

2019 IRP Kickoff Meeting



Public Participation Meeting

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Manager Resource Planning and Analysis

May 30, 2018

Welcome

- Opening remarks
- Safety message

Today's agenda

- Welcome and opening remarks
- Public participation expectations
- Updates
- IRP overview

--BREAK--

- Scenario development
- System planning
- Next steps
- Meet and greet

Public Participation and PSE IRP Charter Development



May 30, 2018

Updates since the 2017 filing

- February 21, 2018 - WUTC Open Meeting
- February 22, 2018 - More than 670 letters filed with the WUTC concerning the electric and gas docket. Thank you!
- March 29, 2018 - 2018 All-Source RFP filed with the WUTC, final bids due August 17, 2018
- May 7, 2018 - WUTC acknowledgement letter

Public process: building on the 2017 IRP

Michele Kvam will continue in Project Manager role

IRP mailbox: IRP@pse.com

Questions and answers

- Michele or designee will reply with acknowledgement and answer question or provide anticipated response date within 2 business days
- Answers to questions sent to IRP@pse.com will be shared with IRPAG Opt-in “sharing” distribution list, along with the original question and receipt
- Answers and questions will also be posted to pse.com: About PSE/Resource Planning

Alternative: Emails, calls, discussion outside mailbox will not be posted

- Will “reply all” within 2 days
- If you email Phillip Popoff a question/request, please cc Michele Kvam (michele.kvam@pse.com)

