



# Grid West

## RRG Update Report

*Layer 1 Draft – Last Updated on November 1, 2004*

*As posted November 9, 2004*

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Page 1

- Introduction
- TSLG Assignment
- Design Overview

# Introduction Status

Activity	Feb '04	Mar '04	Apr '04	May '04	Jun '04	Jul '04	Aug '04	Sep '04	Oct '04
Project Start	Feb 23 ★								
RFQ Issued		Mar 12 ★							
Module 1 Report				May 14 ★					
Structure Group Begins Work						Jul 1 ★			
Cost Drivers						Jul 15 ★			
Seminar on Modules 2, 3, & 4									Oct 14 ★
Seminar Follow-up Webcast									Oct 25 ★

### ***A number of transmission challenges have been identified:***

- Difficulty managing unscheduled electricity flows over transmission lines leading to increased risks to electric system reliability due to unexpected real-time operational requirements;
- Lack of clear responsibility and incentives for planning and implementing transmission system expansion, which may lead to inadequate transmission capacity;
- Inability to monitor wholesale electricity markets, identify market power abuse or provide mitigation and accountability;
- Difficulty in reconciling physical available transmission capacity with that available on a contractual basis, resulting in inefficient utilization of existing transmission and generation capacity;
- Transaction and rate pancaking, i.e. contracting, scheduling, and paying for the fixed costs of multiple transmission segments on a volumetric basis to complete a power sale, resulting in inefficient utilization of generation; and
- Competitive advantage of vertically integrated transmission owning utilities over competing generation owners causing inefficient utilization of generation and potentially a proliferation of control areas and greater operational complexity.

Source: "Regional Representatives Group, Regional Transmission Problems and Opportunities List", August 14, 2003.



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### ***Solutions to these problems must also meet a challenging set of regional conditions:***

- Existing Transmission Rights – Grid West needs to maintain existing transmission rights whether arising from contracts or from native load service obligations.
- Scheduling Flexibility - Participants currently have the ability, under their contractual rights, to update some of their schedules up to 20 minutes prior to the Operating Hour (without financial consequences).
- Hydroelectric System Complexity
  - Opportunity cost-based dispatch, affected by non-power constraints
  - Hydro operations have consequence, either immediately or in the future
  - Marginal hydro is used for regulation and load-following while thermal tends to be base loaded

***Given the current transmission conditions and challenges, several “burning questions” exist:***

- Is the Beginning State feasible? Can it stand alone and is it adaptable?
- Will it free up additional transmission capacity?
- Can the Beginning State create new opportunities and preserve existing rights?
- Will the Beginning State lower the cost of supplying imbalance energy and reserves?
- Will Grid West participants benefit from regional coordination?

- Introduction
- TSLG Assignment
- Design Overview

### ***The principles that guided the Platform Group's work were:***

1. The proposed Beginning State should be a clear improvement over the existing situation and respond to the problems and opportunities identified by the RRG.
2. Each stage of the proposal should be workable in itself. The stages should not create significant new problems at the same time they try to address old ones.
3. Each stage should allow further evolution of solutions to remaining problems, as well as changes in circumstances, with some indication of the expected direction of that evolution today, and subject to review of the desirability of moving forward. Stages should not become obstacles to further steps that the region supports.

***The TSLG was assigned the task of developing a conceptual market design to confirm the feasibility of the platform group proposal:***

- A layered approach – “broad rather than deep”
- Divided work into logical parts - five modules:
  - Module 1 – Transmission Service (Previously discussed)
  - Module 2 – Transmission Rights Administration
  - Module 3 – Scheduling, Operations, and Settlement
  - Module 4 – Reserves
  - Module 5 – Cost Estimate (Future Layer)
- Also included an analysis of cost drivers of RTOs/ISOs

# TSLG Assignment

## Key Definitions

***The following terms are used throughout the Beginning State design:***

- **Geographic Area** – The portions of the provinces of Alberta and British Columbia and the states of Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming that are electrically within the Western Interconnection, together with any additional geographic territory within the state of California that is encompassed by the control areas of the Bonneville Power Administration, PacifiCorp, and Sierra Pacific Power Company.
- **GWF (Grid West Footprint)** – Those portions of the Grid West Geographic Area encompassed by the Control Areas of Transmission Owners have executed a Transmission Agreement with Grid West. (see Grid West Managed Transmission System)
- **Member** – An individual or an entity that has chosen to become a member of the Grid West corporation under the terms of its bylaws, which confer rights and impose obligations on those who choose to become members, in particular the right to participate in member voting processes. Members vote (by class) to choose the Member Representative Committee (MRC). The MRC in turn has the power to elect and remove Trustees.



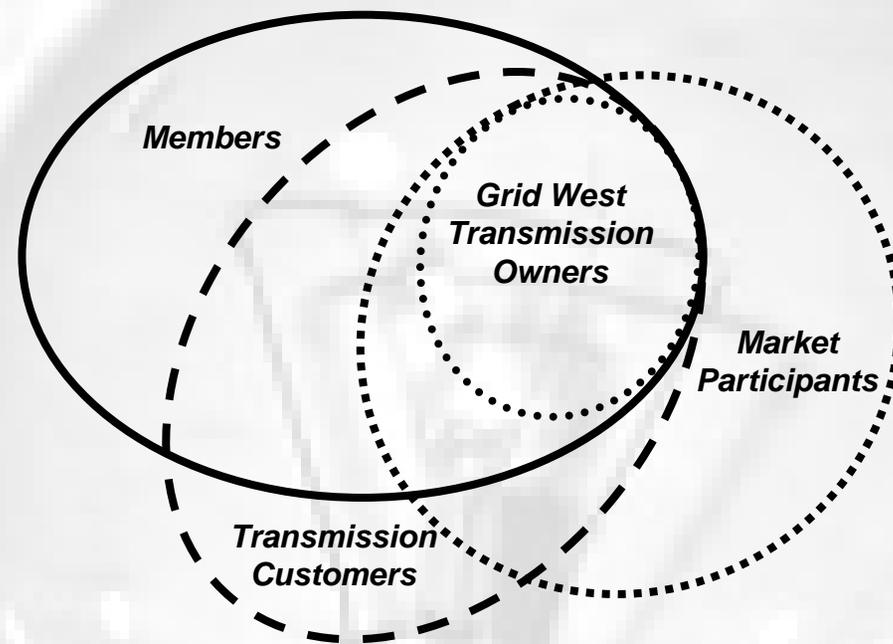
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Page 10  
November 1, 2004



**Grid West**

**Figure 1**  
**Relationship Diagram**



# TSLG Assignment

## *Key Definitions*

***The following terms are used throughout the Beginning State design:***

- **AFC (Available Flowgate Capacity)** – Uncommitted capacity on a flowgate (a line or set of lines with a combined rating, i.e. a “rated system path”). The committed capacity is the sum of the flow components calculated using power utilization factors (also called power distribution factors or generation shift factors) applied to committed injection-withdrawal rights.
- **Bid** – The submission of a request to purchase at or below a given price.
- **Offer** – A request to sell at or above a given price.
- **CCA (Consolidated Control Area)** – A voluntary consolidation of electric power systems bounded by interconnection (tie-line) metering and telemetry. It controls generation to maintain its interchange schedule with other control areas and contributes to frequency regulation of the interconnection, with operational services provided by Grid West.

