TACOMA WATER
TACOMA PUBLIC UTILITIES

Tacoma Water Pipeline No. 1

Tacoma Public Utilities

Public Utility Board Study Session

October 23, 2019

Presentation by:
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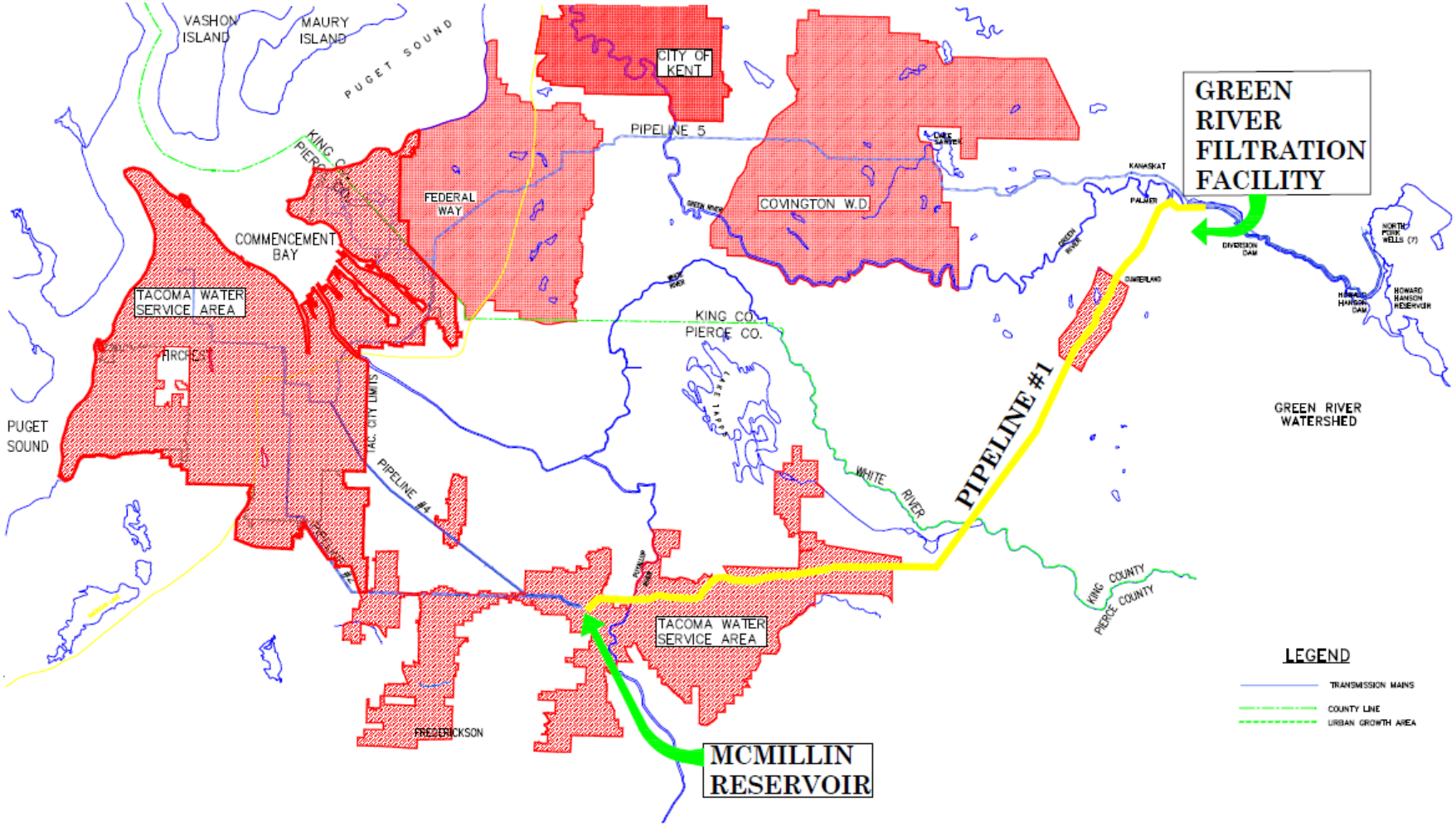
Presentation Overview

- Pipeline No. 1 Overview
- Problem Statement
- Regulatory Drivers
- Plan
- Potential Long Term Costs
- Schedule

Pipeline No. 1 Overview



Pipeline Basic Information

Length: 27 miles

Pipe Diameter Size Range: 30” to 78”

Material: Steel and Concrete

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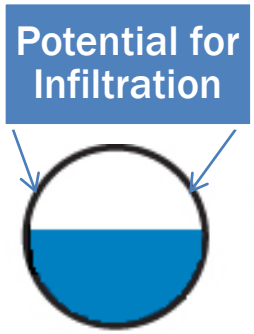
Problem Statement



System and operational changes have reduced the flow transferred by Pipeline No. 1 resulting in portions of the pipeline to become unpressurized which increases the potential for infiltration. How can Tacoma Water address the pressurization issue on Pipeline No. 1 to prevent infiltration?

Pipeline Flow Rate (MGD)	% of Pipeline Unpressurized
12	41%
24	33%
36	24%
48	16%
60	3%

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Regulatory Drivers

Regulatory Items	Definitions/Findings
GROUP A – PUBLIC WATER SUPPLY SYSTEMS WAC 246-290-230(9)	Transmission lines defined in WAC 246-290-010 shall be designed to maintain greater than or equal to five psi (35 kPa) during normal operations, except when directly adjacent to storage tanks, and shall be sized according to a hydraulic analysis…
2018 SANITARY SURVEY FINDINGS FROM WASHINGTON STATE DEPARTMENT OF HEALTH	Significant Deficiency – A deficiency that directly creates a significant public health risk. "Please identify the need to develop an approach to pressurizing the pipeline in your current Capital Improvement Program (CIP) and continue to prioritize the replacement of Pipeline 1 as you update your CIP."

The Plan

Comprehensive Evaluation

- Pipeline Assessment (Condition, hydraulics)
- Develop Alternatives (Technical requirements, lifecycle cost)
- Risk Quantification (Support phased, strategic scheduling)
- Develop financing plan
- Finalize Implementation Plan for pressurizing the pipeline

Potential Long Term Costs

Potential Cost

- Range $60 – $150 million over a 20 year period.

Schedule

Approval of Jacobs Contract to Develop the Plan

- Public Utility Board Meeting 12/04/2019

Development of the Plan

- Notice To Proceed – January 2020
- Plan Completion – December 2020

Transportation Electrification Plan

Cam LeHouillier

Energy Research and Development

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A win-win-win situation

DRIVER

Electricity is less expensive

EVs need less maintenance

ENVIRONMENT

Reduced GHG emissions

Domestic source of energy

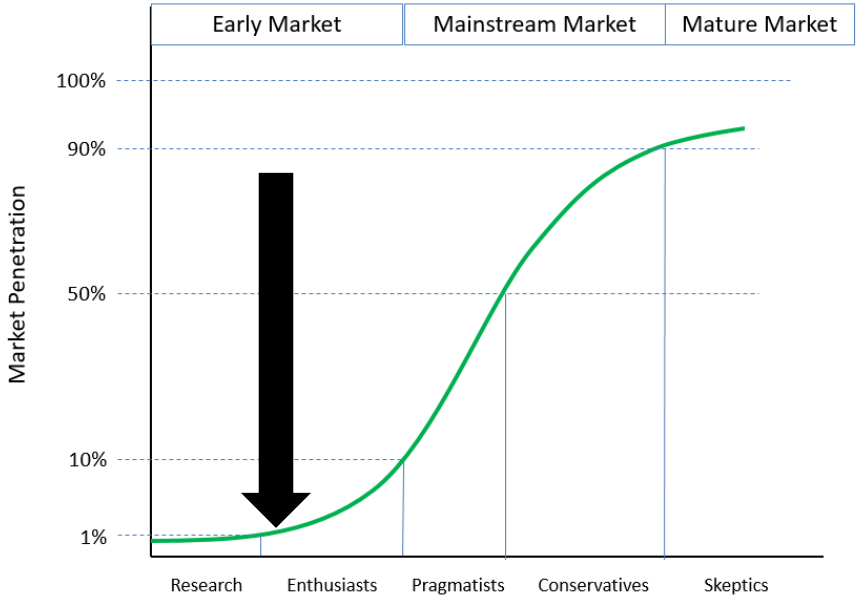
Improved air quality, less noise

UTILITY

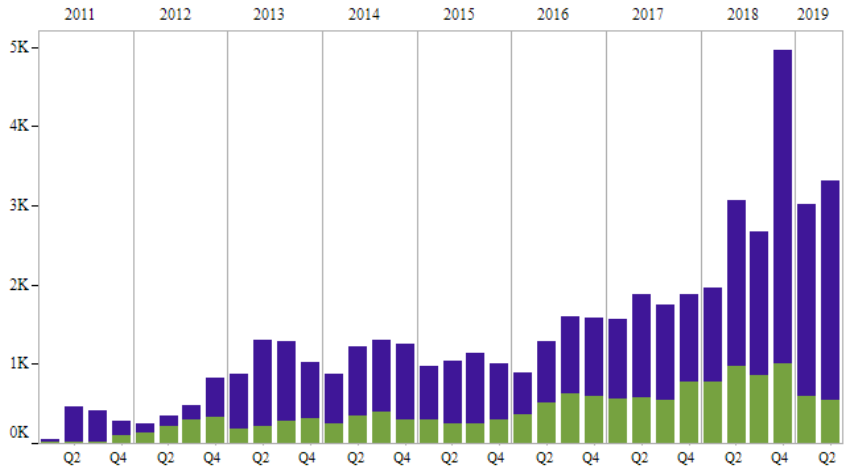
Increased utility revenues

Current market

- Early adoption stage (<3% of new cars in WA)
- Economics outlook of EVs is good
  - Cheap and clean renewable power, battery cost falling
- Public awareness is still low, many questions
- A period of innovation – best practices have not been set



EV Car Sales in WA State (Qtrly)



HB 1512 - Clarified Utility Role

Self Directed

"…each electric utility, depending on its unique circumstances, can determine its appropriate role in the development of electrification of transportation infrastructure."

