Rate Schedule 17
2019 Update

Process Co-Leads:

Clark Kaml and Louis Szablya

Presented by:

Louis Szablya and Baxter Gillette, Large Power Solutions

November 25, 2019

Grant PUD

Powering our way of life.

The Solution was Rate Schedule 17

- The Problem
  - 2017 was a tipping point for Grant PUD new load requests
  - Grant PUD could not design and construct infrastructure quickly enough to satisfy the requests
  - Majority of the requests were for crypto mining loads
  - Nascent crypto mining industry's risk profile different than existing customers
- Grant PUD Plan
  - Moratorium on new requests for new or incremental loads
  - Develop an Evolving Industry Rate (Rate Schedule 17)
  - Update queue management and customer connection process

Resolution 8891 - Rate Schedule 17 (RS17)

- Available to Evolving Industry (EI) customers
  - No less than annually, Grant PUD will review the Evolving Industry Class to determine if it is appropriate for customer’s uses or industries to move into or out of the EI Class
- EI rate class exit criteria
  - No less than annually, a team composed of Grant PUD staff will review the El Rate Class to recommend if it is appropriate for a customer's industry to move into, or out of the El Rate Class
  - The team will be composed of representatives from Large Customer Care (now called Large Power Solutions), Customer Solutions, Engineering, Rates, and Finance/Accounting

RS 17 Components

- Base Energy Costs from appropriate rate from the last COSA
  - RS17a = average of RS1 and RS2 @ 50,000kWh
  - RS17b = average of RS14, 2kW at 92.5% load factor 730.75 hours/mo
- Cost of accelerating transmission construction due to EI loads
- Distribution system impact adder
- Cost to unwind hedges if EI customers default or terminate
- Additional Assessment for the joint and common good

RS17 Team

Name	Role
Dave Churchman	Executive Sponsor**
Louis Szablya*/Clark Kaml	Co-Lead Large Power Solutions/Rates
Baxter Gillette	Update Manager**
Devon Williams	Risk Management**
Terry McKenzie	Customer Service
Mike Facey	Accounting
Jesus Lopez	Engineering
Bonnie Overfield	Finance
Paul Dietz	Quantitative Analysis Subject Matter Expert**

* Prime
** Not required per the Rate Schedule

RS 17 Update Team Charter Objectives

- Concentration and EI Assessment
  - Assess for concentration risk
    - Emerging industries – future requests only
    - Current EI class – current load and future requests
    - Existing customers with nascent uses – current load and future requests
  - Then, as appropriate, assess the other criteria
    - Regulatory risk
    - Business risk (including nascency)
- Assess if RS17 billing rates require adjustment
  - Update assumptions – current market conditions
  - Internal team discussion to confirm the model and assumptions
  - Replace any information, assumptions or data that is no longer available with available information, if necessary
  - Recalculate 2023 RS17 (the target rate) if any parameters have changed
  - Recommend changes to the RS17 billing rates or trajectory as appropriate

RS17 Calculation Inputs

Long-Term Stable Inputs
Load factor of incremental transmission
Minimum increment of transmission capacity
Economic life of incremental transmission
Volatility of transmission project development
Cost of incremental transmission options

System Costs and Inputs
Base case transmission costs
Base case recovery of transmission costs
Transmission acceleration time frame
Incremental distribution adder to serve EI load

EI Load Characteristics
Load Factor
Size of aggregate loads
Size of queue

Electric Power Market Inputs
Volatility of wholesale market
Mid-Columbia forward market
Basket of volatilities to represent North America

Industry or Use Assessment
Concentration Risk

Evolving Industry Assessment

- Evaluate industries that could expose non-EI customers to costs arising from EI risk
- For retail customers whose energy load activity and / or industry has:
  - Business Risk: Price volatility of primary product, nascency and Porter's Five Forces,

  or

  - Regulatory Risk: pending state or federal legislation or regulation and feedback from investment banks

  and

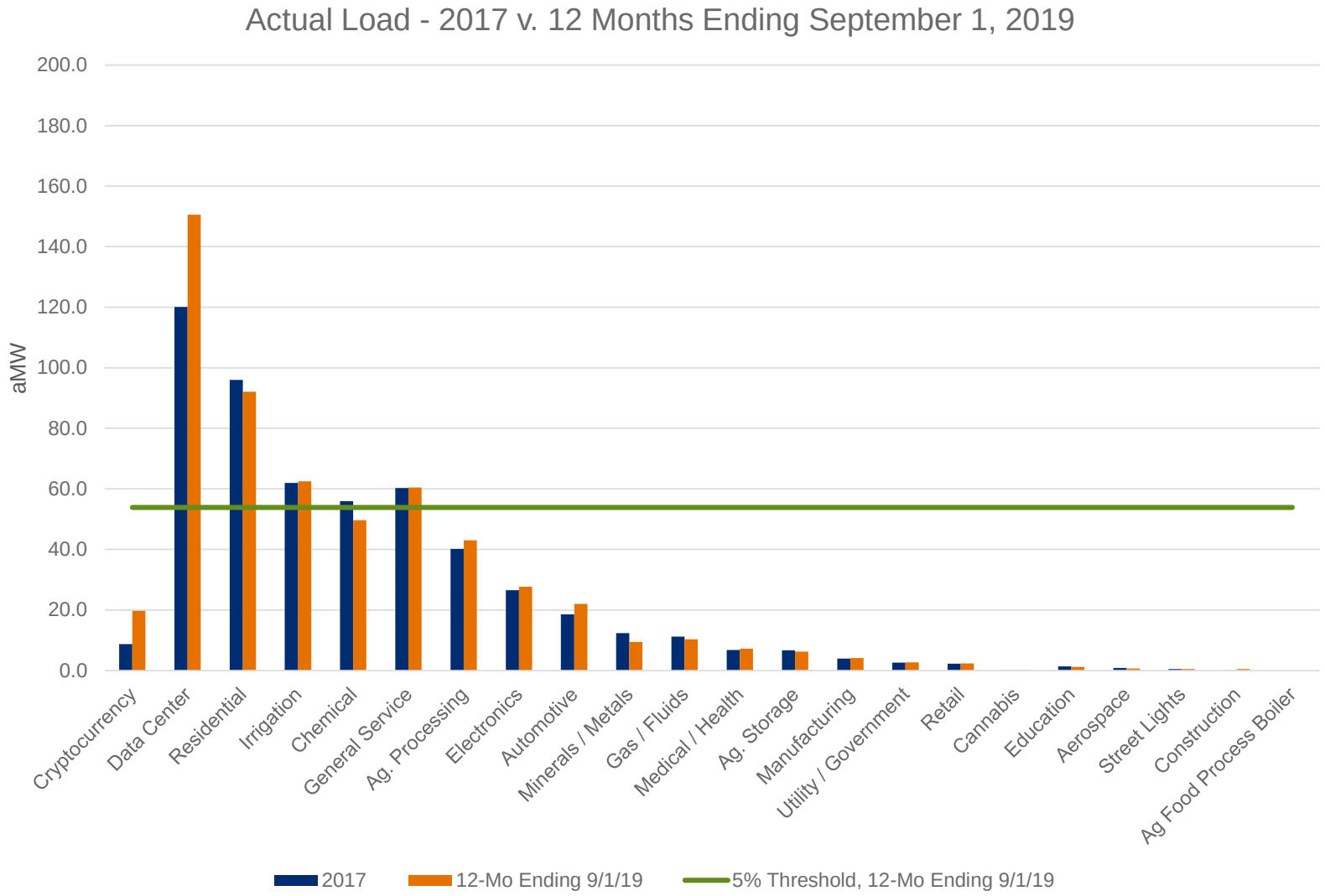
  - Concentration Risk: 5% of Grant PUD's total Load, where

$$Concentration_i = \frac{(Actual\ MWa_i + Queue\ MVA_i)}{(Actual\ MWa_t + Queue\ MVA_t)}$$

