Integrated Resource Plan Public Workshop 3

Current Situation and Future Options

April 27, 2020

TACOMA POWER
TACOMA PUBLIC UTILITIES

WELCOME!

We look forward to working with you.

TACOMA POWER
TACOMA PUBLIC UTILITIES

Outline

TACOMA POWER
TACOMA PUBLIC UTILITIES

1. Scenarios
2. Tacoma Power Resource Need
3. Preliminary Portfolio List
4. Next Steps and Action Items

Scenarios

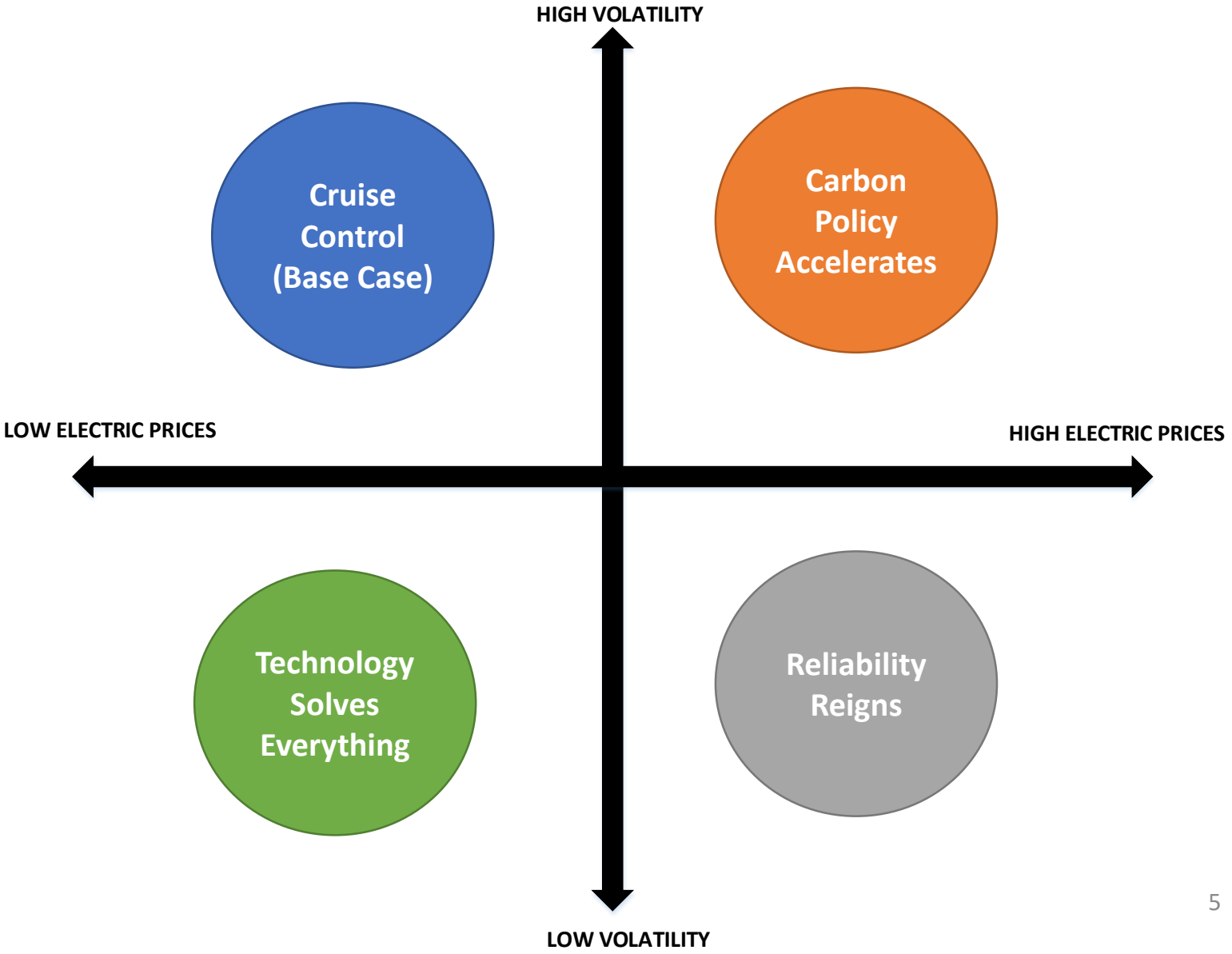
How are we adjusting inputs?

What do prices look like?