Clarifies what is permitted

"…legislative clarity is important for utilities to offer programs and services, including incentives, in the electrification of transportation…"

Transportation electrification is voluntary

"The governing authority…**may** adopt an electrification of transportation plan…"

HB 1512 - Clarified Utility Role

Suggested topics of consideration

"…the governing authority **may** consider some or all of the following…"

1. Applicability of multiple options for electrification of transportation across all customer classes
2. The impact of electrification on the utility's load, the use of demand response or load management including direct load control and dynamic pricing
3. System reliability and distribution system efficiencies
4. Interoperability concerns for software or hardware
5. Overall customer experience

HB1512 - Spending Constraints

Gift of Public Funds Prohibitions

- Each program must still adhere to the constitutional prohibitions against "gifts of public funds" as interpreted in case law to not be a donative act (except in cases of "poor and infirm")
- Satisfied by a Ratepayer Impact Measure (RIM) test

Cost cap

"…*utility outreach and investment in the electrification of transportation infrastructure does not increase net costs to ratepayers in excess of one-quarter of one percent*."

- Interpreted to mean the sum of program costs net of projected benefits plus general expenses explicitly used for programs must not exceed 0.25% of operating expenses for the biennium.

Question of governance

Legislative intent:

- Removes a perceived legal obstacle
- Voluntary and self-directed
- Requires oversight by governing body
- Flexibility in how topics are considered, funds are spent

Required but Permissive Authority

Reality of the early market:

- Technology is continually changing
- Environmental policy is progressing
- Opportunities for partnerships and funding are fleeting
- Impractical for Board approval of program design and delivery

Operational Flexibility

The Strategic Plan

- Contains the strategic vision
- Provides guiding principles
- Codifies interpretation and compliance with HB 1512
- Sets the role of the utility
- Contributes to organizational clarity and consistency
- Establishes governance process
  - Public Utility Board approval of Strategic Plan, review on demand
  - Annual review of Action Plan
  - Describes internal processes for program design and delivery
- Public Input process before adoption

The Action Plan

- Annual update on results of previous year efforts
- Specifies areas of focus for the utility
- Previews program design and delivery for next year
- Aligned with the Strategic Plan
- Not explicitly adopted by the Public Utility Board to provide operational flexibility
- Addresses the “five areas to consider”
- Biennial public input process

Next Steps

Oct 23, 2019	Public Utility Board has first draft of the Strategic and Action Plans
	<u>Public Process:</u>
Nov 6, 2019	Presentation to Infrastructure, Planning and Sustainability
Dec/Jan 2020	Public Meeting with key stakeholders
Jan 2020	Opportunity to comment via website
Feb 2020	Final document including comments from PUB and Public Process presented for approval

Questions?

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Our Energy Future Series

Session 3: Resources

Rachel Clark
Resource Planning Manager

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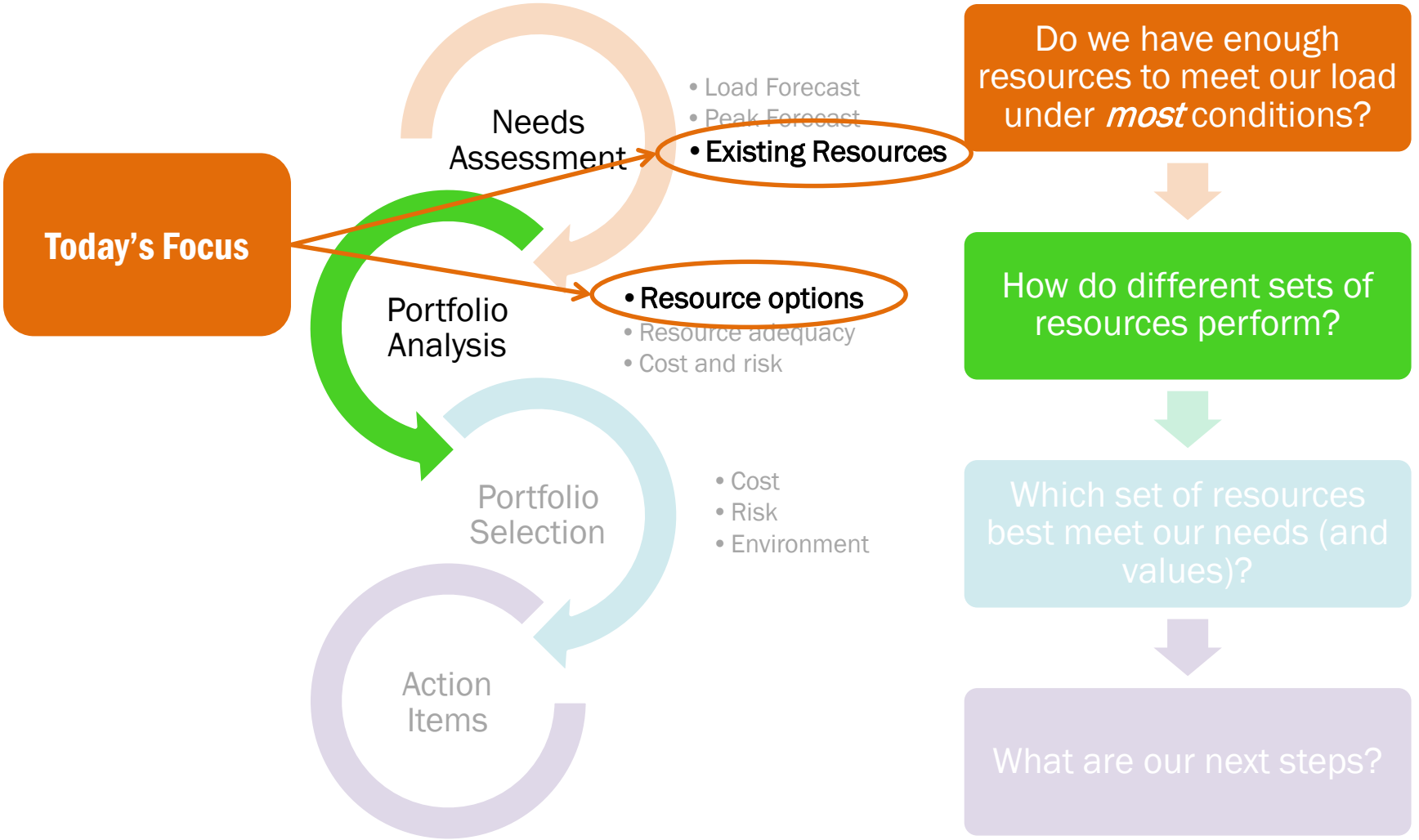
Review

