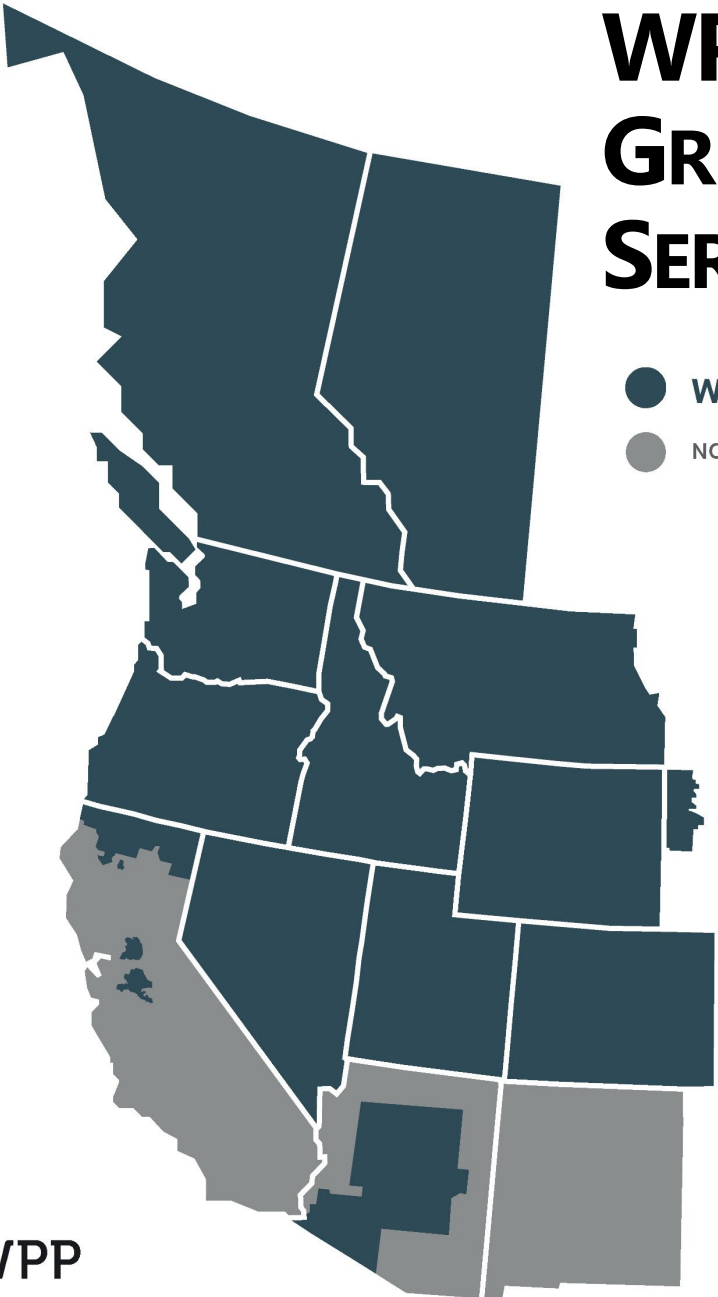




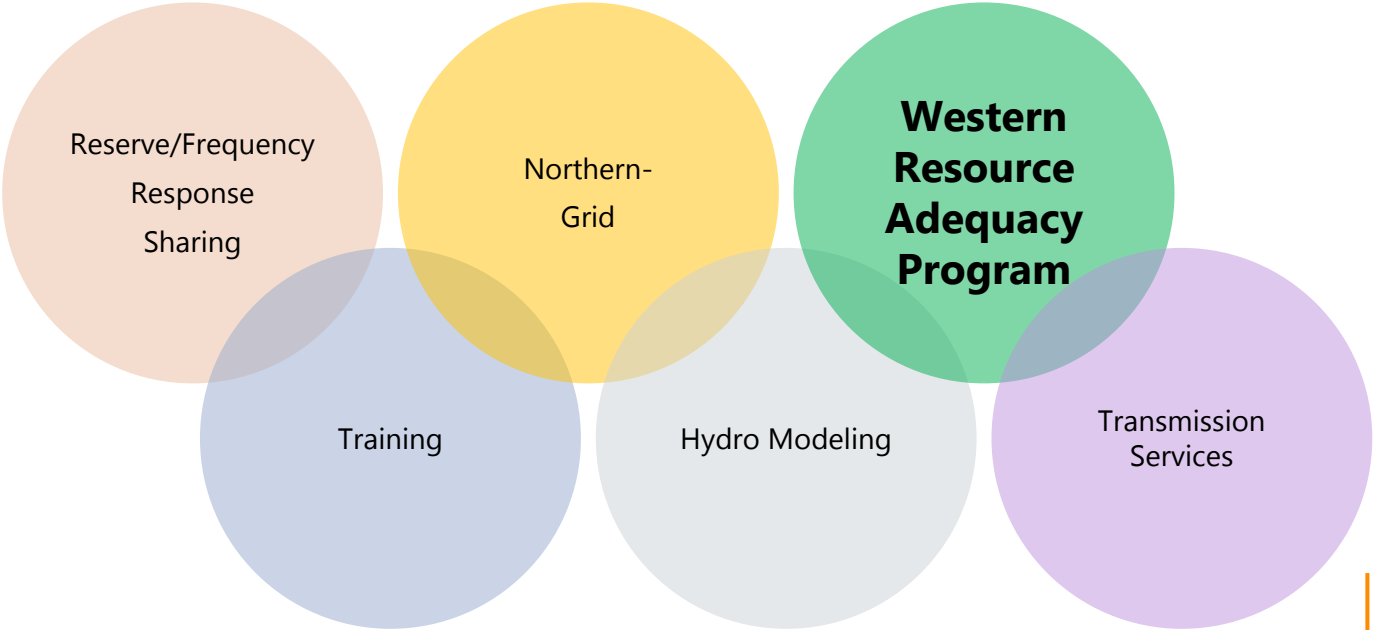
WESTERN POWER POOL & WESTERN RESOURCE ADEQUACY PROGRAM

Ryan Roy, Director of Technology, Modeling & Analytics

WPP PROVIDES A RANGE OF VALUABLE GRID INTEGRATION AND COORDINATION SERVICES TO ITS CUSTOMERS



- WPP AREA
- NON-WPP AREA



HISTORY

- » Established in 1941 by six investor-owned utilities
- » Primarily focused on hydro coordination in support of the Columbia River Treaty and Pacific Northwest Coordination Agreement
- » Informal reserve sharing in the 1970s
- » Added the Transmission Planning Committee in 1990
- » Incorporated in 1999 and transitioned to full-time staff
- » Reserve Sharing fully automated in 2002
- » Became a Continuing Education Units provider in 2005 with a fully automated training platform in 2014
- » Initiated WRAP effort in 2019

WPP GOVERNANCE

WPP governance is in a time of transition

- » WRAP is FERC jurisdictional - WPP will need to become a Public Utility per the Federal Power Act in order to administer WRAP
 - Requires a fully independent board
 - Current board is 'semi-independent' – has no governance oversight of existing (non-FERC-jurisdictional) programs
- » WPP will ensure that legacy programs (RSG, WFRSG, NorthernGrid, etc.) are maintained
- » WPP will act as WRAP Program Administrator (PA) - partnering with SPP as Program Operator (PO)
 - PO performs technical operation of program (forward showings, operations program, assess after-the-fact compliance, participant data collection and validation, PO officer serves as advisor to BOD)

WPP AS PUBLIC UTILITY

» Independent Board Of Directors (BOD) at WPP

- Following FERC approval and “critical mass” commitments by Participants, current WPP board will be transitioned to a new BOD
- Oversees pre-existing WPP functions
- WRAP BOD Responsibilities (codified in tariff):
 - Directs WPP to file WRAP Tariff changes under FPA section 205 (but cannot file certain types of major changes to WRAP Tariff in scope, character of WRAP absent super-majority RAPC approval)
 - Final authority for approval/rejection on all proposed tariff changes, and can propose tariff changes to be considered in stakeholder process