# TSLG Assignment

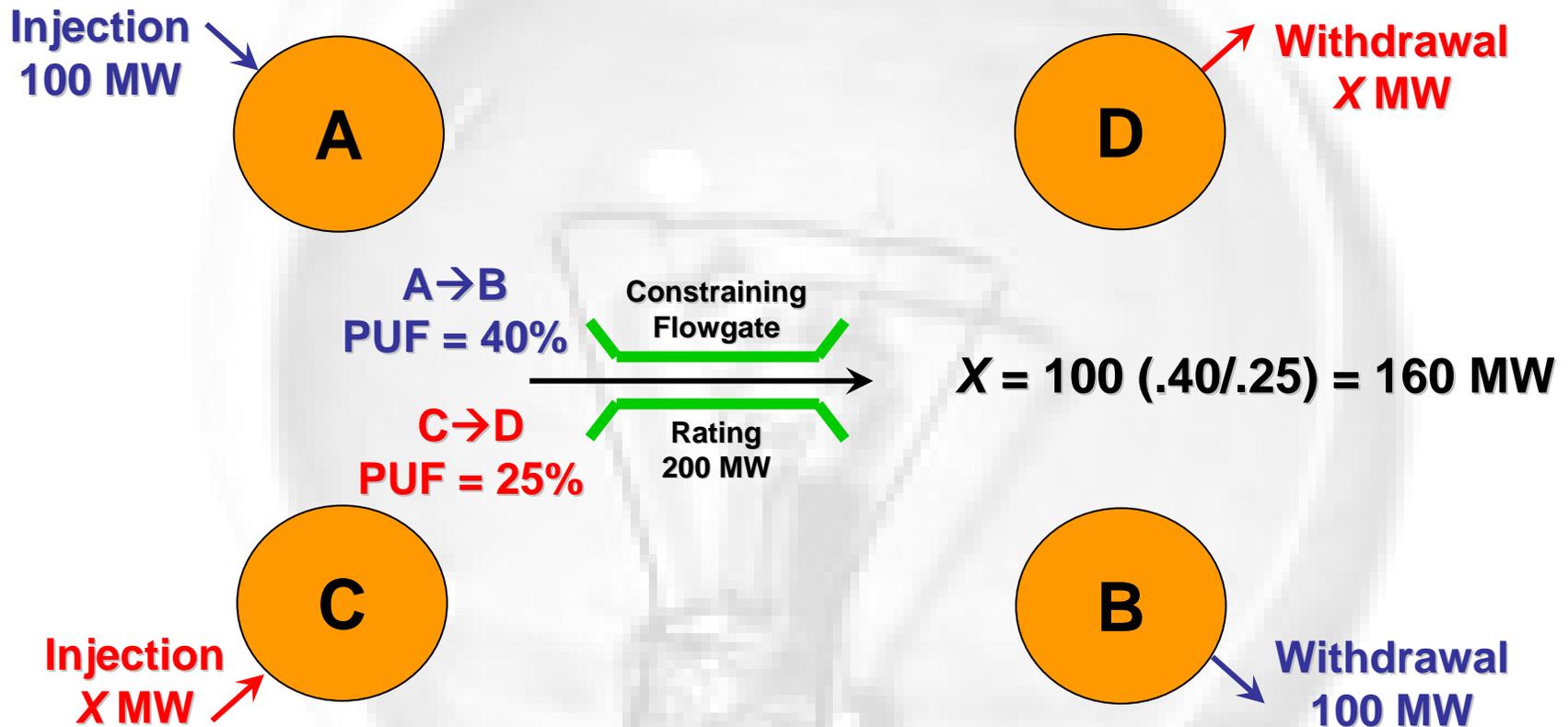
## *Key Definitions*

***The following terms are used throughout the Beginning State design:***

- **Inc/Dec (Incremental and Decremental) Offers** – Offers submitted in either a Day-Ahead Redispatch Market or a Real-Time Energy Market to indicate willingness to increase (inc) or decrease (dec) a resource output for a given offer price.
- **IWR (Injection-Withdrawal Right)** – The right to submit a day-ahead Injection-Withdrawal Schedule.
- **RCS (Reconfiguration Service)** – A Grid West transmission rights service that provides for acquisition of IWRs either from AFC or from transmission rights released by sellers, through annual, monthly, intra-monthly auctions and daily auctions.

