WESTERN RESOURCE ADEQUACY PROGRAM

Review of preliminary, non-binding WRAP regional data for the current participating footprint

September 20, 2022

Today's Objectives

- Provide an overview of the loads and resources in the WRAP footprint
- Provide and overview of installations and nameplate for wind and solar
- Provide an overview of the QCC and ELCC values for each resource class
- Provide an overview of Planning Reserve Margin values (PRM)

WRAP
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Before We Begin

- Modeling provided utilizes WRAP program design, assuming full binding implementation of the WRAP as designed
  - Metrics assume diversity benefit and a level of forward procurement on aggregate that is not presently expected without implementation of the WRAP
- Modeling was performed based on the current footprint of participants
  - Changes to WRAP participation in future phases will impact these metrics
  - These assessments cannot account for adequacy needs or activities of non-participating load or resources
- Be aware of the limits of drawing regional conclusions from aggregate information
  - Information is best applied at individual LREs; WRAP's scope does not include matching LREs in need of additional forward procurement with available resources
  - It cannot be assumed that all resources modeled in the loss of load expectation study will be available to the WRAP footprint
  - Planned outages are not considered; they will be managed by LREs from their surplus

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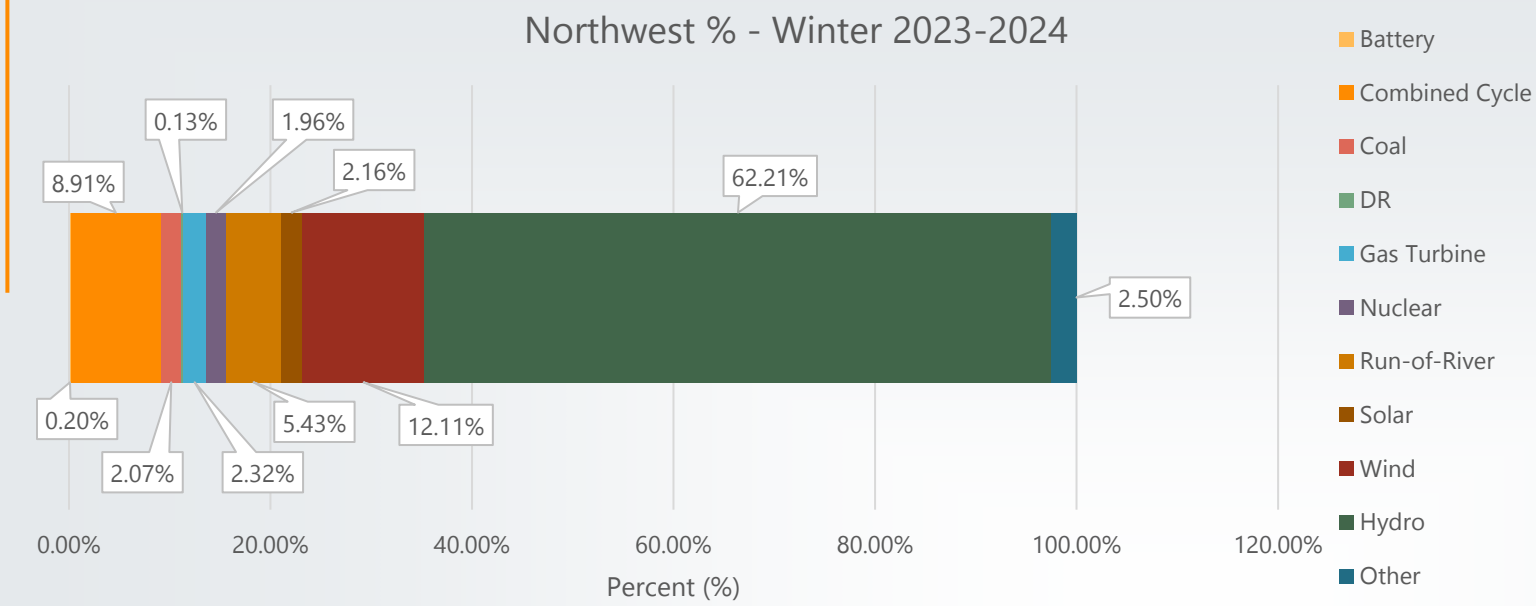

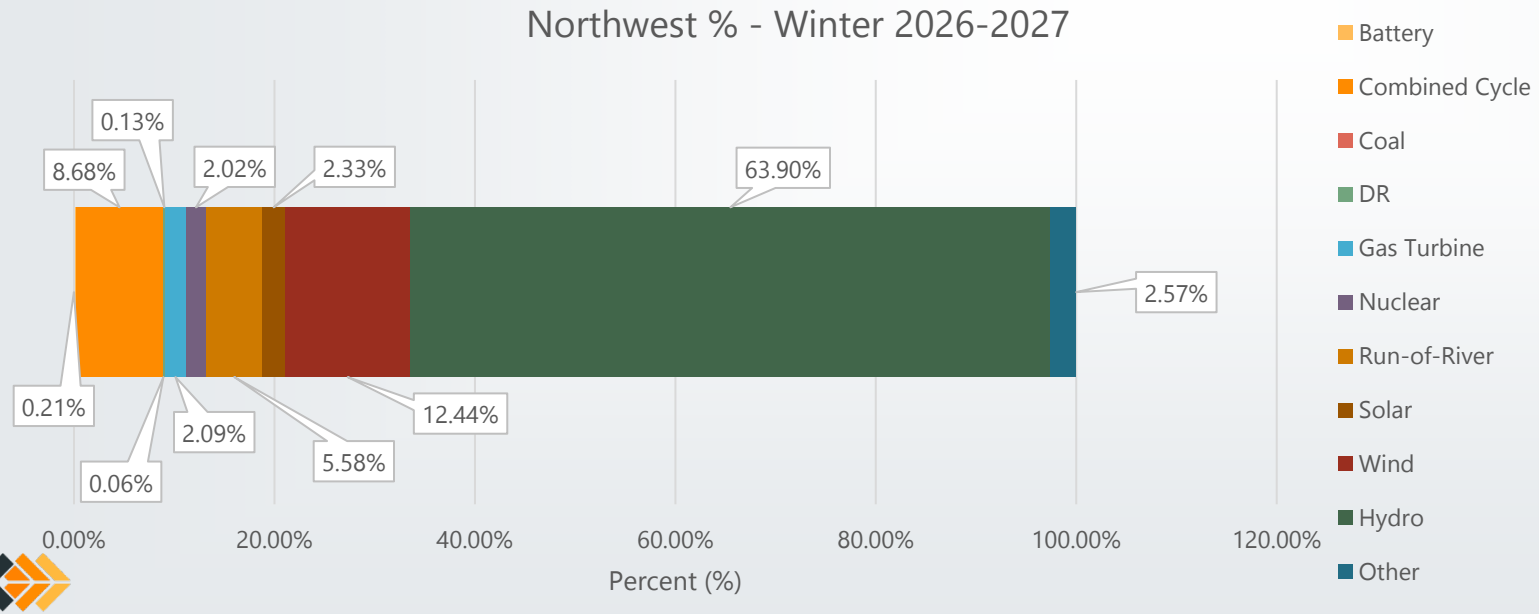

Northwest Winters

Percentage

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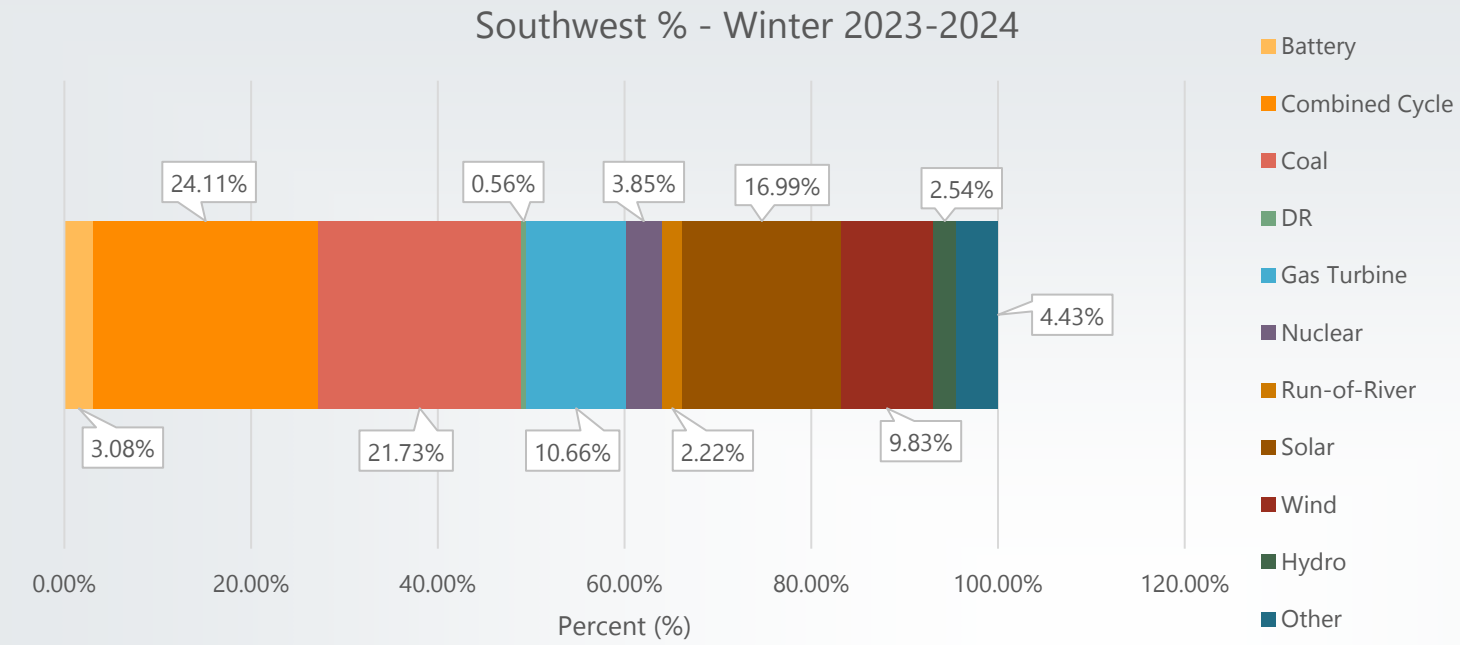

