisdictions indicates usual practices

Functionalization Methods

- This is the first Elenchus review of functionalization methods
  - Previous studies focused on classification and allocation
- Functions are standardized (Generation, Transmission, Distribution, Customer Care)
- Our review focused on level of detail in subfunctions
- Functionalization and sub-functionalization is aligned with revenue requirement cost centres

List of Sub-Functions

1. Generation	2. Transmission	3. Distribution	4. Customer Services
Load	Main Grid	Area Substations	Metering Services
Losses	230 kV & 138 kV Lines Radials	Distribution Mains	Meter Reading
Scheduling and Dispatch	138/72 kV Substations	Urban Laterals	Billing and Customer Accounts
Regulation and Frequency Response	72 kV Lines Radials	Rural Laterals	Customer Collecting
Spinning Reserve		Transformers	Service & Support
Supplementary Reserve		Services	Customer Strategy & Planning
Planning Reserve		Instrument Transformers	
Reactive Supply		Meters	
Grants in Lieu of Taxes		Streetlights	
		Customer Contributions	

Generation Functionalization

1. Generation
Load
Losses
Scheduling and Dispatch
Regulation and Frequency Response
Spinning Reserve
Supplementary Reserve
Planning Reserve
Reactive Supply
Grants in Lieu of Taxes

- Nine Sub-functions
- All generators included together
- Sub-functions delineated by purpose of generation
- Separate Load and Losses sub-functions

Transmission Functionalization

2. Transmission
Main Grid
230 kV & 138 kV Lines Radials
138/72 kV Substations
72 kV Lines Radials

- Four Sub-functions
- Separated into substations and line radials at different voltages

Distribution Functionalization

3. Distribution
Area Substations
Distribution Mains
Urban Laterals
Rural Laterals
Transformers
Services
Instrument Transformers
Meters
Streetlights
Customer Contributions

- Ten Sub-functions
- Includes Streetlights, which are directly classified and allocated
- Customer contributions are classified and allocated to offset the subfunction of the asset paid with the contribution

Customer Services Functionalization

4. Customer Services
Metering Services
Meter Reading
Billing and Customer Accounts
Customer Collecting
Service & Support
Customer Strategy & Planning

- Six Sub-functions
- Often labeled as “Customer Care” or “Retail” in other jurisdictions

Functionalization Recommendations

- Elenchus recommendations are limited to minor restructuring of sub-functions – there is no impact on cost allocation or rate design results
- **Recommendations to consider:**
  - Break out “Load” function into separate types of generation
  - Move “System Operator” sub-functions (Scheduling & Dispatch and Regulation & Frequency) from Generation to Transmission

Classification / Allocation Methods

- Generation costs present conceptual challenges
  - How to separate capacity related from demand related capital
  - Generation assets provide both capacity and energy
- Transmission is essentially capacity related (coincident peak allocation)
- Distribution also capacity (non-coincident peak)
- Customer costs are largely (weighted) customer-related allocation (i.e., not caused by demand or energy)

Generation Classification Methodologies

- Variable costs (per MWh) are energy related
  - Such as fuel costs
- How classify capital and other fixed costs?
  - NARUC Manual (January 1992) identifies many acceptable options to use for the demand/energy split
    - Peak Demand Methods (five methods identified)
    - Energy Weighting Methods (four methods identified)
    - Time Differentiated Embedded Cost of Service Methods (four methods identified)

Generation Classification Methodologies (2)

- Peak Demand Methods (five methods identified)
  - Single Coincident Peak (1-CP)
  - Summer and Winter Peak (Average of 3 CPs in each season)
  - Sum of 12 Monthly Coincident Peaks (12-CP)
  - Multiple Coincident Peak
  - All Peak Hours
- Reflects a view that generation is built to meet the capacity requirements (i.e., caused only by demand, not energy requirements)

Generation Classification Methodologies (3)

- Energy Weighting Methods
  - Average and Excess
  - Equivalent Peaker
  - Base and Peak
  - Judgmental Energy Weightings
- Reflects view that generation is built to meet both energy and demand drivers
  - Widely accepted; must meet annual MWh energy needs as well as peak MW demand
  - Should demand/energy split reflect supply mix or customer load profile?