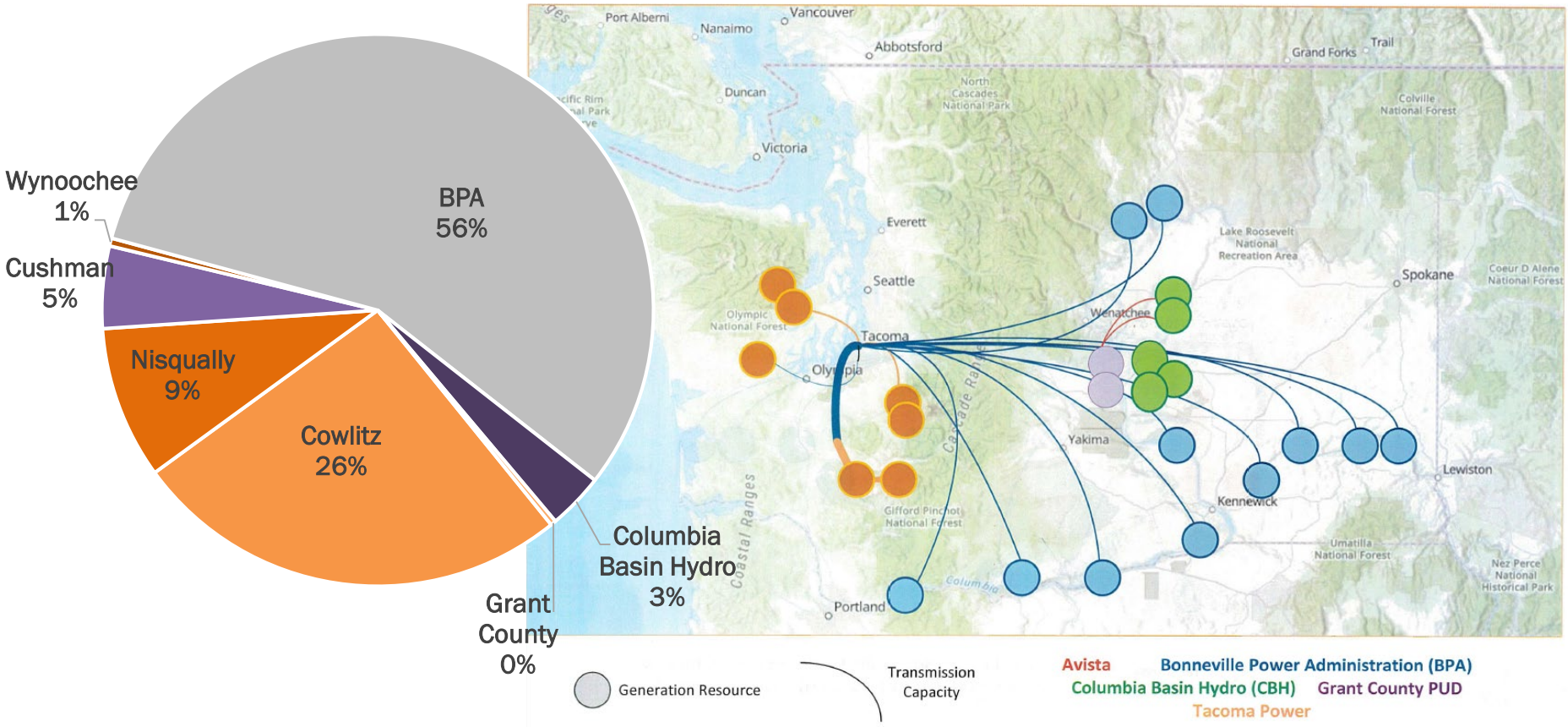
IRP Process Overview



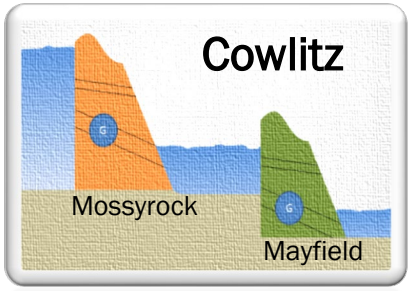
Our Resources

Section 1

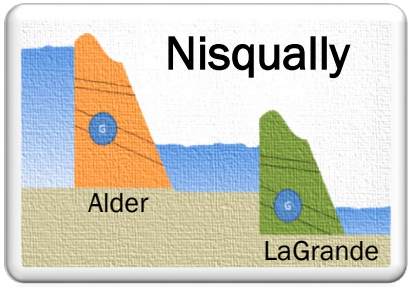
Our Resources Today



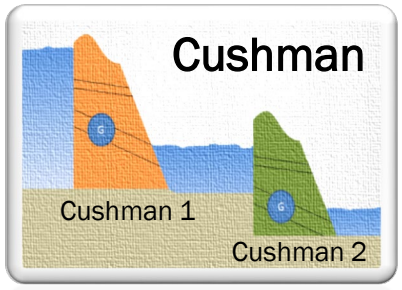
Our Hydro Projects



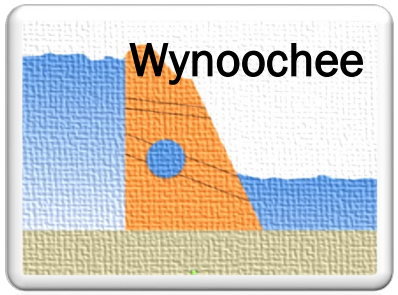
- 63% of Tacoma's average generation
- Total generating capacity = 466MW
- Significant storage and flexibility at Mossyrock
- Continuous outflow at Mayfield
- Diminished storage at Cowlitz due to Riffe Lake upper seismic operating limit



- 22% of Tacoma's average generation
- Total generating capacity = 116MW
- Limited storage and some shaping flexibility at Alder
- Continuous outflow at LaGrande



- 12% of Tacoma's average generation
- Total generating capacity = 135MW
- Flexible when there are sufficient flows



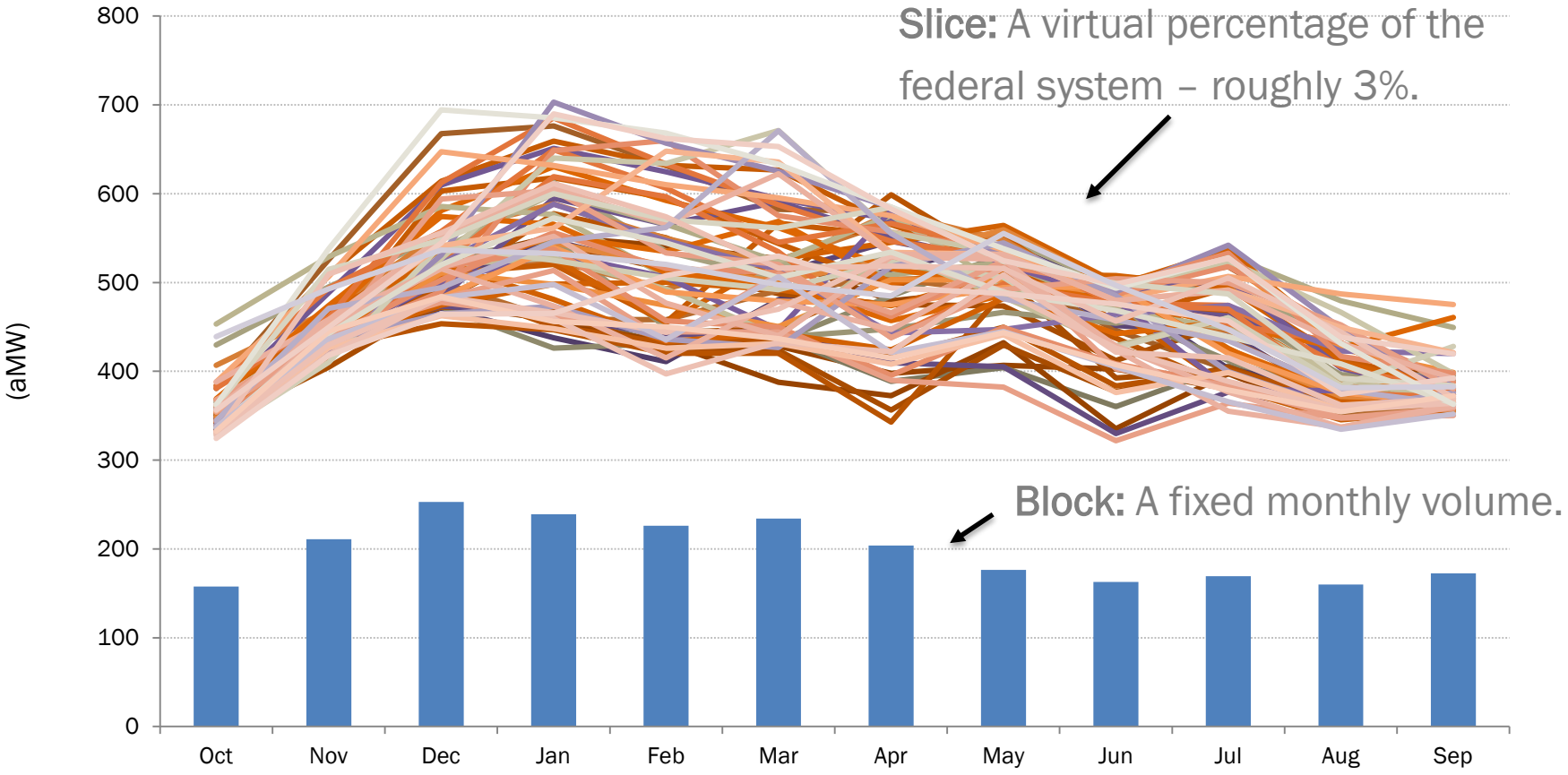
- 2% of Tacoma's average generation
- Total generating capacity = 13MW
- Run-of-river operations

Bonneville Power Administration (BPA) Purchased Power

Overview

- Tacoma Power has been a BPA customer since 1940
- BPA is a Federal Power Marketing Agency
  - ✓ 21 US Army Corp of Engineer Dams (14,650 MW)
  - ✓ 10 Bureau of Reclamation Dams (7,800 MW)
  - ✓ Columbia Generating Station (Nuclear, 1,100 MW)
  - ✓ Several Wind Generation contracts (58 aMW)
- Power is sold at cost (Currently ~ $32/MWh)
- Tacoma Power is BPA's 4th largest customer (~$120M/year, ~5.5% of BPA's total load)
- Current Contract Expires September 2028