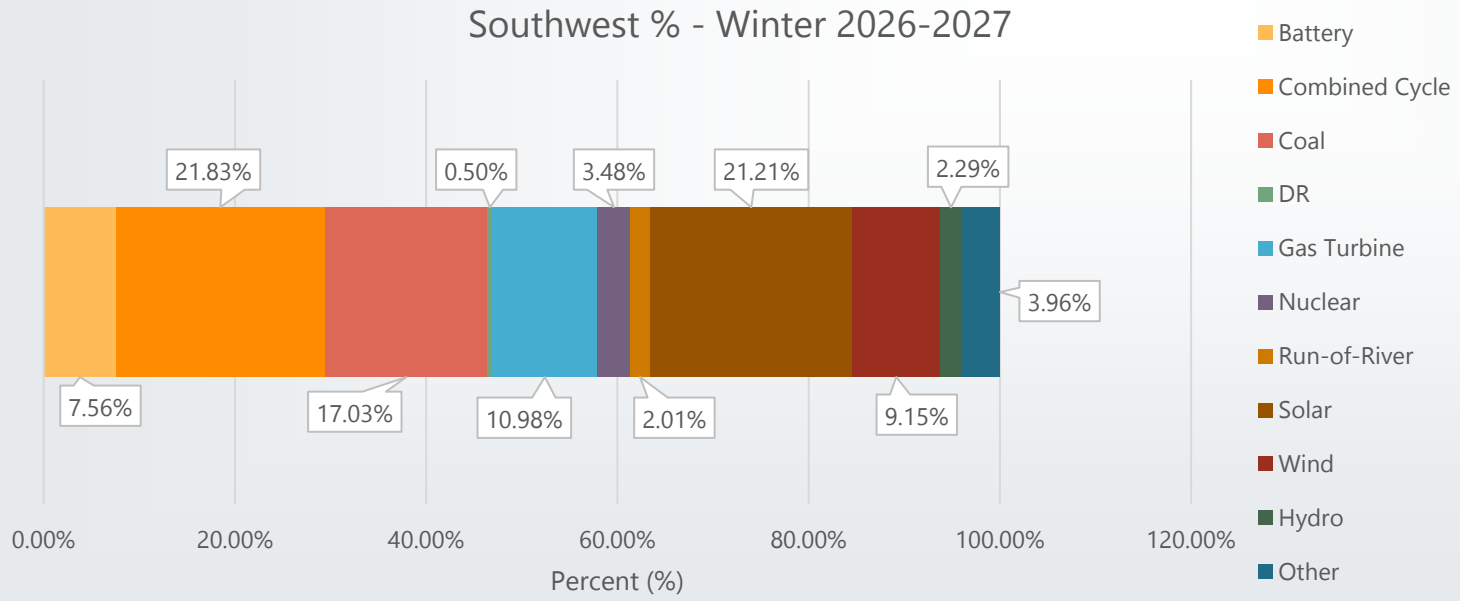

SOUTHWEST WINTERS

Percentage

WRAP
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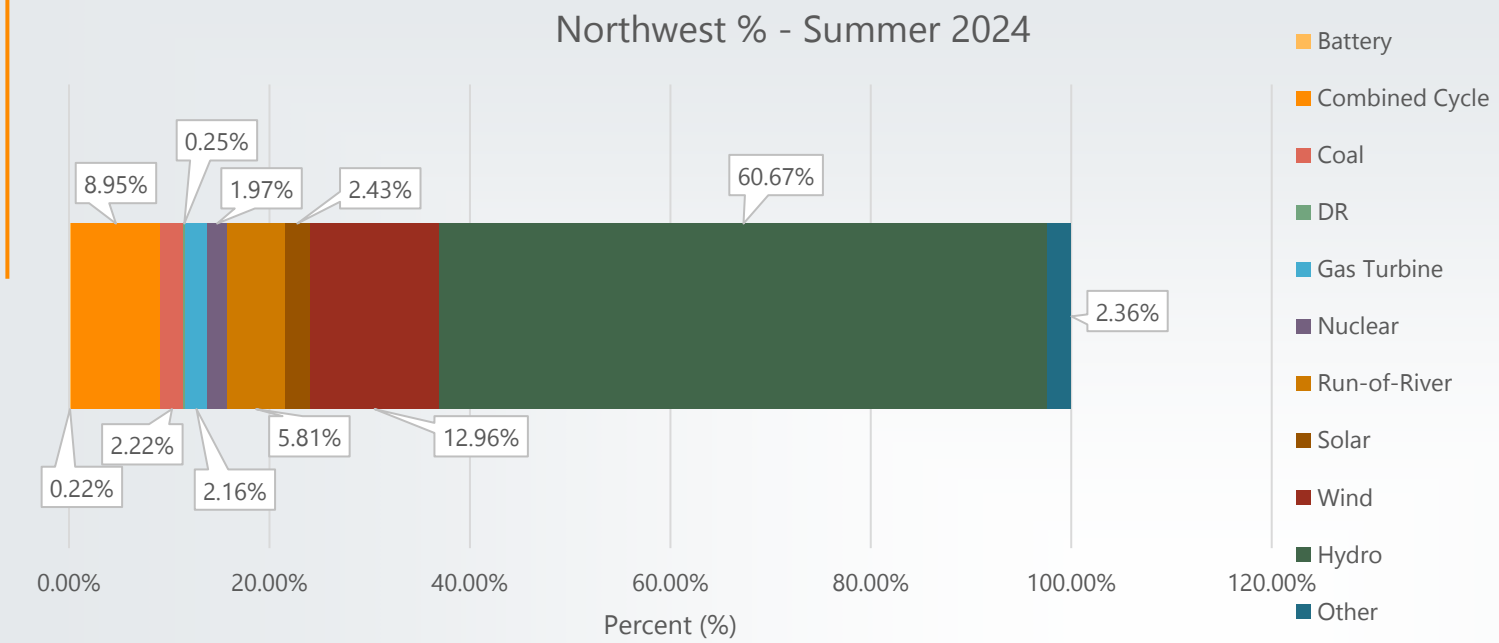

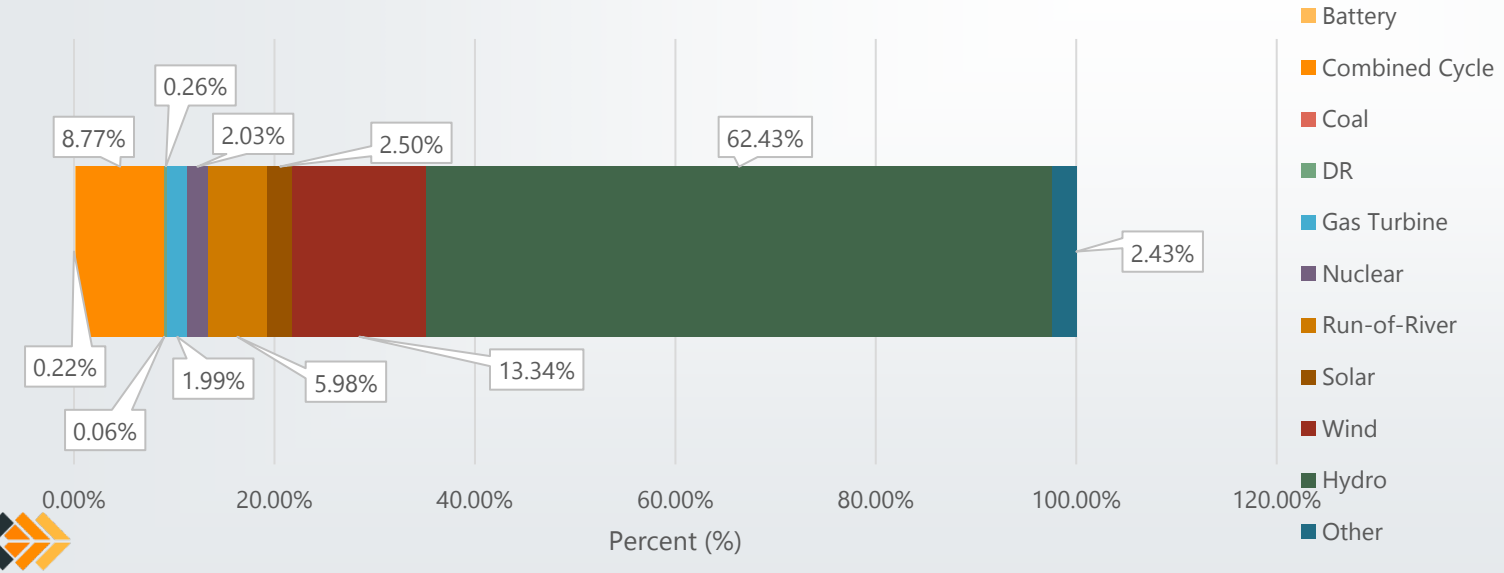

Northwest Summers

Percentage

WRAP
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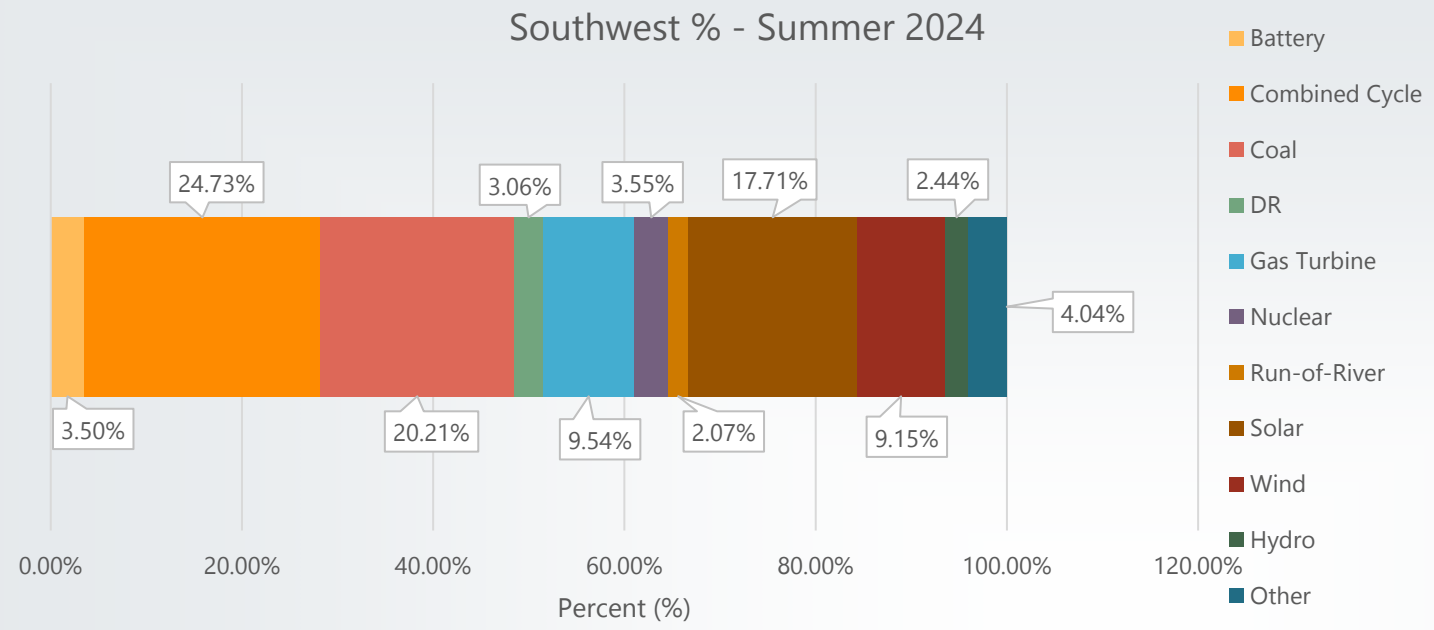

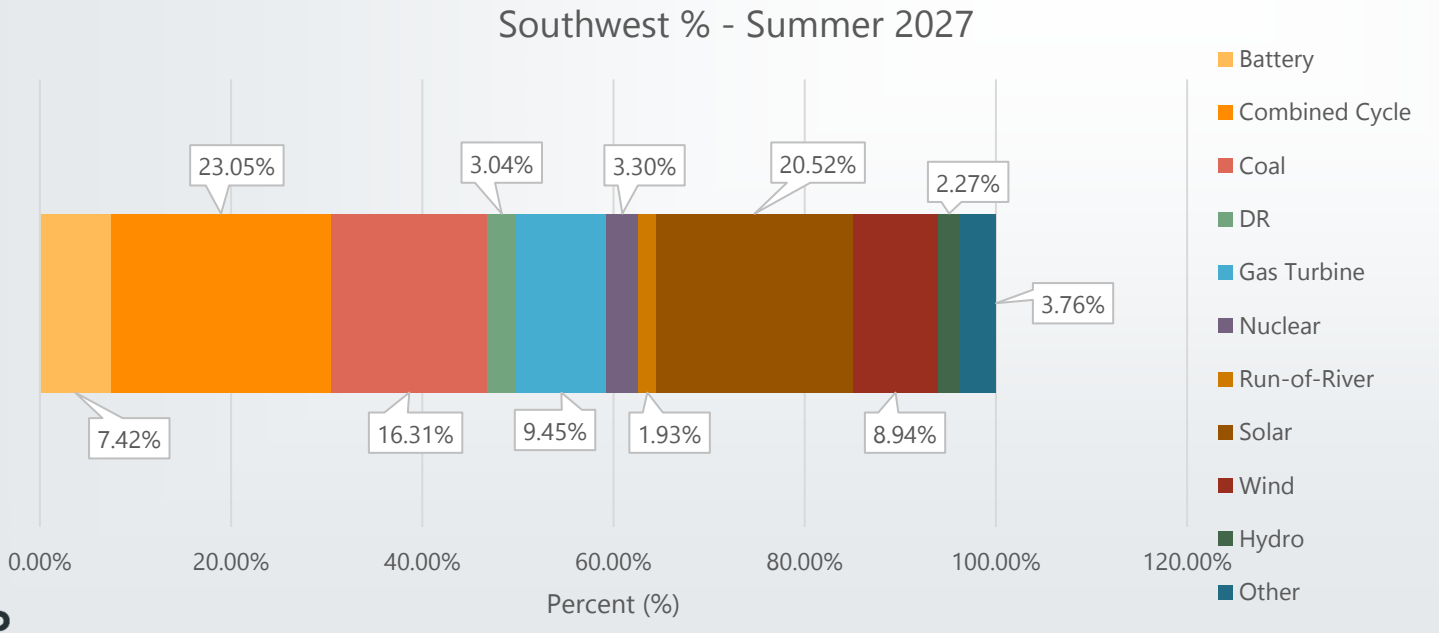

SOUTHWEST SUMMERS

Percentage

WRAP
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KEY TAKEAWAYS

- Northwest has planned resource retirements which can impact capacity available to meet 1event day-in-10 year LOLE
- Southwest is seeing significant increase in resources, very aggressive planned build targets to maintain 1 event day-in-10 year LOLE

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Key Reminders

- Not all resources shown in the preceding slides can be assumed to be available to the WRAP footprint for resource adequacy purposes
  - Planned outages are not considered; they will be managed by LREs from their surplus
  - Does not account for activities and needs of neighboring, non-participating regions or entities
  - Based on information and projections provided by participants
- Aggregate information does not give insight into whether individual participants have enough supply
  - WRAP motivates participants to acquire the necessary capacity
  - Cannot assume this has yet happened or will happen without binding implementation of WRAP