Generation Classification Methodologies (4)

- Time Differentiated Embedded Cost of Service Methods
  - Production Stacking
  - Base-Intermediate-Peak (BIP)
  - Loss of Load Probability (LOLP) Production Cost
  - Probability of Dispatch
- These methods are not commonly used
  - Can be complex
  - Can be unstable if supply mix is changing

SaskPower's Generation Method

- **SaskPower uses Average and Excess** to determine energy-related and capacity-related generation costs
- Energy-related generation costs:
  - Allocated based on energy (MWh)
- Demand-related generation costs:
  - Allocated on the basis of 2 CP (Coincident Peak), reflecting:
    - Winter peak demand > summer peak demand
    - Winter capacity > summer capacity (warm wires)
    - Operationally there are two peaking periods

Transmission Classification / Allocation Methodologies

- Transmission is widely classified and allocated on the basis of capacity (demand-related costs)
  - System is built for peak, not for energy
  - Has spare capacity the rest of the time
- In prior reviews, Elenchus agreed with:
  - Classifying 100% demand-related and
  - Allocation using 2CP (same as generation)

Distribution Classification / Allocation Methodologies

- Report will document main methodologies used
- Elenchus views (across utilities):
  - Use Minimum System Method for classification of lines and transformers
  - Agrees with 2 CP for sub-transmission and NCP allocation of distribution demand related costs
  - Agrees with (weighted) number of customers for customer related costs

- **Elenchus Recommendation:** Use precise distribution classification factors instead of rounded figures

Rate Design Methodology

- SaskPower uses fixed and variable charges:
  - Basic monthly charge and Energy Charge (¢/kW.h) for Residential and energy billed small commercial customers
  - Diesel supplied customers have a monthly charge and an inclining energy rate
  - Farms and larger commercial customers with demand meters have a basic charge, demand rate above 50 kVa/month and energy rate that declines once the demand rates is applied
  - Larger customers, (power standard, resellers), have a monthly charge, a demand charge and an energy charge

Time-of-Use Rates

- Time-of-Use rates apply different energy charges at different time of the day and/or season
- Most effective in systems with low load factors (more significant peaks)
  - SaskPower has a high load factor
- Following the Advanced Metering Infrastructure ("AMI") roll-out, over time SaskPower will have the data necessary to implement time-varying rates in the future
- Elenchus is not recommending Time-of-Use rates at this time, but encourages SaskPower to revisit this option once a reasonable level of AMI data is available for analysis

Methodological Change: Bary Correction

- Used since 2000 as a proxy for coincident peak allocator
- High average demand implied higher coincidence
- Starting with 2022, being phased out because:
  - High energy price is a false price signal to self-generate
  - Electricity markets are changing
  - Change facilitates unbundling of rates
- **Elenchus recommended this change in 2017**

Treatment of Carbon Tax

- Carbon tax is unique from cost allocation perspective
- Functionalization: “caused” by generation
- Classification: “adder” to fuel cost, hence
  - Energy-related cost (caused by coal and natural gas)
  - Essentially a markup on fuel, but tracked separately
- Same allocation to classes as would result from an all-in fuel cost
- Parallel allocation done to derive the correct and transparent line item on customer bill

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4. **Survey Responses**
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Survey of Functionalization, Classification and Allocation Methodologies

- Utilities surveyed:
  - ATCO Electric
  - BC Hydro
  - Newfoundland Power
  - NB Power
  - Nova Scotia Power
  - Hydro Quebec
  - Hydro One
  - Manitoba Hydro
  - Georgia Power
  - Montana-Dakota Utilities

Functionalization

- Approach very standardized in the electricity industry
- Main functions includes generation, transmission, distribution and customer service
- Costs by function are based on the utility's system of accounts
  - All costs incurred by SaskPower are assigned to a function
  - Carbon tax same but parallel calculation
- **SaskPower functionalization approach is standard** (but IFRS has increased componentization)