Five Percent Concentration Threshold

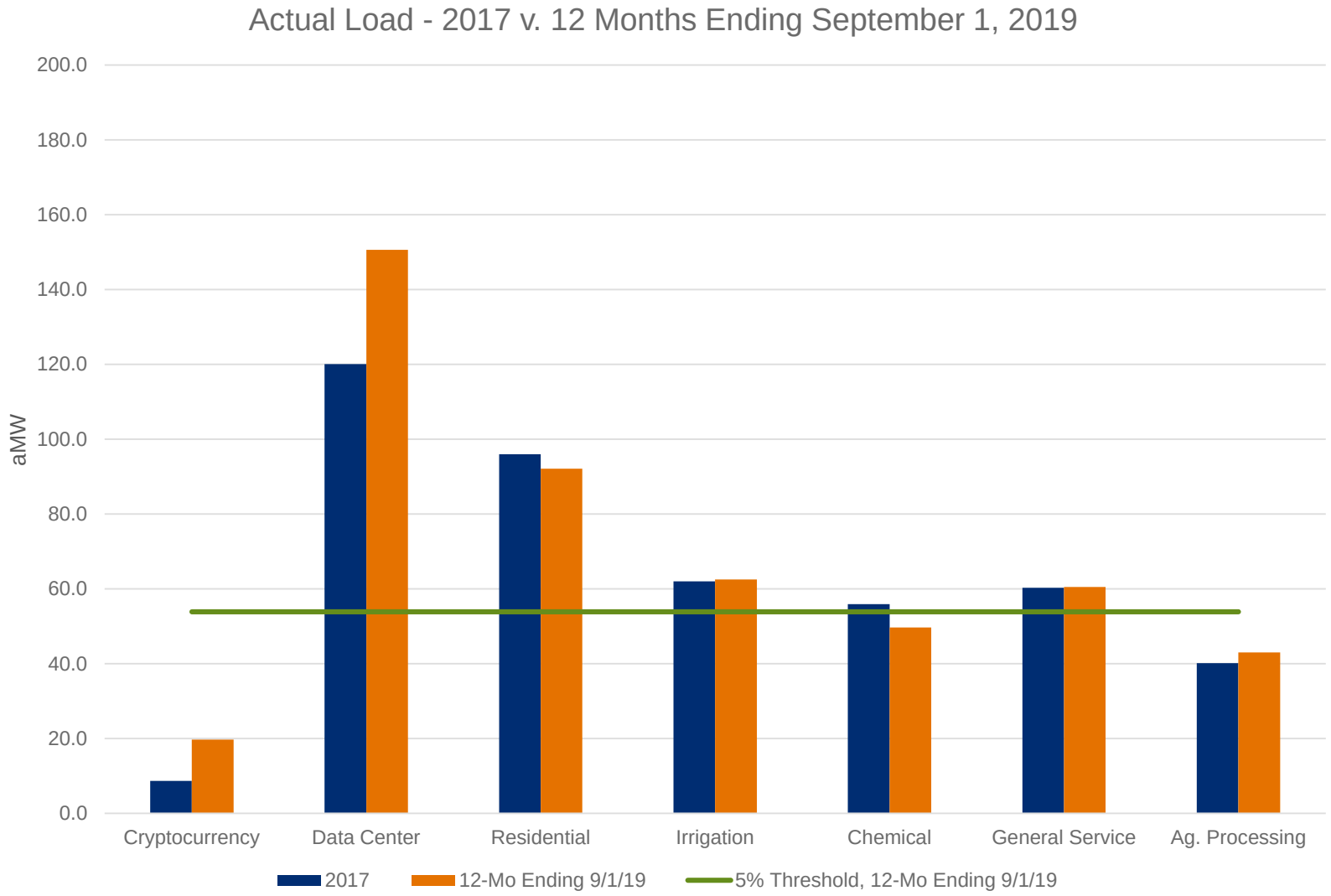
- 2017 Data
  - Load = 537.0 MWa
  - Queue = 514.5 MW
  - Total = 1051.5
  - 5% * 1051.5 = 52.6
- 12-Mo Ending 9/1/2019
  - Load = 573.4 MWa
  - Queue = 504.0 MW
  - Total = 1077.4
  - 5% * 1077.4 = 53.9

Actual Loads



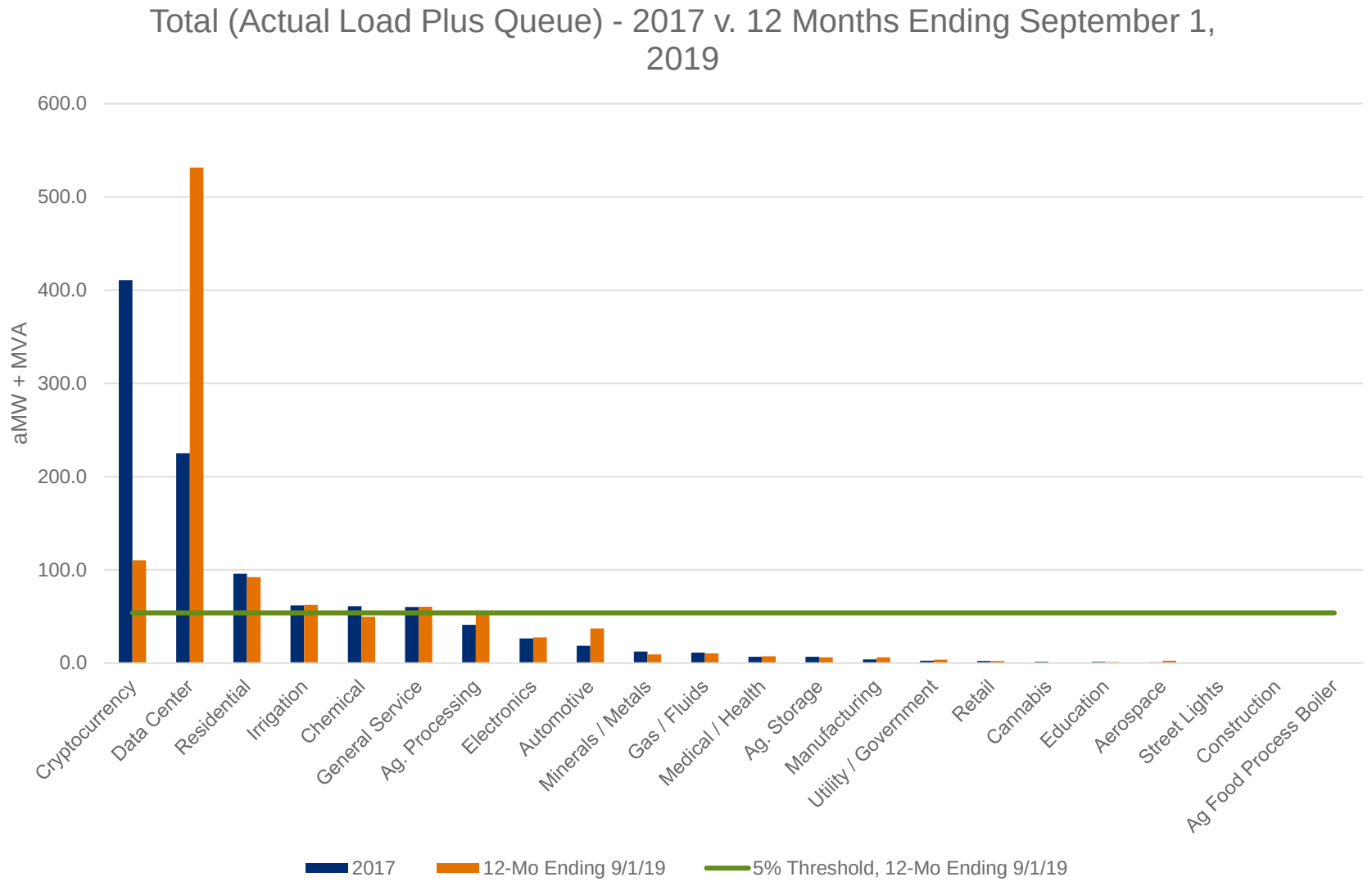
- Industries and load activities
- On the basis of Actual Loads alone Data Centers, Residential, Irrigation and General Service exceed the threshold
- Challenge of identification of uses within General Service