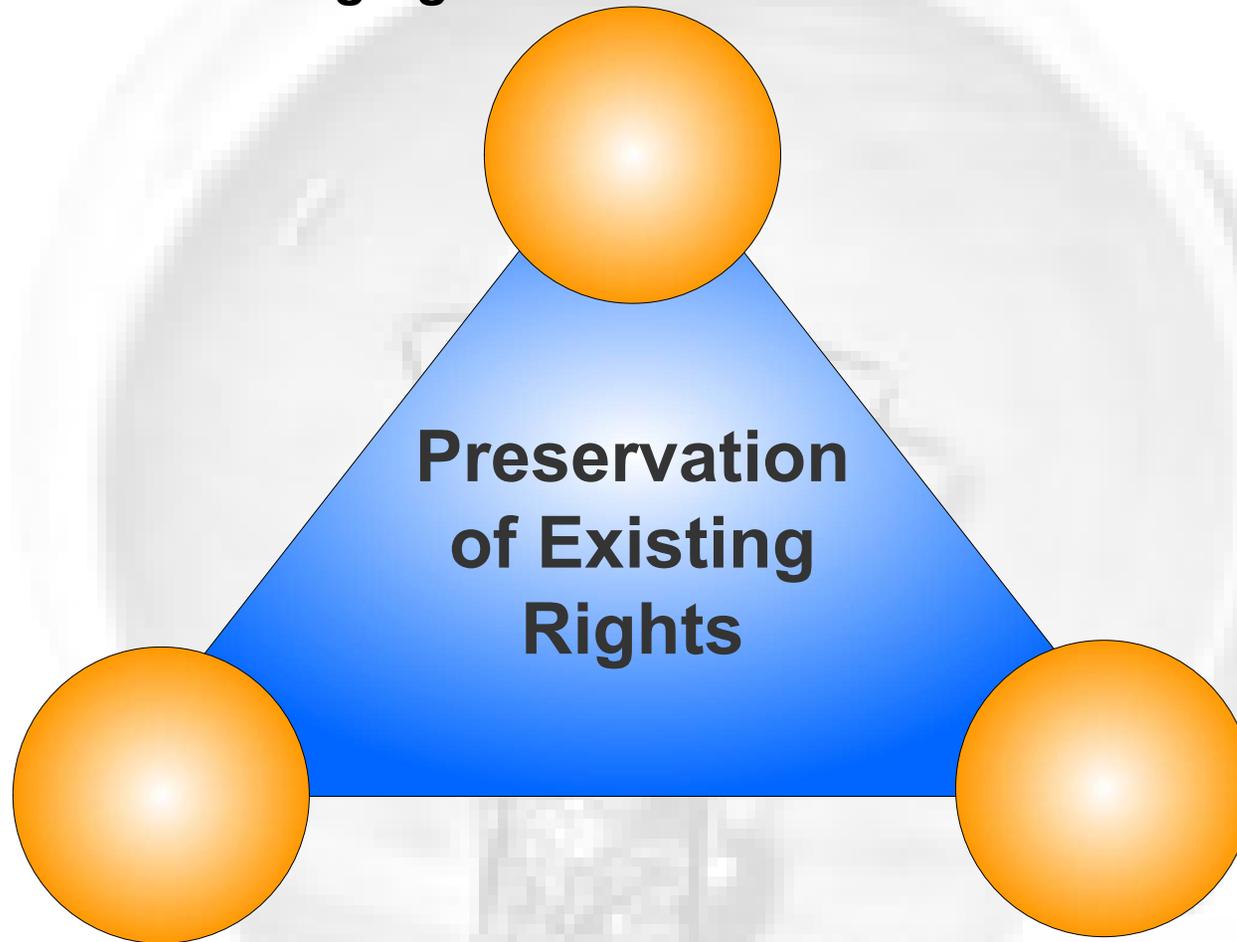
# TSLG Assignment Reconfiguration Example

If  $A \rightarrow B$  is offered (released) into the Reconfiguration Market, how many IWRs can be made available from  $C \rightarrow D$ ?



- Introduction
- TSLG Assignment
- Design Overview

***The number one principle of the Beginning State design is the preservation of existing rights:***



### ***The Regional Proposal contains the following design boundaries....***

- Participants submit balanced schedules
- Control area consolidation is voluntary
- Existing functionality must be maintained unless better alternatives can be presented
- Existing Rights can be voluntarily traded through the Regional transmission reconfiguration services
- All region-wide markets are voluntary

# Design Overview

## *Consolidated Control Area Assumptions*

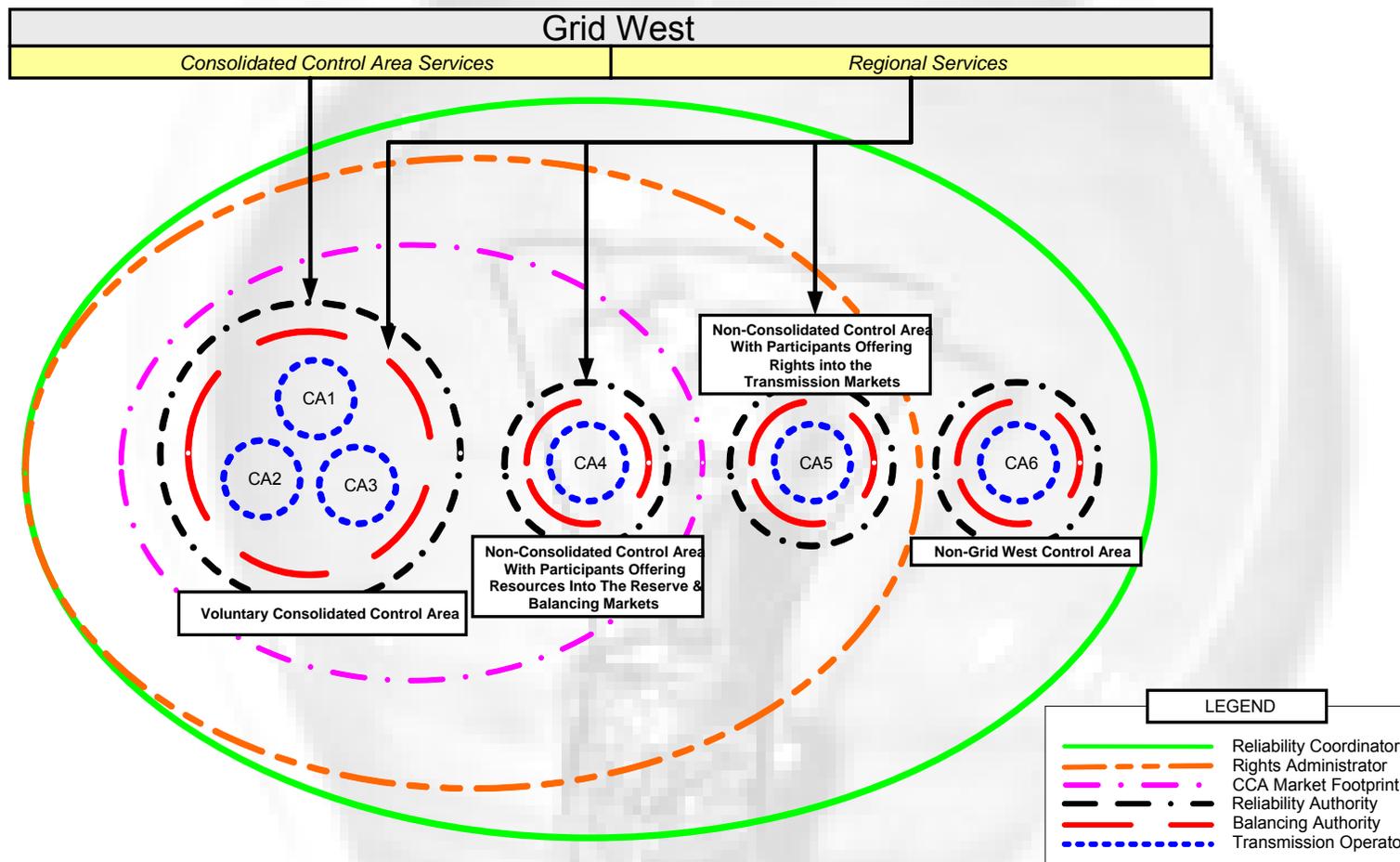
***However, the Regional Proposal provides little detail regarding the Consolidated Control Area. So what can we assume at this point?***