IRP Overview and Scenario Development



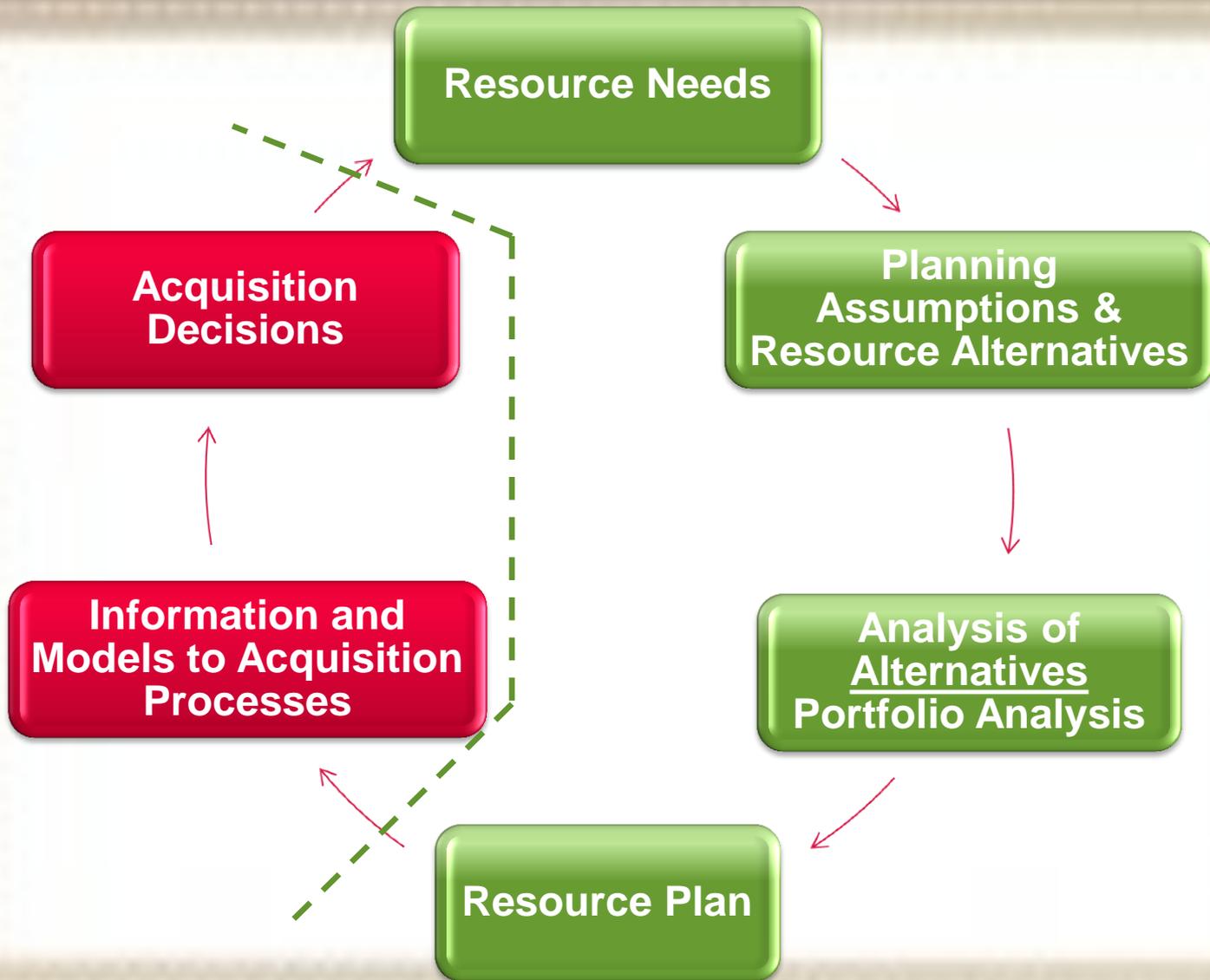
Integrated Resource Plan overview

- Compliance filing at WA Utility Commission
- Details of laws/rules/policies differ across states
- 20+ year look at **needs** and **resources**
- Determine **least cost mix** of resources
- **Understand** how **uncertainty** affects findings



*In preparing for battle, I have found plans to be
useless, but planning essential.
- Dwight D. Eisenhower*





Planning, acquisition, implementation

- Where one ends and the other begins is not always clear.
- IRPs vary across states.
- Planning is a loose term.



Planning



Let's get together
next week

Planning

Lunch at Monsoon:

appetizer, entrée
and dessert



Planning



Select appetizer

Select entrée

Select dessert

Planning



Outputs from IRP



- Demand-side vs. supply-side resource division
- Energy efficiency
- Supply-side acquisitions
- Value of distributed resources

Scenarios and Sensitives Development



What are scenarios?

PSE focuses IRP modeling on determining the least cost mix of resources.

Least cost depends on a host of assumptions about the future:

- Market prices for electricity and natural gas
- Carbon prices
- Energy policies
- Future resource costs, performance, and availability

Why we use scenarios



- Scenarios are useful to understand how the least-cost mix of resources would change under different future conditions.

Three kinds of scenarios



Fully integrated scenarios

One-off scenarios

Portfolio sensitivities

Types of variables to consider

Outside PSE's control: factors that may affect markets

Outside PSE's control: policies

Factors specific to PSE's portfolio



Meaning of “base” or “reference” case

Option 1: expected case

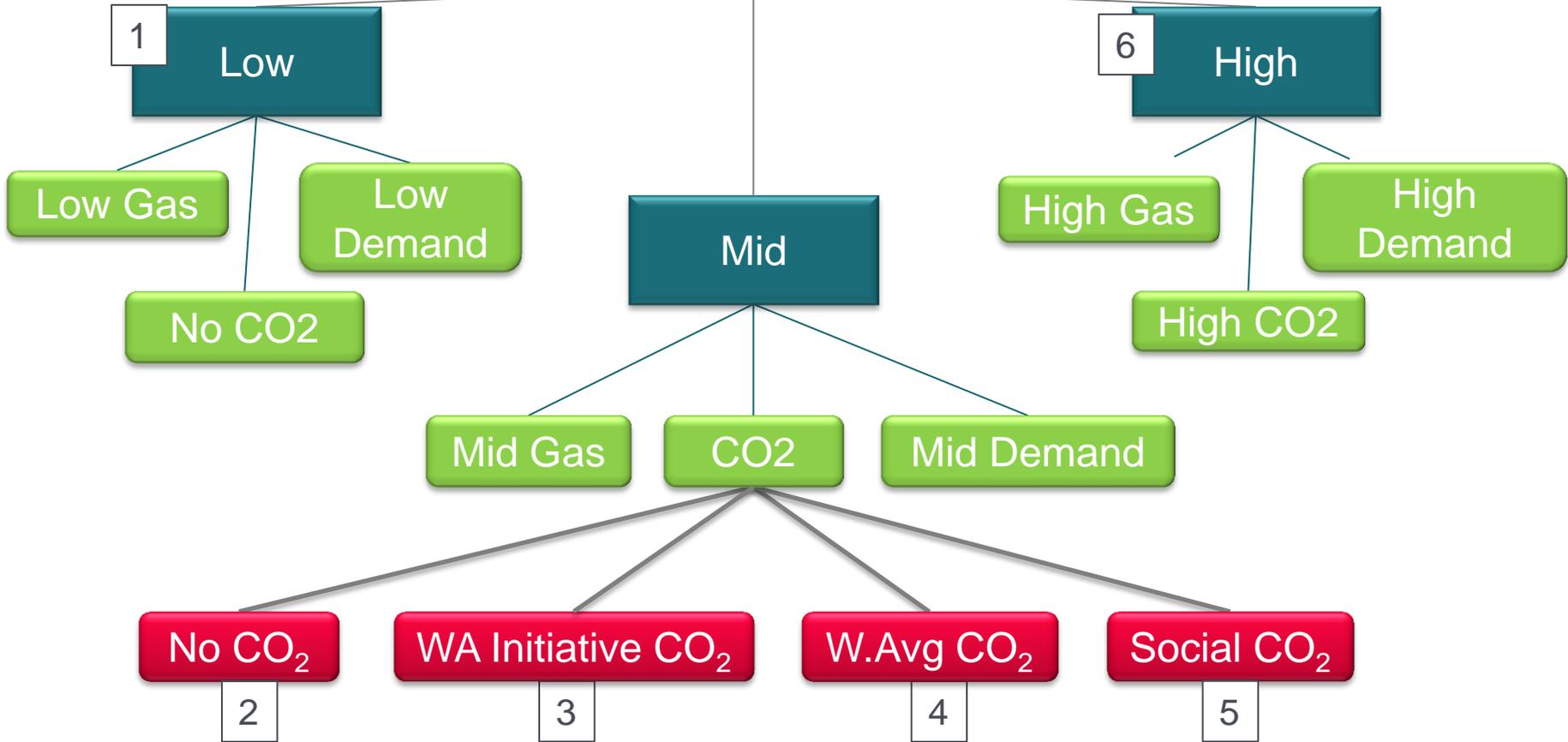
Option 2: frame of reference for comparisons—example