Actual Loads – A Closer Look



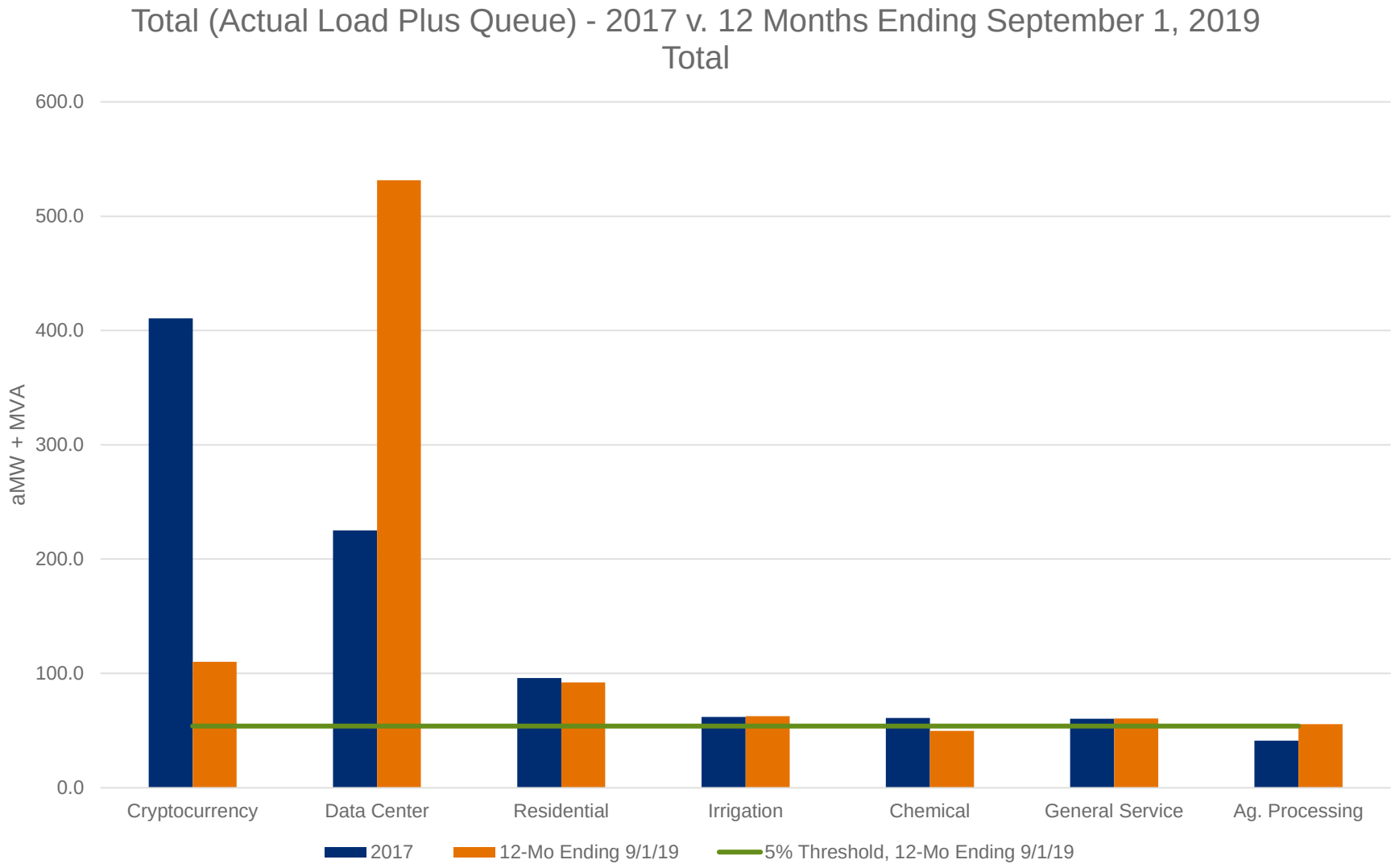
- Cryptocurreny existing loads are < 5%
- Chemical was > 5% in 2017 and < 5% in the update
- Cannabis maximum scenario:
  - 9.6 MWa
  - ~1% concentration

Totals



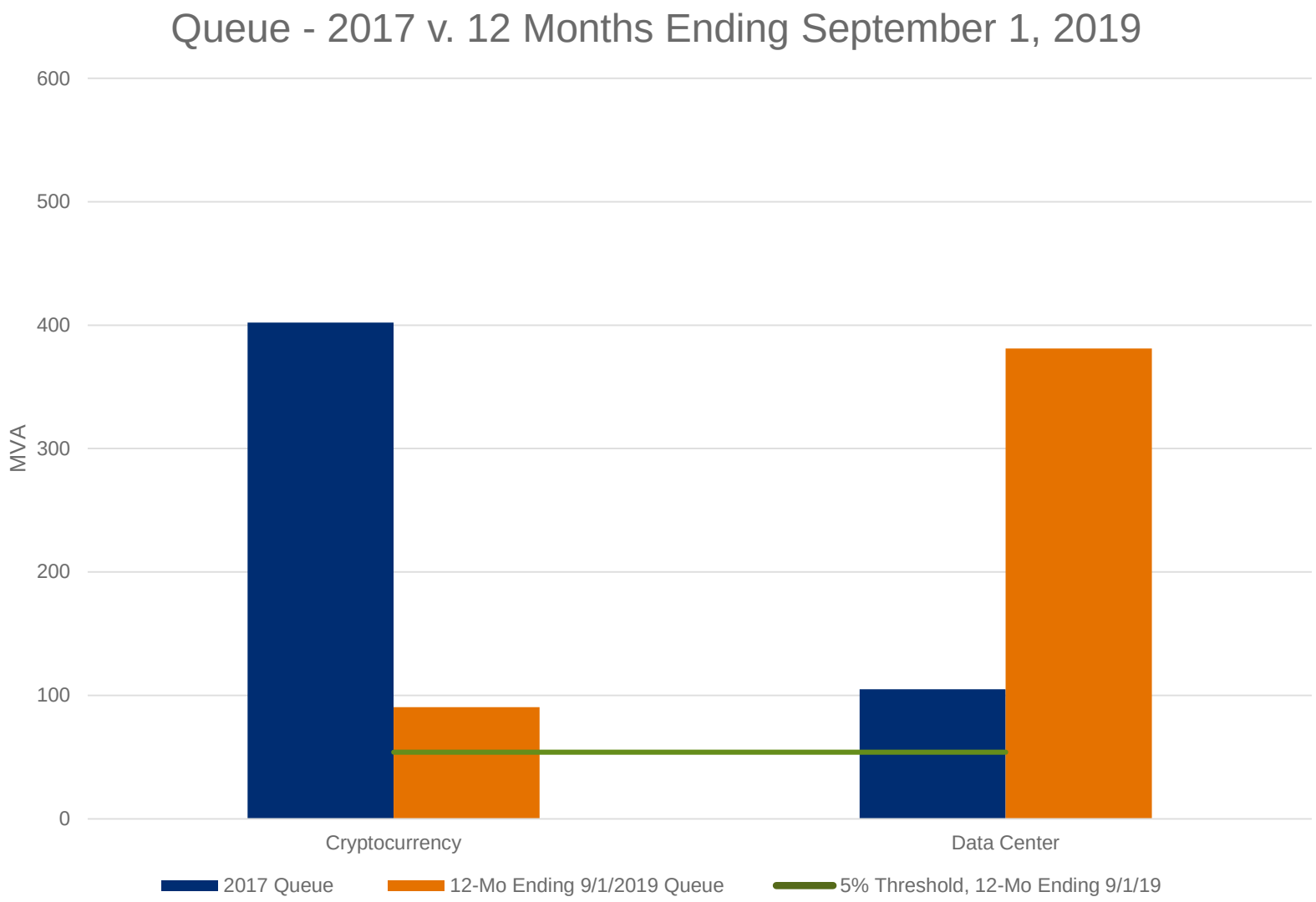
- Cryptocurrency concentration has fallen from 39% to 10%
- Data Center concentrations have risen from 21% to 49%
- Changes driven primarily by the queues