TACOMA POWER
TACOMA PUBLIC UTILITIES

Reminder: 4 Scenarios

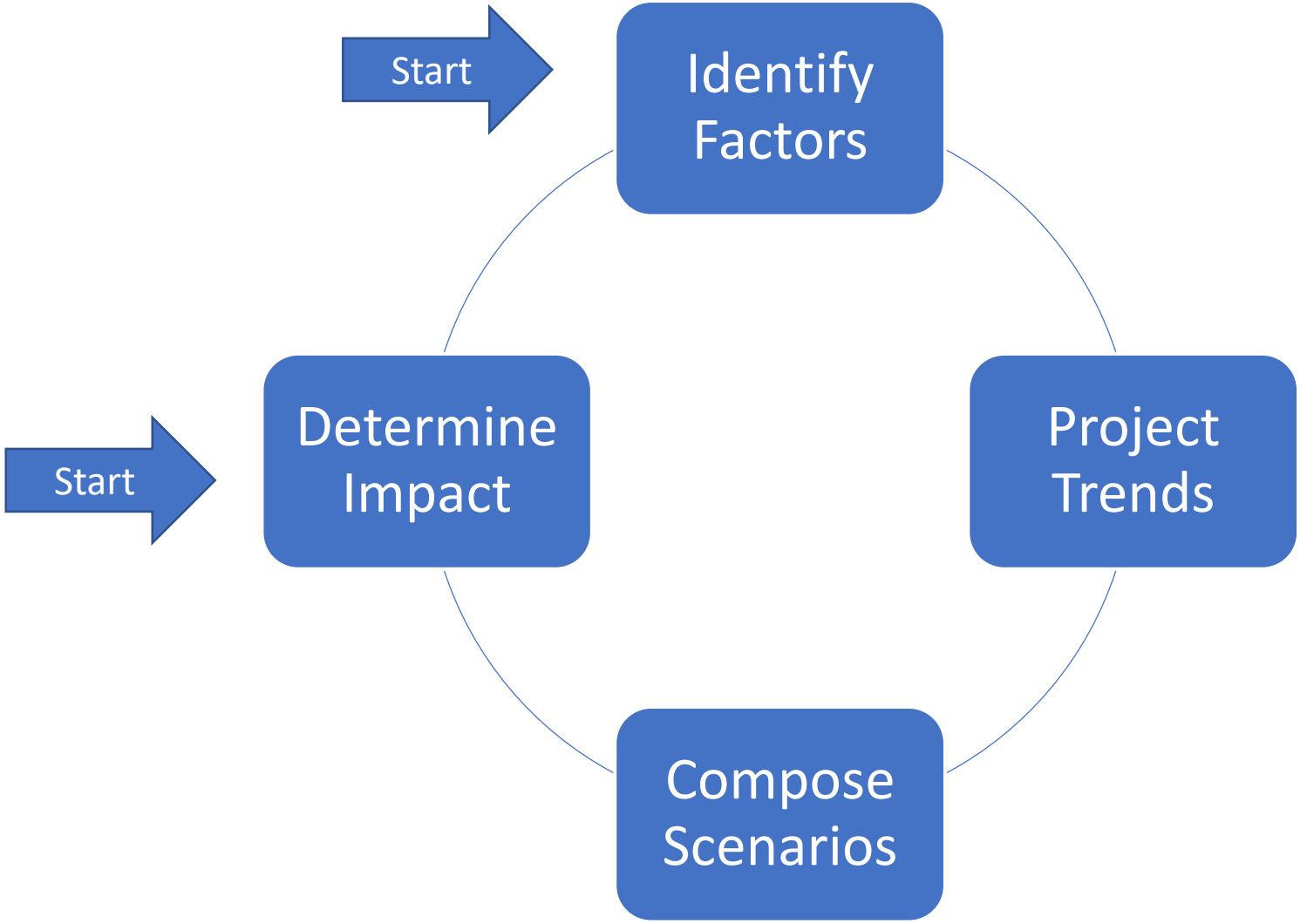
TACOMA POWER
TACOMA PUBLIC UTILITIES



SCENARIOS

Top Down vs Bottom Up Scenarios

TACOMA POWER
TACOMA PUBLIC UTILITIES



SCENARIOS

Scenario Input Summary

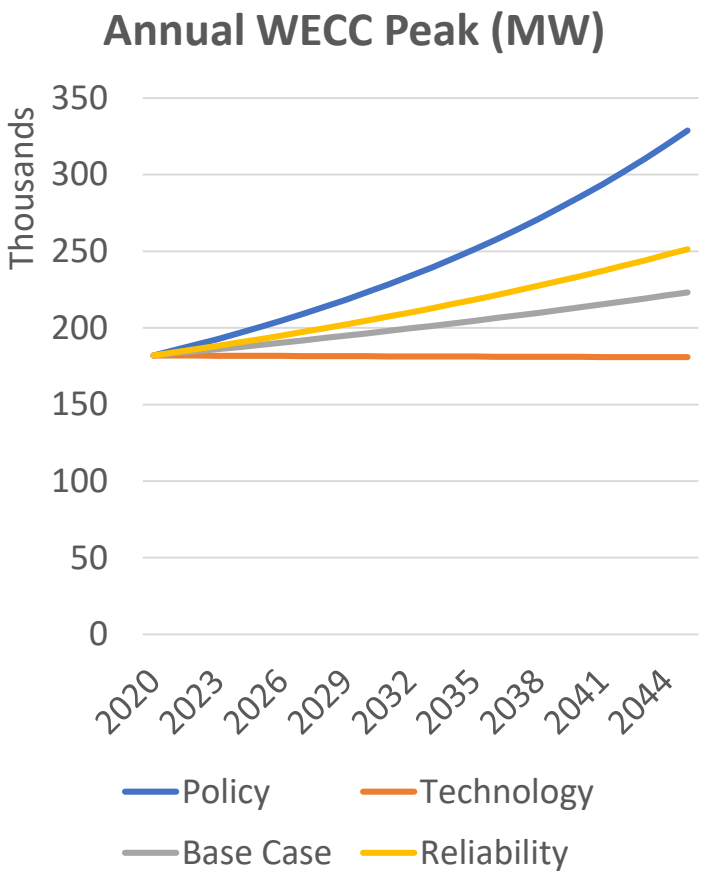
TACOMA POWER
TACOMA PUBLIC UTILITIES

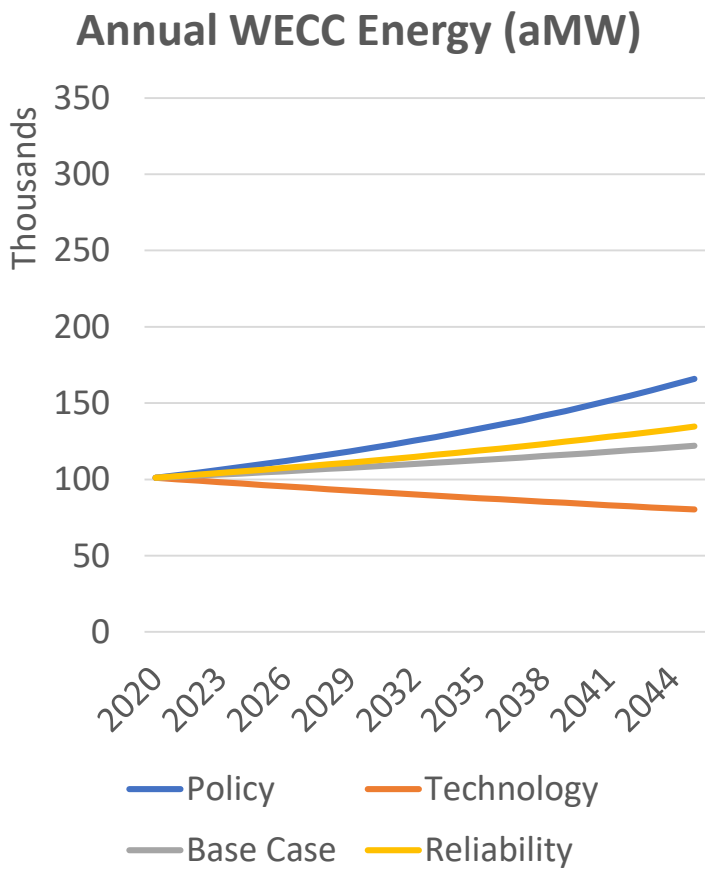
Factors:	Scenario 1: Carbon Policy Accelerates	Scenario 2: Technology Solves	Scenario 3: Cruise Control (Base Case)	Scenario 4: Reliability Reigns
Demand				
Peak Growth Rate	2.13%	0.00%	**0.85%**	1.28%
Energy Growth Rate	1.74%	-0.79%	**0.79%**	1.11%
Storage Resources				
2hr (by 2045)	5 GW	28 GW	2 GW	2 GW
16hr (by 2045)	0 GW	28 GW	0 GW)	0 GW
Carbon Policy				
SCC (in price) pre 2030	yes	no	No	yes
SCC (in price) post 2030	yes	no	No	no
Min RPS by 2045	50%	base	base	Base 2030
Natural Gas Prices				
Growth Rate	400% higher	50% lower	base	300% higher
Capital Costs				
wind	base	-30%	base	base
solar	base	-30%	base	base
RA Standard				
PRM	15%	15%	15%	5% then 15%
Coal Retirements				
NW Coal	2025	base	base	none post 2030
WECC Coal	2030	base	base	none post 2030