PSE uses Option 2 approach

Draft Scenarios

	Scenario	Demand	Gas Price	CO2 price
1	Low	Low	Low	None
2	Base + No CO2 price	Mid	Mid	None
3	Base + WA Initiative CO2 price	Mid	Mid	WA - Initiative
4	Base + W. Avg CO2 price	Mid	Mid	WECC - weighted average
5	Base + Societal CO2 price	Mid	Mid	Plan Adder-Societal
6	High	High	High	WECC High

Scenarios



15 minute break



Carbon price assumptions



Today-focus on carbon price/cost assumptions

New: PSE will develop a weighted average carbon price based on subjective expected value that different carbon policies will be implemented

Policy themes

- No CO2 regulation: likelihood of no action decreasing over time
- Carbon Tax: WA Initiative as an explicit tax on generation and imports
- Societal Cost of Carbon: Planning adder
- Carbon Market: Integrated cap and trade market across WECC

Need your help



Talk through subjective probabilities to assign to different policies over time.

Interested in dialogue more than specific numbers and dates

Will help us think more broadly about future potential policy developments

Idea...



Likelihood of carbon policies being adopted in legislation will change in the future. Further into the future, less likelihood of inaction.

- Thinking to split the future up into specific time periods

What is the likelihood one of the policies will be adopted during each time period?

- Not an aspirational exercise
- What could happen not what we hope/want to happen

How dialogue will be used



PSE will use input from this dialogue in developing a weighted carbon cost scenario

- Input about timing,
- Input about why different policies are more or less likely to be adopted in the future

Will include a write-up in IRP on this dialogue

May include one or more specific assumptions on the chart in 2019 IRP based on stakeholder feedback...not run the full scenario

Note: It is unlikely that any of these regulatory policies will achieve the kind of emission reductions we're targeting—the additional carbon constraint will be important.

