

WRAP and EDAM Interoperability



WRAP is Well-Designed for EDAM Interoperability

- The WRAP design document states that “minimum coordination” is required between WRAP and EDAM/WEIM
 - WRAP as currently designed is not a market and provides its participants benefits independent of an organized market
 - The entities that participate in both WRAP and EDAM will be responsible for managing their participation in both
 - WRAP benefits should not shift to non-WRAP entities participating in the same market

WRAP is a Commitment that Provides Benefits to Participants and the Region

| | WRAP Commitment | WRAP Benefits |
|---------------------------|---|--|
| Forward Showing | Demonstrate adequate capacity available to meet peak load plus a planning reserve margin (PRM) using established metrics for the footprint | More efficient planning by leveraging the footprint diversity through enhanced regional coordination and increased visibility and transparency into the capacity position of the footprint |
| Operations Program | Excess capacity resulting from changes in day-ahead load and resources from what was assumed in the forward showing is first obligated to deficient WRAP participants | Ability to use pooled capacity to remedy capacity deficiencies in the day-ahead and real-time due to changes in load and resources from what was assumed in the forward showing |

EDAM RSE Acts as the Universal Adapter

- EDAM participants will be subject to different resource adequacy requirements
 - California RA Requirements implemented by the California Public Utilities Commission
 - WRAP
 - Independent RA Requirements
- A robust day-ahead RSE in EDAM levels the playing field and ensures all EDAM participants come to the day-ahead market resource sufficient
- **Decision Point:** Each EDAM entity must decide if the RSE satisfactorily adapts different RA requirements resulting in sufficient resource quality to provide confidence in the EDAM market solution

We Decide WRAP and EDAM Can Work – How Do We Do It?

- WRAP includes an operations program designed to unlock the RA diversity benefits by sharing the pooled capacity to meet the needs of the WRAP participants
- The WRAP day-ahead sharing calculation and holdback determination needs to be completed within a reasonable timeframe to allow participants to manage their WRAP holdback requirements and their EDAM RSE obligation
- WRAP holdback results should be self-scheduled and treated like a bilateral
 - Capacity set aside for a positive holdback (export) cannot be used to pass the RSE
 - A negative holdback (import) can be used to pass the RSE, subject to the RSE tagging requirements

WRAP Forward Showing Determines the WRAP Commitment

- Each WRAP participant is required to show it has sufficient resources to adequately serve its load under a loss of load expectation (LOLE) of 1 in 10 years

$$\textit{FS Capacity Requirement} = \textit{monthly P50 load} * (\textit{100\%} + \textit{seasonal PRM})$$

- Capacity in excess of a participant's FS requirement has no obligation to WRAP
- Forward Showing Details
 - P50 load forecast plus a PRM
 - PRM accounts for the LOLE of the WRAP zone
 - Forward showing is done twice a year, seven months in advance of the binding season (summer and winter) with two months to cure, if needed
 - Established metrics for resource quality and qualified capacity contribution (QCC)
 - Transmission rights to deliver at least 75% of forward showing capacity requirement to load, priority 6 or 7

WRAP Sharing Calculation Determines Day-Ahead WRAP Requirement/Assistance

- Each preschedule day the WRAP sharing calculation is performed for each participant
- The WRAP sharing calculation is an assessment of each entity's position relative to their forward showing requirement

Sharing Requirement

= [FS Capacity Requirement – ΔForced Outages + ΔRoR Performance

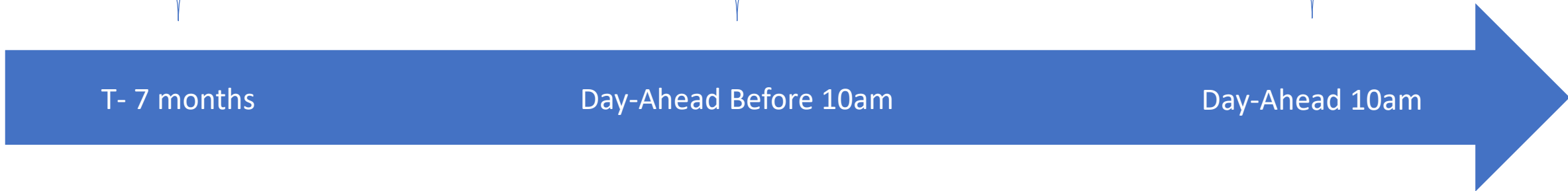
WRAP Holdback and EDAM RSE

- WRAP transfers are settled bilaterally between participants
- For an entity participating in both EDAM and WRAP, the results of the WRAP sharing calculation and resulting holdback requirement or requested holdback should be accounted for in the EDAM RSE and respected resulting market run
 - If the entity has a holdback obligation to WRAP it should be a self-scheduled export in EDAM and that capacity cannot be used to pass the EDAM RSE
 - If the entity has requested holdback from WRAP it should be a self-schedule import and count towards the entity's EDAM RSE and subject to the same conditions as other imports
 - In the WRAP operational program, the resulting energy is not scheduled until T-90, a capacity tag could be used for EDAM RSE purposes