SCENARIOS

Scenario Inputs: Demand

TACOMA POWER
TACOMA PUBLIC UTILITIES

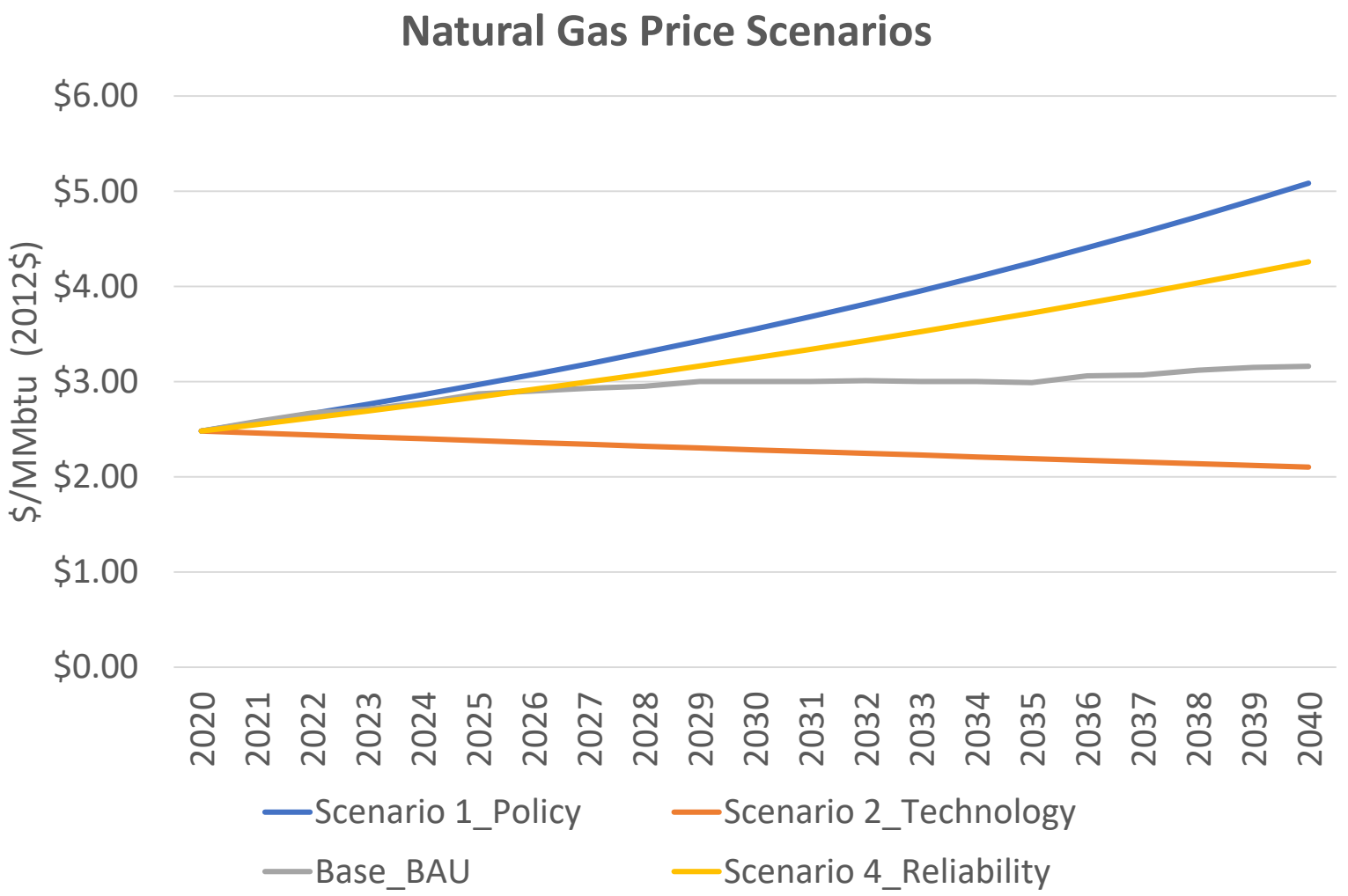




SCENARIOS

Scenario Inputs: Natural Gas

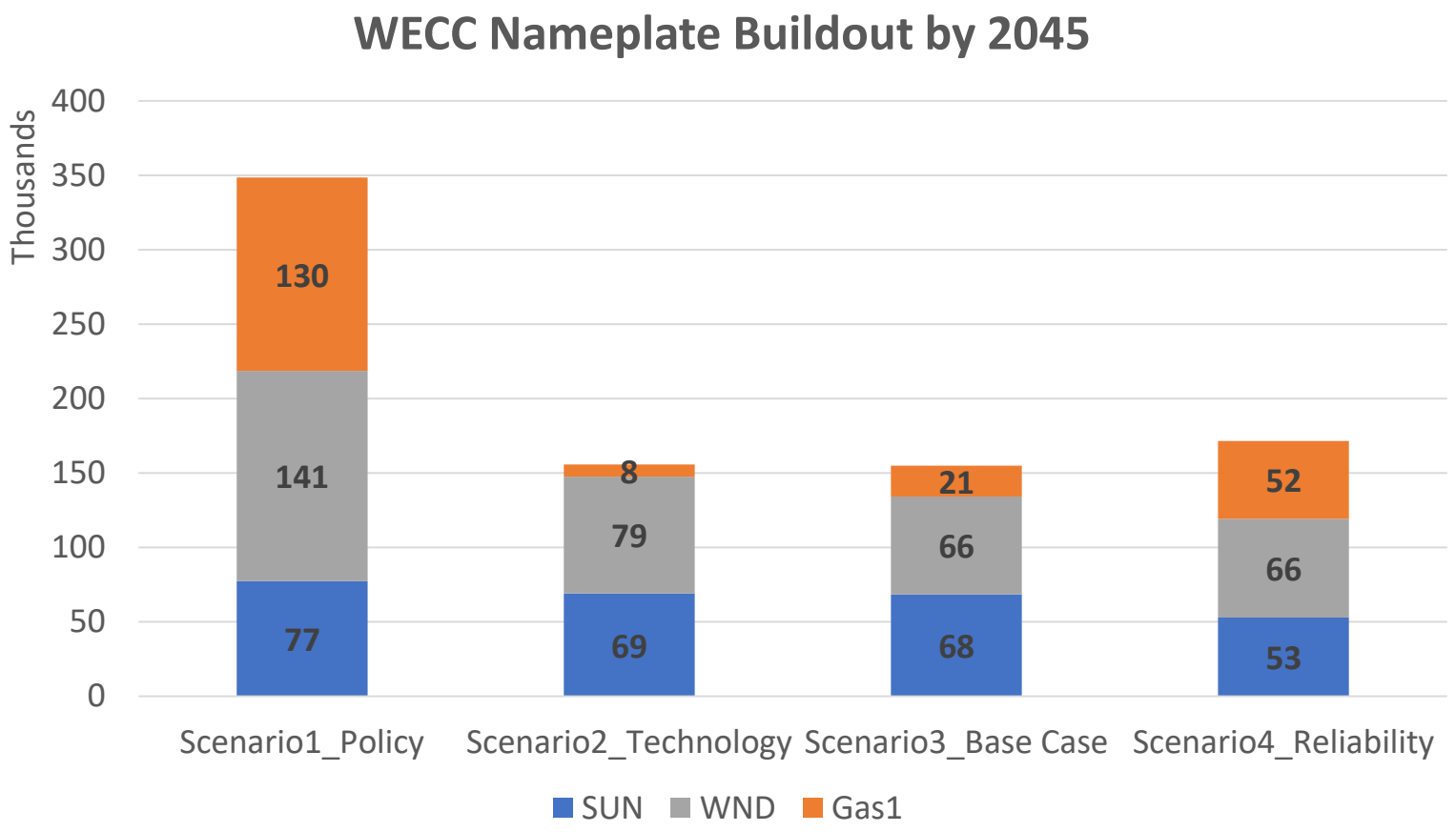
TACOMA POWER
TACOMA PUBLIC UTILITIES