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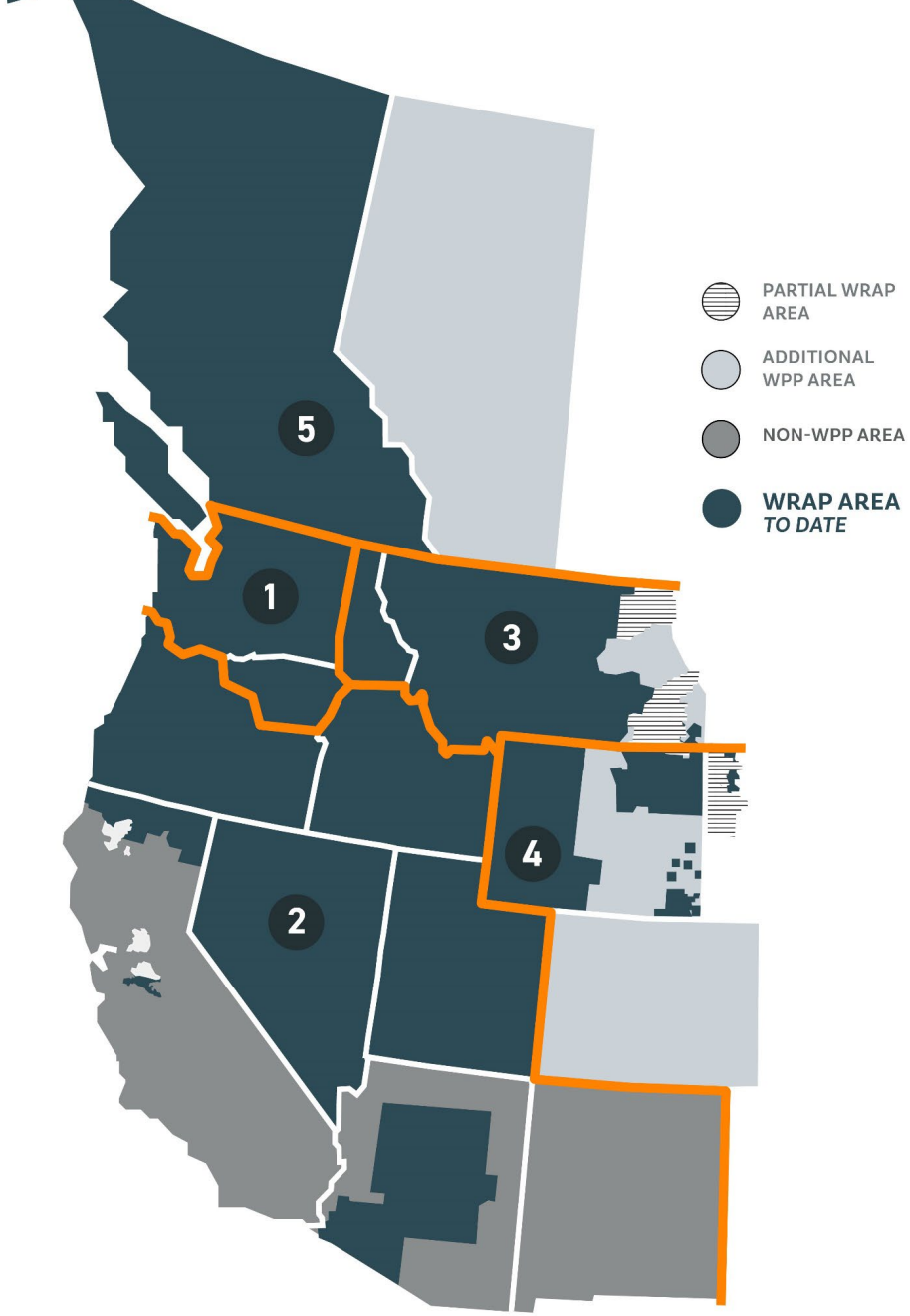

WIND ZONES

Zone	# of Plants	Nameplate Capacity (MW)
Wind VER1	54	5,734
Wind VER2	44	2,400
Wind VER3	23	1,378
Wind VER4	24	2,429
Wind VER5	Aggregate	747
Total	**146**	**12,688**

WRAP
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SOLAR ZONES

Zone	# of Plants	Nameplate Capacity (MW)
Solar VER1	159	2,138
Solar VER2	108	9,024
Total	**267**	**11,162**

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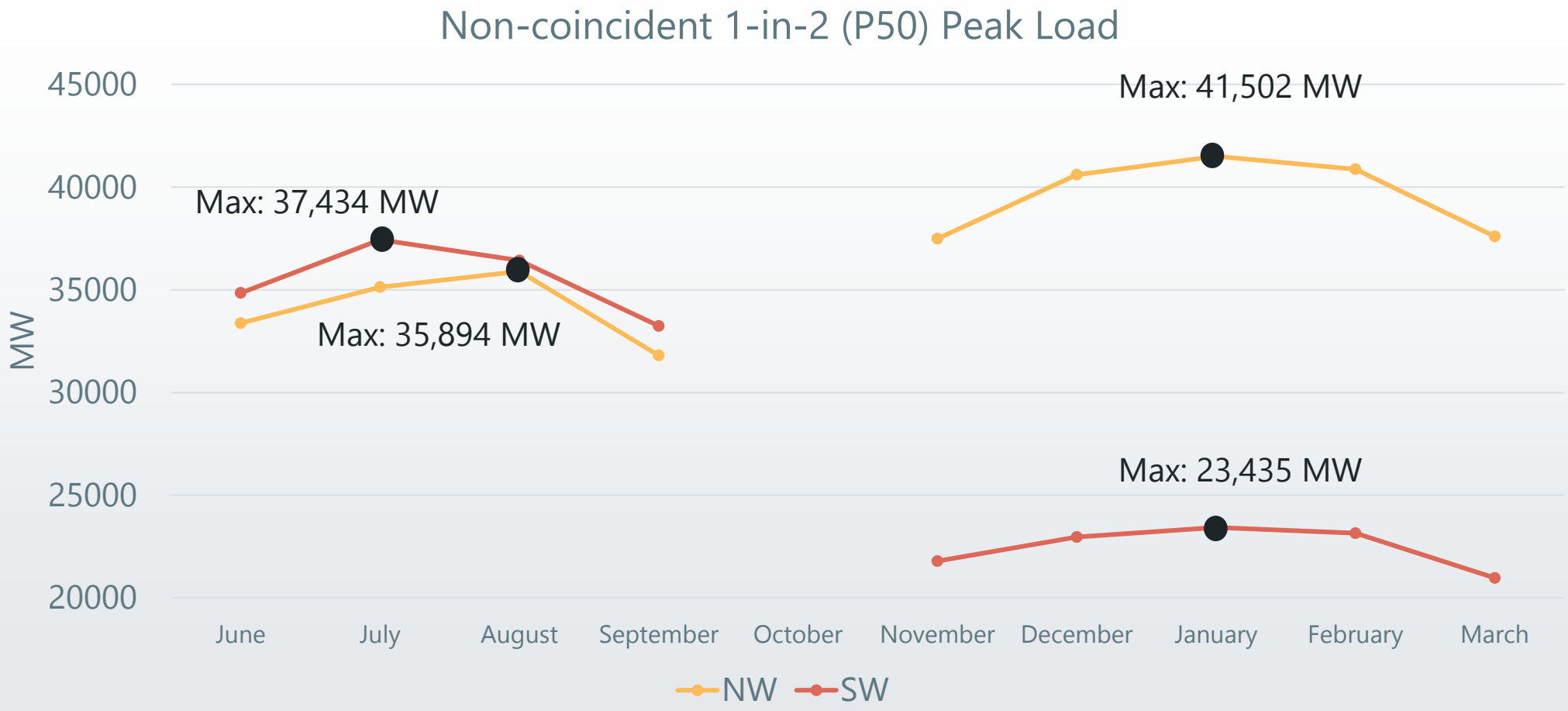
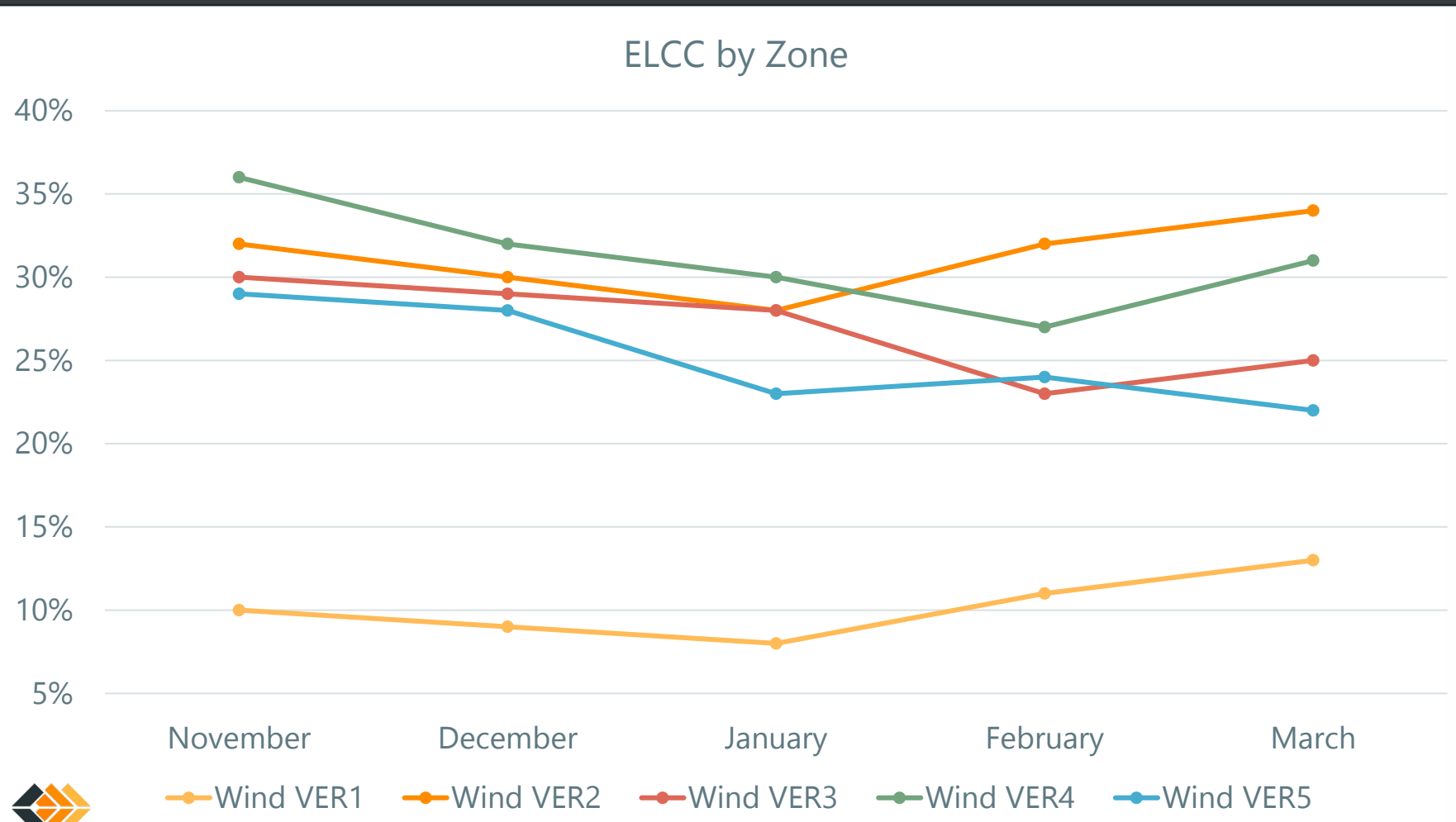
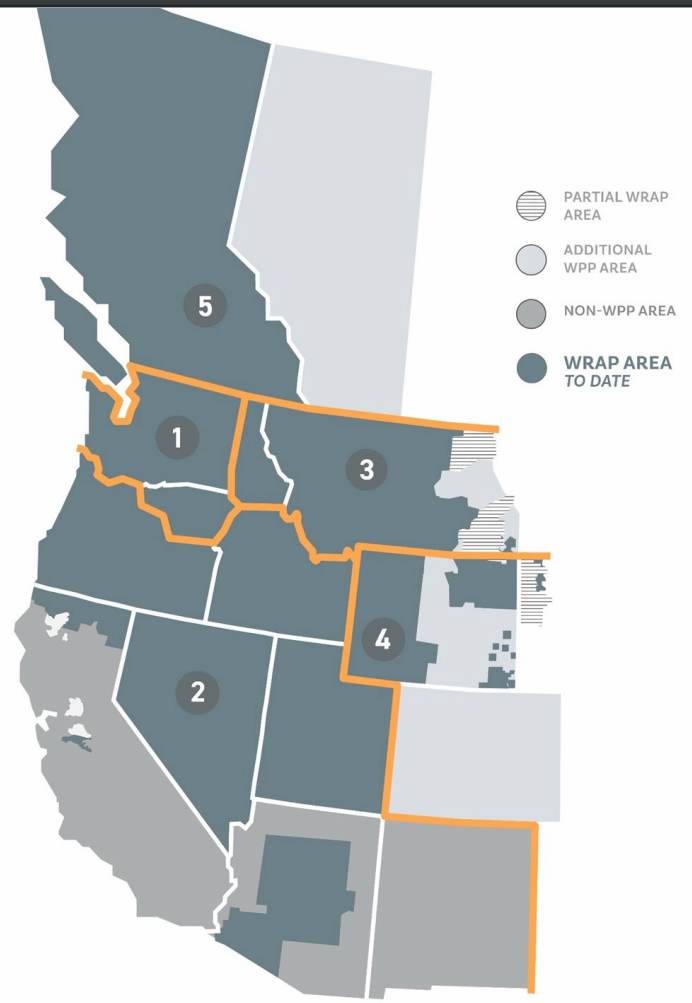
Peak Load