Totals – A Closer Look



- Residential, Irrigation and General Service maintained above 5%
- Chemical fell below 5%
- Agricultural Processing rose above 5%

Queues – A Closer Look



- Queue of data centers update almost as large as cryptocurrency was in 2017
- Both industries exceed the 5% concentration threshold in both time periods solely on a queue basis

02 Industry or Use Assessment
Business and Regulatory Risk

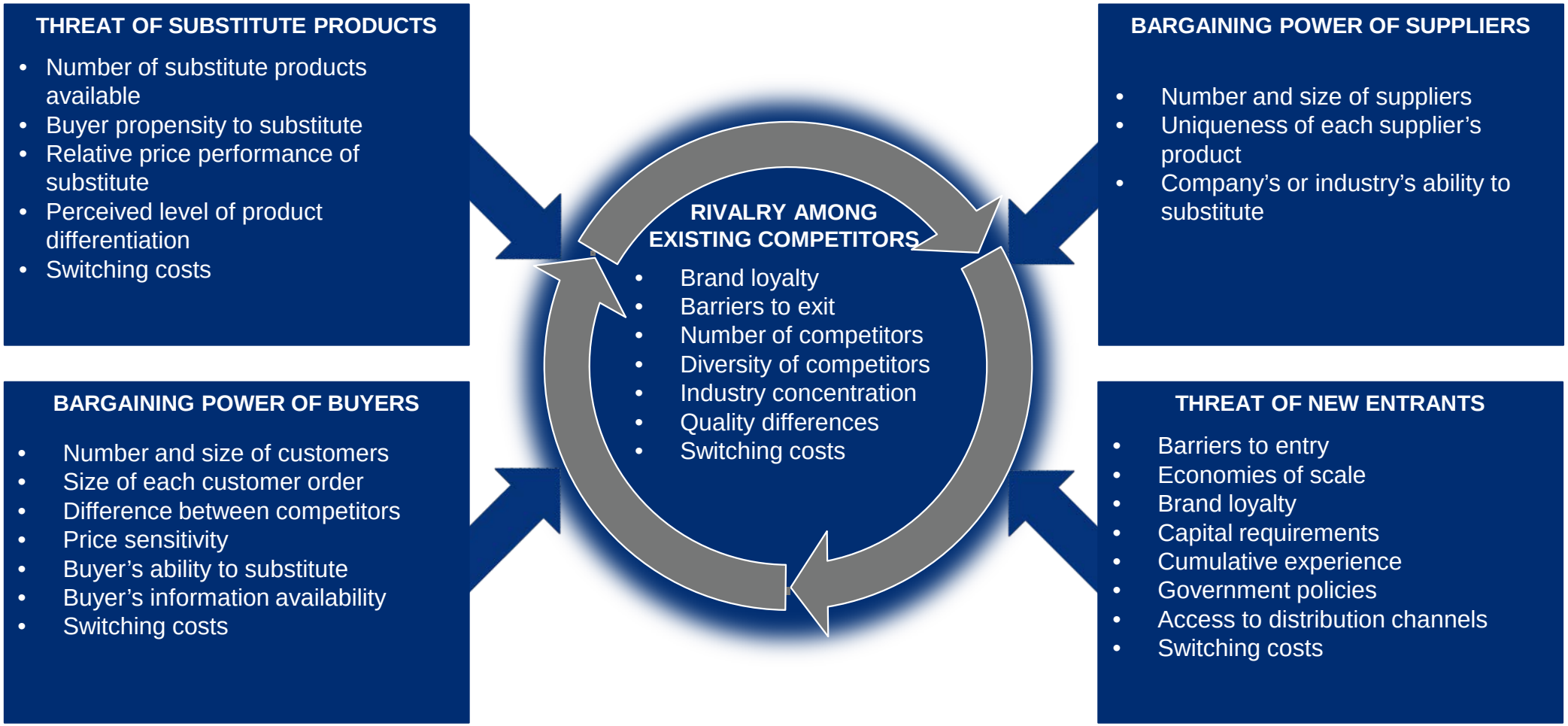
Nascent Industry Characteristics[1]

From Invention to Commercial Viability

- Factors that affect nascency
  - Extensive parallel or sequential technological experiments
  - Bottlenecks and problems, which may not be well understood until after development of various versions of the entire system
  - Substantial efforts devoted to designing and establishing complementary systems
  - Commercial viability of a new industry may still not be evident until technological, demand, social, and institutional uncertainties are resolved.
- From invention to first commercialization
  - 3 studies range 13.6 to 21.8 years average; range 1-140 years
  - Dropping over last century
- From commercialization to commercial viability
  - Can take over a decade

[1]Goldfarb, Brent. 2017. Time to Commercial Viability in Nascent Industries: A Historical Study. *SSRN Electronic Journal.*

Porter’s Five Forces



Cryptocurrency: An Evolving Industry

Although cryptocurrencies are expanding and resilient,

they continue to be a volatile, evolving industry.

THREAT OF SUBSTITUTE PRODUCTS

- Competing currencies, algorithms, and ASIC resistance
- Precious metals and fiat currencies
- Governments, banks and companies
- Stablecoins and virtual banking

BARGAINING POWER OF SUPPLIERS

- CPU to GPU to ASIC
- High machine turnover (efficiency and difficulty)
- 20+ firms globally, $3-4B/yr in sales