BPA Slice/Block Product



Columbia Basin Hydro and Grant County

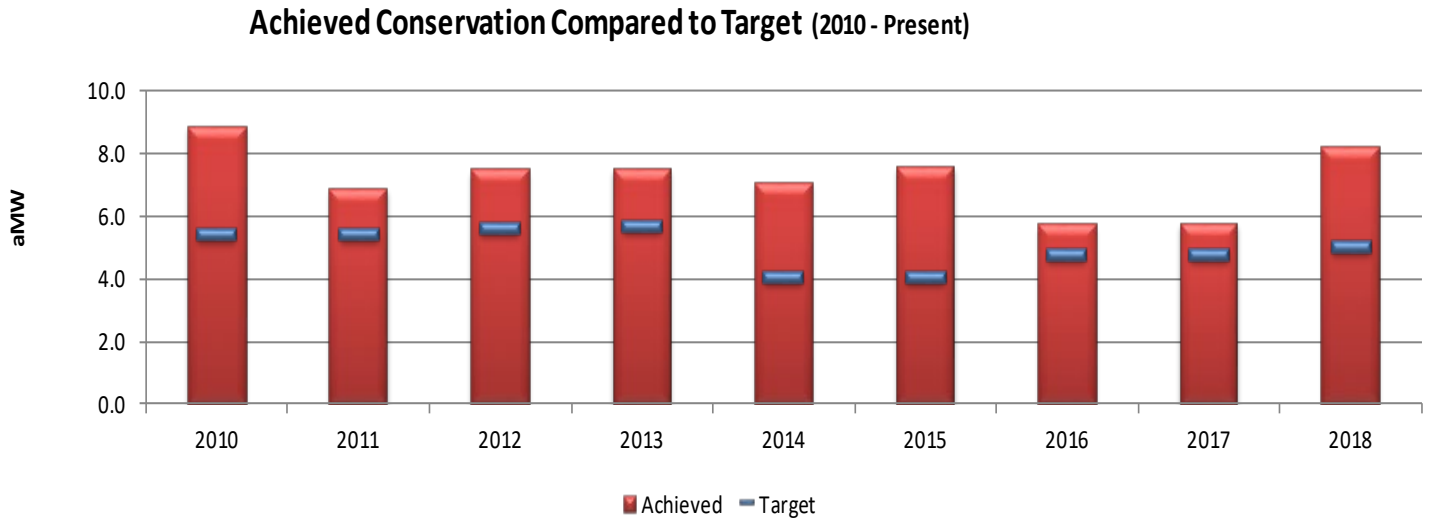
Columbia Basin Hydro

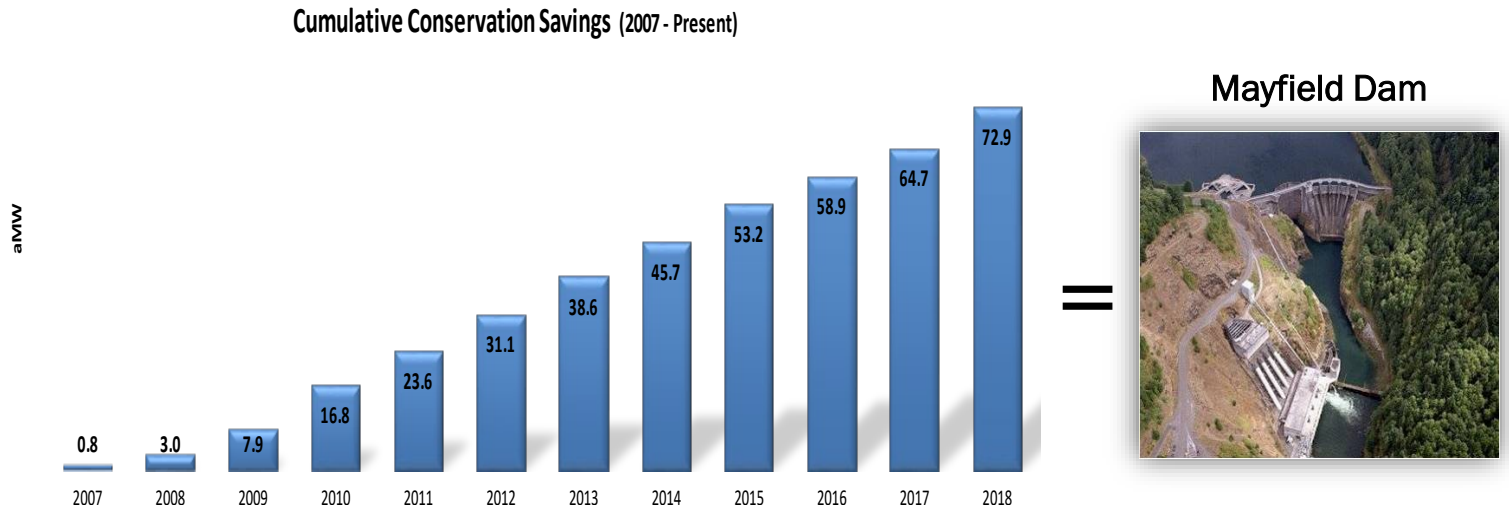
- 5 Irrigation Canals (Staggered Terms 2022-2026)
- ~27 aMW in months of March through October
- Pricing (~$29/MWh) = Cost (~$12/MWh) + Incentive Payment (~$17/MWh)

Grant County Contract

- .29% “slice” share of Priest Rapids and Wanapum Dams (expires 2052)
- ~2.5 aMW Similar in shape to the BPA Slice product
- Pricing (~$11/MWh) = Cost + Share of proceeds from auction of excess energy