Non-coincident 1-in-2 (P50) Peak Load
45000
40000
35000
30000
25000
20000
MW
Max: 41,502 MW
Max: 37,434 MW
Max: 35,894 MW
Max: 23,435 MW
June
July
August
September
October
November
December
January
February
March
NW
SW

Wind ELCC - Winter





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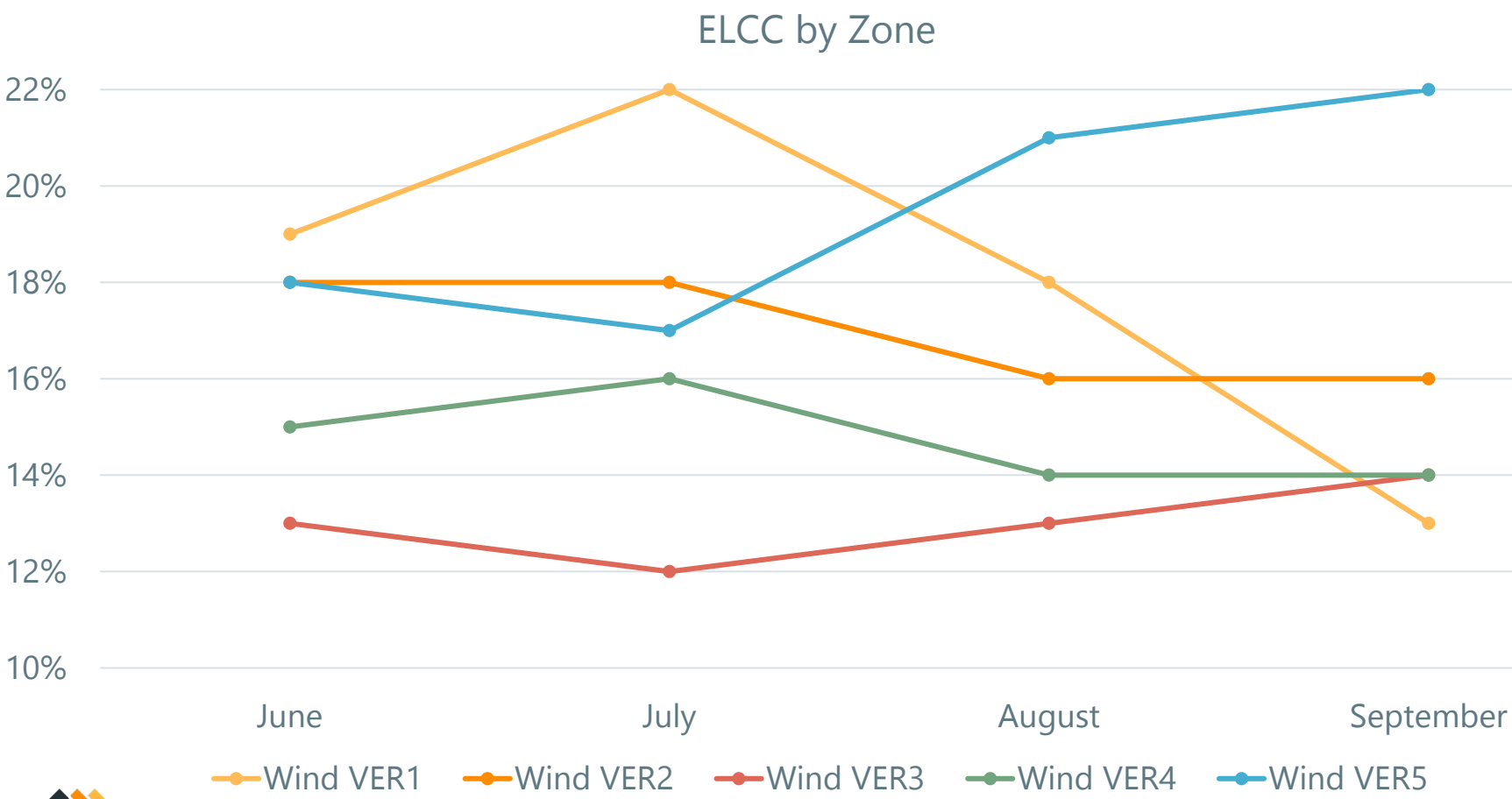
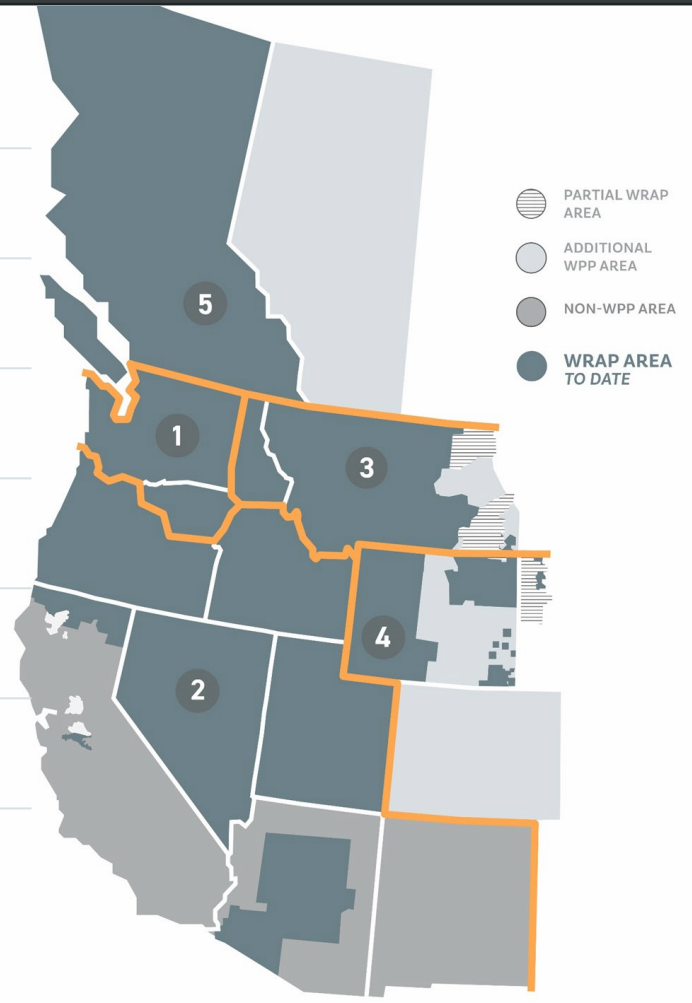
Wind ELCC - Summer





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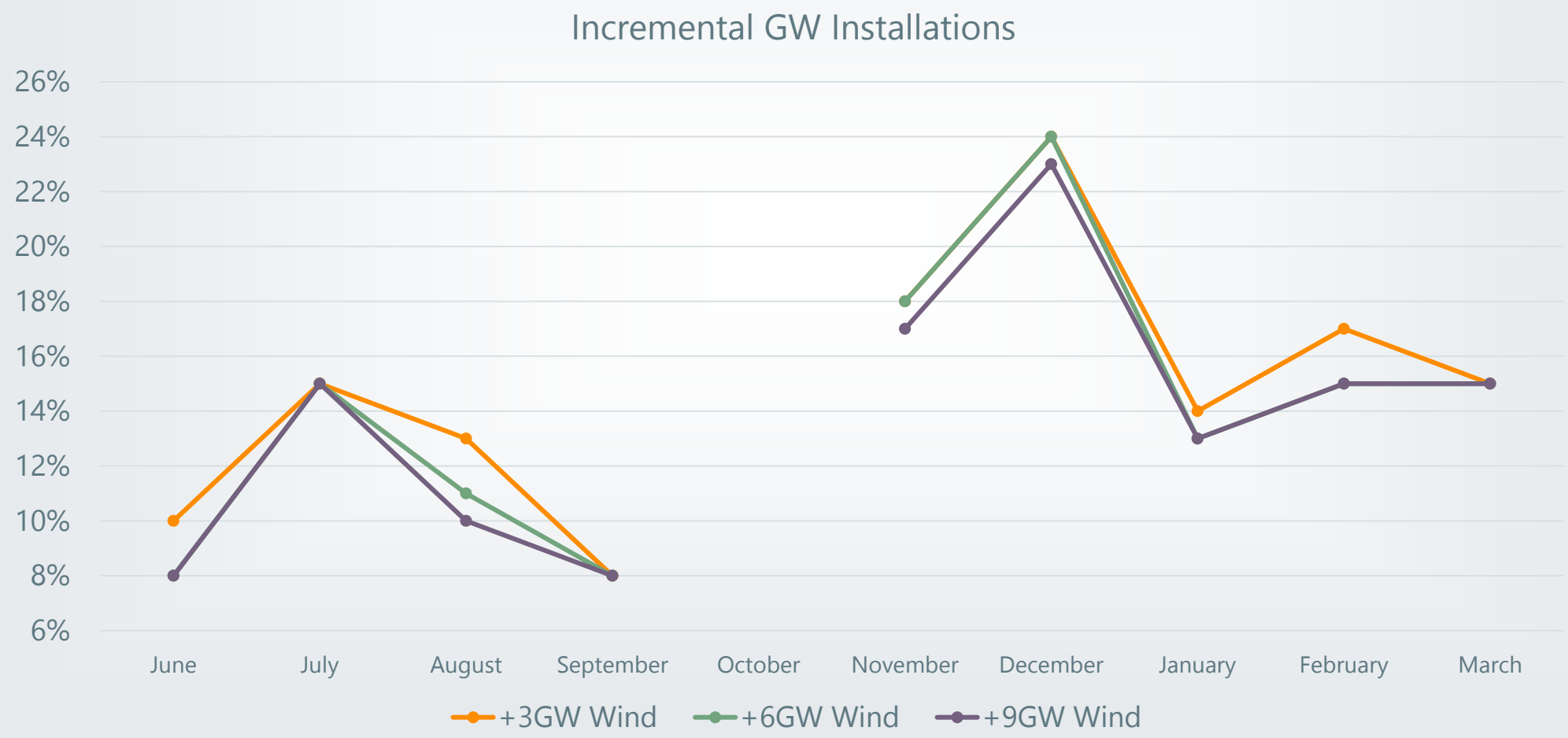
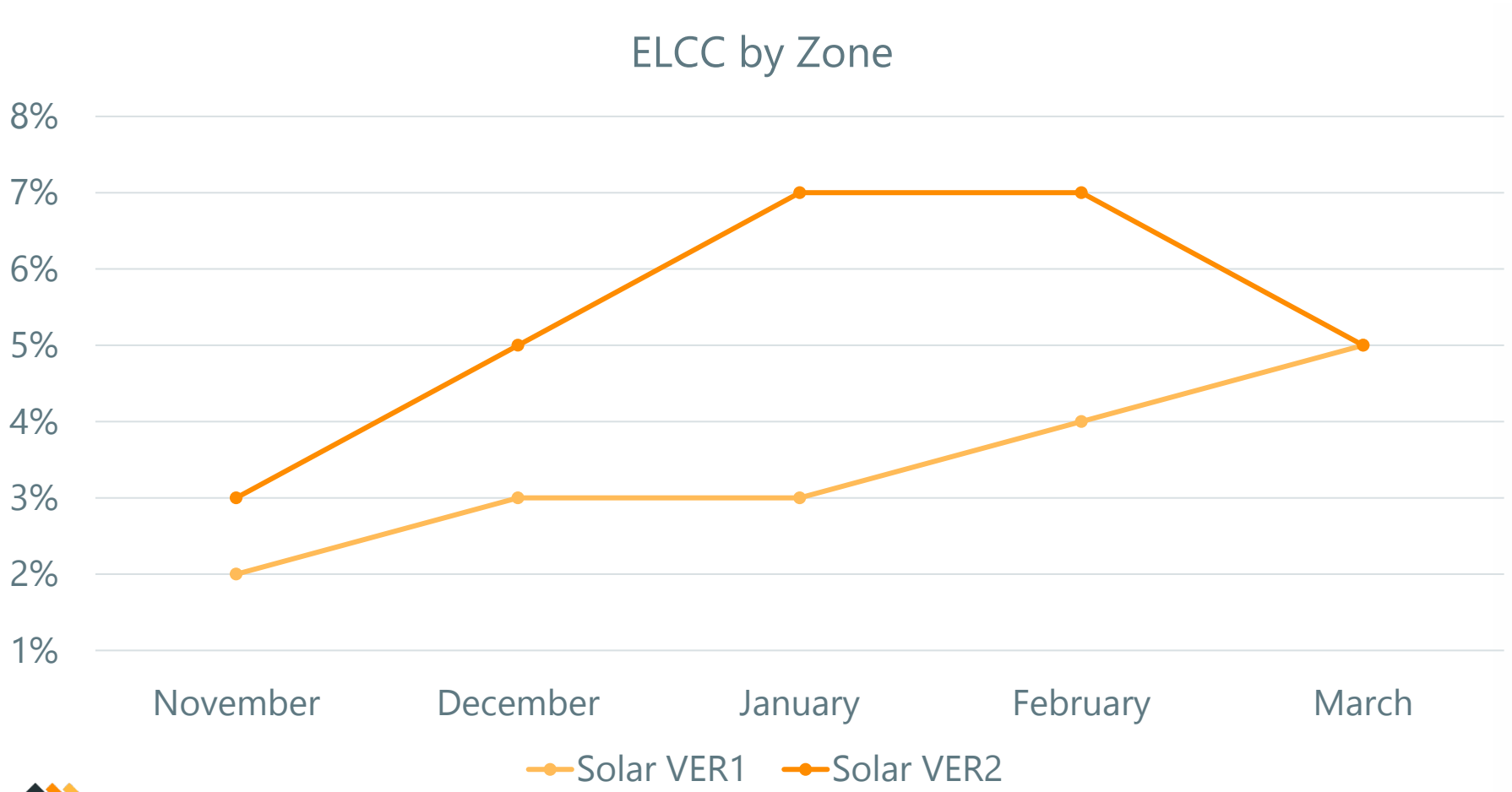
Wind ELCC –
Wind at Incremental GW Installations