- Control areas may decide to voluntarily consolidate (we assume that at least two will do so)
- Grid West will provide both regional and Consolidated Control Area (CCA) service
- Certain services (e.g. Reserves Market, Real-Time Energy Services, etc.) in the Beginning State will be provided to the Consolidated Control Area only
- Where possible, resources located within non-consolidated control areas can voluntarily offer to sell into the markets that were formed for the CCA
- Grid West will act as both the Reliability Authority and Balancing Authority for the CCA within the overall perspective of the PNSC, whose function may be enhanced in the future
- Control Areas that choose not to consolidate will serve as the Balancing Authority of their areas
- The division of duties for the Reliability Authority role between the PNSC, Grid West, and the control areas is yet to be resolved

# Design Overview

## The RRG Services Model

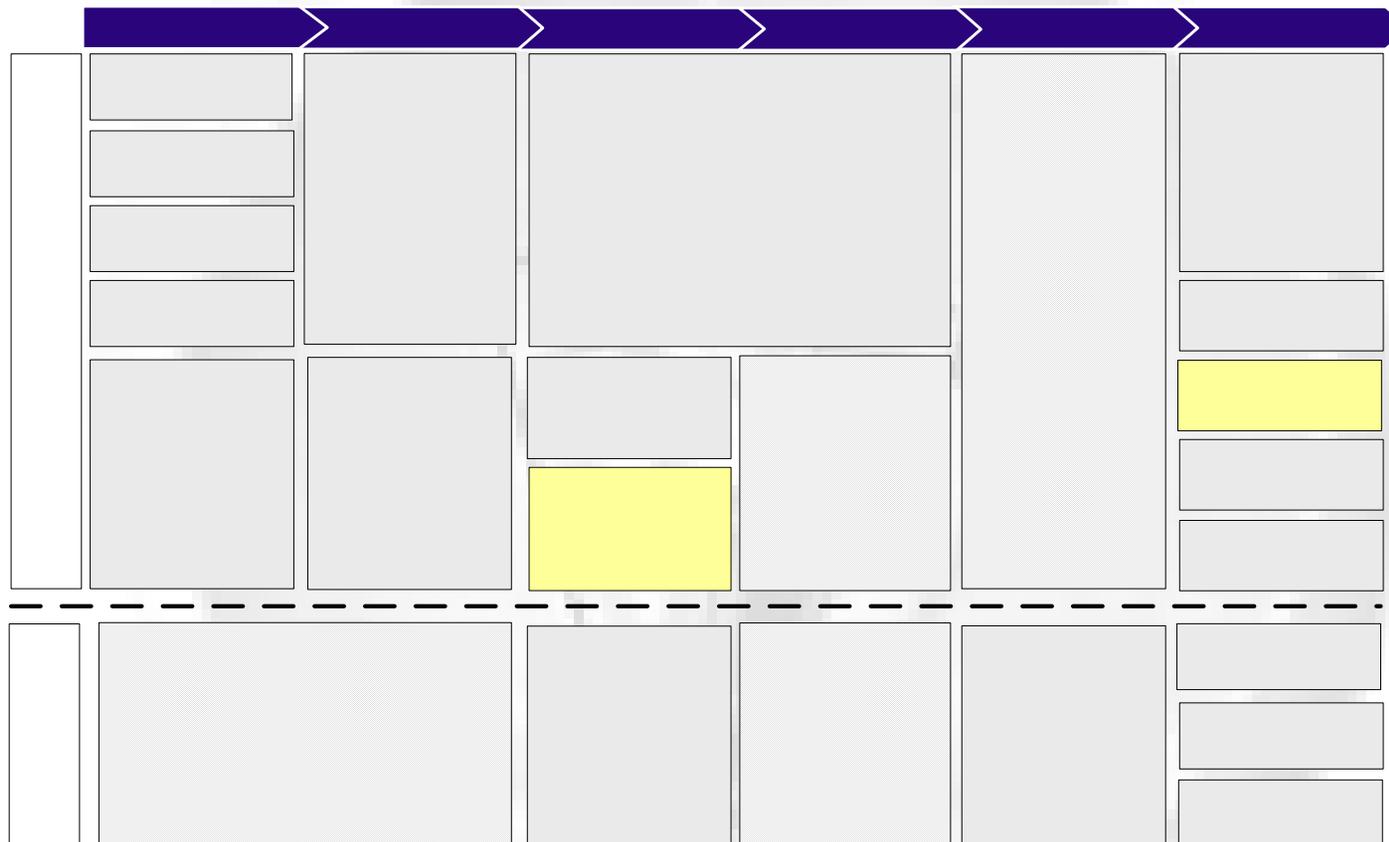
**The following RRG Service Model defines the Grid West services that are to be provided to the Consolidated Control Area and the non-Consolidated Control Areas.**



# Design Overview

## Grid West Functions

**Given the services that are to be provided region wide and on a consolidated control area basis, we developed a high-level functional framework for Grid West:**