Conservation



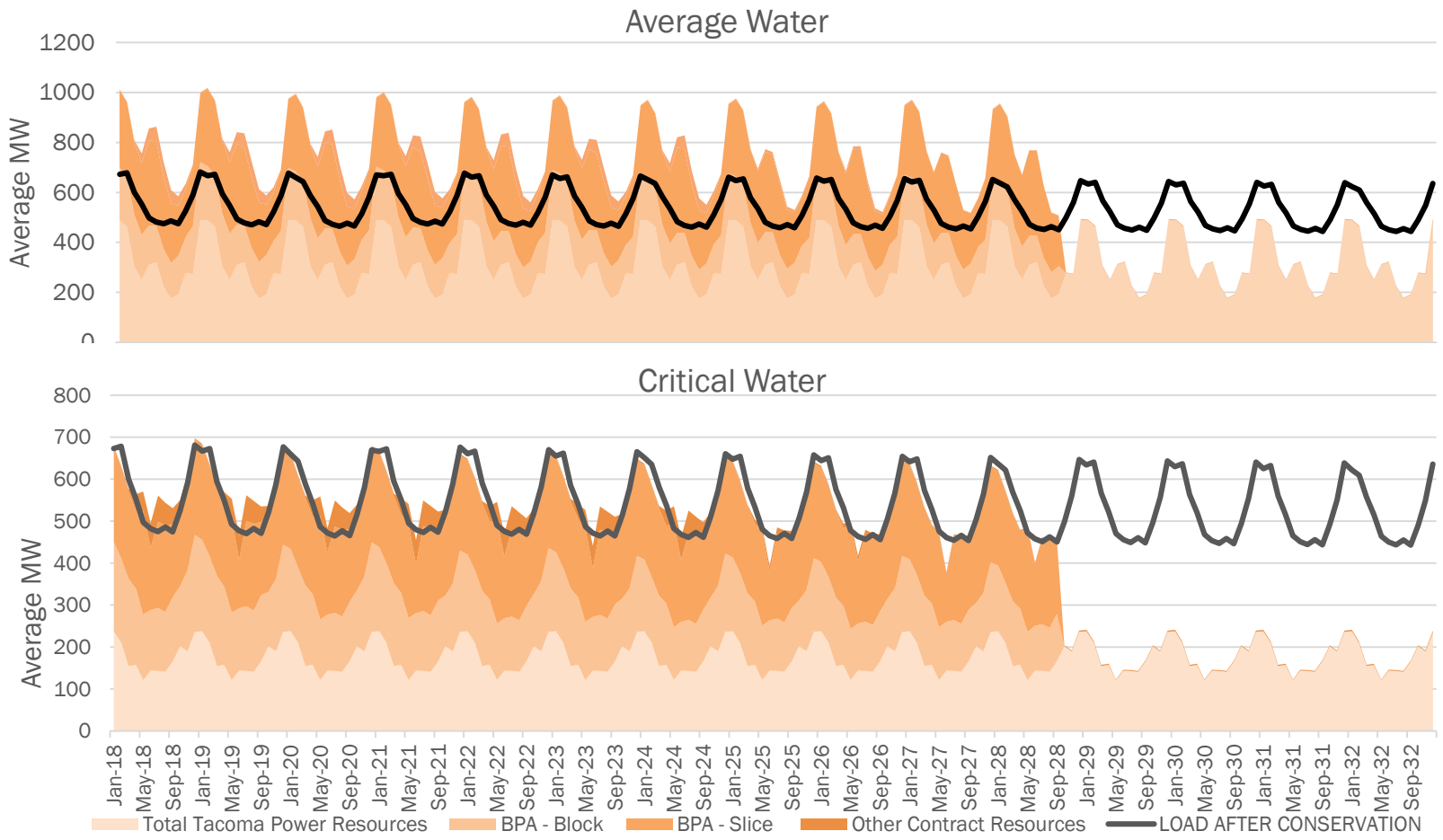


Our Resource Needs in the Future

Section 2

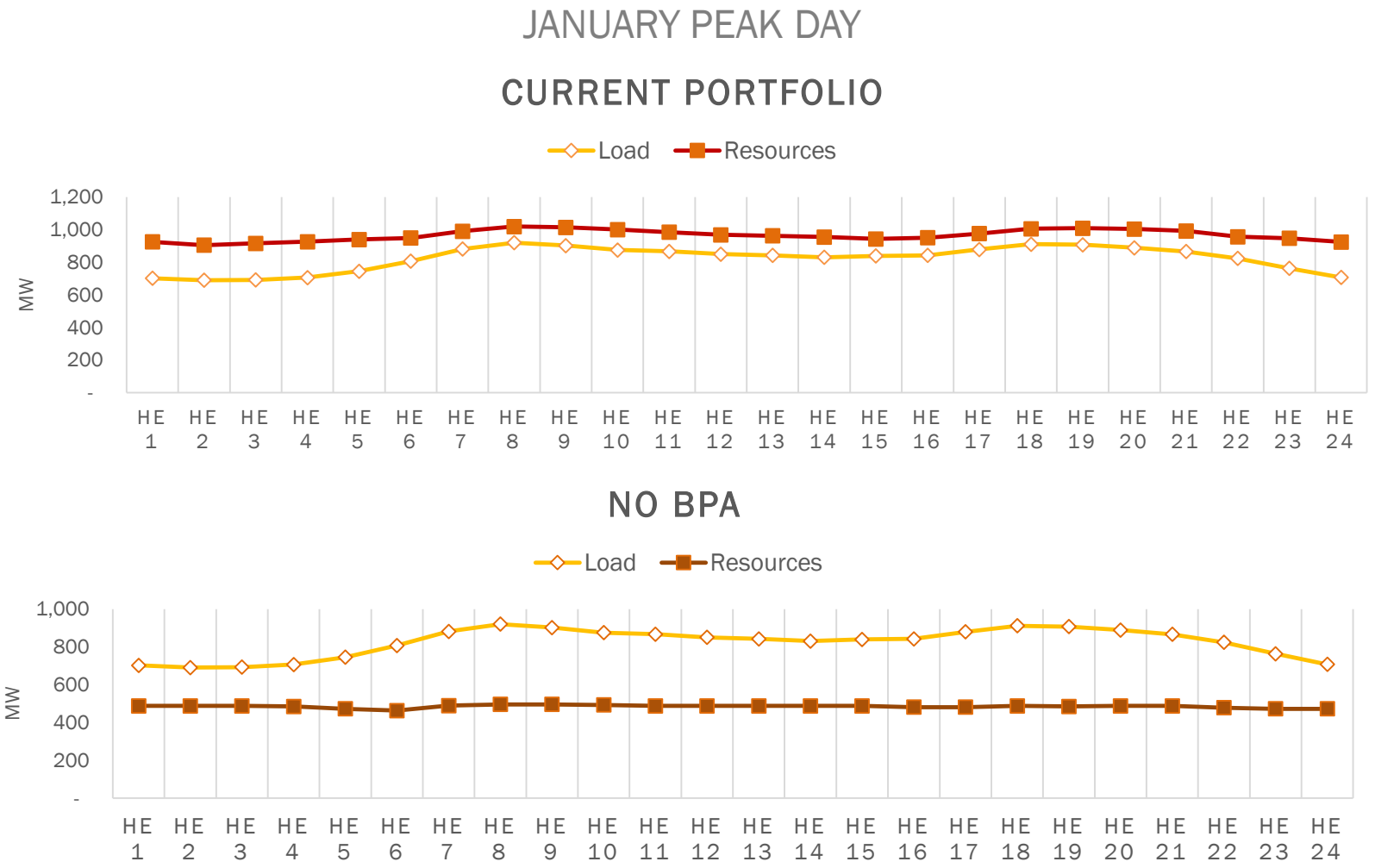
Section 2: Our Resource Needs in the Future

Our Hydro Projects Alone Don't Provide Enough Energy



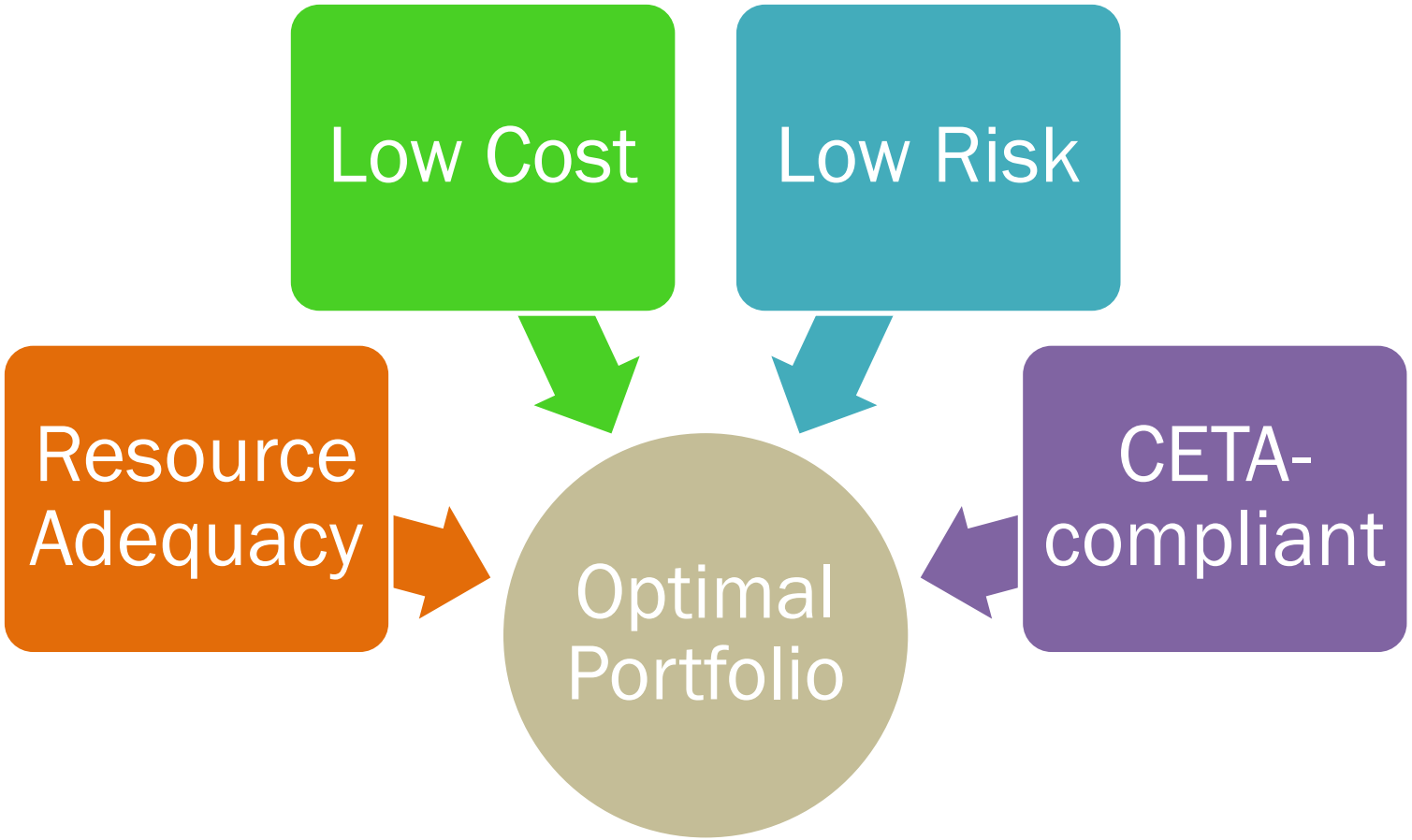
Section 2: Our Resource Needs in the Future

Our Hydro Projects Alone Don't Provide Enough Capacity

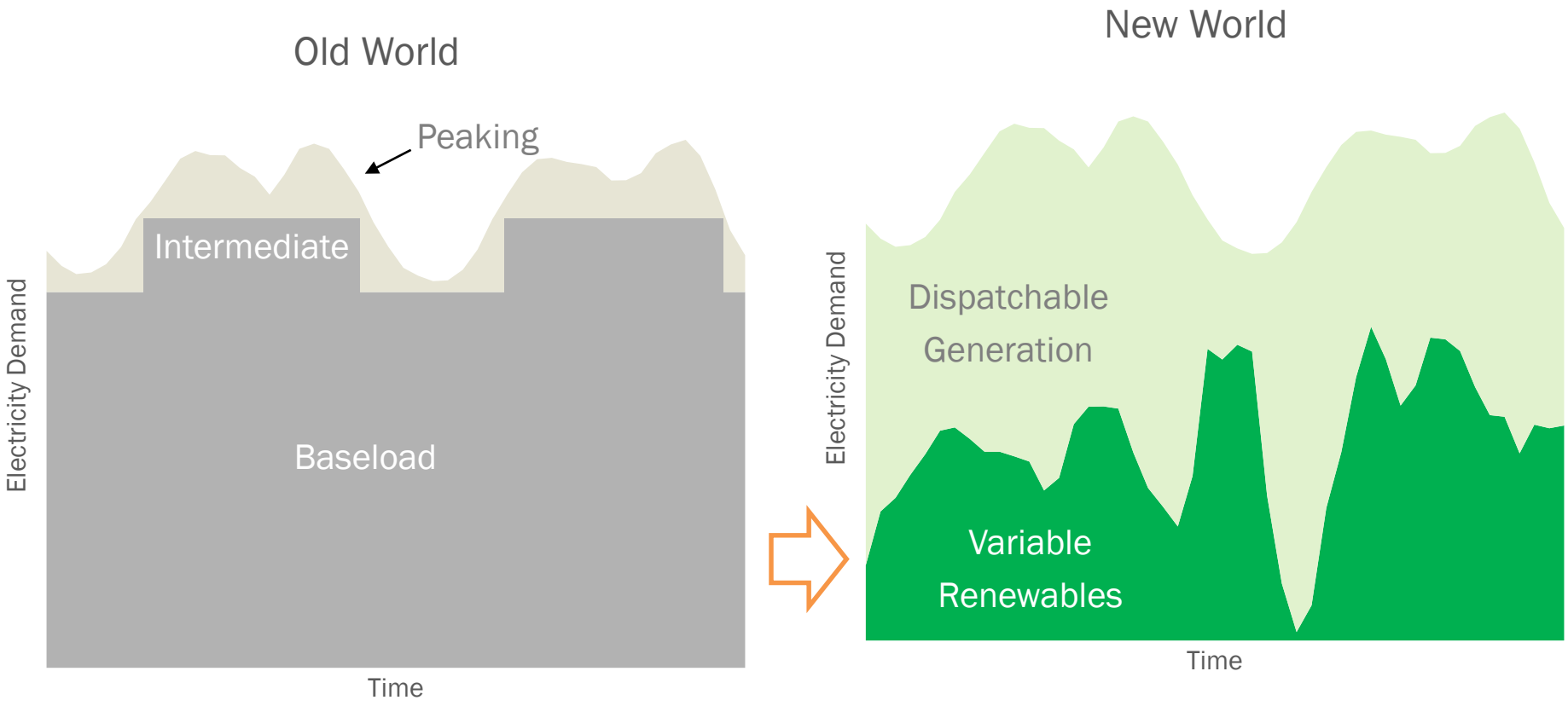


HE: Hour Ending

Our Future Portfolio Needs



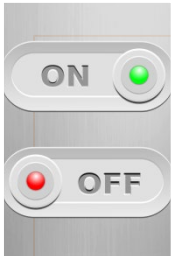
A System in Transition



Resource Characteristics

Predictability

- Do we know when it will be available?