Scenario 1: WRAP Holdback is a Self-Scheduled Export, EDAM RSE Passed

| Forward Showing | | WRAP Sharing Calculation | | WRAP Holdback | | EDAM RSE | |
|------------------------------------|------------|----------------------------|----------|---|------------|---|-------------|
| | MW | | MW | | MW | | MW |
| Peak Load | 100 | Available DA WRAP Capacity | 115 | Holdback Requirement | 7 | Load | 100 |
| PRM 15% | 15 | FS Requirement | 115 | Holdback Requested | 0 | EDAM Uncertainty | 8 |
| Forward Showing Requirement | 115 | + Δ VER | 0 | Holdback Released | 0 | EDAM RSE Requirement | 108 |
| Portfolio QCC | 115 | + Δ Forced Outages | 0 | | | Available DA Capacity after WRAP | 108 |
| | | - DA Load | 100 | | | | |
| Excess Capacity | 0 | - DA Uncertainty | 8 | Available DA Capacity after WRAP | 108 | EDAM RSE | Pass |
| | | DA WRAP Position | 7 | | | | |

WRAP holdback is a self-schedule export to deficient WRAP participant, capacity cannot be used in EDAM RSE



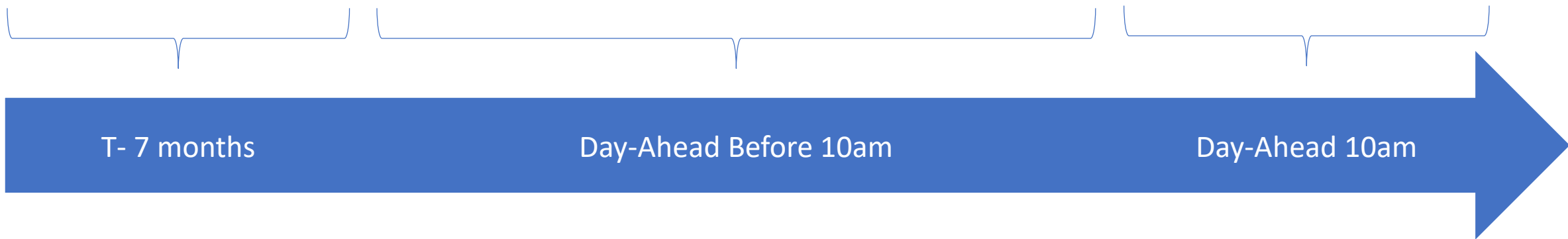
Scenario 2: Self-Scheduled Import from WRAP, EDAM RSE Passed

| Forward Showing | MW |
|------------------------------------|------------|
| Peak Load | 100 |
| PRM 15% | 15 |
| Forward Showing Requirement | 115 |
| Portfolio QCC | 115 |
| Excess Capacity | 0 |

| WRAP Sharing Calculation | MW | WRAP Holdback | MW |
|----------------------------|------------|---|------------|
| Available DA WRAP Capacity | 115 | Holdback Requirement | 0 |
| FS Requirement | 115 | Holdback Requested | 18 |
| + Δ VER | 0 | Holdback Released | 0 |
| + Δ Forced Outages | 0 | | |
| - DA Load | 125 | | |
| - DA Uncertainty | 8 | | |
| DA WRAP Position | -18 | Available DA Capacity after WRAP | 133 |

| EDAM RSE | MW |
|---|-------------|
| Load | 125 |
| EDAM Uncertainty | 8 |
| EDAM RSE Requirement | 133 |
| Available DA Capacity after WRAP | 133 |
| EDAM RSE | Pass |

WRAP holdback requested is a self-schedule import from sufficient WRAP participant(s), capacity can be used in EDAM RSE and is subject to all RSE tagging requirements



