

Congestion Revenue Rights



Agenda

Topics:

- I. Background of Congestion Hedging (TCRs) in Zonal**
- II. Changes in Congestion Hedging (CRRs) in Nodal**
 - A. CRR Market Trial Events (timeline, activities)
 - B. CRR Go-Live Events
- III. Available Resources, Documentation, Sources**

Objectives

Using the information in this presentation you will be able to:

- Identify differences between TCR and CRR markets
- Describe scheduled CRR Market Trial activities
- Describe go-live transition events
- Identify training opportunities
- Identify location of other CRR resources



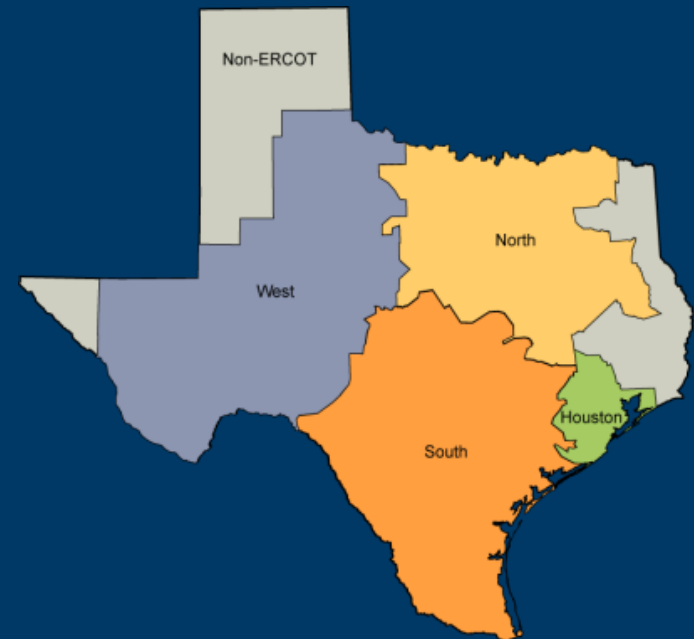
Stretch Objectives

At the end of this presentation you will be able to:

- 1. Identify the differences between the TCR market and the CRR market.**
 1. While upside down.
 2. Underwater.
 3. On Neptune.
- 2. Identify the training opportunities available for learning about CRRs.**
 1. While juggling 4 chainsaws.
- 3. Recite from memory the scheduled CRR Market Trial activities.**
 1. Backwards.
 2. In Morse Code.
- 4. Write a detailed 15 page essay discussing the go-live transition between the TCR market and the CRR market and its relation to world peace.**
- 5. Identify the location of further CRR resources.**
 1. Then recreate them in their entirety.
 2. In Sanskrit.



Zonal Overview



Zonal Overview

Key Differences

	Zonal Market	Nodal Market
Hedging Instruments	Flowgate Rights (5)	<ul style="list-style-type: none">•Point-to-Point Options (1000s)•Point-to-Point Obligations (1000s)•Possible Flowgate Rights
Hedging Approach	Complicated	More straight-forward

Transmission Congestion Rights

- TCRs have been active in ERCOT since 2002
- Annual/Monthly timetable
 - Allocated and Auctioned Annually
 - Auctioned Monthly

Zonal Overview

2009 Zonal Market: 5 CSCs

W N N W N S S N N H

TCR – Flowgate Right that entitles you to the *Shadow Price* of a CSC if it becomes binding.

Shadow Price

- How much \$ ERCOT would save in the balancing market if the CSC limit were 1MW higher.



Determine how much power flows on each CSC.