» Sector-representative Nominating Committee (NC) to nominate BOD

- Committee has been stood up, recommending first independent board slate

WRAP PARTICIPATION

Voluntary participation in the program by the Load Responsible Entity (LRE)

- » Primary entity responsible for meeting RA requirements —focus of program rights, responsibilities and compliance
- » Sign Western Resource Adequacy Agreement (WRAA) (pro forma agreement under the WRAP Tariff) to commit
- » Fund the costs of administering the program and sits on RA Participant Committee (RAPC)

Exit Provisions

- » Exit, like entry, is voluntary, but 24 months advance notice required
- » Shorter notice of exit allowed for extenuating circumstances on case-by-case basis, or in case of significant reduction of peak load forecast under certain conditions, or if Participant pays determinable costs of exit
- » Exit also allowed if RAPC super-majority allows BOD to file major changes to WRAP Tariff that are otherwise prohibited
- » Non-standard exit provisions anticipated for federal entity subject to specific statutory requirements

STAKEHOLDER ENGAGEMENT AND TRANSPARENCY

» **WRAP will have sector-based committees**

- Nominating committee to nominate BOD
- Program Review Committee is the work-horse of program design review/updates

» **Committee of State Representatives**

- One rep from each state/province that regulates one or more Participants

» **Open meetings of RAPC and BOD** when making decisions about WRAP

- Materials provided in advance to stakeholders/public

» **PRC's process for review of design recommendations includes public comment**

- Ability to make public comment in BOD, RAPC open meetings

» **Independent evaluator**

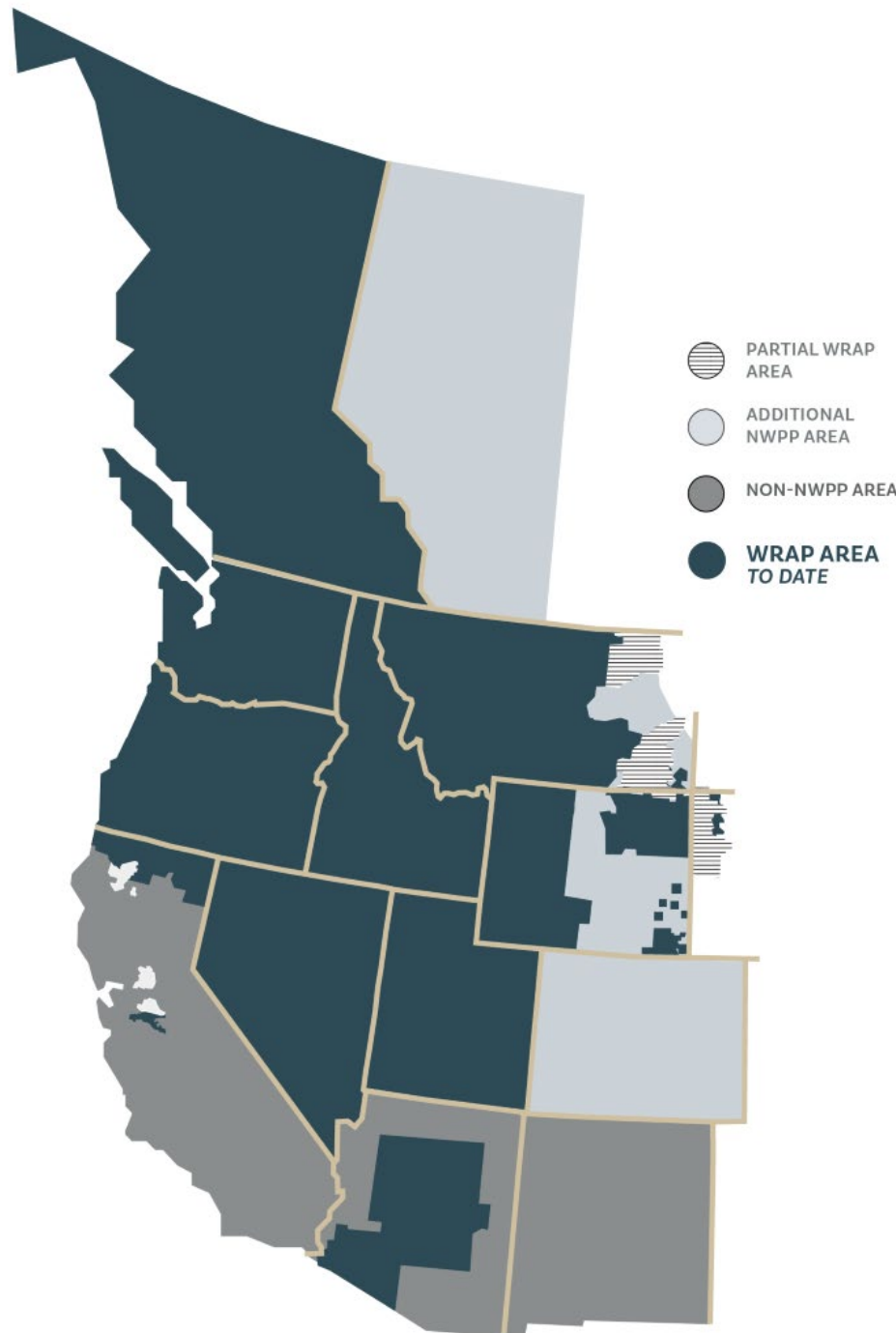
- Provides BOD with outside, independent assessment of program operations, accounting/settlement, and design
- Does not monitor program participants