Initial brainstorm

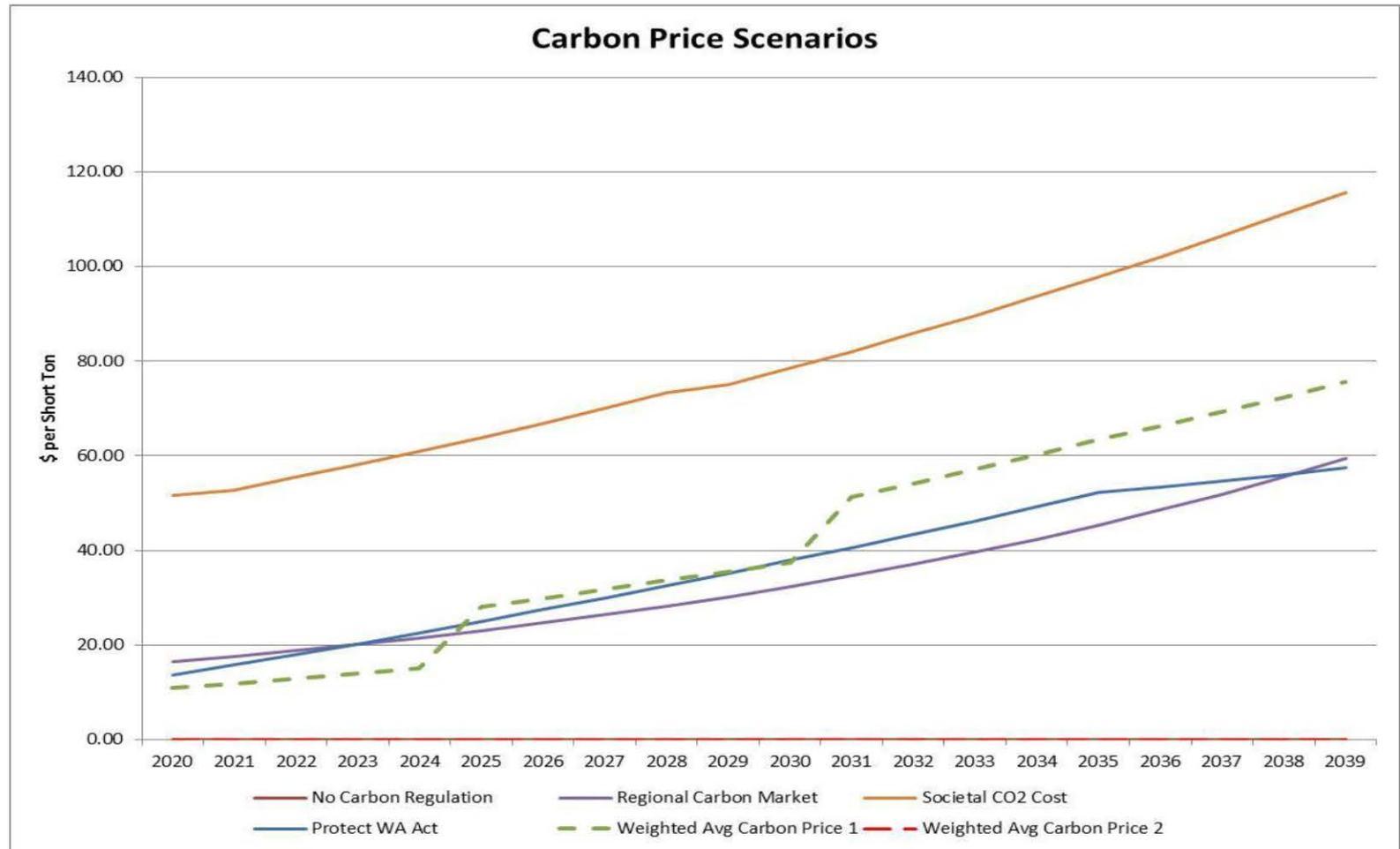
Passed in Legislation	2020 - 2024			2025 - 2030			2030+		
	Prob (%)	Price (\$/ton in 2020)	Weighted \$/ton	Prob (%)	Price (\$/ton in 2025)	Weighted \$/ton	Prob (%)	Price (\$/ton in 2030)	Weighted \$/ton
No Carbon Regulation	50%	\$ -	\$ -	25%	\$ -	\$ -	5%	\$ -	\$ -
Protect WA Act	30%	\$ 13.61	\$ 4.08	30%	\$ 25.04	\$ 7.51	30%	\$ 37.88	\$ 11.36
Societal CO2 Cost	10%	\$ 51.53	\$ 5.15	25%	\$ 63.85	\$ 15.96	35%	\$ 78.53	\$ 27.48
Regional Carbon Market	<u>10%</u>	\$ 16.45	<u>\$ 1.64</u>	<u>20%</u>	\$ 23.06	<u>\$ 4.61</u>	<u>30%</u>	\$ 32.35	<u>\$ 9.71</u>
Weighted \$/ton	100%		\$ 10.88	100%		\$ 28.09	100%		\$ 48.55