Generation Functionalization Survey Results

Table 1: Functionalization methodology used for generation assets and expenses		
Number of Functions	Number of Utilities	Percent of Utilities
8-10	1*	10
6-7	1	10
4-5	1	10
2-3	5	50
NA	2	20
Totals	10	

* Indicates SaskPower's placement in the table

Transmission Functionalization Survey Results

Table 2: Functionalization methodology used for transmission assets and expenses		
Number of Functions	Number of Utilities	Percent of Utilities
6-8	2	20
3-5	1*	10
2	2	20
1	4	40
NA	1	10
Totals	**10**	

* Indicates SaskPower's placement in the table

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Distribution Functionalization Survey Results

Table 3: Functionalization methodology used for distribution assets and expenses		
Number of Functions	Number of Utilities	Percent of Utilities
10-11	2*	20
8-9	2	20
6-7	2	20
4-5	4	40
Totals	**10**	

* Indicates SaskPower's placement in the table

Customer Care Functionalization Survey Results

Table 4: Functionalization methodology used for customer care assets and expenses		
Number of Functions	Number of Utilities	Percent of Utilities
6	0*	0
5	1	10
4	4	40
3	3	30
2	2	20
Totals	**10**	

* Indicates SaskPower's placement in the table

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Generation Classification

Table 5: Classification methodology used for generation assets and expenses		
Methodology	Number of Utilities	Percent of Utilities
Set by regulation	1	10
System Load Factor	4*	40
100% demand	1	10
3 CP Peak and Average	1	10
Fixed and Variable	1	10
NA	2	20
Totals	10	

* Indicates SaskPower's placement in the table

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Generation Classification

Table 5: Classification methodology used for generation assets and expenses		
Methodology	Number of Utilities	Percent of Utilities
Set by regulation	1	10
System Load Factor	4*	40
100% demand	1	10
3 CP Peak and Average	1	10
Fixed and Variable	1	10
NA	2	20
Totals	10	

* Indicates SaskPower's placement in the table

Baseload Generation Classification to Demand

Table 6: Classification of Base Load Steam generation costs to demand		
Percent Classified as demand	Number of Utilities	Percent of Utilities
90 - 100	3	30
70 - 90	0	0
50 - 70	0	0
35 - 50	3	30
Below 35	0*	0
NA	4	40
Totals	10	

* Indicates SaskPower's placement in the table

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Transmission Classification to Demand

Table 9: Classification of transmission costs to demand		
Percent Classified as demand	Number of Utilities	Percent of Utilities
90 - 100	6*	60
70 - 90	0	0
50 - 70	0	0
35 - 50	2	20
NA	2	20
Totals	10	

* Indicates SaskPower's placement in the table

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Distribution Classification Methods

Table 11: Classification Method for Distribution Lines and Transformers		
Method	Number of Utilities	Percent of Utilities
Minimum System	3*	30
Zero Intercept	0	0
Both Minimum and Zero Intercept	3	30
Other	3	30
Judgment 50/50	1	10
Totals	**10**	

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NEXT STEPS

Date	Milestone
March 22	Deadline for written questions to be submitted to SaskPower/Elenchus
March 30	Written responses provided to stakeholder questions
April 28	Elenchus submits draft report to SaskPower
May 17	**Elenchus presents draft report and findings to stakeholders, invites written submissions**
May 24	Deadline for written questions to be submitted to SaskPower/Elenchus
June 2	Written responses provided to stakeholder questions
June 16	Stakeholders file final written submissions on the draft report
June 30	Elenchus delivers final report which includes all written questions and responses to stakeholder submissions.