BARGAINING POWER OF BUYERS

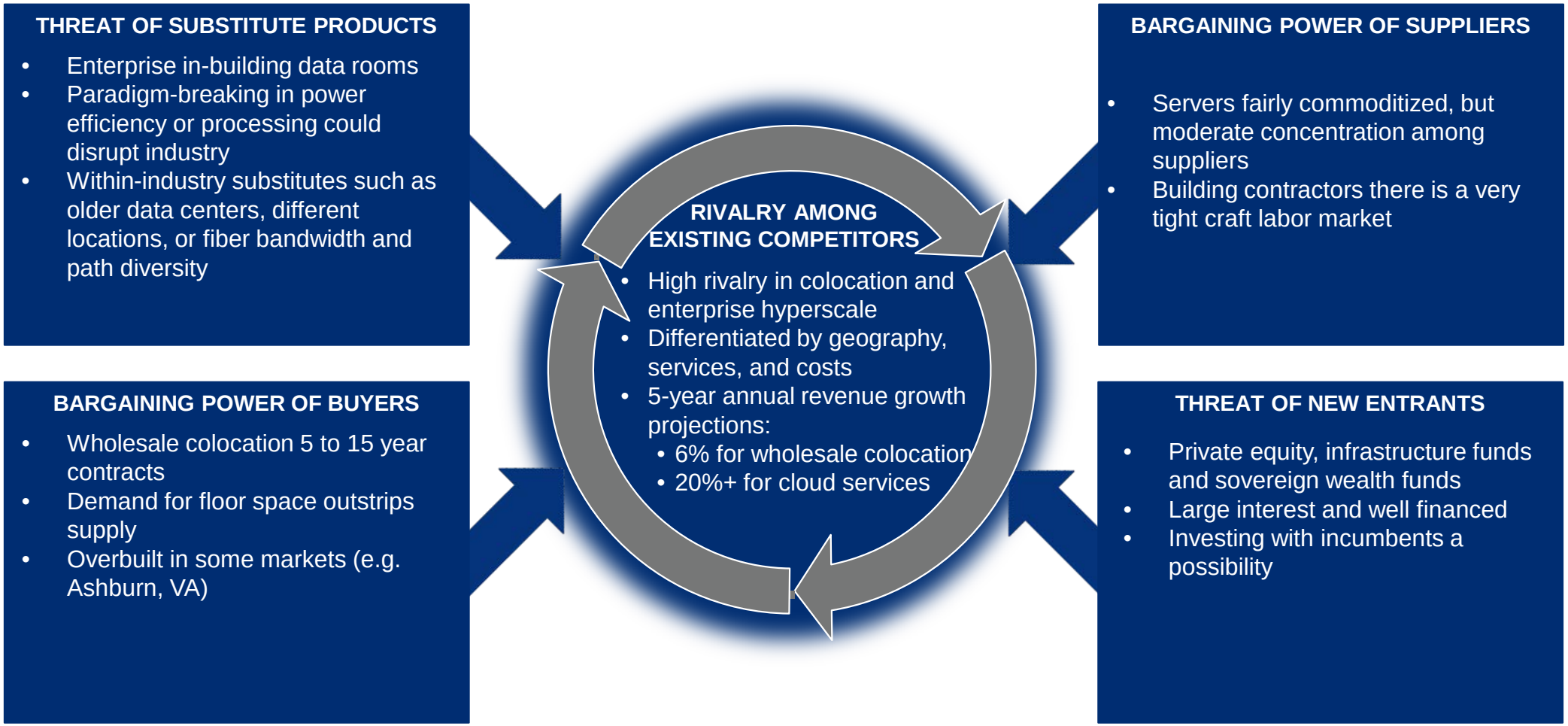
- Exchange listings: BTC on CME and ICE
- 85% annualized volatility
- Over 42 million blockchain wallets
- Top 0.55% of wallets (150k) have 86% of BTC
- 0.1% BTC purchase has sent prices up 20%
- SEC repeated refusals to list ETFs

THREAT OF NEW ENTRANTS

- Suppliers becoming competitors
- Cryptojacking
- Scandals: 51% attacks, wallet hacks, Ponzi schemes

Data Centers: A Growth Industry

Growing revenue and consistent profitability – well-capitalized, diverse investors are hallmarks of a growth industry.



Agricultural Processing: A Mature Industry

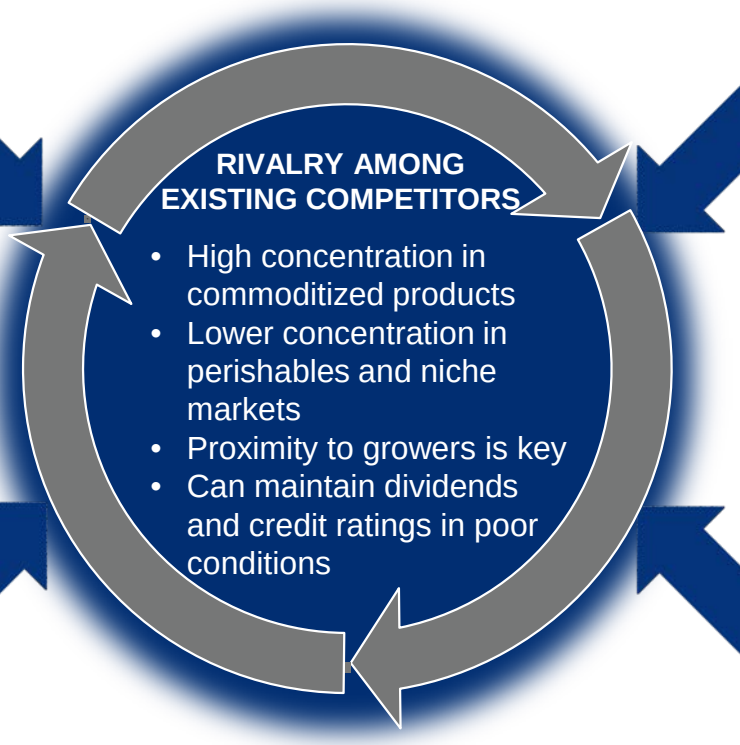
Agricultural processing gradual business changes driven by consumer tastes, processing technology improvements, and operational efficiencies.

THREAT OF SUBSTITUTE PRODUCTS

- Consumer switching as a function of crop price
- Based more on product attributes driven by consumers (e.g. non-GMO, organic, whole grains, heirloom, low carb, etc…)
- Growth in private labels and store brands

BARGAINING POWER OF SUPPLIERS

- Farmers are price takers
- Rise of farmer-processor contracts instead of spot market
- Vertical integration between farmers and processors increasing



BARGAINING POWER OF BUYERS

- Desire for consistent supply and quality fosters relationships
- Wholesale grocery and retail supermarket integration
- National single-desk purchasing

THREAT OF NEW ENTRANTS

- Farmer owned cooperatives especially in high concentration segments
- Underlying farm growth, end of plant life, emerging substitutes, or new processing technologies

03

Pricing Model Review

Rate Schedule 17 Billing Rates

Revisiting Rate Schedule 17

- Understand 2017 methodology and models used for Resolution 8891
  - Data sources –availability
  - Confirm methodology used
  - Calculations – verify error free spreadsheets
- Assess components in RS17-2017 and determine which elements have changed due to the passage of time
- Confirm the same data sources are available and if not, identify alternatives

Base energy component

- The base energy component for RS17 is from the 2017 COSA
  - RS17a – RS1 and RS2
  - RS17b – RS14
- Represents the appropriate rate to recover costs for a customer with a typical risk profile
- The Rate Schedule 14 rate is unchanged since the original RS17 calculations at $0.0281/kWh