Dispatchability

- Can we control when it is available?

Flexibility

- Can it respond quickly (e.g. within seconds) to changing demand?

Sustained Peak Availability

- Is it available for a long time during peak demand?

Emissions Profile

- How little carbon (or other pollutants) does it emit?

Other Considerations

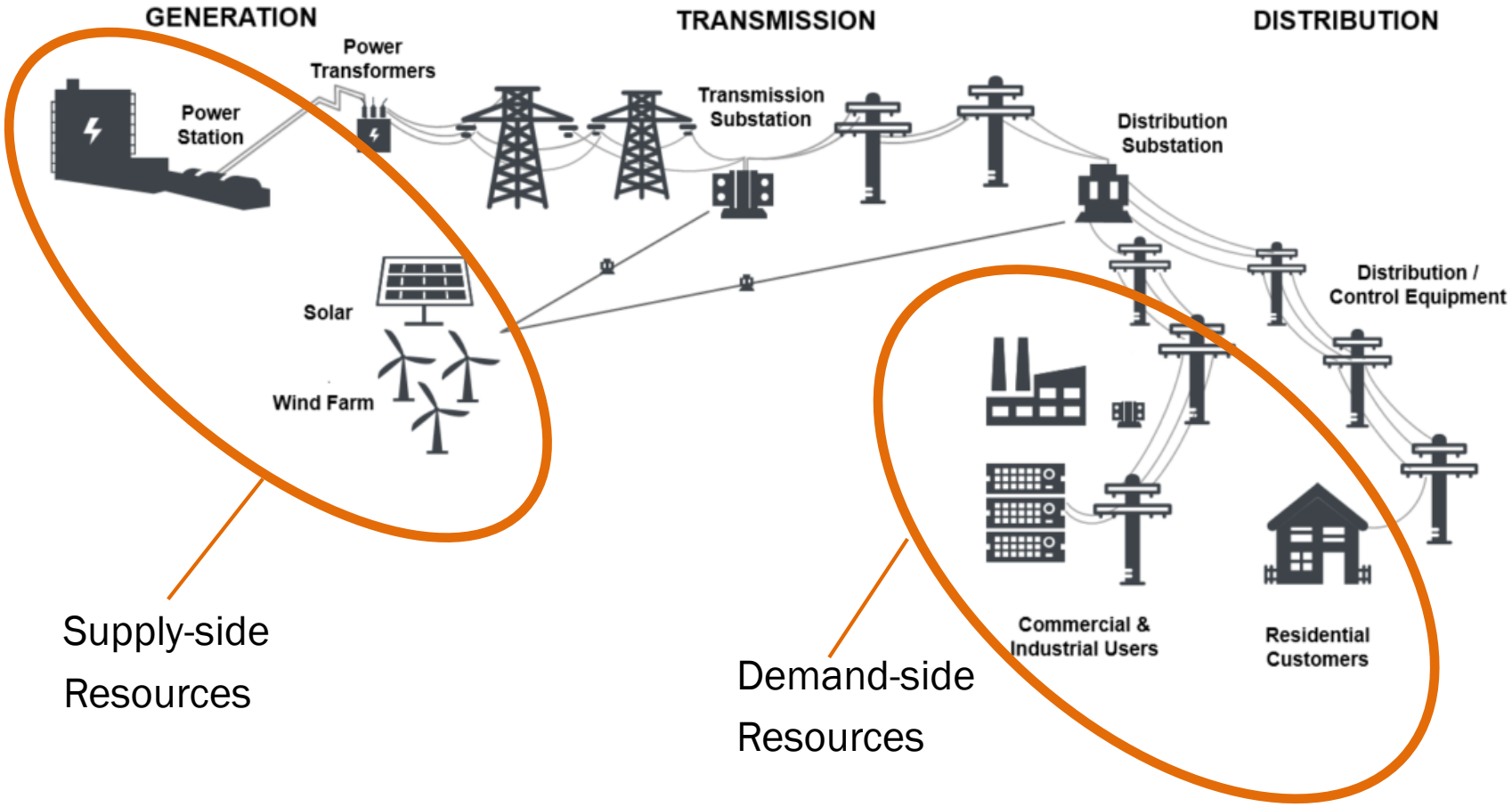
Cost

- How much does it cost to build/purchase and to run?

Financial Risk

- How uncertain are we about the value and/or cost of the resource?

Types of Resources We Will Consider in this IRP

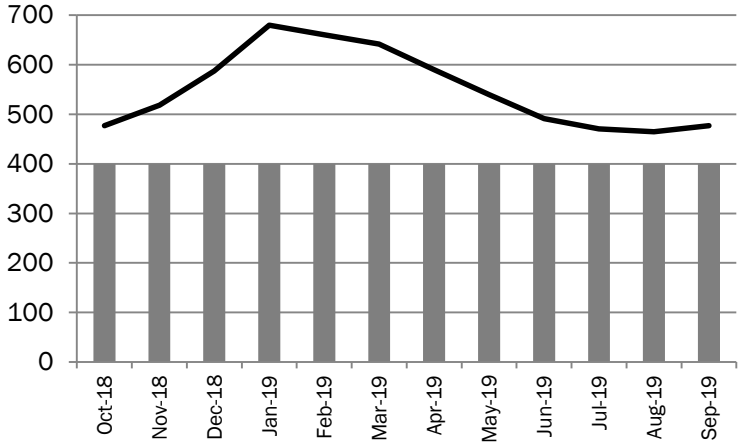


Resource Options: BPA

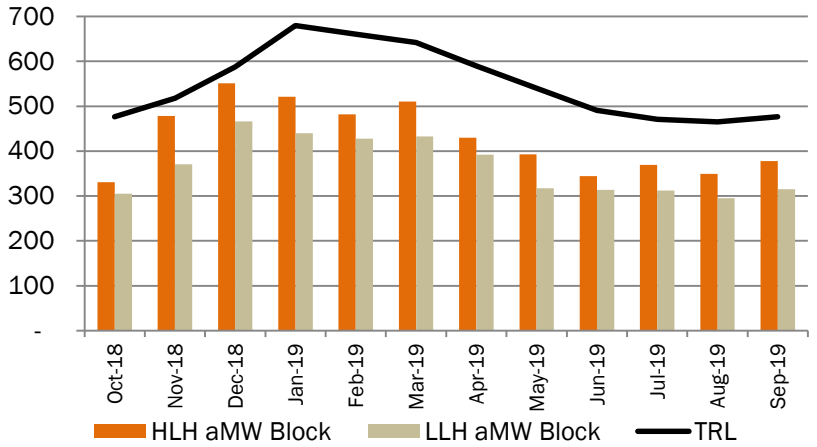
Section 3

Current Product Options: Block Products

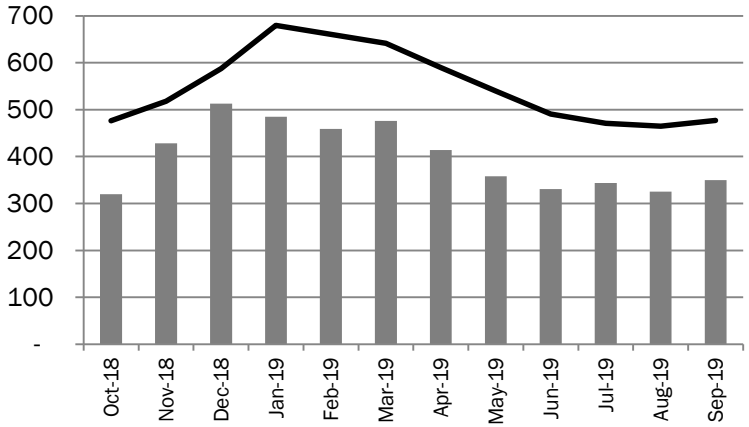
Flat Annual Block (400 aMW, $34.20/MWh)



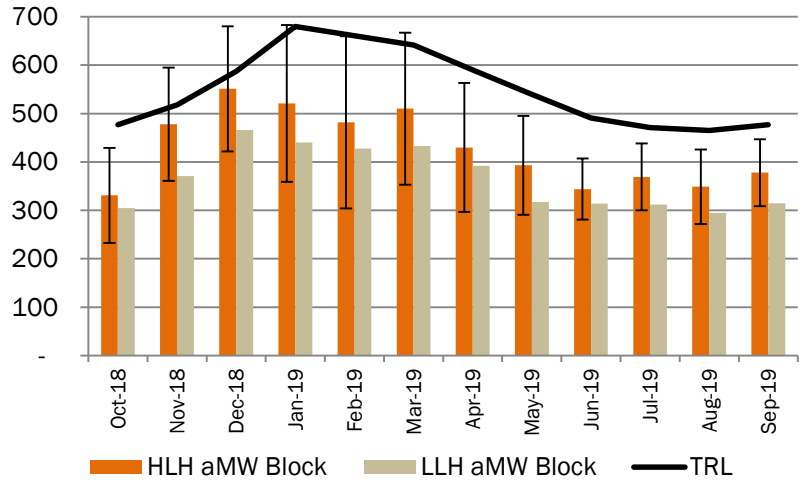
Diurnal Monthly Block (400 aMW, $34.50/MWh)