SCENARIOS

WECC Buildout by 2045

TACOMA POWER
TACOMA PUBLIC UTILITIES

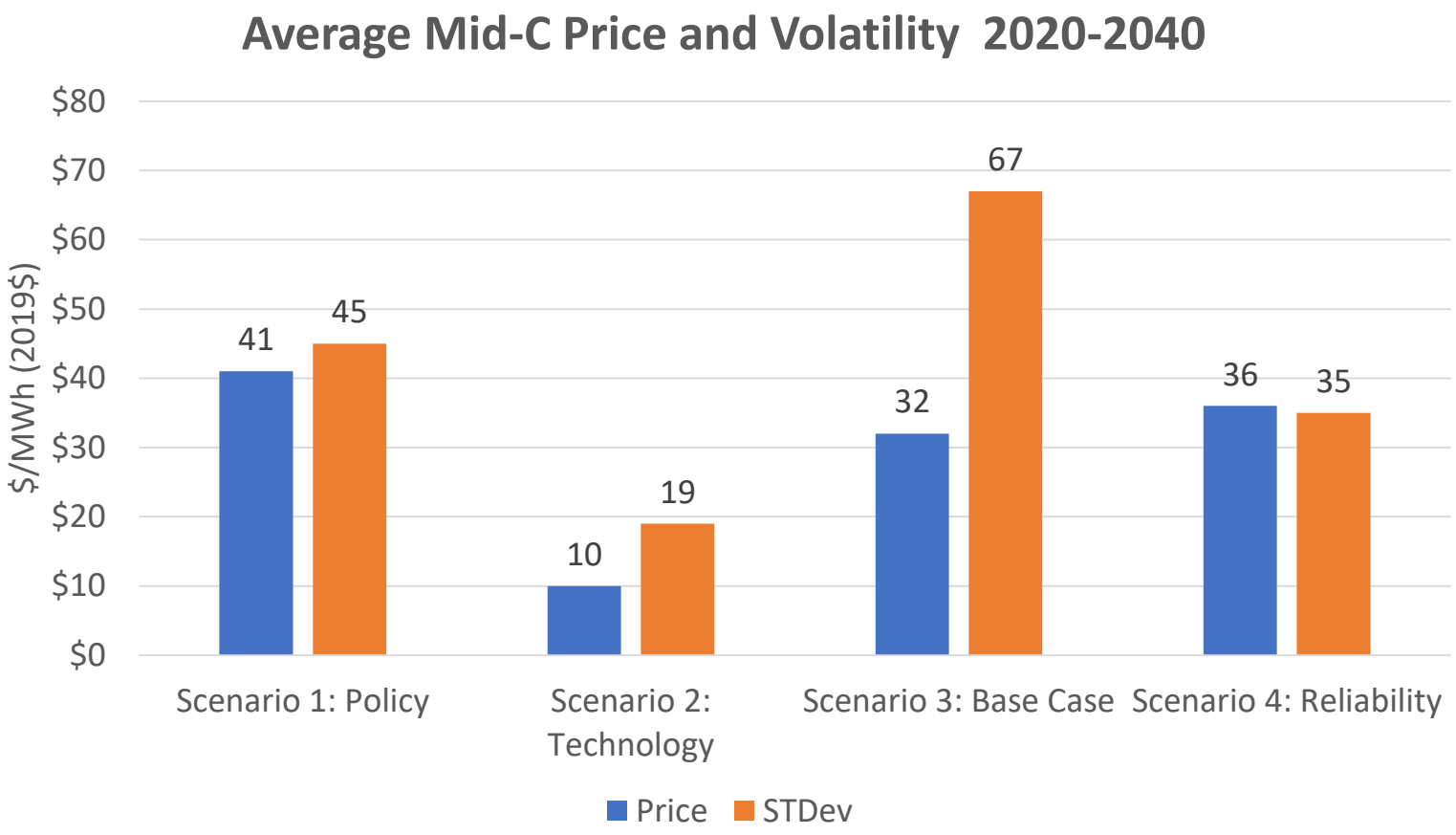


- Gas buildout driven by peak demand increase
- Renewable buildout driven by policy (and technology)