SOLAR ELCC - WINTER



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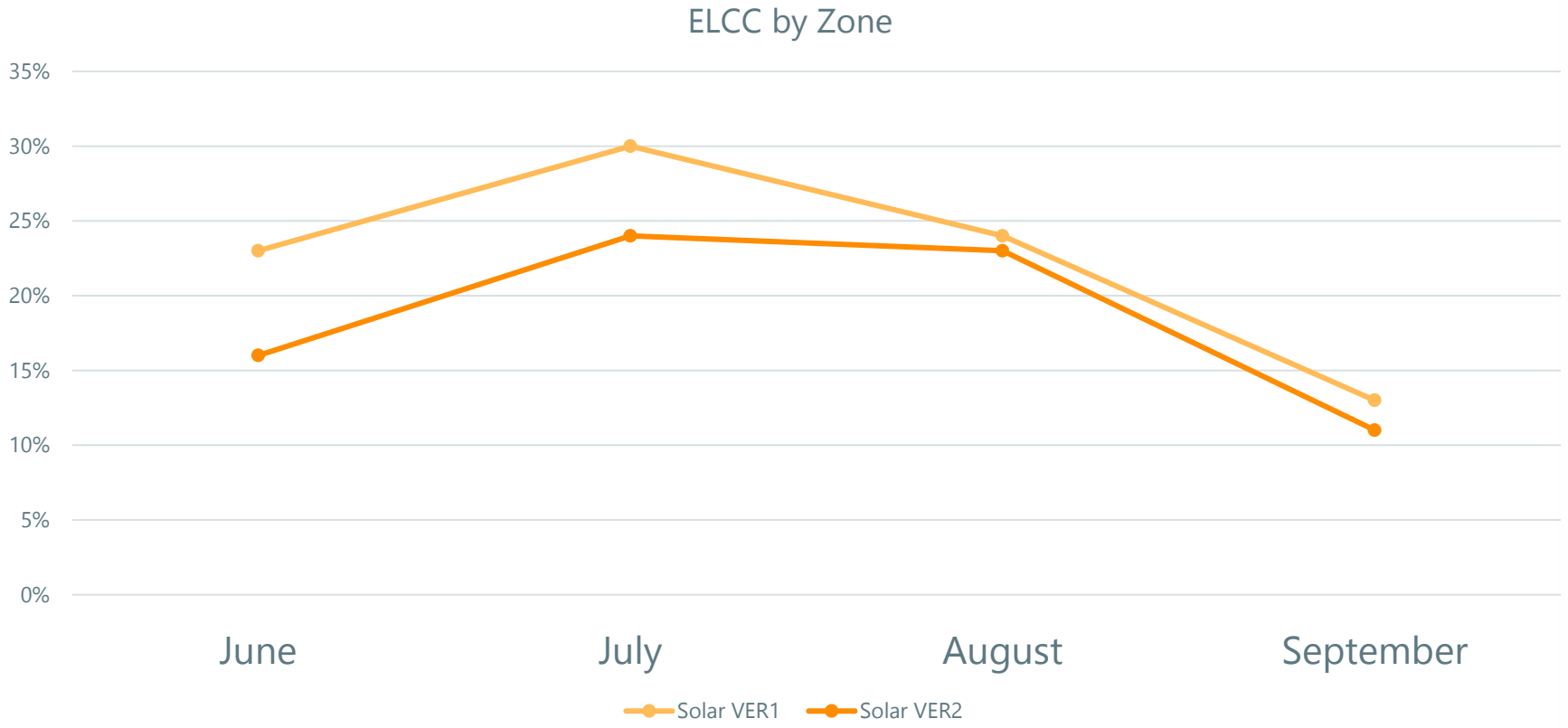
SOLAR ELCC - SUMMER



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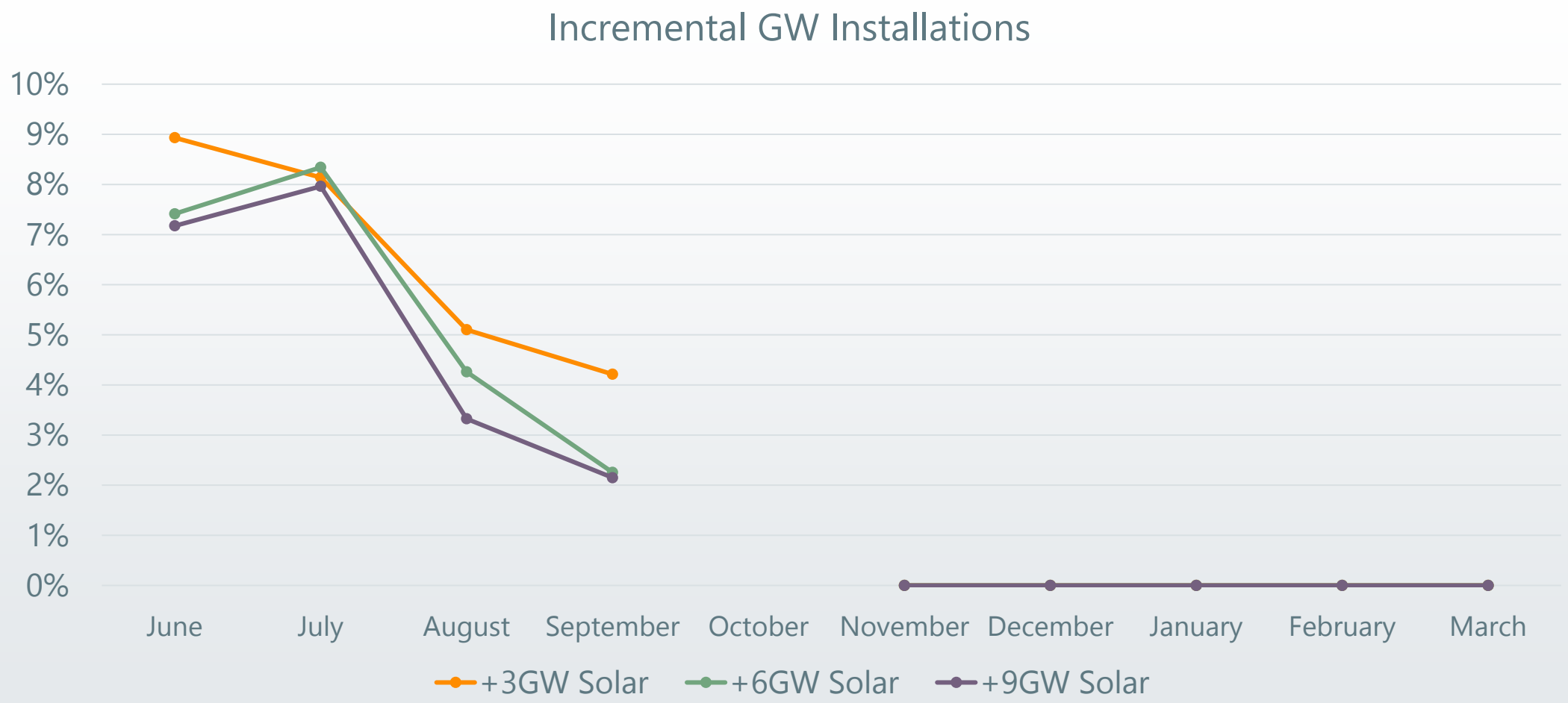
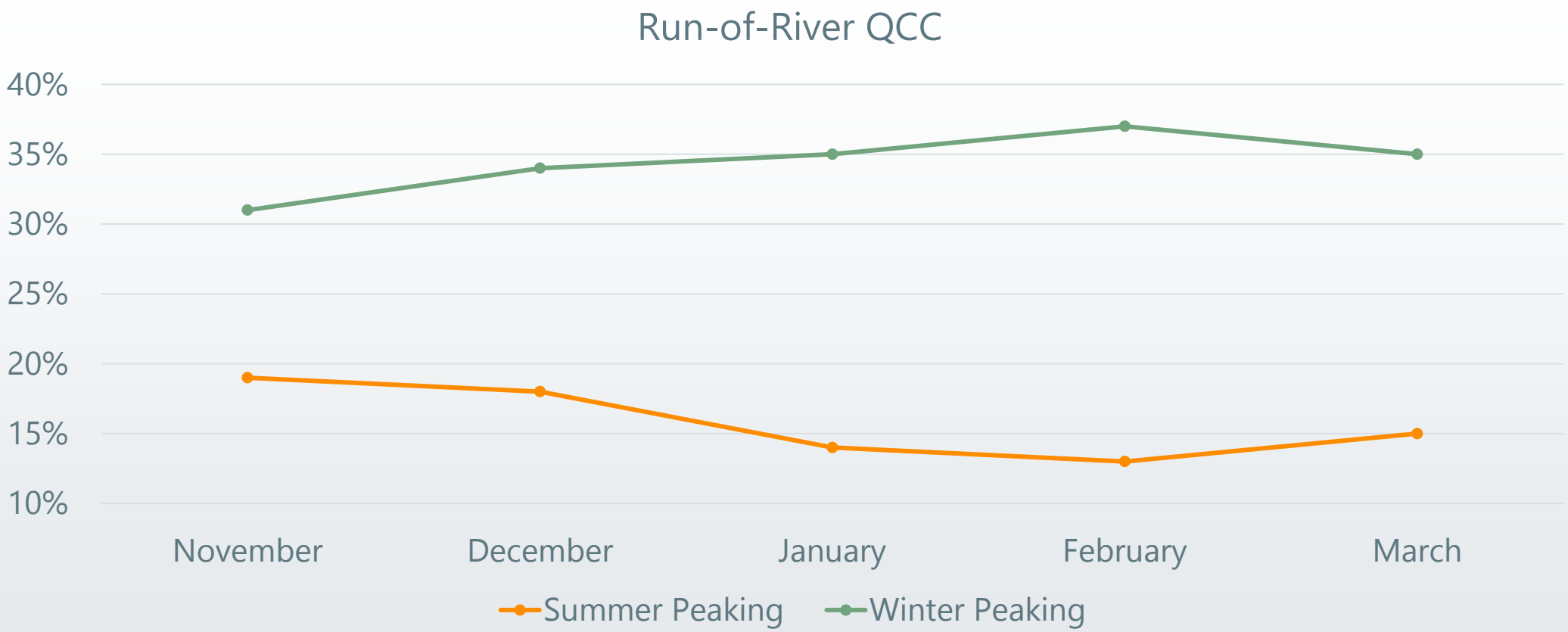
Solar ELCC –
Solar at Incremental GW Installations