WRAP DECISION-MAKING

- » BOD has ultimate decision-making authority for WRAP
- » RAPC will provide advisory votes to BOD on program changes
 - “House” (P50 load) and “Senate” (headcount) style voting
 - 67% approval on both House and Senate tallies needed on resolutions that were approved by PRC, all other votes require 75%
- » PRC will provide advisory votes to RAPC on program changes
- » COSR can compel RAPC to engage for discussions if they disagree

PHASE 3A PARTICIPANTS

Arizona Public Service
Avangrid
Avista
Black Hills
Basin Electric
Bonneville Power Administration
Calpine
Chelan PUD
Clatskanie PUD
Douglas PUD
Eugene Water & Electric Board
Grant PUD
Idaho Power
NorthWestern Energy
NV Energy
PacifiCorp
Portland General Electric
Powerex
Puget Sound Energy
Salt River Project
Seattle City Light
Shell
Snohomish PUD
Tacoma Power
The Energy Authority
Turlock Irrigation District



Western Resource Adequacy Program

- > **Industry-driven initiative** for regional approach to help ensure resource adequacy in light of changing resource composition and increased resource uncertainty
 - > Estimated peak winter load of 65,122 MW and summer load of 66,768 MW
- > **Participation is voluntary**, with mandatory requirements once joined
- > Implemented through **bilateral transactions under existing frameworks**

SOLVING A PROBLEM

» What WRAP does:

- » Implements a **binding forward showing** framework that requires entities to demonstrate they have secured their share of the regional capacity need for the upcoming season
- » Implements a **binding operational program** that obligates members with calculated surplus to assist participants with a calculated deficit on the hours of highest need
- » Leverages the binding nature of the operational program, together with modeled supply and load diversity, to **safely lower the requirements** in the forward showing and help **inform resource selection** for the region, **driving investment savings** for members and their end use customers

PROGRAM DESIGN OVERVIEW

FORWARD SHOWING PROGRAM

- » Establishes a **regional reliability metric** (1 event-day in 10 years LOLE)
- » Utilizes thoughtful modeling and analytics to:
 - » Determine historical summer and winter **capacity critical hours** (CCHs) data sets for the region
 - » Determine each resource type's **qualifying capacity contribution** (QCC) to the regional capacity needs
 - » Determine a planning reserve margin (PRM) which is applied to peak load forecast based on P50 metric
- » Showing requirement includes **deliverability** component
 - » Firm or conditional firm transmission to meet 75% of P50 + PRM (paired with robust exception framework)
- » Participant compliance obligation (7 months in advance of binding season) = **physically firm resources to meet P50 + PRM**