SCENARIOS

Avg. Price and Volatility Comparison

TACOMA POWER
TACOMA PUBLIC UTILITIES



SCENARIOS

Annual Mid-C Price and Volatility

TACOMA POWER
TACOMA PUBLIC UTILITIES

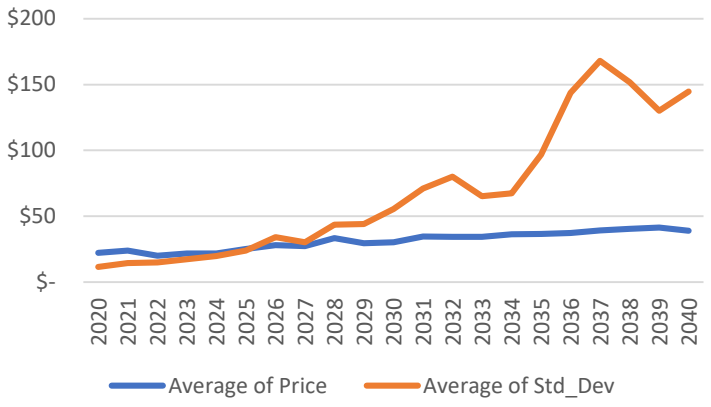
HIGH VOLATILITY

LOW ELECTRIC PRICES

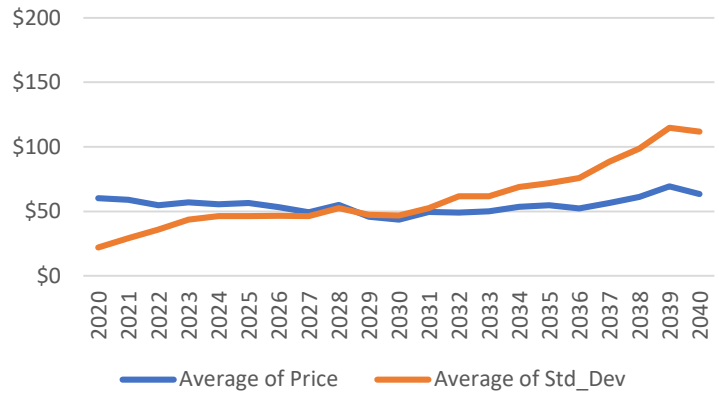
HIGH ELECTRIC PRICES

LOW VOLATILITY

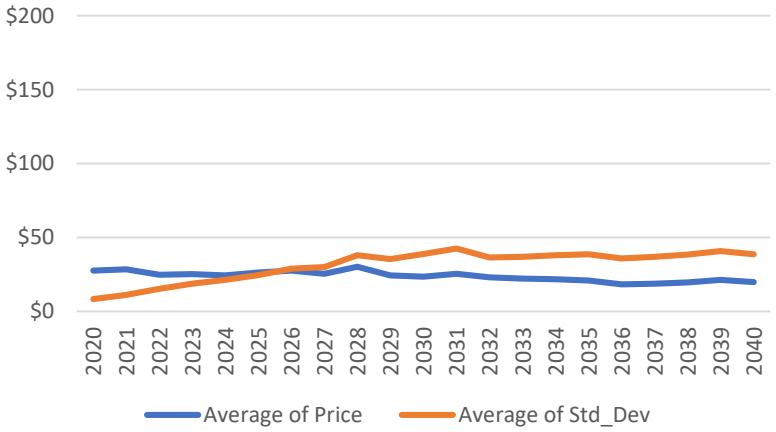
Scenario 3: Base Case



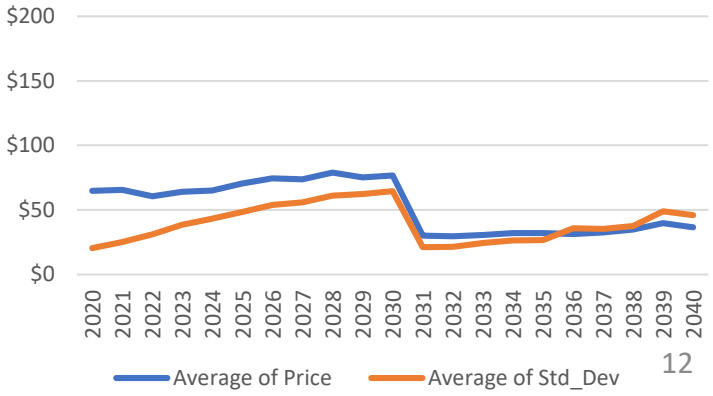
Scenario 1: Policy



Scenario 2: Technology