Scenario 3: WRAP Holdback Obligation, Excess Capacity Needed to Pass EDAM RSE

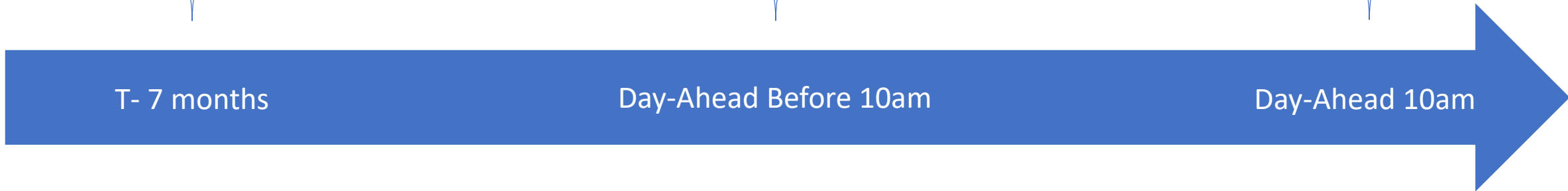
| Forward Showing | MW |
|------------------------------------|------------|
| Peak Load | 100 |
| PRM 15% | 15 |
| Forward Showing Requirement | 115 |
| Portfolio QCC | 125 |
| Excess Capacity | 10 |

| WRAP Sharing Calculation | MW | WRAP Holdback | MW |
|----------------------------|----------|---|------------|
| Available DA WRAP Capacity | 115 | Holdback Requirement | 7 |
| FS Requirement | 115 | Holdback Requested | 0 |
| + Δ VER | 0 | Holdback Released | 0 |
| + Δ Forced Outages | 0 | | |
| - DA Load | 100 | | |
| - DA Uncertainty | 8 | | |
| DA WRAP Position | 7 | Available DA Capacity after WRAP | 108 |

| EDAM RSE | MW |
|------------------------------------|-------------|
| Load | 100 |
| EDAM Uncertainty | 10 |
| EDAM RSE Requirement | 110 |
| Available DA Capacity after WRAP | 108 |
| Excess Capacity not in WRAP | 10 |
| Total Available DA Capacity | 118 |
| EDAM RSE | Pass |

WRAP holdback requirement is a self-schedule export, cannot be used to meet EDAM RSE

WRAP committed capacity is not sufficient to pass RSE because of different uncertainty requirements, entity must rely on excess capacity to meet RSE



Scenario 4: WRAP Import, Additional Bilateral Purchase Needed to Pass RSE

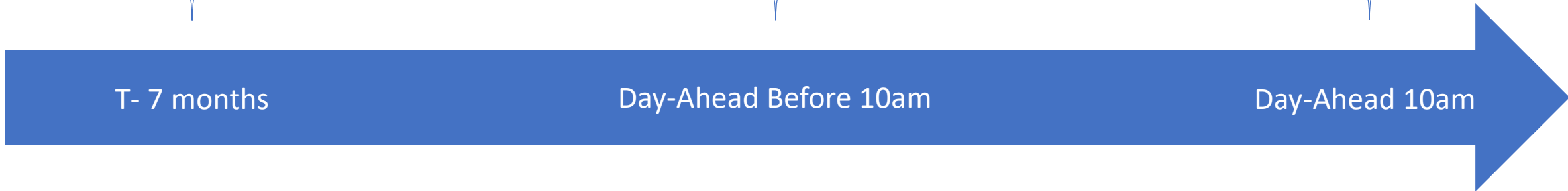
| Forward Showing | MW |
|------------------------------------|------------|
| Peak Load | 100 |
| PRM 15% | 15 |
| Forward Showing Requirement | 115 |
| Portfolio QCC | 115 |
| Excess Capacity | 0 |

| WRAP Sharing Calculation | MW | WRAP Holdback | MW |
|----------------------------|------------|---|------------|
| Available DA WRAP Capacity | 115 | Holdback Requirement | 0 |
| FS Requirement | 115 | Holdback Requested | 18 |
| + Δ VER | 0 | Holdback Released | 0 |
| + Δ Forced Outages | 0 | | |
| - DA Load | 125 | | |
| - DA Uncertainty | 8 | | |
| DA WRAP Position | -18 | Available DA Capacity after WRAP | 133 |

WRAP holdback requested is a self-schedule import and can be used to meet EDAM RSE

WRAP import is not sufficient to pass RSE because of different uncertainty requirements, entity makes bilateral purchase to meet RSE

| EDAM RSE | MW |
|------------------------------------|-------------|
| Load | 125 |
| EDAM Uncertainty | 10 |
| EDAM RSE Requirement | 135 |
| Available DA Capacity after WRAP | 133 |
| Bilateral Purchase | 5 |
| Total Available DA Capacity | 138 |
| EDAM RSE | Pass |



WRAP and EDAM are Operationally Compatible - Summary

- Each entity must decide if the EDAM RSE provides sufficient resource parity and provides confidence in the market solution
- As currently designed the WRAP operations program and EDAM are operationally compatible
 - The sharing calculation timeline in WRAP needs to be firmed up
- The WRAP operational program is independent of the market solution and the resulting transactions are self-scheduled in EDAM
- WRAP benefits stay with WRAP participants

Thank You

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