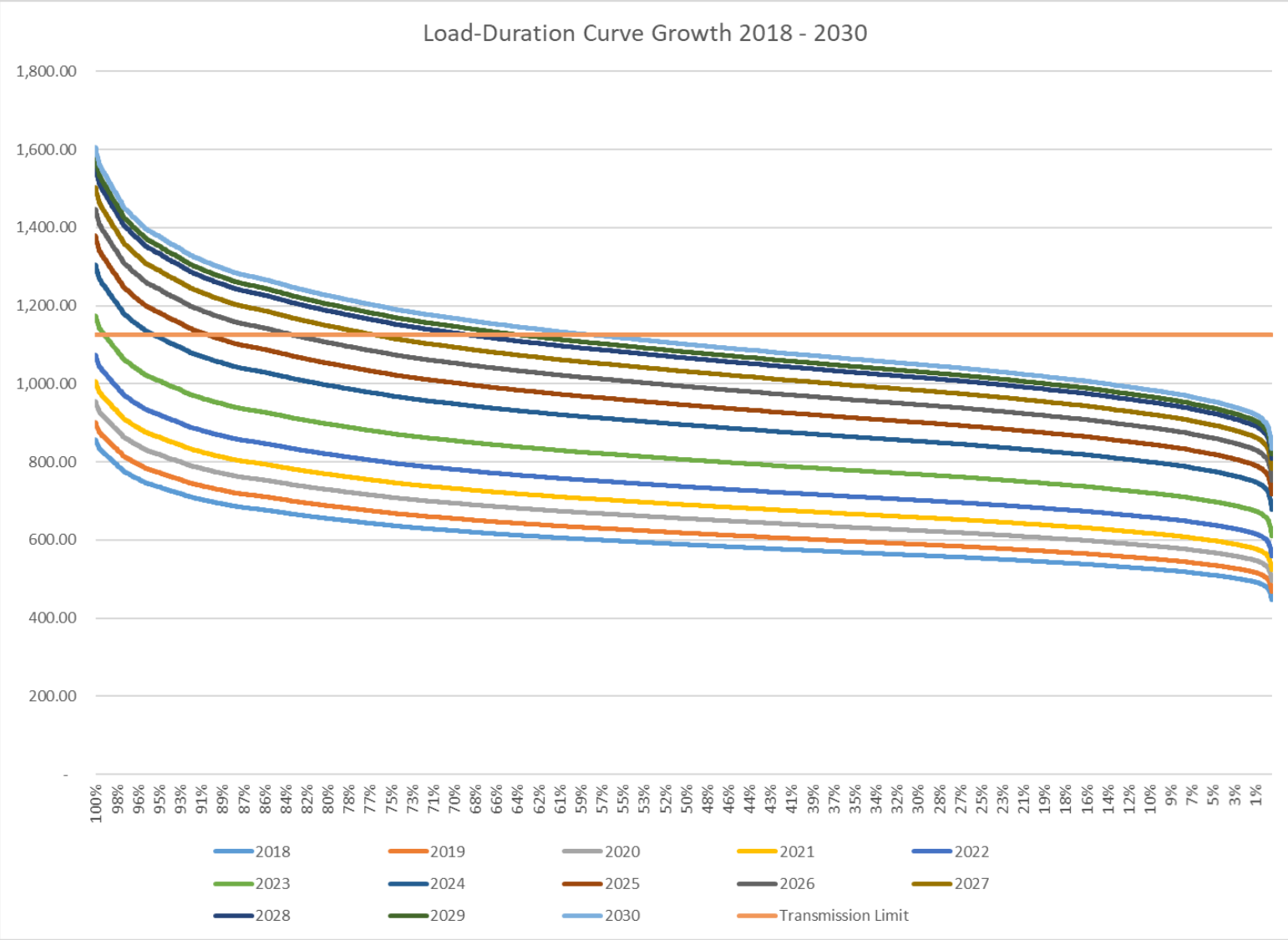
Load Growth

- Inputs
  - Amount of load growth in percent per year (Rates & Pricing)
  - Load characteristic
    - The load-duration (LD) curve establishes load characteristic and is used to the utilization of incremental transmission assets (New Transmission)
- Data needed
  - 2017 LD data – to confirm methodology consistency
  - 2018 – 2019 actual hourly data (from PI database)
- Evaluation
  - Create LD curve data and establish when new transmission is required
  - Using LD curve data identify when new transmission is needed with EI load and without EI load
- Differences 2017 – 2019
  - Load growth estimates
  - Changes in Queue

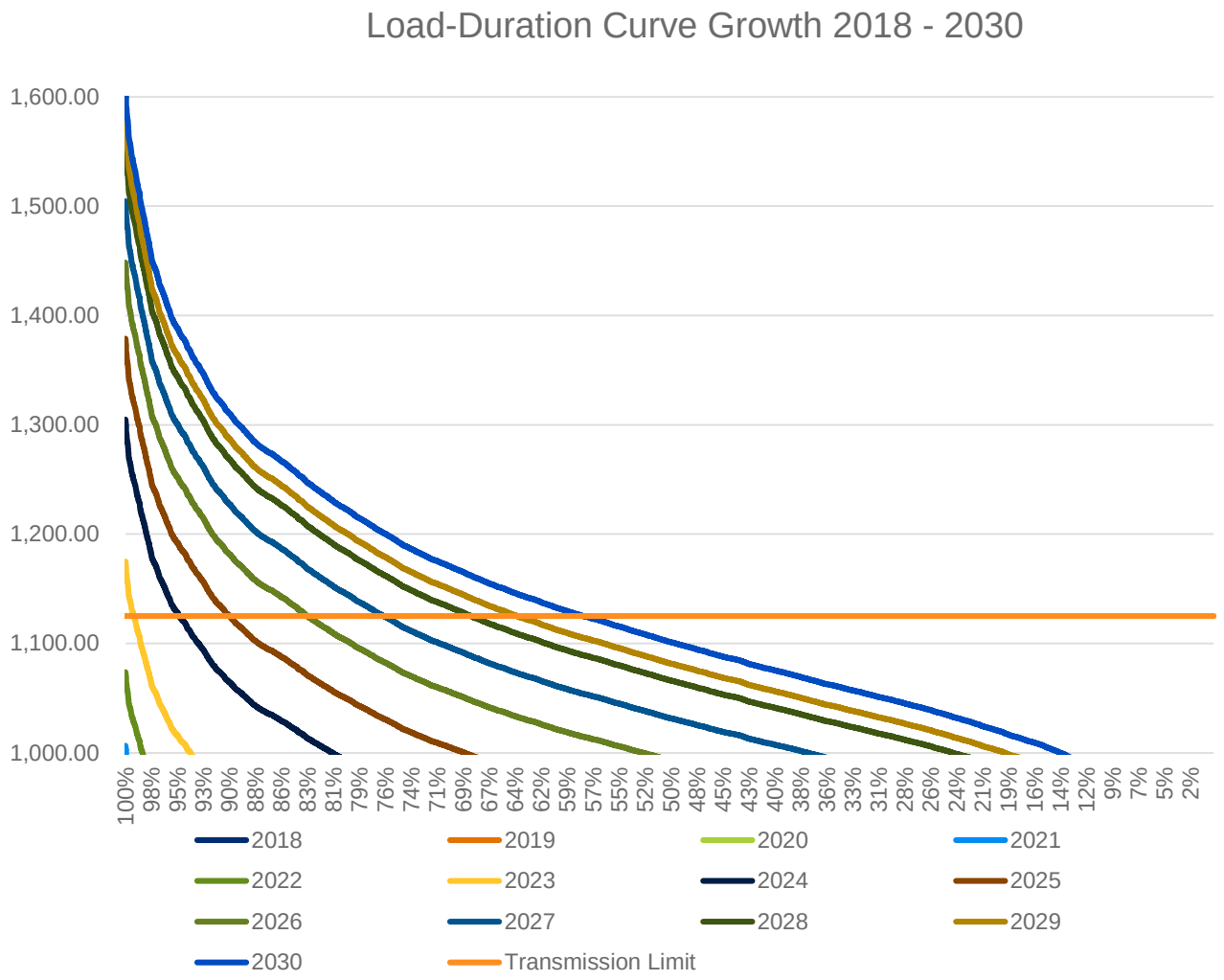
Transmission

- Intent of RS17 is to include the costs of early construction of new transmission due to acceleration in load growth caused by the EI class
  - Establish a system level load over time with and without EI Class
  - Identify when incremental transmission would be needed for each load scenario
  - The difference in time between the need for construction of new transmission is the “EI Transmission Acceleration Period”
  - The transmission capability unchanged from original calculation
- Two elements impact utilization of transmission
  - Load Growth
  - Load Duration