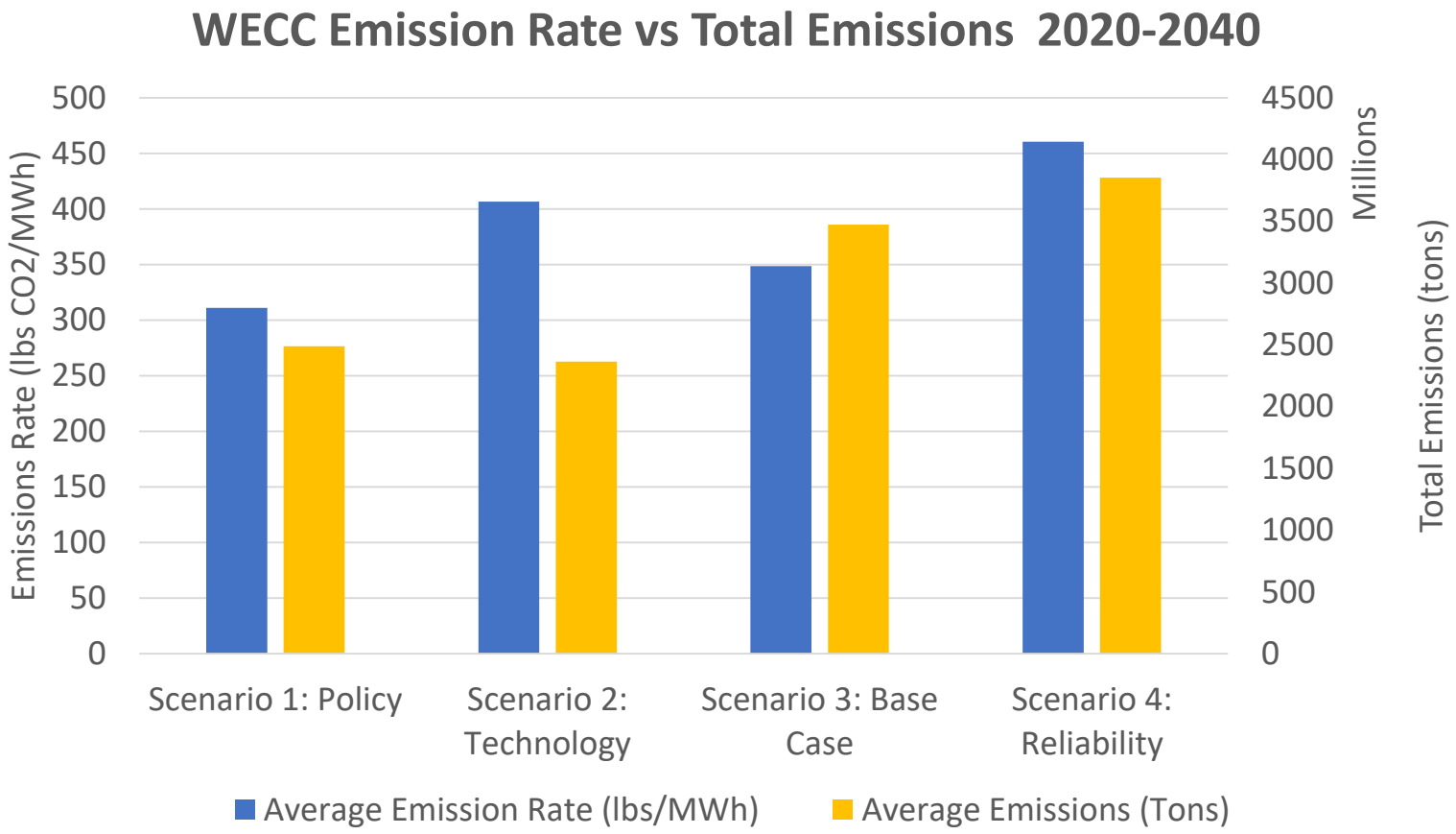
Scenario 4: Reliability



SCENARIOS

Average WECC Emissions Comparison

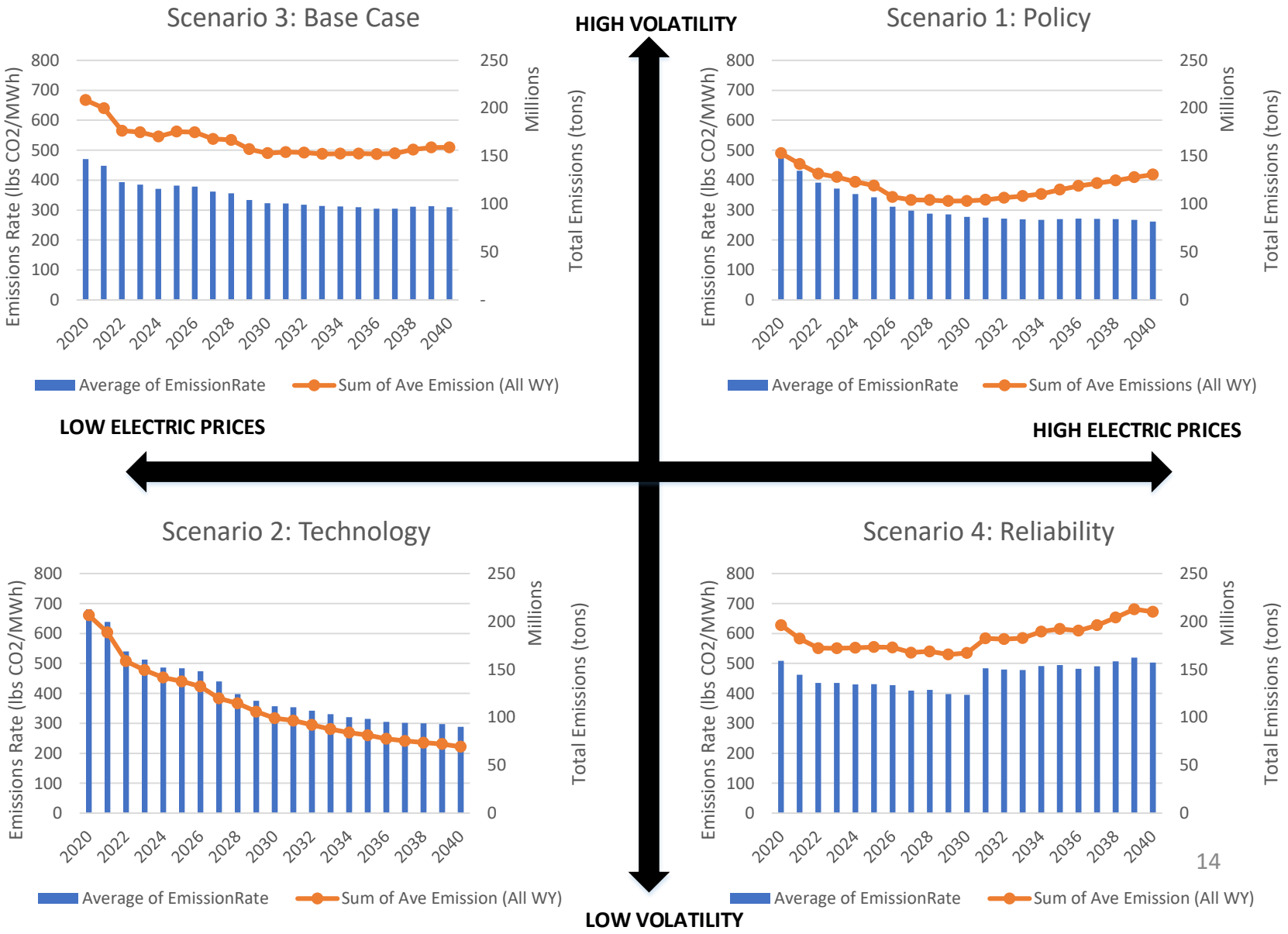
TACOMA POWER
TACOMA PUBLIC UTILITIES



- Scenario 2 high emission rate due to decreasing energy (increasing distributed energy resources)

Annual Emissions Comparison

TACOMA POWER
TACOMA PUBLIC UTILITIES



SCENARIOS

POLL

Are we adequately addressing key changes we might see in the future with our scenarios?