CO₂ Price Options

	Scenario	Description	CO2 price	Notes
2	None	Zero price	\$0/ton	Assumes no effective carbon regulation is implemented by law
3	Protect WA Act-Initiative	Carbon tax in WA and on imports	\$13.61/ton in 2020	Equivalent to \$15/tonne in January 2020 and escalating
5	Societal CO ₂	Societal CO ₂	\$51.53/ton in 2020	Interagency working group on societal cost of greenhouse gases, August 2016 (Equivalent to \$42/tonne 2007\$ in 2020)
-	Regional CO ₂ Market	WECC wide societal CO ₂	\$16.45/ton in 2020	Forecast of AB-32 prices from Wood Mackenzie
4	Weighted Average	W. Avg CO ₂	TBD	Assign a probability of each of the carbon prices

Annual Carbon Prices

DRAFT



System Planning



The future of Delivery System Planning is changing.

Greater focus on integrating distribution planning into IRP process is evident by:

- Transmission and Distribution Introduction Workshop March 10, 2017
- Energy Storage Policy October 11, 2017
- Report on Current Practices of Distributed Energy Resource Planning December 31, 2017
- Commission Staff comments on 2017 IRP February 6, 2018
- Distribution Planning draft rules April 17, 2018; Comments submitted May 17, 2018; Calendar for rule making process nearing order late 2018; Details of Final Rulemaking still to be revealed



Internal and External collaboration increasing through:

- 4000+ net metering and Solar interconnection requests increasing
- PSE Green Direct and Electric Vehicle Strategy
- Smart Cities / Connected Cities initiatives

PSE's interpretation of objectives of rule making are:

- Clarity of how Distributed Energy Resources ("DER") will and can impact energy supply resource needs
- Transparency into how utility planning occurs
- Opportunity for stakeholders to engage and educate utility planning process
- Confidence DERs are getting fair evaluation
- Encouragement to enable third party/customer resources for solving delivery and energy system concerns

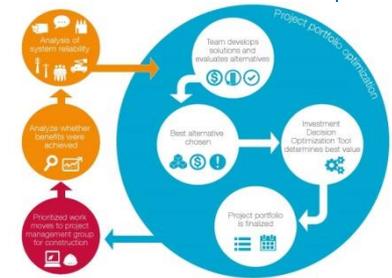
UTC support is needed to:

- Determine expectations of interrelated processes relative to all IRP sub parts (Distribution Planning, Energy Storage Policy, and PURPA requirements) as well as customer requested work processes and any other regulatory process requirements
- Clarify framework and formats for utility consistency
- Actively participate in process for future recovery and tariff process efficiency

PSE can leap off of its Delivery Planning process towards the proposed rules.

Leverage existing information and process:

- Energy and Demand load forecast from IRP
- Value of Distributed Resources from IRP
- Avoided T&D deferral for IRP
- Conservation estimates from IRP
 - For example PSE models assuming 100% conservation
- Process that incorporate non-capital solutions
 - Phase balancing
 - Evaluate solutions such as DG based on solution criteria



Progressing towards future vision:

- On-boarding expertise for Distributed Energy Resources analysis for 4-5 projects
- Monitoring other states similar process progress
 - California Distribution Resource Plan
- High-level foundational and tool / technology gaps analysis
- Active engagement in proposed rule making process – **Still in draft format**
- Internal development of an advisory committee function that will engage on planning process and assumptions
- Consideration of focus groups for needs currently being evaluated to increase transparency
- Smart Grid pilot and demonstration projects in motion to learn specific technology, how to integrate, value assumptions, and operationalization processes when potentially scalable
 - <https://pse.com/inyourcommunity/Smart-Grid/Pages/default.aspx>



Describe how PSE will incorporate distributed resource planning and public review into development of 2019 IRP*

So what will be included in 2019 IRP?

- Roadmap to future planning process maturity based on high-level gap analysis including foundational and technology work necessary.
- Charter for and initial Delivery Advisory Committee meetings to engage in planning process and assumptions.
- Considerations for focused input or transparency for projects that are starting the planning process without the benefit of an “Advisory Group”.
- Process pilots for 4 areas for which grid can’t support need in future.
 - Load impacted by greater definition of conservation potential for 4 areas.
 - Initial needs assessment process leveraging DER process expertise.
 - Trial solutions assessment process.
- Process documentation that demonstrates how IRP load forecasting, conservation, and resource value is incorporated into planning process.
- Draft format of Short Term Plan that considers information security requirements.
- Plan for a Short Term Plan, Planning Process Improvement Plan, and Enabling DER Integration Plan that aligns with maturing in Roadmap (assuming draft rules are finalized with these elements).
 - PSE initially proposes that Delivery System planning is off cycle of IRP process due to inputs and outputs.
- Enhancements of the Delivery System Chapter for greater understanding of process overall and updates of plan information within.