Flat Monthly Block (400 aMW, $34.30/MWh)

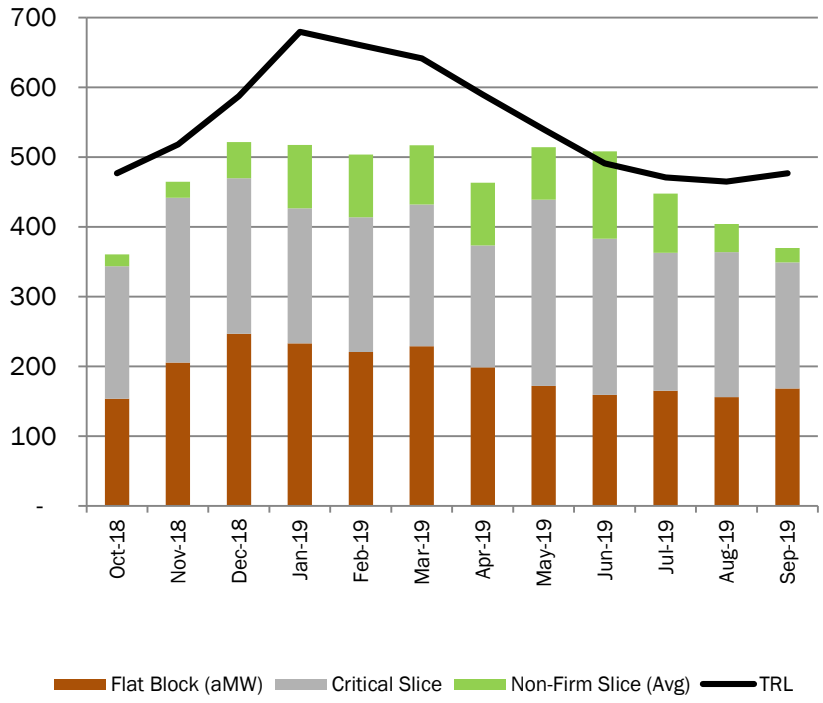


Diurnal Block with Shaping Capacity (400 aMW,

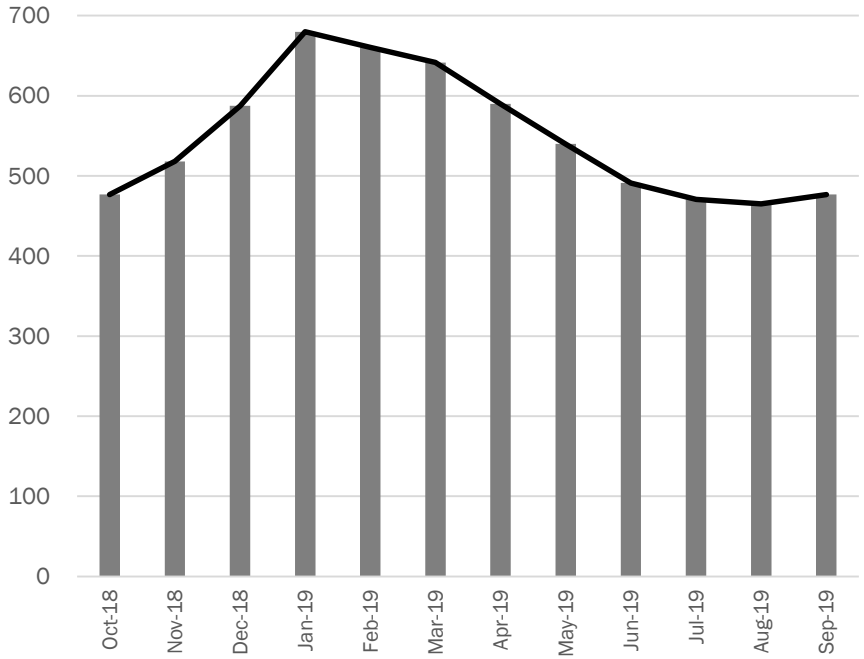


Current Product Options (Cont'd)

Slice/Block (453 aMW, $33.05/MWh)



Load Following (549 aMWs, $35.87/MWh)



BPA “Preference” Power Products

BPA’s Statutes Require It To:

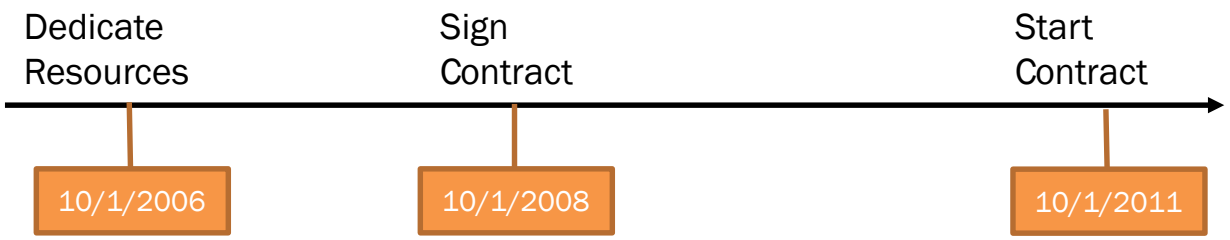
- Provide power to public utilities (or “preference customers”) upon request
- Amount of power is based upon the requesting utility’s Total Retail Load less its own resources under “critical water” conditions (“Net Requirement”)
- Net Requirement (NR) is determined annually based upon our load forecasts (Example to right):

	aMW
Total Retail Load	580
Less: Tacoma Resources (Critical Water)	185
BPA "Net Requirement"	**395**
⬇	
Critical "Slice" @ 2.96%	**200**
Block (Net Requirement less Slice)	**195**

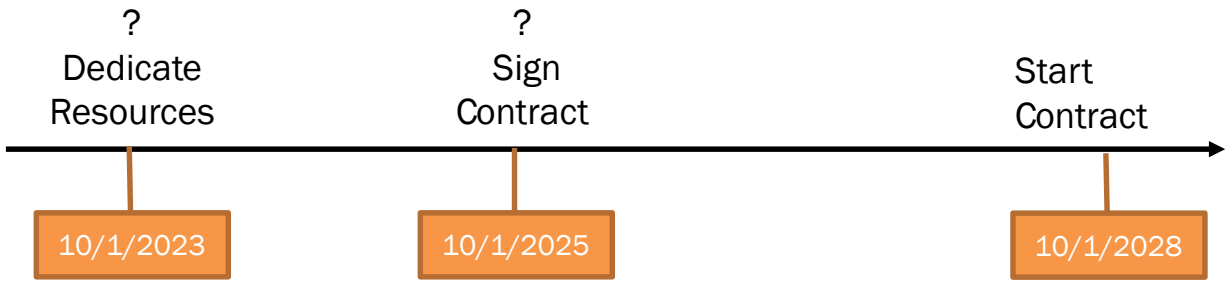
Key Challenge: BPA has discretion over whether to allow any new resource we acquire to count against our net requirement

Current Contract Framework & Post-2028 Timeline

Regional Dialogue Contracts



Post-2028 Contracts



Example: New Wind Plant

Scenario

- Tacoma Power decides to build a new wind plant as part of a "BPA diversification" strategy.
- The plant will generate 25 aMW a year. The remainder of load will be served from existing Tacoma projects and the BPA contract.

Implications

- New wind plant would not displace BPA Preference Power under current contract.
- If current contract timeline is applied, Tacoma would need to declare the resource to load by October 2023 to apply toward net requirement post 2028.

Other Resource Options

Section 4

Section 4: Other Resource Options

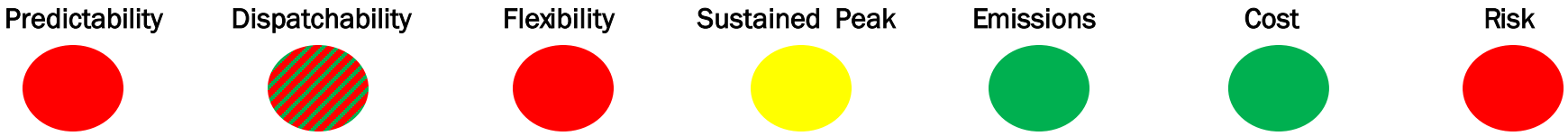
Other Hydropower

Options	Advantages	Challenges
• Expand generating capabilities at existing projects • Contract with other hydropower supplier	• Renewable • Flexible • Uniquely positioned to integrate other renewables	• Licensing • Operating constraints • Hydro variability • Rising costs of fish mitigation

Section 4: Other Resource Options

Wind

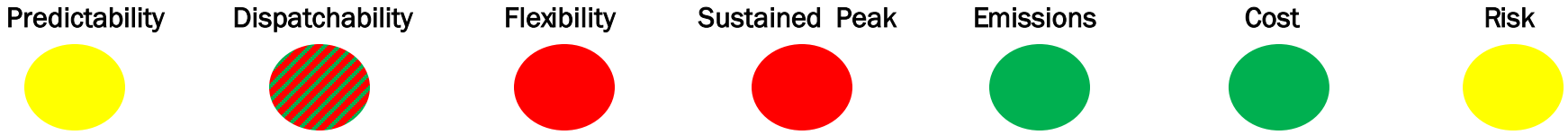
Options	Advantages	Challenges
• Contract vs. build • Location • With or without storage	• Renewable • Decent winter output	• Not very predictable • Not dispatchable • Transmission constraints