- ❑ YES
- ❑ NO

Poll Results

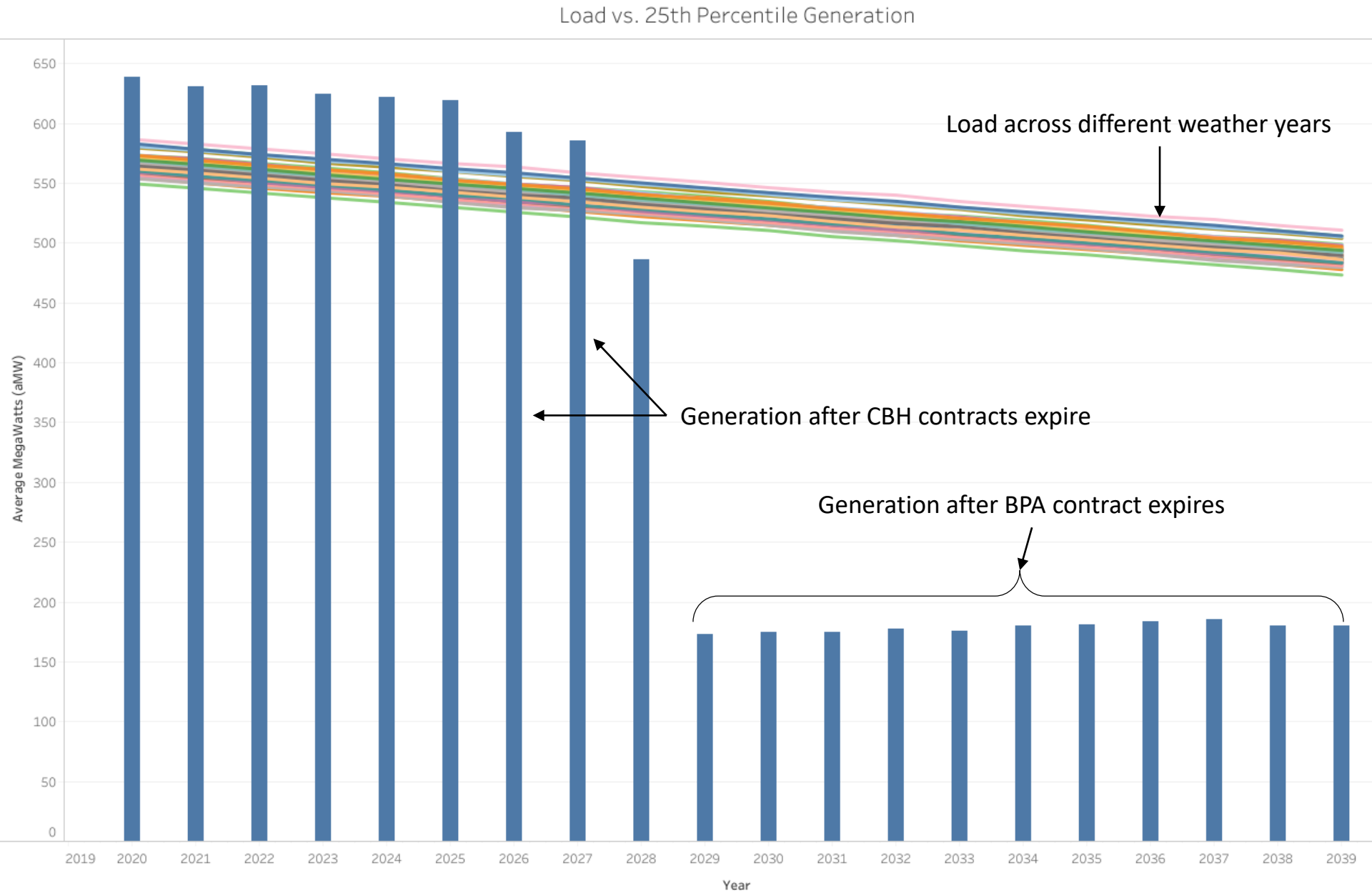
Answer	Count	%
Yes	12	8%
No	1	92%
Total	13	100%

Resource Need

Do we pass our resource adequacy test with our current portfolio?

TACOMA POWER
TACOMA PUBLIC UTILITIES

Do we have enough resources?



What do our metrics say?

TACOMA POWER
TACOMA PUBLIC UTILITIES

We still have enough if we don't renew our CBH contracts.

We <u>don't have enough</u> if we don't renew our BPA contract in 2028.

	LOLH (hours per year we're short)	NEUE (annual shortage as % of load)	LOLE (days per year we're short)
Threshold to stay below	**2.4**	**0.001%**	**0.2**
Value before CBH ends (2020-2025)	1.9	0.001%	0.2
Value after CBH ends but before BPA ends (2026-2027)	1.7	0.001%	0.2
Value after BPA contract ends (after 2028)	5,916	19.4%	299

When do you think our need is biggest?