Determine
Program
Capacity
Requirement



Determine
Resource
Capacity
Contribution



Compliance
Review of
Portfolio

QUALIFYING CAPACITY CONTRIBUTIONS

Resource Type	Accreditation Methodology
Wind and Solar Resources	Effective Load-Carrying Capability (ELCC) analysis
Run-of-River Hydro	ELCC analysis
Storage Hydro	WPP-developed hydro model that considers the past 10 years generation, potential energy storage, and current operational constraints.
Thermal	Unforced capacity (UCAP) method.
Short Term Storage	ELCC Analysis
Hybrid Resource	"Sum of parts" method where energy storage resource will use ELCC and generator will use appropriate method as outlined above
Customer Side Resources	Can either register as a load modifier or as a capacity resource

PROGRAM DESIGN OVERVIEW

OPERATIONS PROGRAM



- » Evaluates participants operational situation relative to Forward Showing assumptions (for load, outages, VER performance)
- » Obligates participants with calculated surplus to assist participants with a calculated deficit on the hours of highest need
- » Deficiency forecast on day before Operating Day (Preschedule Day) establishes Holdback Requirement for surplus participants
- » Surplus Participant that fails to provide assigned Energy Deployment must pay Energy Delivery Failure Charge

- » WRAP Participants **must forward secure capacity from an identified source** (can be unit-specific or a system sale that has been validated as real capacity) with transmission for deliverability
 - Access to these resources (or same-quality resources) and transmission on the worst of days is necessary to maintain business case
- » **Holdback: a MW value for potential delivery** on identified hours of need of the operating day
- » **Energy Delivery Obligations: a MW value for a specific hour, counterparty, delivery point**



KEY INTEROPERABILITY CONCEPTS ON THE WRAP OPERATIONS PROGRAM

- » WRAP Ops calculations and obligations **are simply a MW value** – *they are entirely agnostic to participant (or market) decision-making about what resources are actually used to serve energy obligations*
- » WRAP **obligations include uncertainty** in both day-ahead and real-time
- » WRAP obligations **can only be reduced** from day-ahead to operating day obligations
 - Energy not obligated on operating day can be marketed as Participant sees fit
- » **WRAP will set obligations prior to the day-ahead and real-time markets running** – participants and markets will be able to ensure markets observe these obligations

INTEROPERABILITY PRINCIPLES – *DRAFT*

The Western Resource Adequacy Program (WRAP) has always embraced an objective of compatibility with existing and future western organized market, including those being developed and operated by CAISO and SPP.

The WRAP will continue to support the development and evolution of these western organized markets and the ongoing ability for WRAP participants to participate in such markets, while ensuring that the reliability and economic benefits of WRAP are maintained or enhanced.

INTEROPERABILITY PRINCIPLES – *DRAFT*

To achieve the interoperability of WRAP and western organized markets, western organized markets should:

1. Be designed such that they do not interfere with or preclude participation in the WRAP.
2. Respect the governance framework and decision-making of the WRAP.
3. Preserve the diversity and investment cost savings derived from participation in the WRAP.
4. Preserve the supply priority and OATT transmission priority of WRAP forward showing supply to meet WRAP obligations.
5. Preserve the delivery of diversity benefits (holdback and energy) in the operational timeframe from one WRAP participant to another, including from WRAP participants in one organized market to WRAP participants in another or no organized market.
6. Seek to collaborate with WRAP to ensure compatibility and to achieve potential operational efficiencies and reliability benefits.

TRANSITION TO A BINDING PROGRAM

- » A thoughtful and deliberate transition from a non-binding RA program to a binding program is important for the WRAP's ability to maintain participation, remain viable, and ensure value to the region
- » Key principles:
 - The region greatly benefits from keeping the footprint moving forward together. The program should make reasonable efforts to accommodate any entity that desires to be part of the program
 - The program needs to ensure transition provisions generally maintain the principle of all parties providing a fair share of the region's capacity need. The program does not have the ability or intent to backstop capacity for participants unable to procure it in the market
 - Communication and coordination around the transition plan and impacts is vital.