Email questions & submissions to :

cosreview@saskpower.com

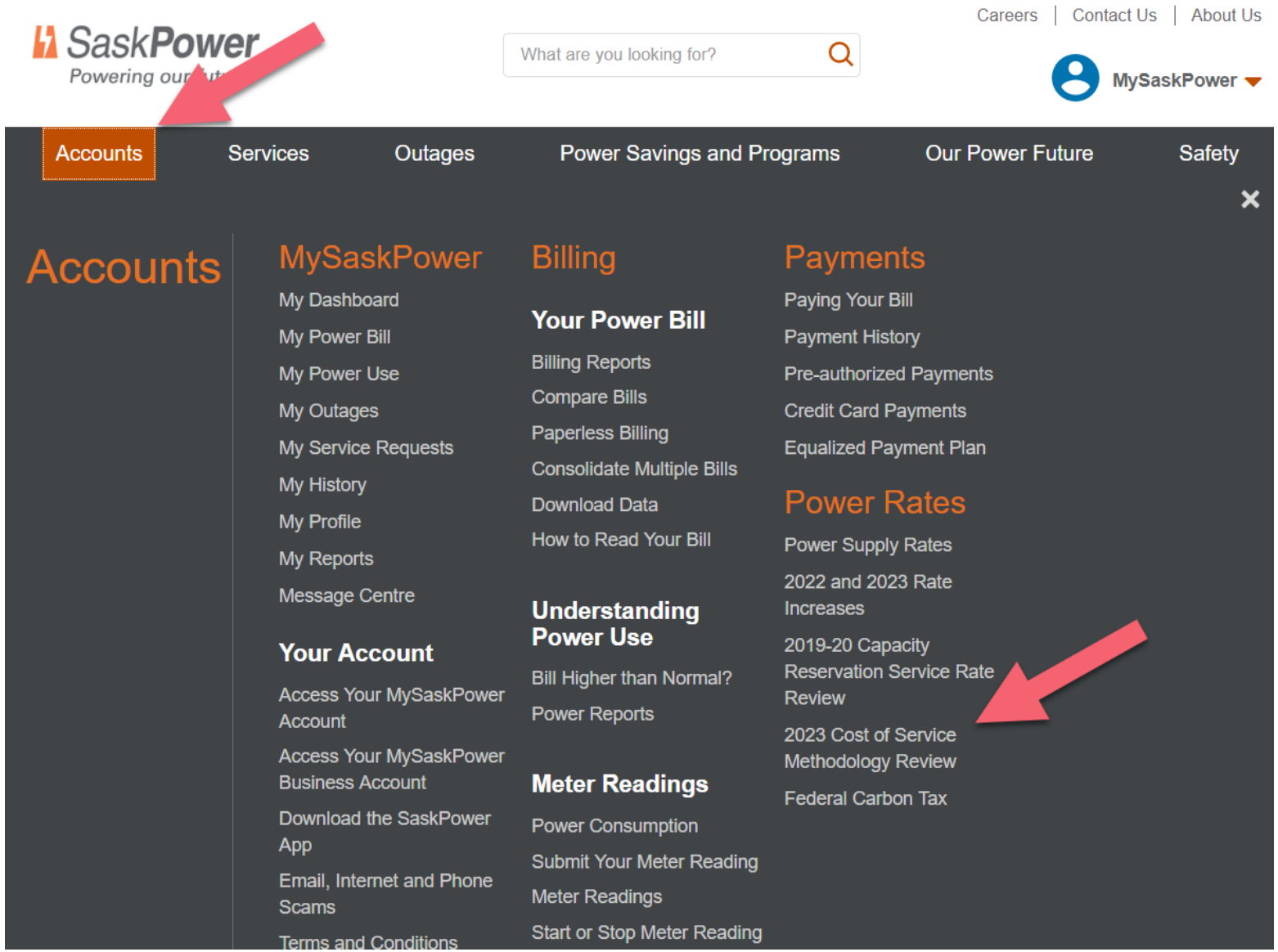
Wrap-up

THANK YOU

Questions?

How to find COS Methodology Review information on our website:

- www.saskpower.com
- Click “Accounts”
- Click “2023 Cost of Service Methodology Review” in the Power Rates section.



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