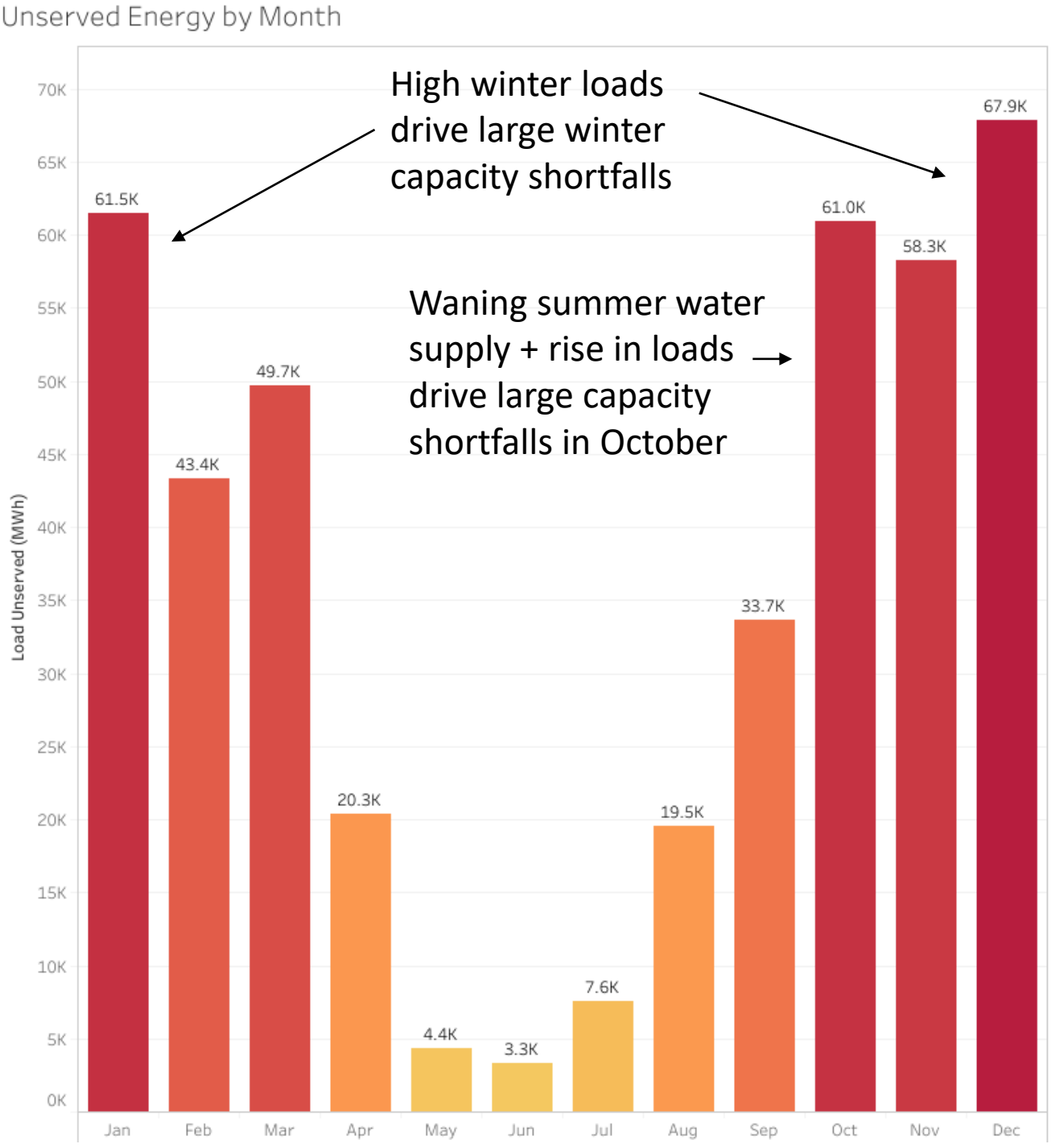
- ❑ Summer
- ❑ Fall
- ❑ Winter
- ❑ Spring

Poll Results

Answer	Count	%
Summer	4	23%
Fall	1	6%
Winter	12	71%
Spring	0	0%
Total	17	100%

When is our need?

Without BPA, we have a need in every season, but need is highest October through January



Draft Portfolio Options

What could we do to fill the gap?

TACOMA POWER
TACOMA PUBLIC UTILITIES

Resources to be considered

TACOMA POWER
TACOMA PUBLIC UTILITIES

DRAFT PORTFOLIO OPTIONS

CBH Contract	• Renew • Don't renew
BPA Contract	• Renew with same product (Slice/Block) • Renew with different product (Block with Shaping) • Don't renew
Non-Hydro Renewables	• Solar • Eastern WA wind • Gorge wind
Adding to Existing Hydro Projects	• Add generator to Cowlitz project • Add pumped storage to Cowlitz project
Other Backup for Renewables	• Small modular nuclear • Simple cycle natural gas

Do we have the right list of resources?

- ❑ **YES**
- ❑ **NO**, there are important resources missing from the list
- ❑ **NO**, there are some resources on the list that we should not consider

Poll Results

Answer	Count	%
Yes	9	17%
No. There are resources missing	2	8%
NO, there are resources we should not consider	1	75%
Total	**12**	**100%**

Draft Portfolio List

Renew BPA Slice/Block

- Tacoma Power Hydro + BPA Slice + renew CBH (*continue current portfolio*)
- Tacoma Power Hydro + BPA Slice
- Tacoma Power Hydro + BPA Slice + 2023 Solar
- Tacoma Power Hydro + BPA Slice + 2028 Solar
- Tacoma Power Hydro + BPA Slice + WA Wind
- Tacoma Power Hydro + BPA Slice + Gorge Wind
- Tacoma Power Hydro + BPA Slice + Pumped Storage at Cowlitz
- Tacoma Power Hydro + BPA Slice + 3rd Generator at Cowlitz

Renew BPA with Shapeable Block

- Tacoma Power Hydro + BPA Block
- Tacoma Power Hydro + BPA Block + 2023 Solar
- Tacoma Power Hydro + BPA Block + 2028 Solar
- Tacoma Power Hydro + BPA Block + WA Wind
- Tacoma Power Hydro + BPA Block + Gorge Wind
- Tacoma Power Hydro + BPA Block + Pumped storage at Cowlitz
- Tacoma Power Hydro + BPA Block + 3rd Generator at Cowlitz

No BPA Renewal

- Tacoma Power Hydro + WA Wind + Gorge Wind + 2028 Solar
- Tacoma Power Hydro + WA Wind + Gorge Wind + 2028 Solar + Pumped storage at Cowlitz
- Tacoma Power Hydro + WA Wind + Gorge Wind + 2028 Solar + 3rd Generator at Cowlitz
- Tacoma Power Hydro + WA Wind + Gorge Wind + 2028 Solar + Limited Natural Gas
- Tacoma Power Hydro + WA Wind + Gorge Wind + 2028 Solar + Small Modular Nuclear

Next Steps and Action Items

What are we covering next?

TACOMA POWER
TACOMA PUBLIC UTILITIES

Workshop Plan

TACOMA POWER
TACOMA PUBLIC UTILITIES

NEXT STEPS AND ACTION ITEMS

JUNE 11

Workshop 1

IRP Overview

Workshop 2

Present key inputs

Present and discuss metrics

Present and discuss scenarios

Workshop 3

Present and discuss scenario results

Review resource need

Present and discuss resource alternatives

Workshop 4

Present analysis results

Present and discuss preferred portfolio

Discuss action items

How can we improve next time?

Workshop 4 Plan (June 11)

TACOMA POWER
TACOMA PUBLIC UTILITIES

1 Present analysis results

How do each of our portfolios perform?

2 Present and discuss preferred portfolio

Which portfolio is recommended?

3 Discuss action items

What do we need to do between now and the next IRP?

4 How can we improve next time?

What can we do to improve the public process?

Discussion

Are there any other topics that we should address at our next meeting?