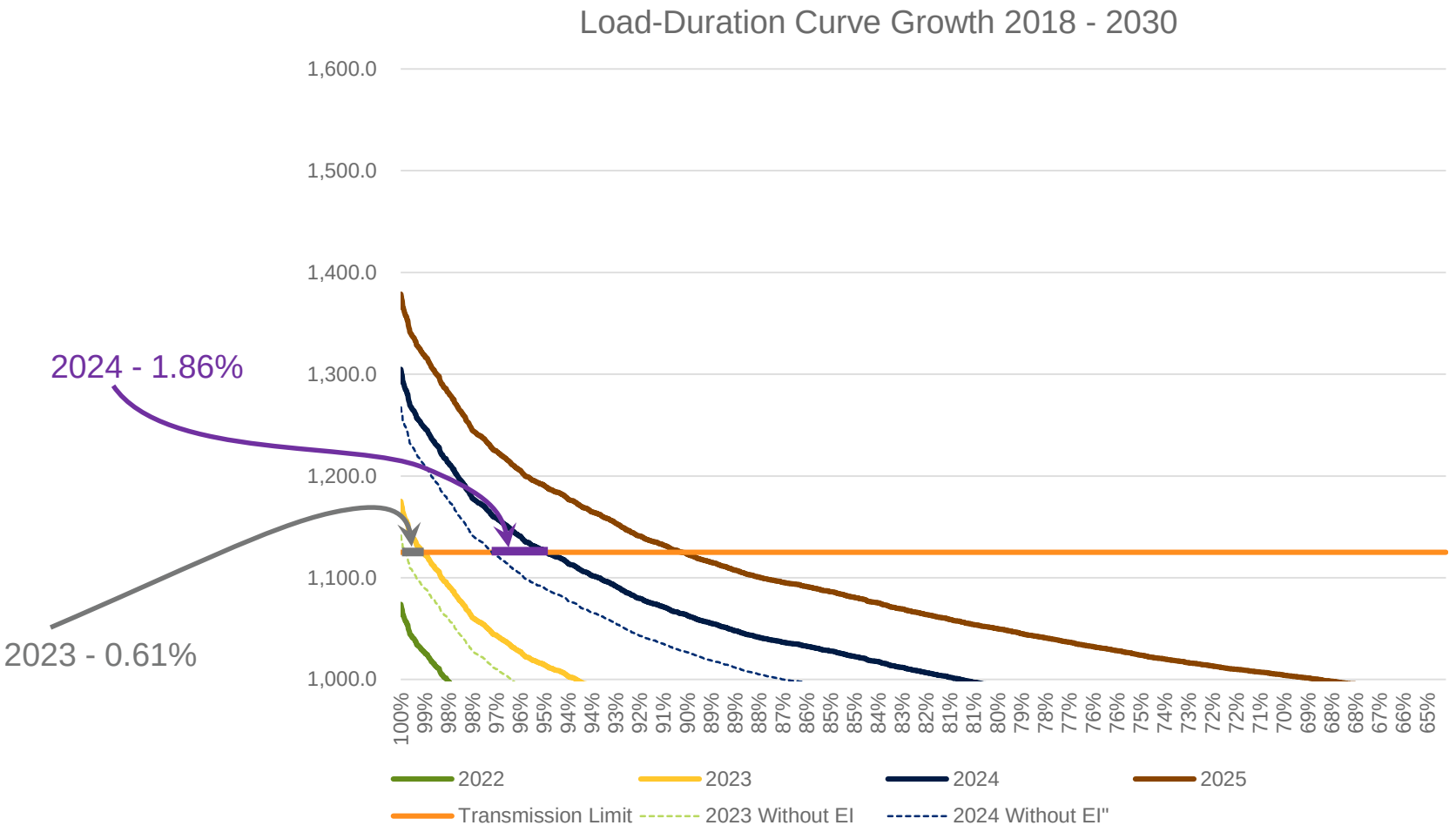
Timing for New Transmission



Transmission Call Timing for base load



Transmission Call EI Impact - minimal



Calculation of Transmission Call

- Basic components
  - Cost per MWh of embedded transmission for all customers
    - Year new transmission is required for load growth **without** EI loads (Expected Date)
    - Year new transmission is required for load growth **with** EI loads (Accelerated Date)
  - Cost per MWh of incremental transmission when allocated to only EI loads for the period prior to the Expected Date
  - Capital cost of incremental transmission projects
  - Black-76 Model inputs using direct data or proxy data
- Calculate call value (this is the transmission component)
- Differences
  - Volatilities updated to reflect current market
- Calculated transmission call = $0.000749/kWh

Overall Put of Excess Power if Default

- Model
  - 3.76% probability of cessation of delivery at retail per month
  - Liquidated at Mid-C index, flat
  - 12 month liquidation period
  - Hedge horizon for load 12 months
- Calculated cost for put $.014086/kWh

Overall Rate Recalculation (2021 rate)

Rate Schedule 17b	
Proposed	
31.00%	Assigned Additional Assessment
$0.02807	Current Rate 14 Cost to Serve
$0.00075	Trans Call
$0.00337	Distribution Adder
$0.01409	Overall Put 1
$0.01434	Additional Assessment
$0.06061	Overall Expected at 92.5% LF

Rate Schedule 17ar & 17ac	
Proposed	
31.00%	Assigned Additional Assessment
$0.06310	Current Blended (RS 1 &2) Cost to Serve
$0.00075	Trans Call
$0.00337	Distribution Adder
$0.01409	Overall Put 1
$0.02520	Additional Assessment
$0.10650	Overall Expected at 92.5% LF

Comparison to current RS17

Rate Schedule 17b		
Original	Proposed	
31.00%	**31.00%**	Assigned Additional Assessment
$0.02807	**$0.02807**	Current Rate 14 Cost to Serve
$0.01857	**$0.00075**	Trans Call
$0.00336	**$0.00337**	Distribution Adder
$0.01097	**$0.01409**	Overall Put 1
$0.01890	**$0.01434**	Additional Assessment
$0.07987	**$0.06061**	Overall Expected at 92.5% LF

Rate Schedule 17ar & 17ac		
Original	Proposed	
31.00%	**31.00%**	Assigned Additional Assessment
$0.06066	**$0.06310**	Current Blended (RS 1 &2) Cost to Serve
$0.01857	**$0.00075**	Trans Call
$0.00336	**$0.00337**	Distribution Adder
$0.02225	**$0.01409**	Overall Put 1
$0.03250	**$0.02520**	Additional Assessment
$0.13734	**$0.10650**	Overall Expected at 92.5% LF

For Rate Schedule 17b						
Average Rate $/kWh			**Year on Year % Increase**		**Difference**	
Year	Original	Proposed	Original	Proposed	$/kWh	%
2019	$ 0.03441	$ 0.03441	30.89%	30.89%	$ -	0.00%
2020	$ 0.05334	$ 0.04740	55.07%	38.66%	$ (0.00594)	-11.14%
2021	$ 0.08034	$ 0.06061	50.73%	27.88%	$ (0.01973)	-24.56%

Next steps

- Begin socializing update status
- Provide opportunity for public input
- Update Team approval of staff recomendation
- Submit staff recommendation to CXO Team
- CXO Team provides recommendation to CEO
- Submit to Commission for consideration
- Commission action

Appendices

RS17 2019 Update - Project Charter

Project Name:	**Rate Schedule 17 – 2019 Annual Refresh**		Status: Inception
Estimate Confidence:	85%	Project SR No: n/a	Size: n/a

Business Value Proposition – Problem to be Solved

- Rate Schedule 17 was developed to help Grant PUD deal with the risk associated with energy intensive industries that have the potential to impact the rates of Grant PUD's existing core customers and other existing customers. Industry groups that consume and could consume (based on expectations) more than 5% of Grant PUD's total load are to be considered in this group. Additional screens determine if the identified industry group meets certain criteria to be considered as an Evolving Industry.

Business Strategy Reference (Select all that apply)

- Safety for both public and employees
- Maintain a strong financial position
- Provide long term low rates
- Operate responsibly by attaining environmental, cultural, resource and regulatory compliance

Improvement Opportunity Summary

- Review Grant PUD's service area and identify industries that are growing rapidly and exceed, or may in the nearby future, 5% of Grant PUD's total energy load (Concentration). Include public input if possible.
- Update pricing model(s) used in 2018 with 2019 information to establish RS 17, determine if the trajectory or any underlying rate components need to be updated.