Run-of-River QCC

Winter



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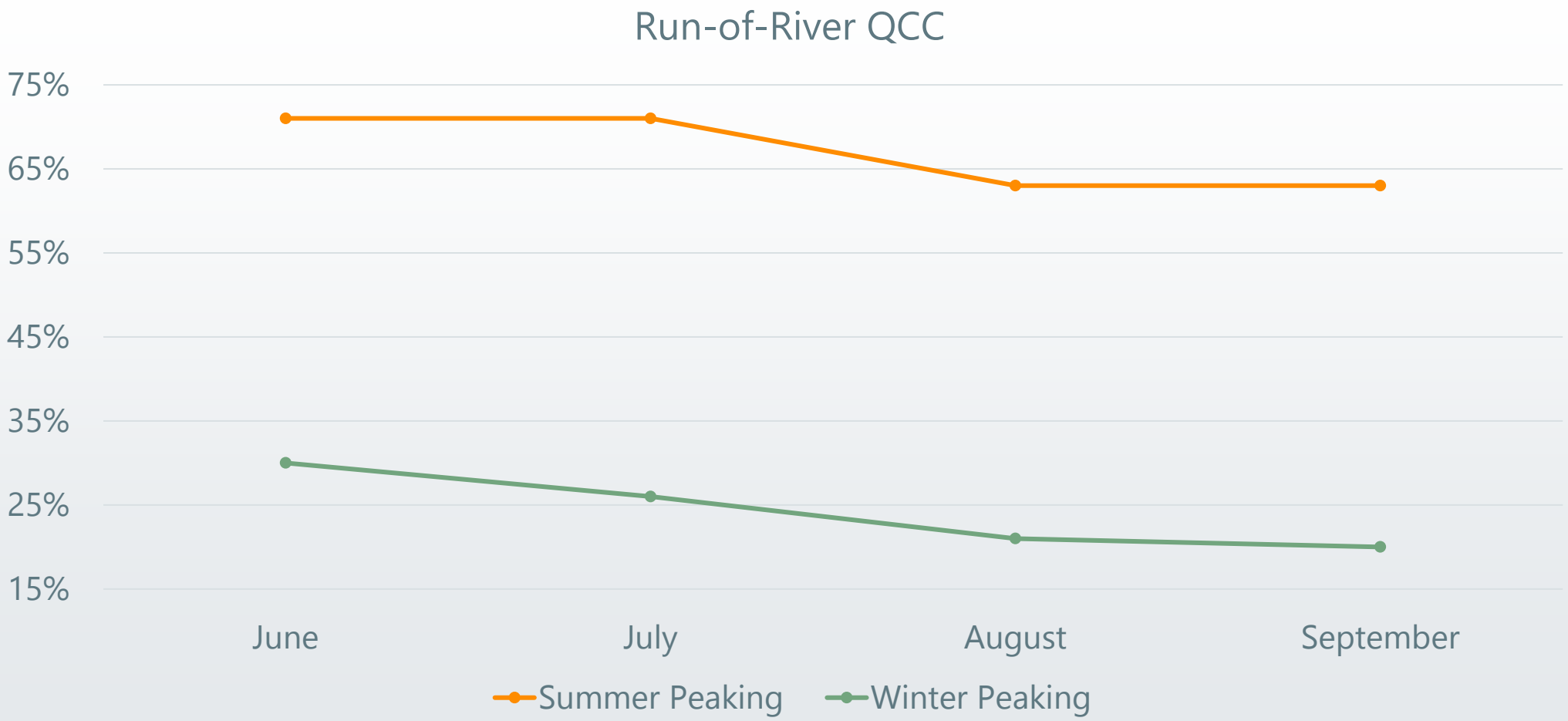
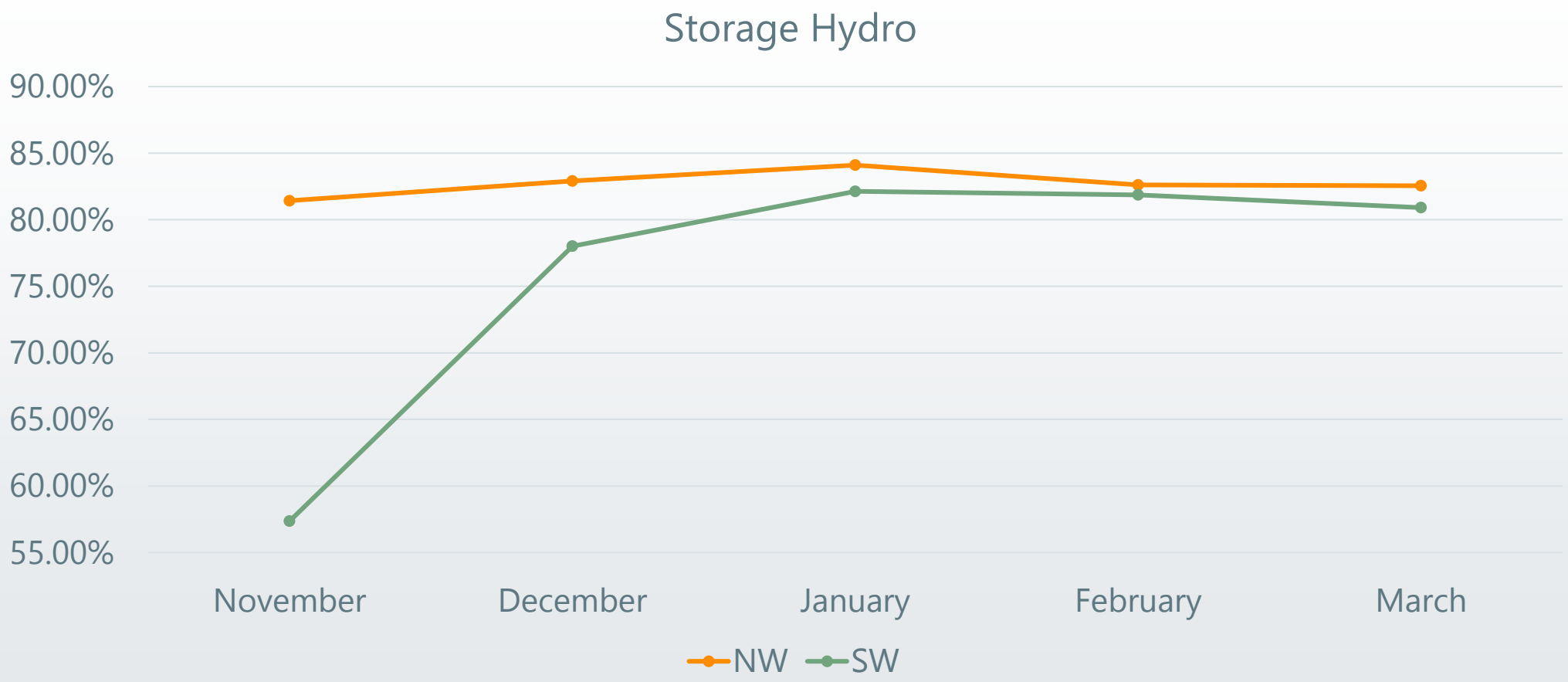
Run-of-River QCC