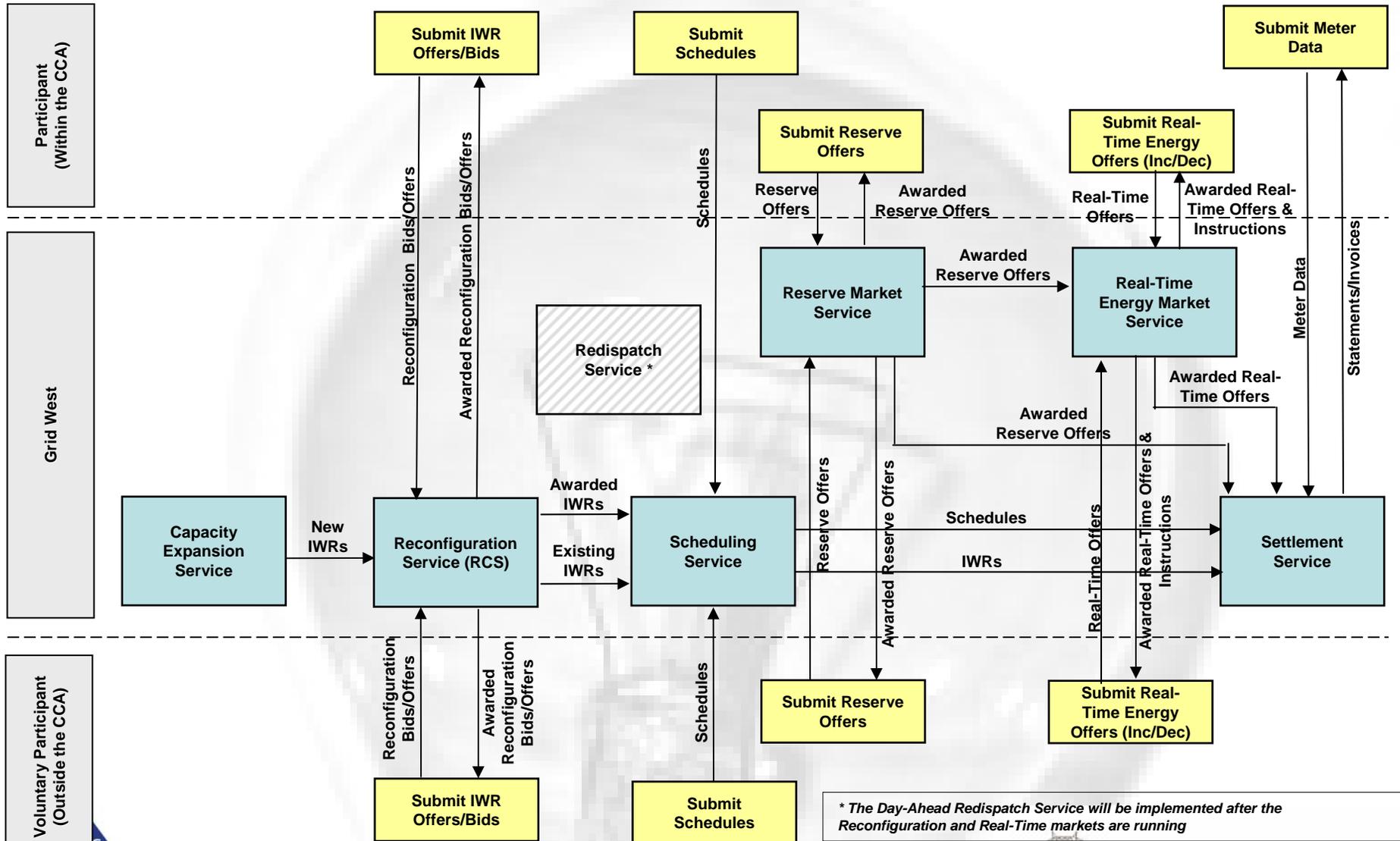


### ***The TSLG looked at the feasibility of a Day-Ahead Redispatch service given the identified design boundaries:***

- The RRG Proposal envisioned a region-wide day-ahead Redispatch Service.
- Some participants currently have the right to adjust their schedules up to 20 minutes prior to the Operating Hour without financial consequence.
- The value of a Day-Ahead redispatch market is greatly reduced if it is not accompanied by a financial and/or a physical commitment.
- The desire to maintain scheduling flexibility and the need for a day-ahead financial commitment are competing interests that led to the current sequencing approach.
- Participants can buy/sell transmission rights in the Day-Ahead reconfiguration market.
- Resources are re-dispatched as a part of the Real-Time Energy Market within the Consolidated Control Area

# Design Overview

## High-Level Business Process



\* The Day-Ahead Redispatch Service will be implemented after the Reconfiguration and Real-Time markets are running