*2019 IRP has a compressed schedule with a due date of July 2019.

DRAFT IRP Cycle Integration – Future state

Currently: Build understanding of new IRP rule-making. High-level assessment of current and future state. Engage UTC to align expectations. Develop roadmap for integration in current IRP cycle. Begin developing processes.

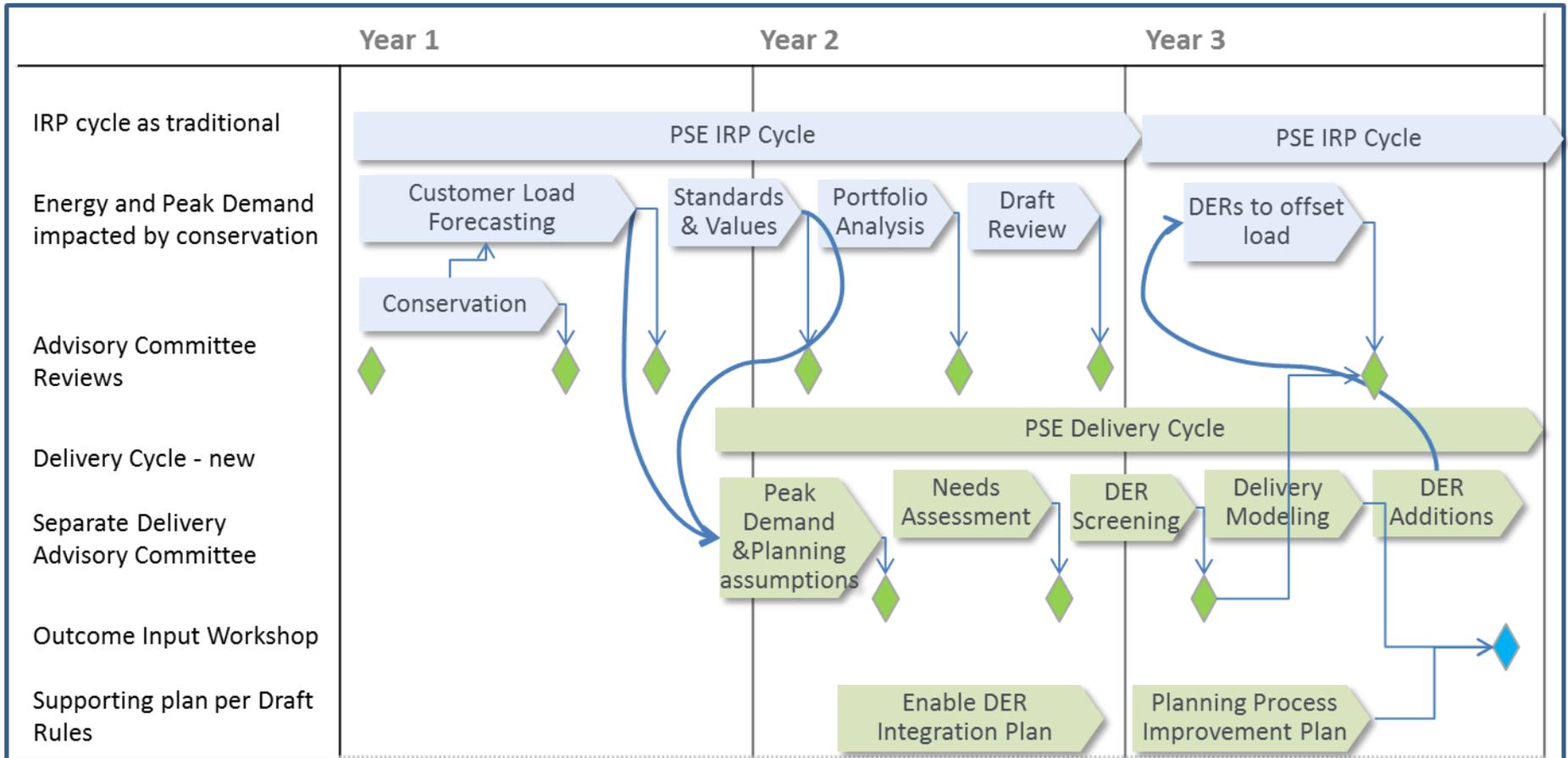


2-3 years: Provide first plans per roadmap. Tracking status of tool and changes needed to meet full assumptions. Reporting plan formats and frameworks well understood. UTC help to ensure all new IRP rules and policies align well.