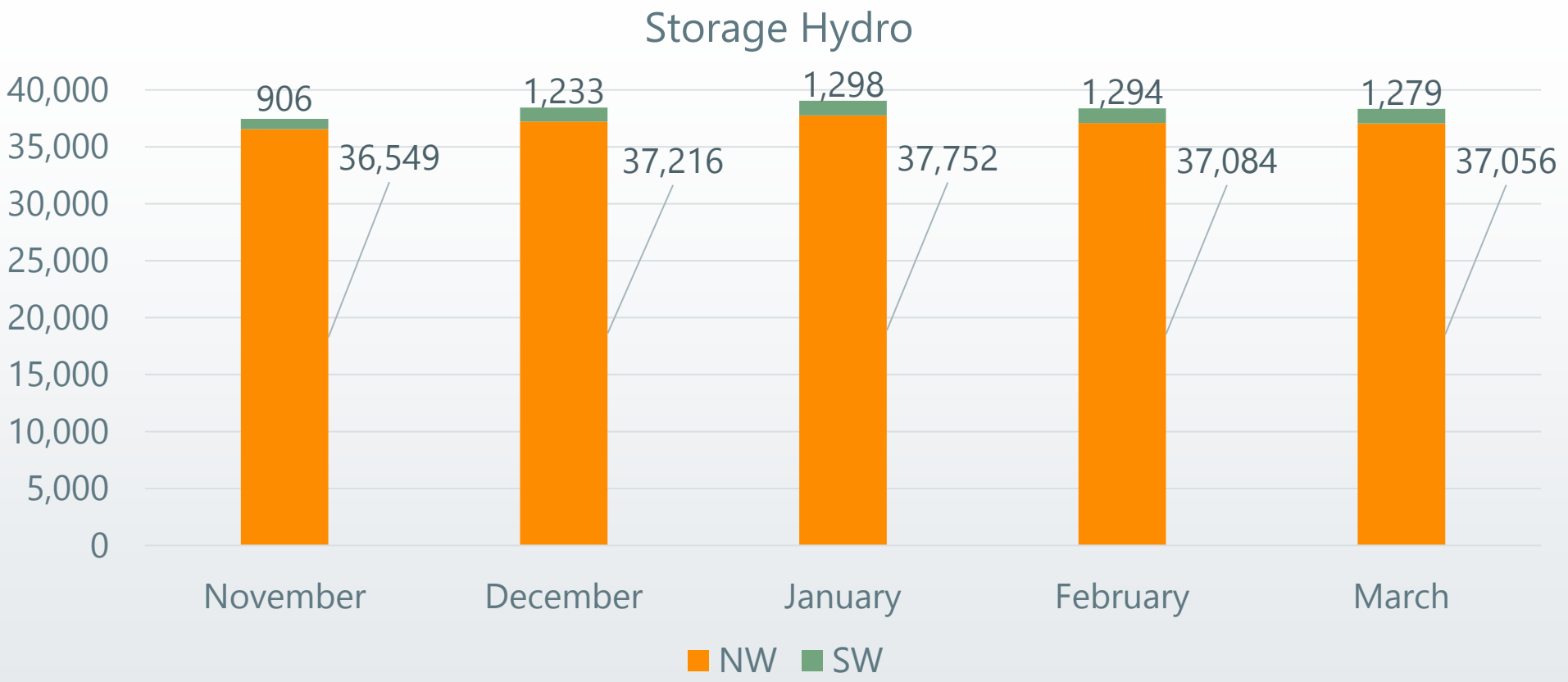
Summer



Storage Hydro QCC - Winter



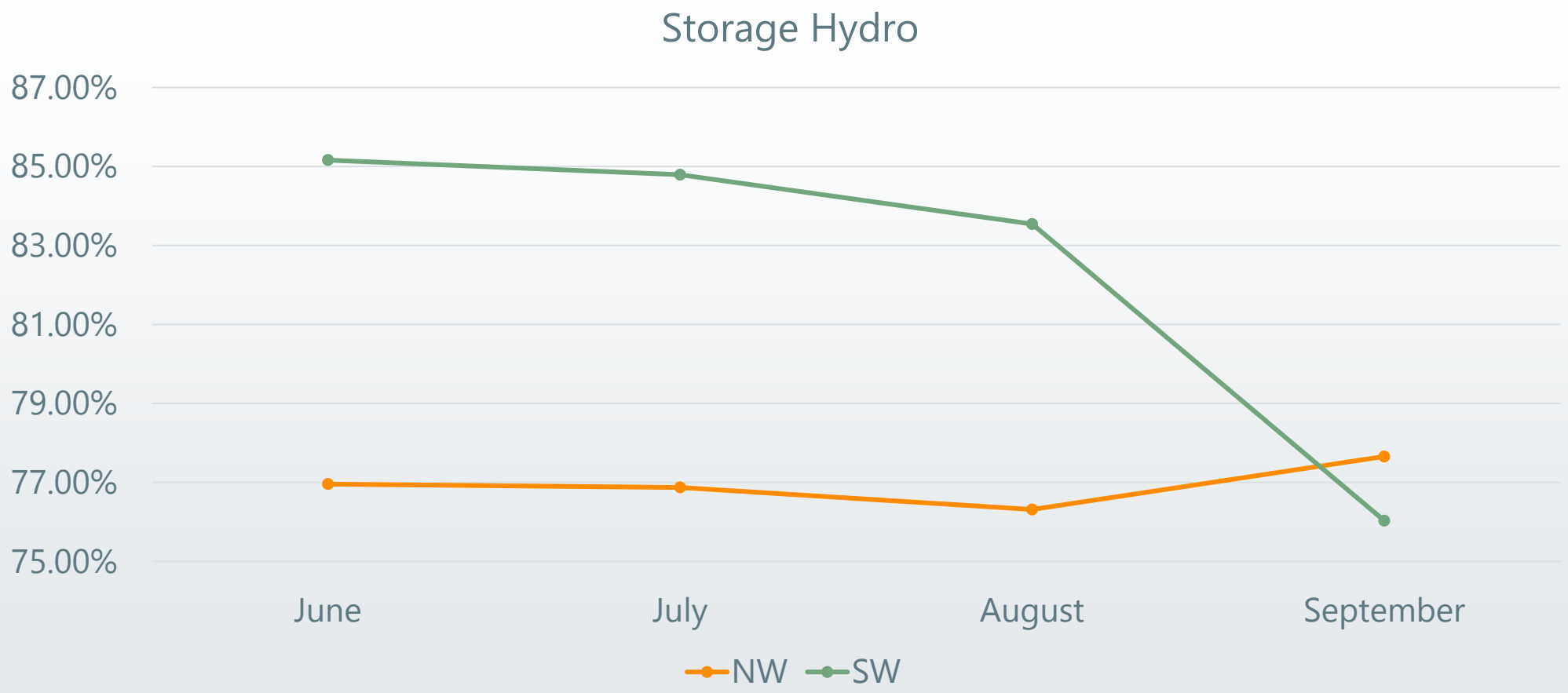
STORAGE HYDRO QCC - WINTER



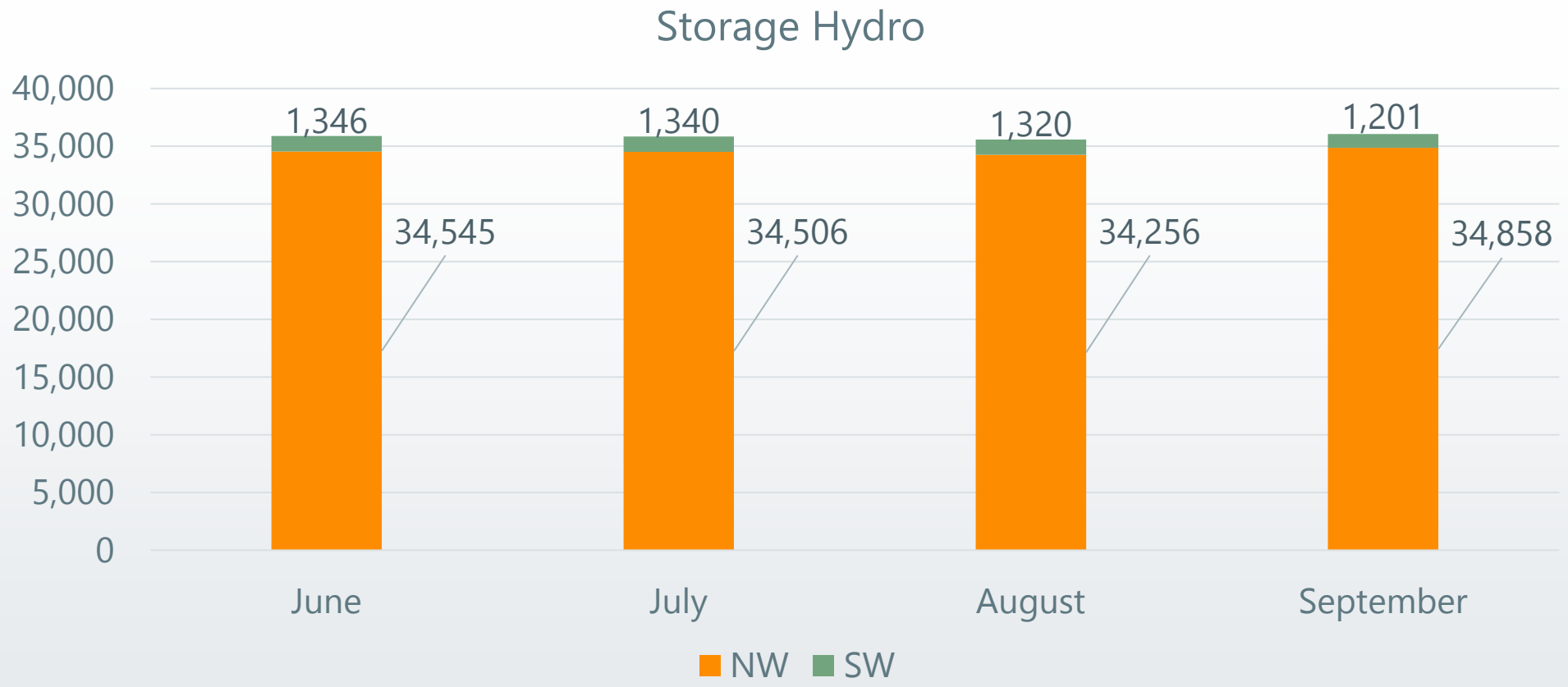
Average across the Winter Season

NW: 37,131 MW SW: 1,202 MW

Storage Hydro QCC - Summer



STORAGE HYDRO QCC - SUMMER

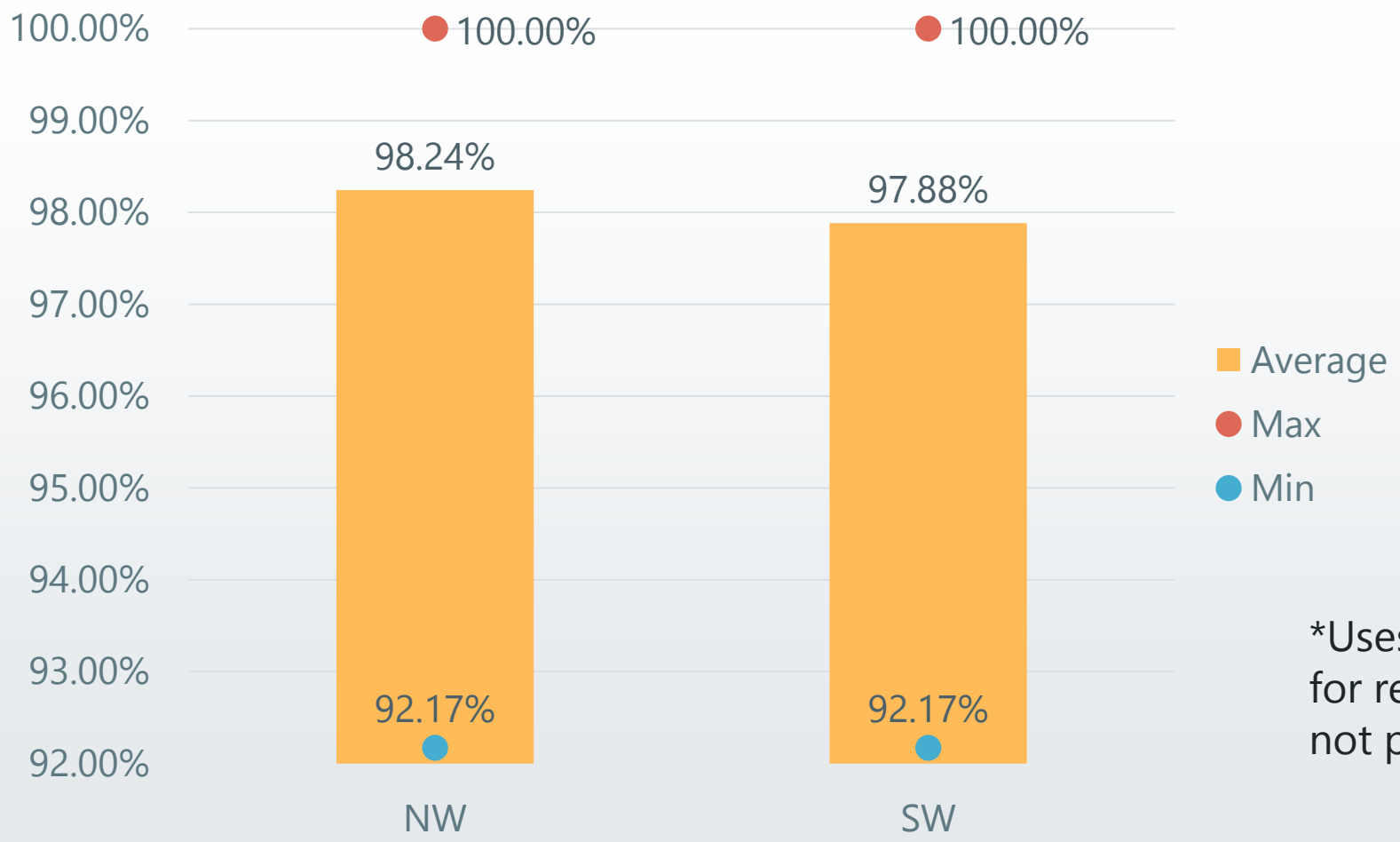


Average across the Summer Season

NW: 34,571 MW (2,590 MW less than Winter)

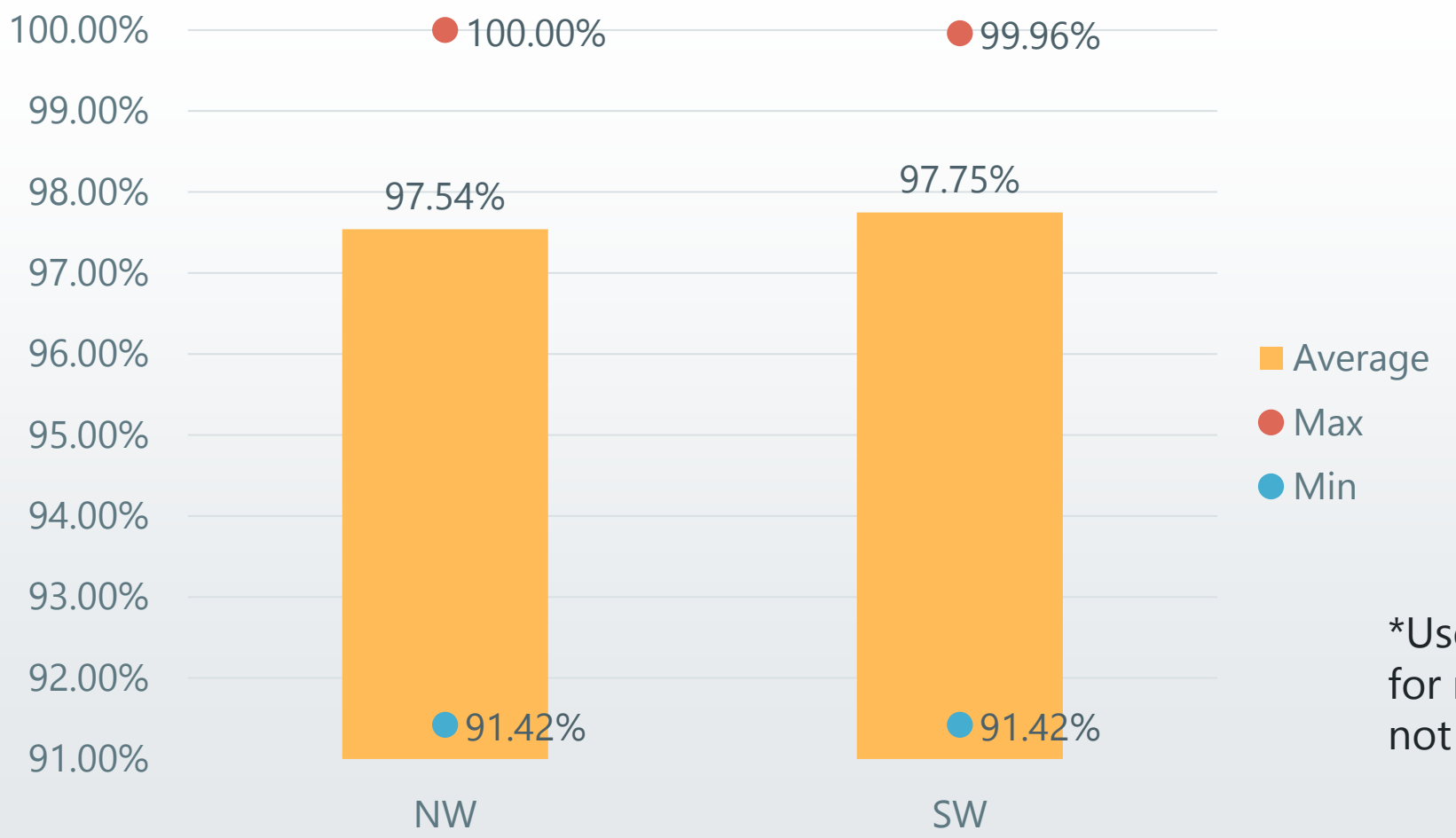
SW: 1,302 MW (100 MW more than Winter)

Thermal QCC- Winter



*Uses indicative values for resources that did not provide GADS data

Thermal QCC- Summer



*Uses indicative values for resources that did not provide GADS data

PRM Considerations

- Attempting to maintain 0.1 LOLE across the season
- Allow up to 0.01 LOLE in each individual month
- NCP load for a given month a significant factor in calculation of PRM (lower load months will have higher PRM value)