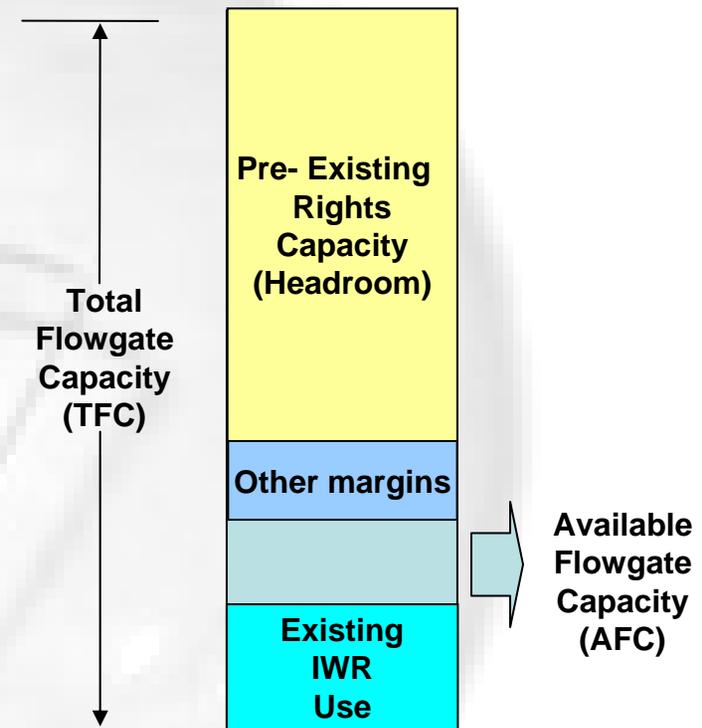


# Design Overview

## Residual Capacity Release

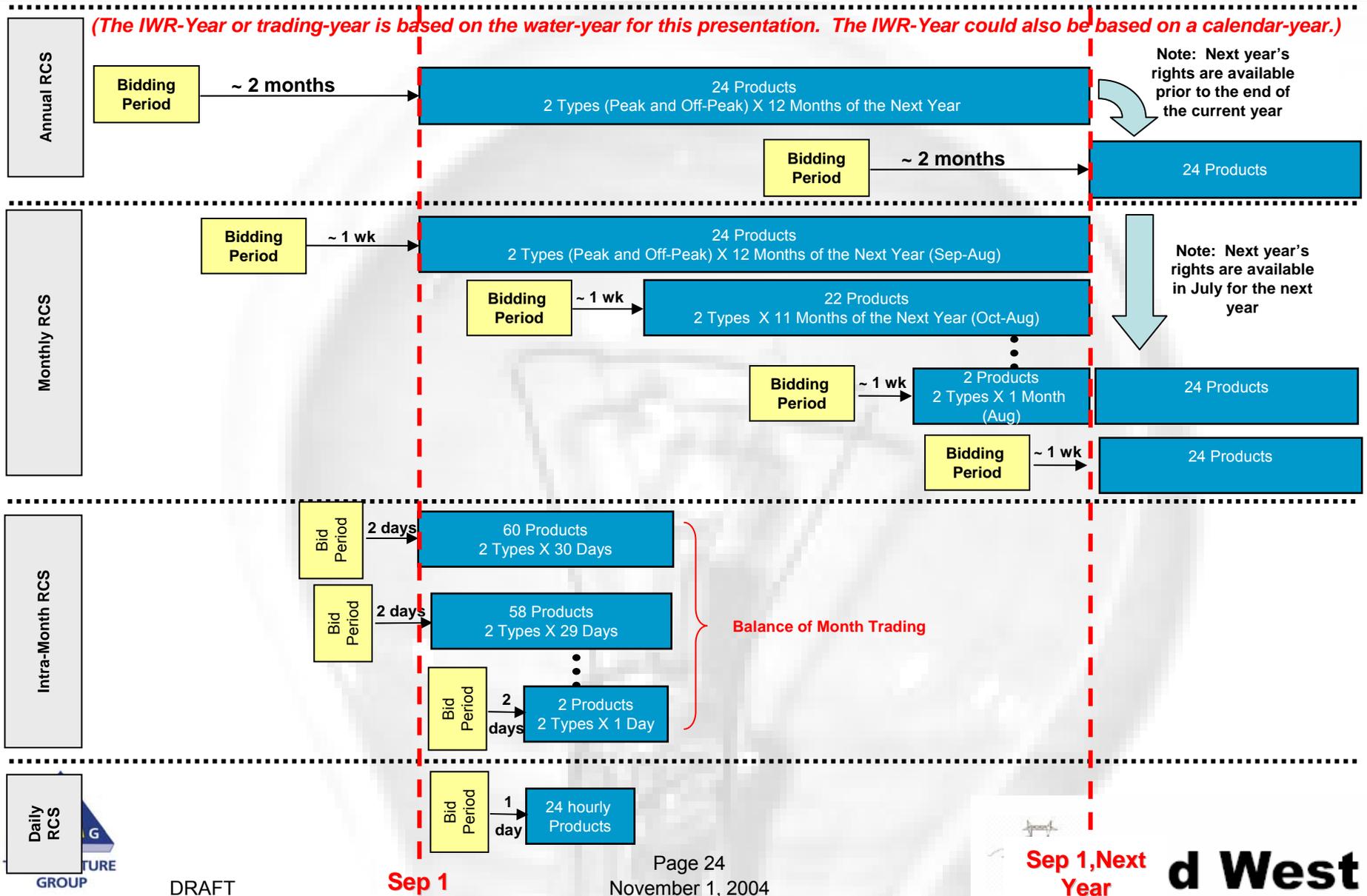
***The Reconfiguration Service should result in the release of additional flowgate capacity:***

- Available Flowgate Capacity, along with offered IWRs, is made available to meet a request by IWRs buyers
- Grid West may have the discretion of the percentage of the residual capacity to be offered in auction markets
- The payments received for release of residual capacity (i.e., AFC) is used to reduce R3A



# Design Overview

## Proposed Auction Timeline and Products



# Design Overview Review

**The following matrix summarizes the Beginning State design for Transmission Rights Administration:**

Description	Current Practice	Proposed Change	Opportunities/ Value
<b>Capacity Planning &amp; Transmission Expansion</b>	<ul style="list-style-type: none"> <li>Performed on a CA basis.</li> <li>Limited Regional coordination.</li> </ul>	<ul style="list-style-type: none"> <li>Performed on a region-wide basis.</li> </ul>	<ul style="list-style-type: none"> <li>Regional coordination.</li> <li>New IWRs based on capacity expansion providing region-wide benefits and incentives.</li> </ul>
<b>Existing Transmission Rights</b>	<ul style="list-style-type: none"> <li>Rights provide scheduling priority.</li> <li>Scheduling rules allow adjustment of some schedules up to 20 minutes prior to the Operating Hour without financial consequences.</li> </ul>	<ul style="list-style-type: none"> <li>No change required.</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance of existing physical rights.</li> </ul>
<b>Reconfiguration Service</b>	<ul style="list-style-type: none"> <li>Decentralized bilateral markets for existing transmission rights.</li> </ul>	<ul style="list-style-type: none"> <li>Multiple voluntary centralized reconfiguration auctions that allow rights to be acquired based on existing rights as well as available flowgate capacity</li> <li>Bilateral market based on existing or awarded rights could readily co-exist</li> </ul>	<ul style="list-style-type: none"> <li>New market for participants to buy/sell existing transmission rights.</li> <li>Release of additional flowgate capacity.</li> <li>One-to-one trade is no longer required.</li> <li>Additional revenue applied towards R3A and the reduction of existing rate bases.</li> </ul>
<b>Transition Plan</b>	<ul style="list-style-type: none"> <li>Transmission Providers will confirm the existing rights contracts.</li> <li>Lack of Independence.</li> </ul>	<ul style="list-style-type: none"> <li>Grid West will use an inventory to confirm rights and implement direct scheduling (within 2 years).</li> </ul>	<ul style="list-style-type: none"> <li>Transparency to all users.</li> </ul>