4-5 years: All sections of rule and other policies embedded in planning process and continuous process to future state. Approvals of DER Integration Plan and Planning Process Improvement Plan are evidence of UTC alignment.

High level roadmap through maturity process



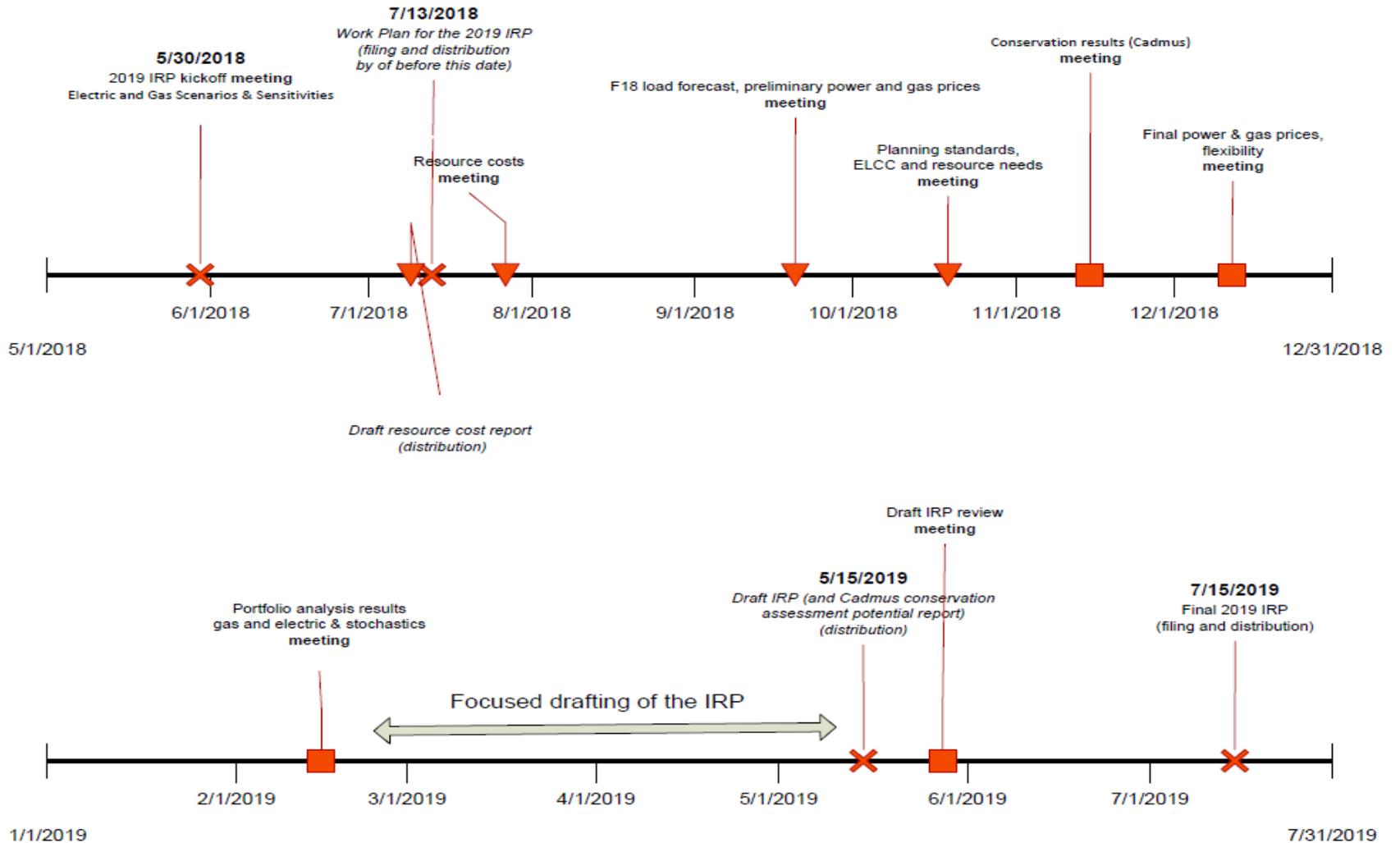
Next Steps



Next steps

- Share the draft resource cost report mid-July 2018
- Schedule the resource cost public participation meeting in summer 2018
- File the 2019 IRP Work Plan by July 13, 2018
- Build on the good work of the 2017 IRP

PSE 2019 IRP draft meeting schedule



Meeting(s) concerning transmission and distribution planning to be determined at a later date.