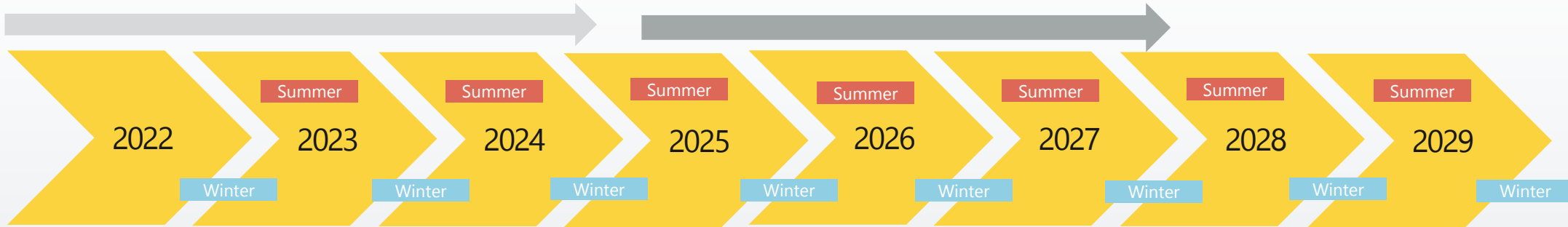
TRANSITION TIMELINE

Non-Binding Forward Showing

Winter 22-23, Summer 23, Winter 23-24, Summer 24, Winter 24-25

Transition Seasons (Ops and FS)

Summer 25, Winter 25-26, Summer 26, Winter 26-27, Summer 27, Winter 27-28



Non-Binding Operations Program

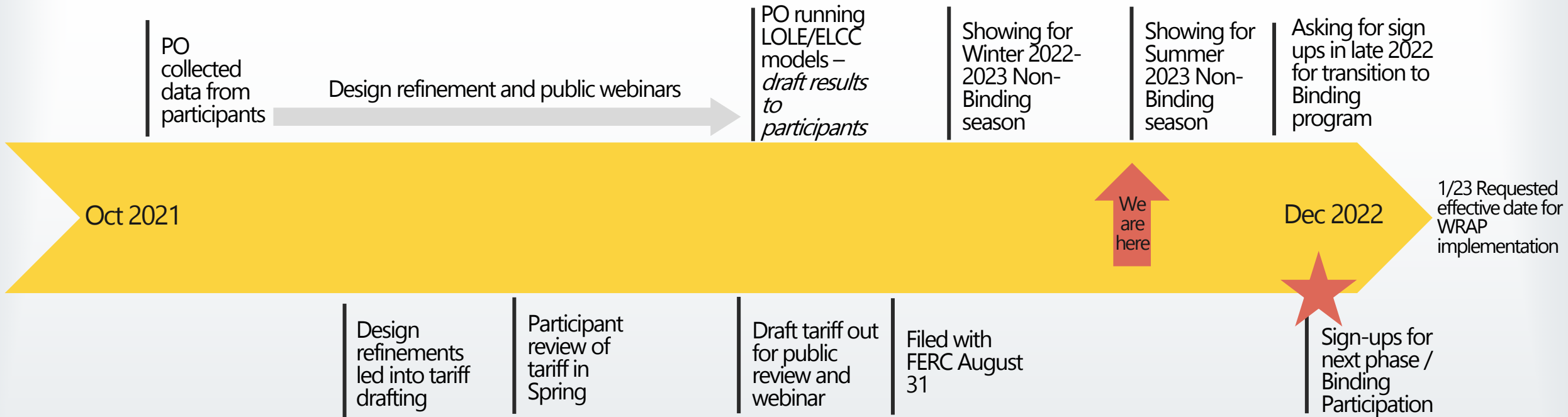
Summer 23 (trial – will include testing scenarios), Winter 23-24, Summer 24, Winter 24-25

Binding Program Without Transition Provisions

Summer 28 and all seasons following

CURRENT PHASE ACTIVITIES

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



THANK YOU

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*For general inquiries or to be added to our mailing list:
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