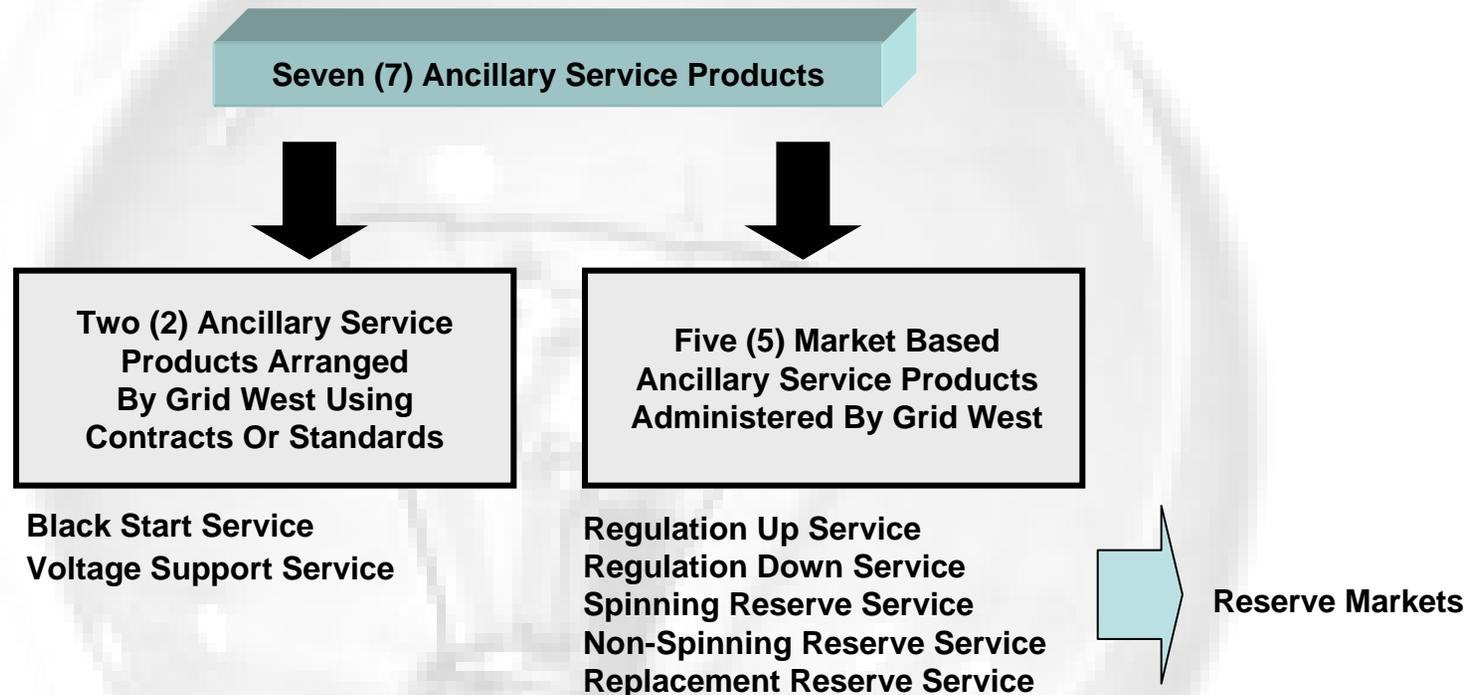
### ***The Beginning State Scheduling discussion assumes the following:***

- Participants submit balanced schedules
- E-Tags not required for schedules within the CCA
- Grid West will perform check-out for the CCA and with other control areas
- Grid West will calculate and control Net Scheduled Interchange for the CCA and coordinate the implementation with non-CCA

# Design Overview

## Ancillary Services Products

**Ancillary Services are necessary to support the reliable transmission of energy. Some services will be procured through the market and others will be contract based:**



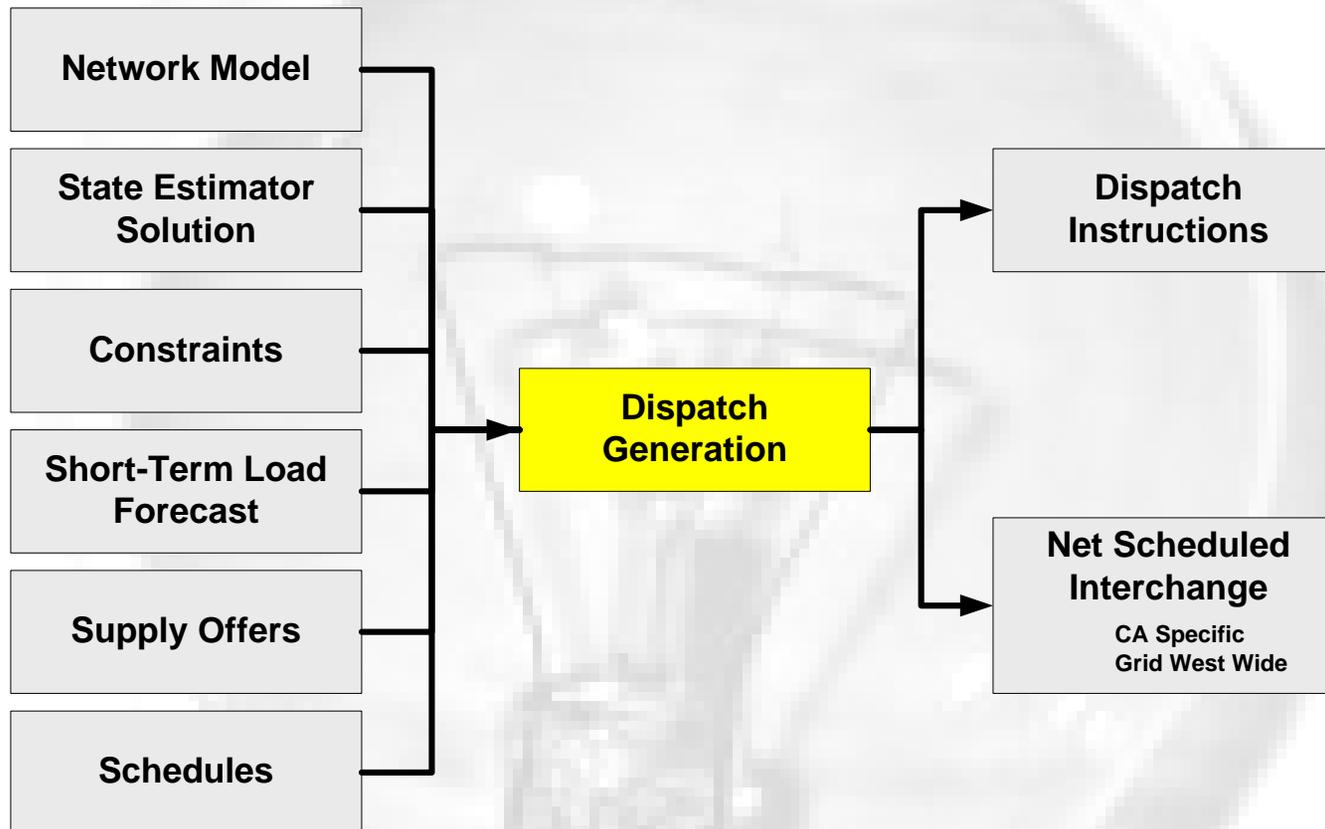
\* Note: If Grid West enters into Reliability Must Run (RMR) agreements, they may be used as a source for Ancillary Services