Goals and Objectives (How much and by when)

- Study and assess the Concentration of industries identified with the potential to have enough aggregate kWh per year to represent 5% or more of Grant PUD total load.
- Review and update if necessary, the rates in the current RS 17 and provide recommendations.
- Seek public comment on appropriate elements of the RS 17 2019 Annual Refresh

Dependencies

- Availability of system load data
- Accurate Identification of Evolving Industry accounts
- Billing information and data extraction from CC&B and SSN Operational Data

Summary Measurable Benefits

- Grant PUD is required to update RS 17 each year using a team that can assess the potential impacts of various Evolving Industries.

Project Contacts & Stakeholders

Executive Sponsor:	Dave Churchman
Project Leads:	Louis Szablya - Prime-LPS, Clark Kaml – Co-lead-Rates
Responsible Mgr.:	Baxter Gillette
Responsible Sr. Mgr.:	Louis Szablya
Key Stakeholders or Team Members:	• Devon Williams – Risk Management • Terry McKenzie – Customer Solutions • Mike Facey – Accounting • Jesus Lopez - Engineering • Bonnie Overfield – continuity

Project Milestone Dates

- Charter Adoption: Sep 9
- Assignments: Sep 10
- Kick-Off: Sep 11
- Public Input: Sep [17]
- Analysis: Sep 18 - 24
- Analysis Review: Sep 25
- Initial results: Sep 30
- Incorporate into rate process Oct 1

In Scope	Out of Scope
• Identify new potential Evolving Industries and assess Concentration • Solicit public input regarding Concentrations and Assumptions • Assess all industry groups whose collective energy loads exceed 5% • Update RS 17 rate calculations including reviewing and vetting assumptions • Recommend update to rates if needed	• Changing Rate 17 design • Material changes to implementation of Rate Schedule 17 other than updating the billing components

Project SharePoint Site:	Large Power Solutions>Site Contents>RS17 2019 Update
Cost Estimate:	**No Capital Required**

Concentration Calculations - 2017

Industries / Energy Load Activities, Calendar 2017 Loads						
		2017 MWa	Queue Request	Total	Percent Concentration	Avg. No. of Service Agreements
Rate 1	Residential	96.0	0.0	96.0	9.1%	37,453
Rate 2	General Service	60.3	0.0	60.3	5.7%	6,405
Rate 3	Irrigation	62.0	0.0	62.0	5.9%	4,718
Rate 6	Street Lights	0.5	0.0	0.5	0.0%	68
Rate 85	Ag Food Process Boiler	0.0	0.0	0.0	0.0%	-
Rate Schedules 7, 14, 15, 16, 17, 94	Aerospace	0.8	0.0	0.8	0.1%	2
	Ag. Processing	40.1	1.0	41.1	3.9%	37
	Ag. Storage	6.7	0.0	6.7	0.6%	10
	Automotive	18.6	0.0	18.6	1.8%	2
	Cannabis	0.1	1.5	1.6	0.1%	1
	Chemical	55.9	5.0	60.9	5.8%	6
	Construction	0.1	0.0	0.1	0.0%	2
	Cryptocurrency	8.7	402.0	410.7	39.1%	19
	Data Center	120.1	105.0	225.1	21.4%	11
	Education	1.4	0.0	1.4	0.1%	6
	Electronics	26.5	0.0	26.5	2.5%	1
	Gas / Fluids	11.2	0.0	11.2	1.1%	3
	Manufacturing	4.0	0.0	4.0	0.4%	3
	Medical / Health	6.8	0.0	6.8	0.6%	4
	Minerals / Metals	12.4	0.0	12.4	1.2%	6
	Retail	2.3	0.0	2.3	0.2%	8
	Utility / Government	2.6	0.0	2.6	0.3%	10
	Total	**537.0**	**514.5**	**1051.5**	**100%**	**48,775**

Concentration Calculations - Update

Industries / Energy Load Activities, September 2018 - August 2019 Loads						
		September 2018 - August 2019 MWa	Queue Request	Total	Percent Concentration	Avg. No. of Service Agreements
Rate 1	Residential	92.1	0.0	92.1	8.5%	38,104
Rate 2	General Service	60.5	0.0	60.5	5.6%	6,657
Rate 3	Irrigation	62.5	0.0	62.5	5.8%	4,752
Rate 6	Street Lights	0.5	0.0	0.5	0.0%	88
Rate 85	Ag Food Process Boiler	0.0	0.0	0.0	0.0%	-
Rate Schedules 7, 14, 15, 16, 17, 94	Aerospace	0.7	2.0	2.7	0.2%	2
	Ag. Processing	43.0	12.5	55.5	5.2%	38
	Ag. Storage	6.3	0.0	6.3	0.6%	10
	Automotive	22.0	15.0	37.0	3.4%	2
	Cannabis	0.2	0.0	0.2	0.0%	1
	Chemical	49.7	0.0	49.7	4.6%	7
	Construction	0.5	0.0	0.5	0.0%	4
	Cryptocurrency	19.7	90.5	110.2	10.2%	24
	Data Center	150.6	381.0	531.6	49.3%	12
	Education	1.2	0.0	1.2	0.1%	6
	Electronics	27.7	0.0	27.7	2.6%	1
	Gas / Fluids	10.3	0.0	10.3	1.0%	3
	Manufacturing	4.2	2.0	6.2	0.6%	3
	Medical / Health	7.2	0.0	7.2	0.7%	5
	Minerals / Metals	9.4	0.0	9.4	0.9%	6
	Retail	2.3	0.0	2.3	0.2%	9
	Utility / Government	2.7	1.0	3.7	0.3%	10
	Total	**573.4**	**504.0**	**1077.4**	**100%**	**49,743**

Concentration Calculations - Changes

Industries / Energy Load Activities, Current Update minus Last Update Change						
		MWa Change	Queue Request Change	Total Change	Percent Concentration Change	Avg. No. of Service Agreements Change
Rate 1	Residential	-3.9	0.0	-3.9	-0.6%	651
Rate 2	General Service	0.2	0.0	0.2	-0.1%	252
Rate 3	Irrigation	0.5	0.0	0.5	-0.1%	33
Rate 6	Street Lights	0.0	0.0	0.0	0.0%	20
Rate 85	Ag Food Process Boiler	0.0	0.0	0.0	0.0%	-
Rate Schedules 7, 14, 15, 16, 17, 94	Aerospace	-0.2	2.0	1.8	0.2%	-
	Ag. Processing	2.9	11.5	14.4	1.2%	1
	Ag. Storage	-0.4	0.0	-0.4	-0.1%	-
	Automotive	3.5	15.0	18.5	1.7%	-
	Cannabis	0.1	-1.5	-1.4	-0.1%	-
	Chemical	-6.2	-5.0	-11.2	-1.2%	1
	Construction	0.5	0.0	0.5	0.0%	2
	Cryptocurrency	11.0	-311.5	-300.5	-28.8%	5
	Data Center	30.5	276.0	306.5	27.9%	1
	Education	-0.1	0.0	-0.1	0.0%	-
	Electronics	1.2	0.0	1.2	0.1%	-
	Gas / Fluids	-0.9	0.0	-0.9	-0.1%	-
	Manufacturing	0.2	2.0	2.2	0.2%	-
	Medical / Health	0.4	0.0	0.4	0.0%	1
	Minerals / Metals	-2.9	0.0	-2.9	-0.3%	-
	Retail	0.1	0.0	0.1	0.0%	1
	Utility / Government	0.1	1.0	1.1	0.1%	-
	Total	**36.4**	**-10.5**	**25.9**	**0%**	**968**

Powering our way of life.