Section 4: Other Resource Options

Solar

Options	Advantages	Challenges
• Contract vs. build • Location • With or without storage	• Renewable • Fairly predictable	• Low winter output • Not dispatchable



Section 4: Other Resource Options

Pumped Storage

Options

- Build on existing projects
- Partner with others to build on another site

Advantages

- Renewable
- Long duration

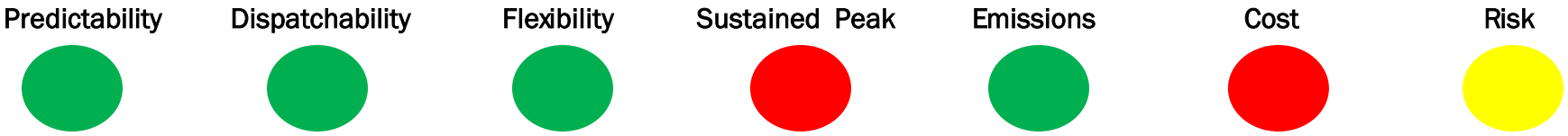
Challenges

- Large investment
- Licensing

Section 4: Other Resource Options

Battery Storage

Options	Advantages	Challenges
• Independent • Combined with wind and/or solar	• Carbon-free • Dispatchable & flexible • Modular	• Limited duration • Limited lifespan



Section 4: Other Resource Options

Conservation

Examples

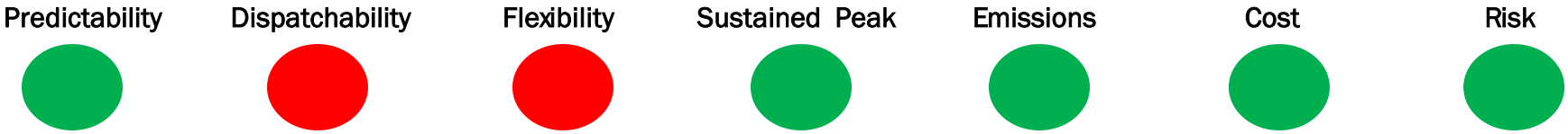
- Weatherization
- More efficient lighting
- Improved HVAC systems

Advantages

- Carbon-free
- Reliable
- Modular
- No need for long-distance transmission

Challenges

- Not dispatchable
- Easy opportunities waning



Section 4: Other Resource Options

Demand Response

Options

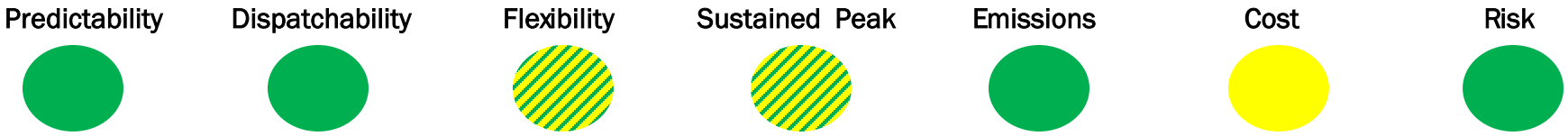
- Agreements with large industrial customers
- Interaction with residential/commercial heating equipment (thermostats, water heaters, etc.)

Advantages

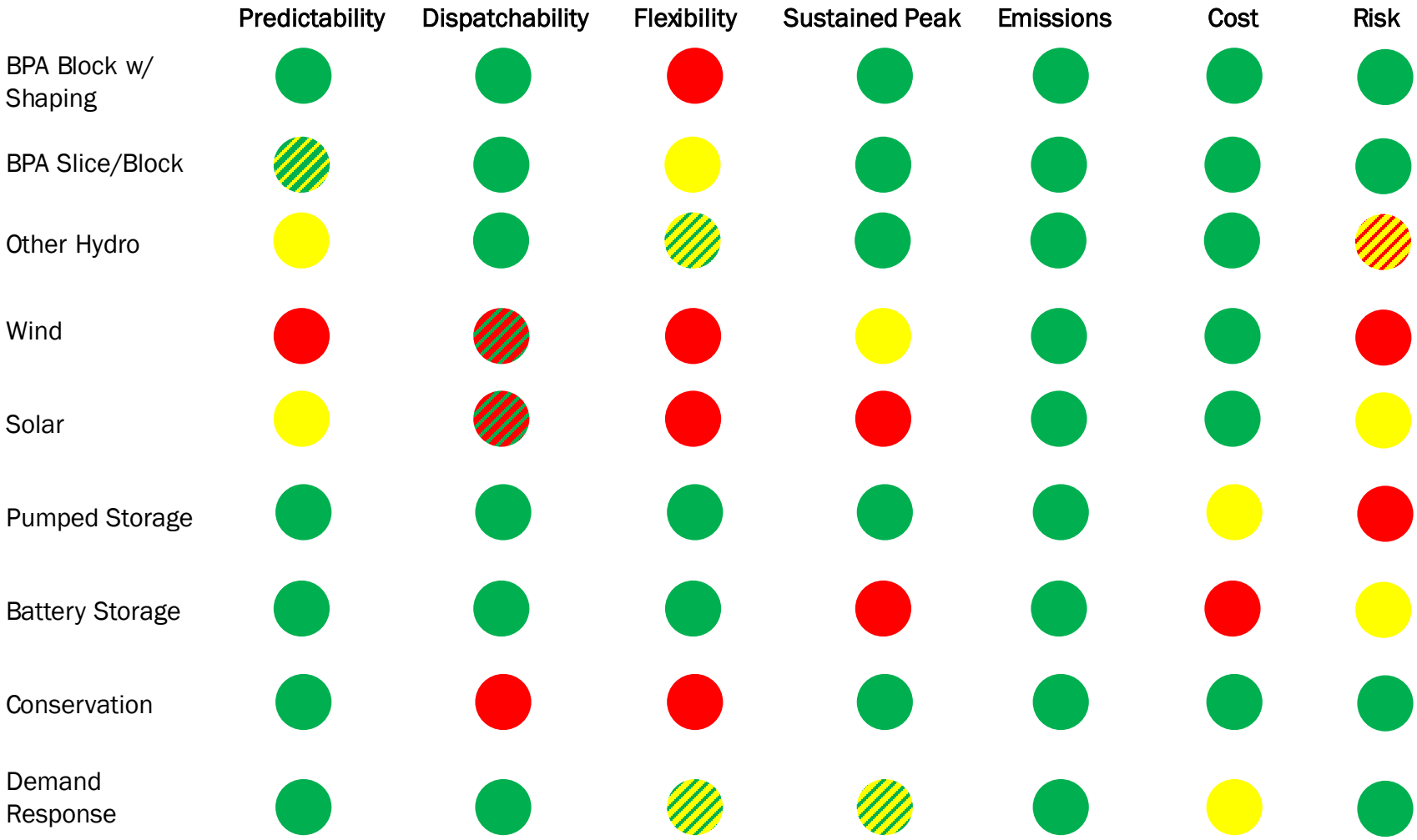
- Carbon-free
- Dispatchable
- No need for long-distance transmission

Challenges

- Current market structure keeps incentives for capacity products like DR low
- Administrative costs of residential/small commercial DR program



Summary


Predictability
Dispatchability
Flexibility
Sustained Peak
Emissions
Cost
Risk
BPA Block w/ Shaping
BPA Slice/Block
Other Hydro
Wind
Solar
Pumped Storage
Battery Storage
Conservation
Demand Response

Other Promising Resources for the Future

Supply-Side: Renewable Hydrogen

- Using surplus renewable energy to convert water into hydrogen gas, which is used later as fuel for transportation, industrial processes or power generation

Supply-Side: New Battery Technologies

- Lithium-sulfur, solid-state, vanadium-flow, potassium-ion, silicon batteries, etc.

Supply-Side: Small Modular Nuclear

- "Smaller, safer, cheaper" nuclear power

Supply or Demand-Side: Formic Acid

- A safer, more efficient fuel cell

Demand-Side: Self-Generation with Storage

- Incentivizing customers to store behind-the-meter power generation and use it when it is most beneficial to the grid

Demand-Side: Vehicle-to-Grid Storage

- Demand response using electric vehicle batteries

Demand-Side: Rate Design

- Time-of-use rates, real-time pricing, time-varying demand charges, critical peak pricing, etc.

Next Steps

Section 5

Action Items for Resources Considered in 2020 IRP

Regional Engagement

- Working to gain more clarity on BPA product options for 2028
- Seeking more flexibility from BPA in resource dedication policies post-2028

Modeling Tools

- Starting to model resources in system model

Resource Cost Estimates

- Estimating costs specifically for Tacoma Power

Stakeholder Engagement

- Working on plan (schedule, invite list, etc.) for community input meetings (to start around mid-January)

Anticipated Study Session Schedule

		Study Session Date
1	Resource Planning 101	August 28 (complete)
	~~Resource Adequacy~~	~~September 11~~
2	Resource Adequacy	October 9 (complete)
3	Our Current Portfolio & Resource Options	October 23 (today)
4	Small Nuclear Reactors	November 13
5	Energy Storage	December 4
6	Load Management	TBD (2020)
7	Load forecast, Current Position & Metrics	TBD (2020)
8	Scenarios & Resources Considered	TBD (2020)
9	Preliminary Analysis Results	TBD (2020)
10	Final Results & Portfolio Recommendation	TBD (2020)