# Design Overview

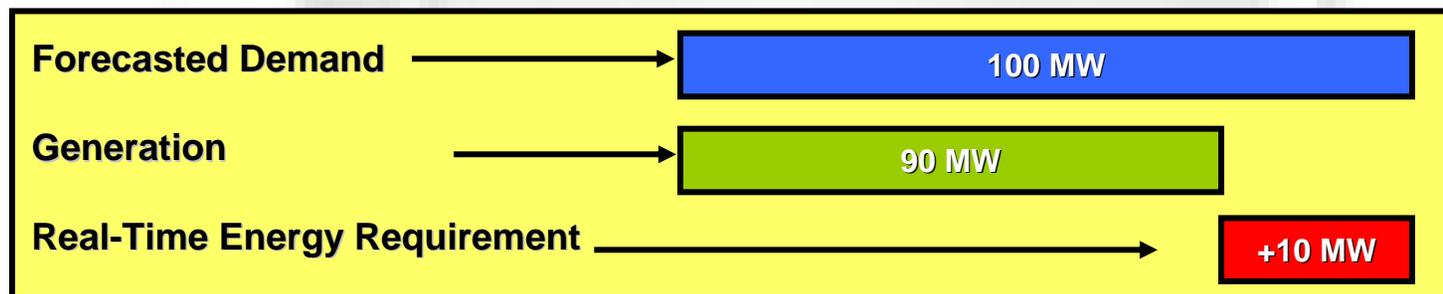
## Real-Time Energy Inputs/Outputs

**The Real-Time Energy Market includes the following inputs and outputs:**



***Grid West will award Real-Time offers in response to energy imbalance...***

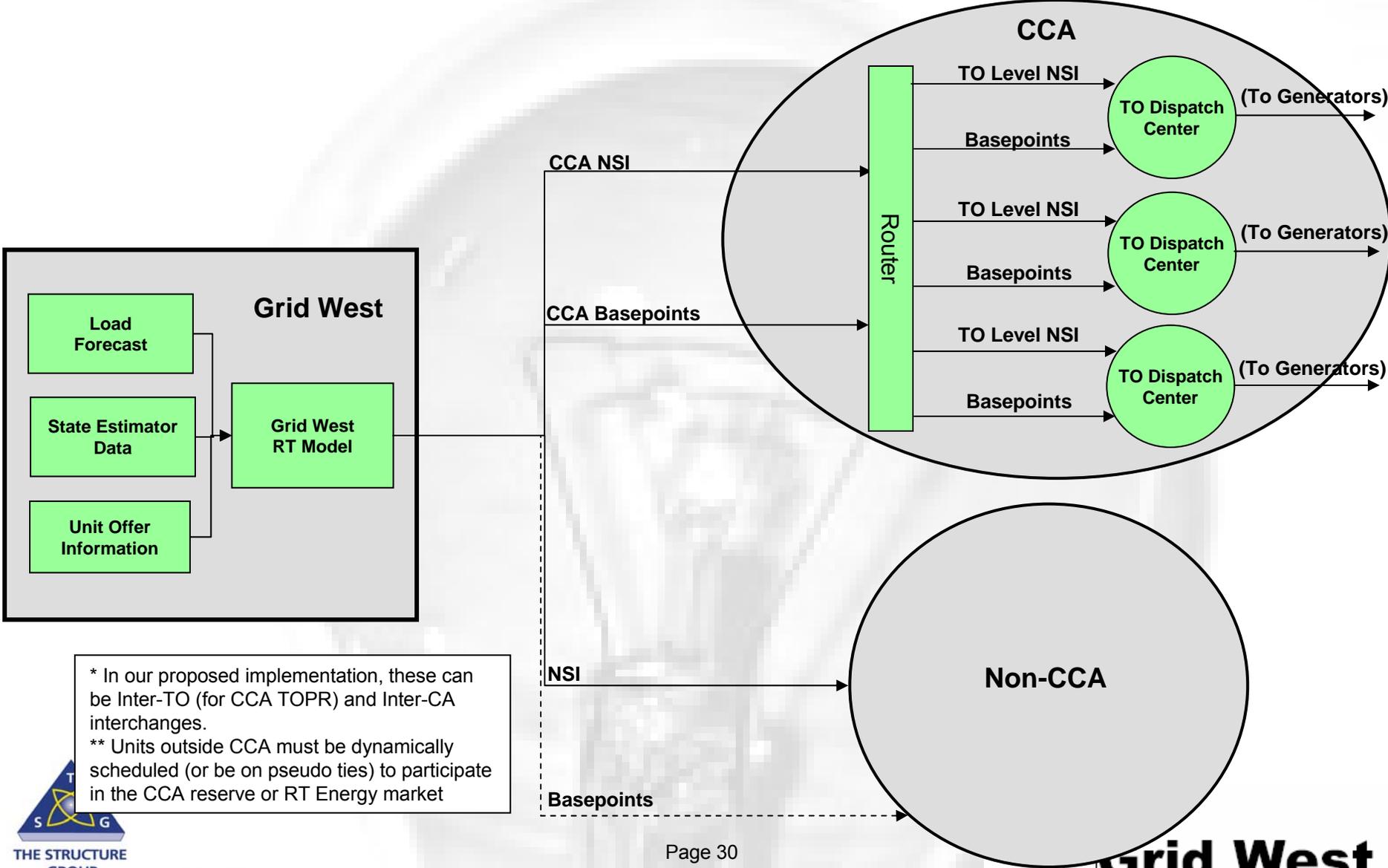
For any given 'n' Minute period:



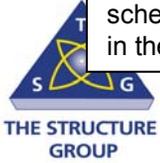
***However, Grid West will ALSO use Real-Time Offers (Incs/Decs) to relieve congestion AND/OR to produce a least-cost redispatch solution...***

# Design Overview

## Grid West Dispatch Process Flow



\* In our proposed implementation, these can be Inter-TO (for CCA TOPR) and Inter-CA interchanges.  
 \*\* Units outside CCA must be dynamically scheduled (or be on pseudo ties) to participate in the CCA reserve or RT Energy market



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