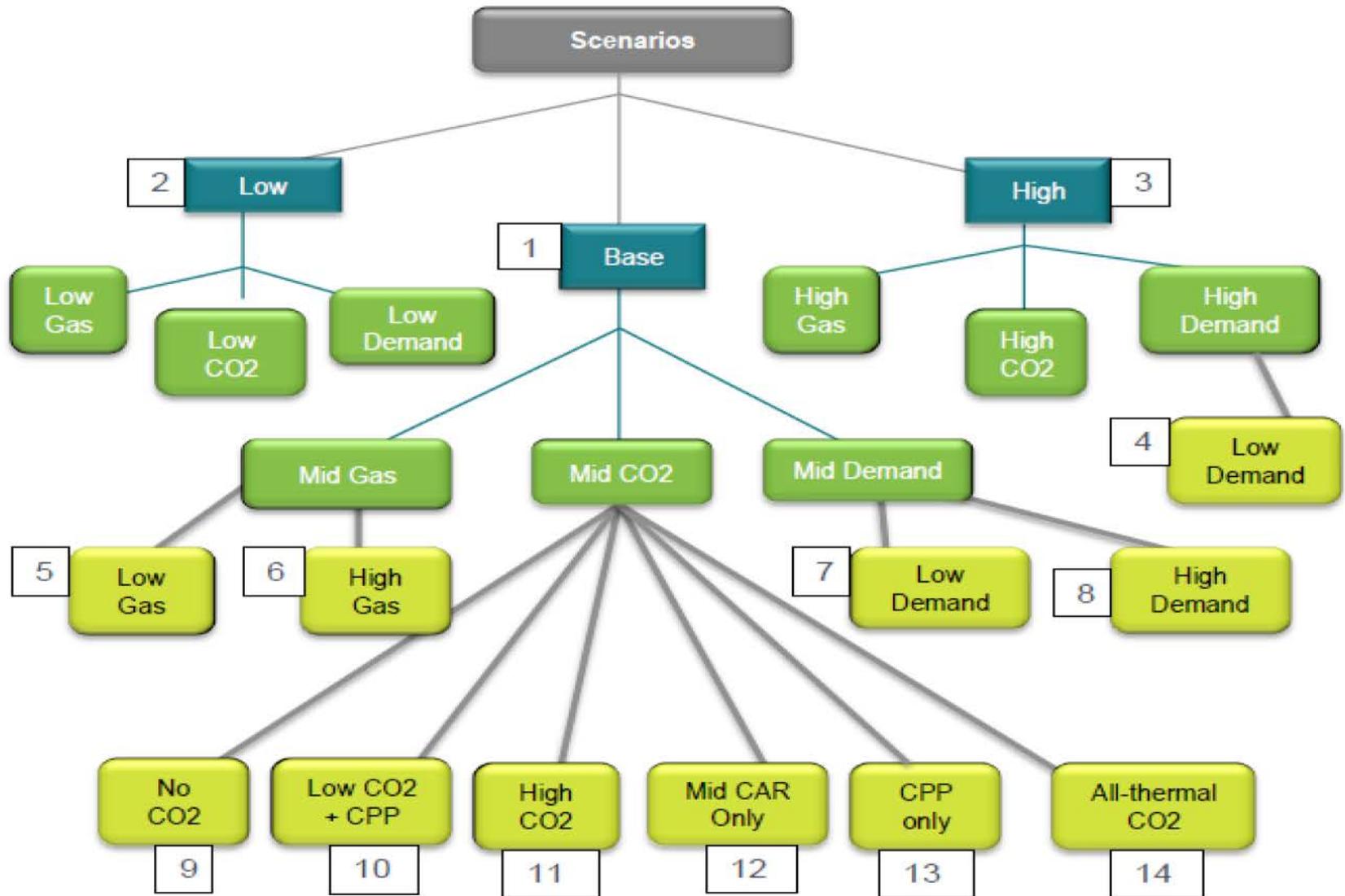


THANK
YOU

Appendix



Scenarios from 2017 IRP



NOTES

*CAR refers to Washington state Clean Air Rule regulations.
 CPP refers to federal Clean Power Plan regulations.*