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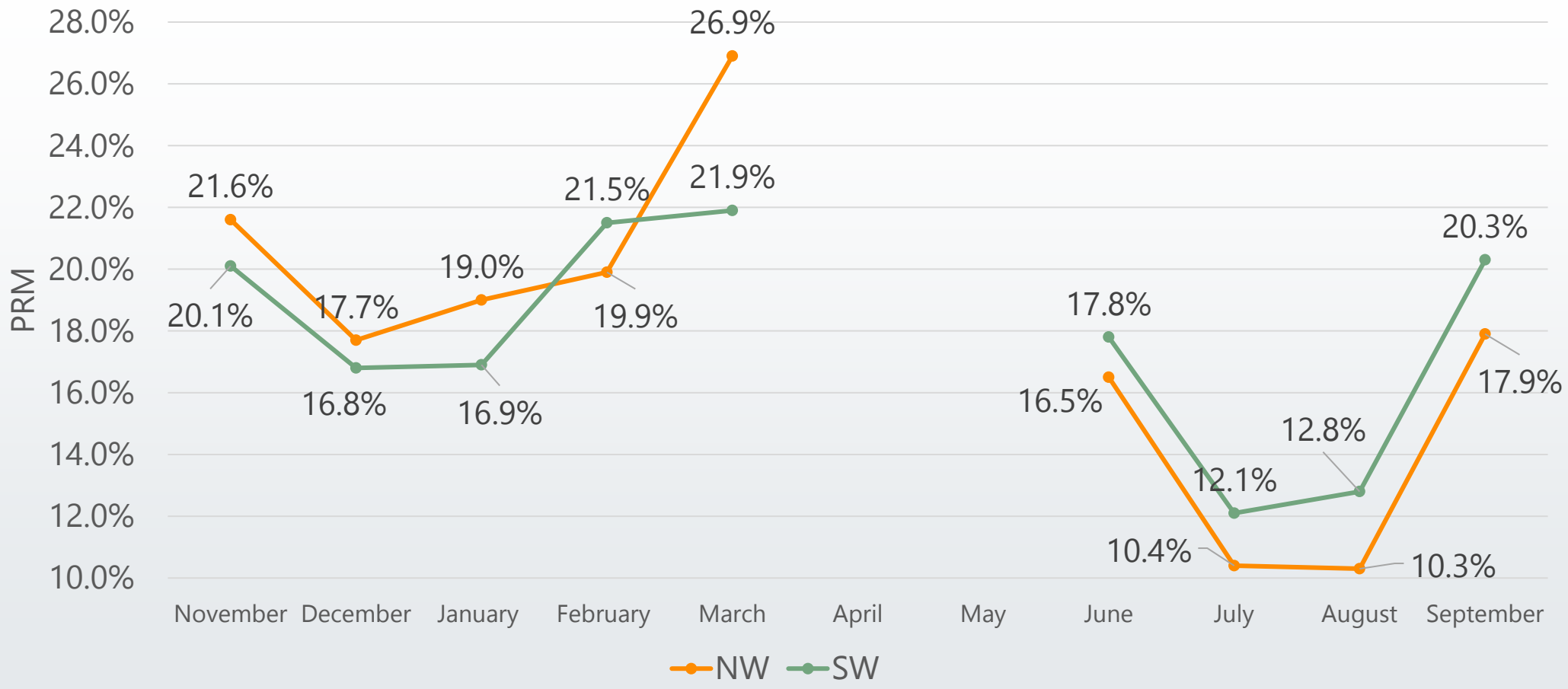
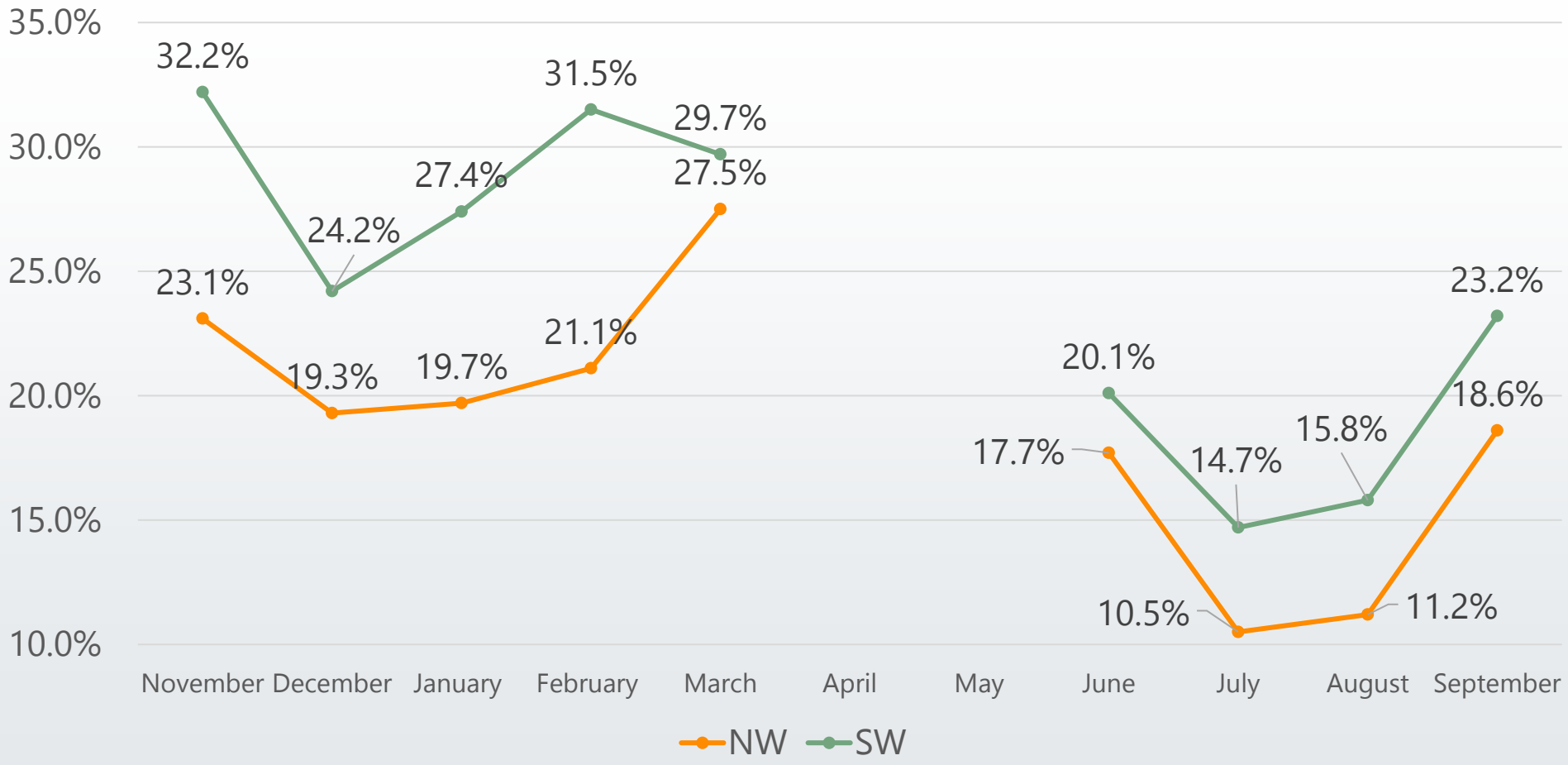
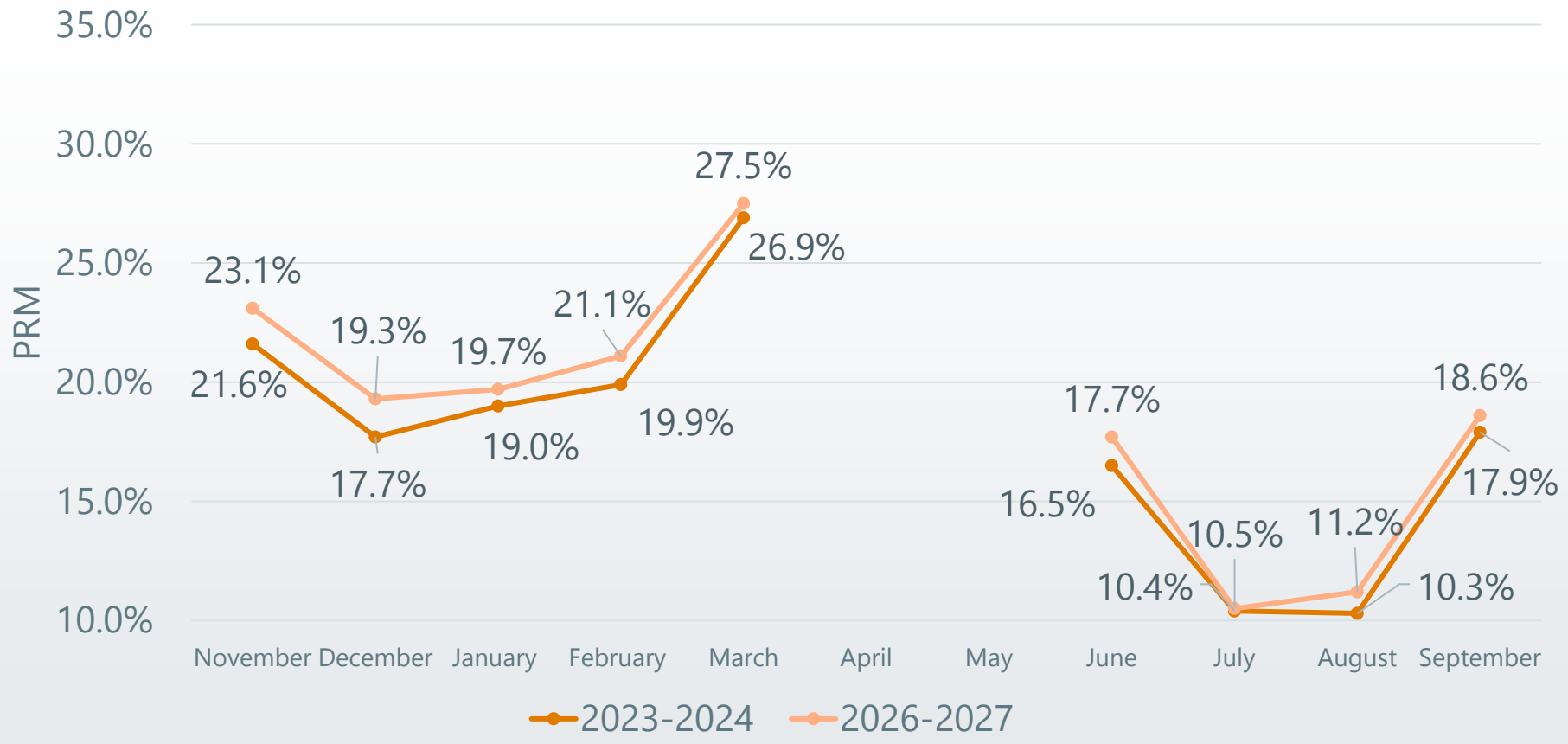
PRM – 2023-2024 (UCAP)



PRM – 2026-2027 (UCAP)



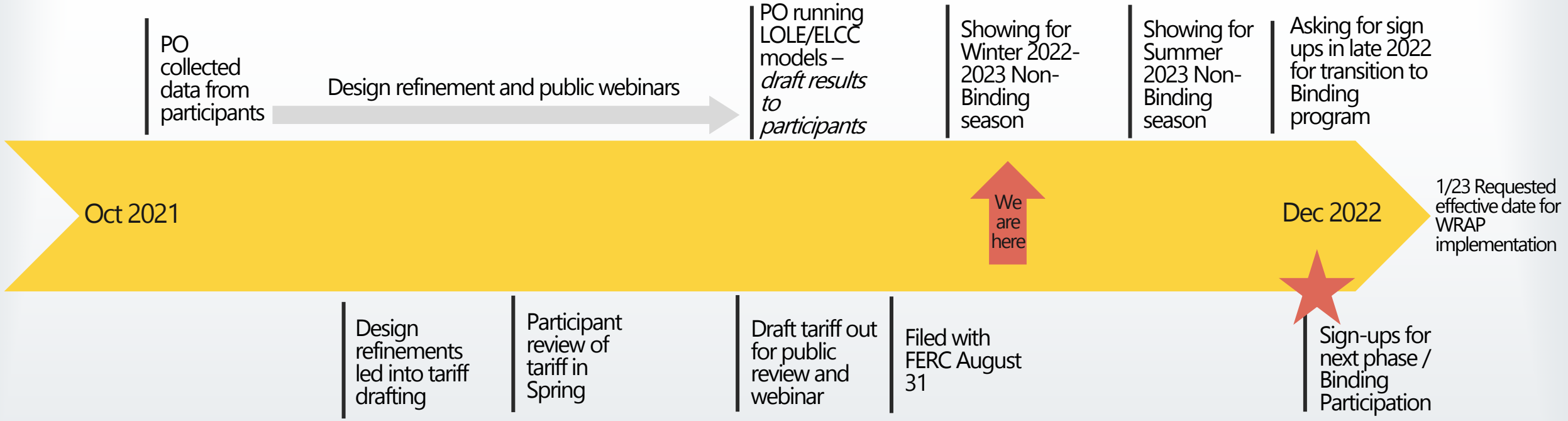
PRM – Northwest (UCAP)



PRM – Southwest (UCAP)

Current Phase Activities

PO = Program Operator
LOLE = Loss of Load Expectation
ELCC = Expected Load Carrying Capacity



Thank You

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