- Generator in North, Load in South, 100MW
- This contract is not hedged by 100MW N → S
- Most power flows N → S
 - Some power flows N → H
 - Some power flows N → W

Conclusion:

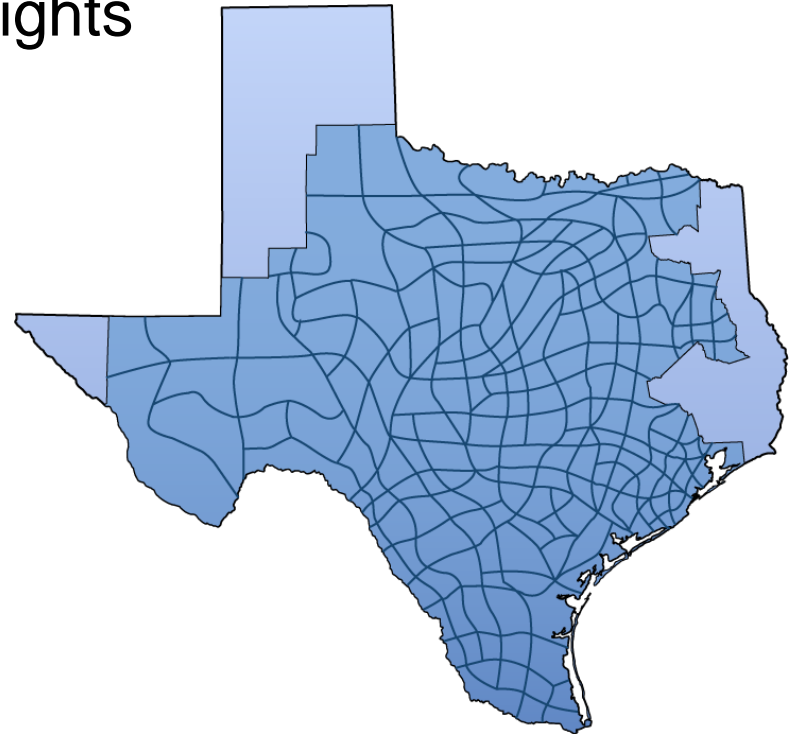
- Would need to buy some combination of N → S, N → W, N → H to properly hedge that contract

Nodal Overview

Nodal Overview

Topics in this overview:

- Types of Congestion Revenue Rights
- Obtaining CRRs
 - Auctions
 - Allocations



Congestion Revenue Rights

Types of Congestion Revenue Rights

Point-to-Point (PTP) Congestion Revenue Rights

- Designated point of injection (source) and point of withdrawal (sink)
- Settlement price related to LMP diff. between Source & Sink
- If flowing power from source to sink causes power to go on a binding constraint, that constraint shadow price will affect clearing price/settlement price

Flowgate Rights

- No active flowgates to be implemented in Nodal

Congestion Revenue Rights

Types of PTP CRRs

	PTP Obligations	PTP Options
Target Payment	$\left(\text{MW}_{\text{Owned}} \right) \times \left(\text{Sink}_{\text{Price}} - \text{Source}_{\text{Price}} \right)$	$\left(\text{MW}_{\text{Owned}} \right) \times \text{Max} \left(0, \text{Sink}_{\text{Price}} - \text{Source}_{\text{Price}} \right)$
Clearing Price	Can be negative	Only non-negative clearing price
Credit Impact	Takes up more space in credit limit constraint in the CRR optimization	

Congestion Revenue Rights

Primary Methods of Obtaining CRRs

Auctions	Allocations
<ul style="list-style-type: none">• Annually• Monthly• Balance of Year	<ul style="list-style-type: none">• Annually• Standard Monthly• Special Monthly• Balance of Year

Bilateral Trading:

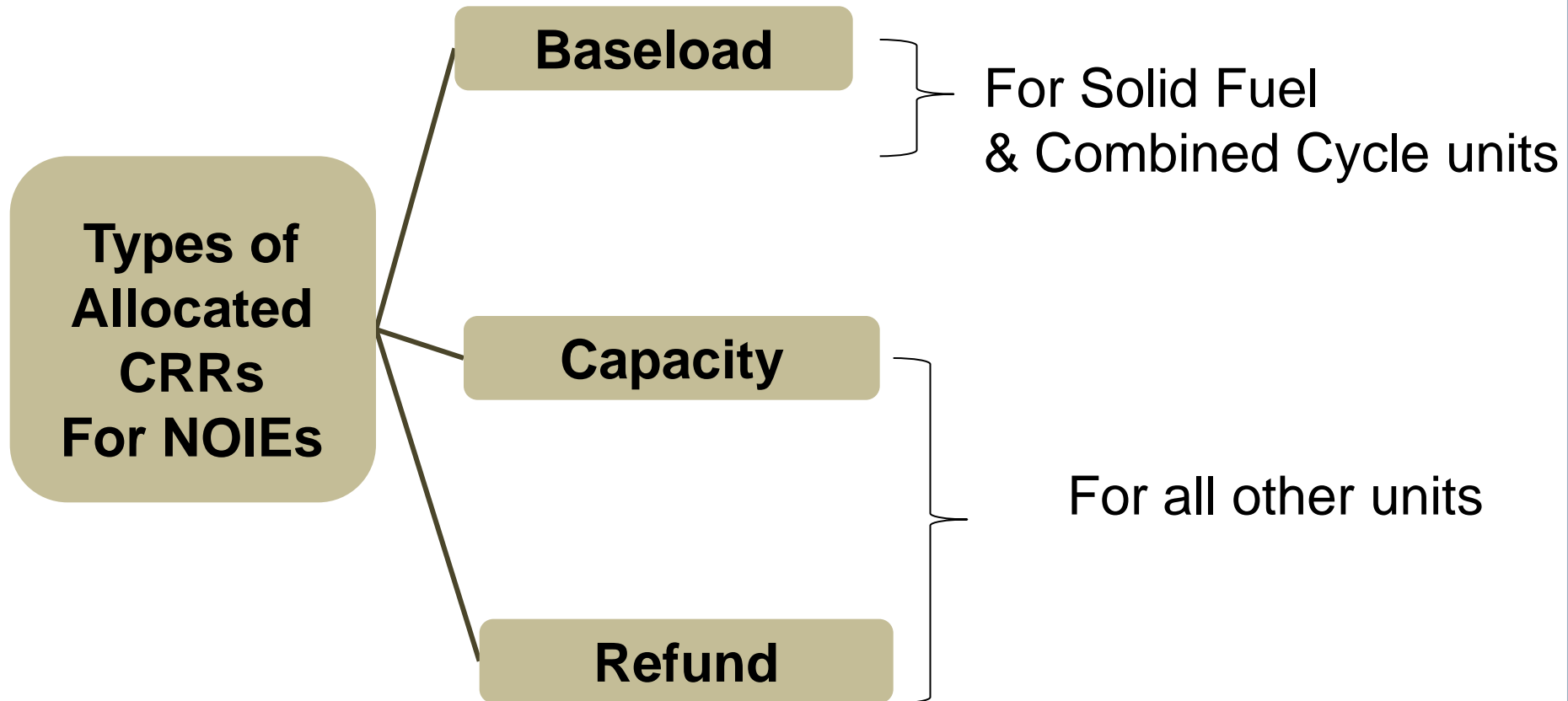
CRR MPs can register bilateral trades in the CRR system
(after CRR Auction Payment confirmation)

Congestion Revenue Rights

CRR Allocations for NOIEs only

	Period	Requires NOIE Activity
Annual Allocation	2 calendar years	Yes
Standard Monthly Allocation	1 month	No (Allocate previously requested but not allocated amounts)
Special Monthly Allocation	1 month	Yes
Balance of Year Allocation	7 months (balance of year after 6 monthly auctions)	Yes

Congestion Revenue Rights



Congestion Revenue Rights

Types of Allocated CRRs for NOIEs

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graph LR; A[Types of Allocated CRRs for NOIEs] --- B[Baseload]; A --- C[Capacity]; A --- D[Refund]; B --- B1[Up to 100% of grandfathered contract/plant capacity]; B --- B2[Options cost 10%]; B --- B3[Obligations cost 5%]; C --- C1[Limited to 40% of calendar year MW-hrs]; C --- C2[Options cost 15-20% depending on unit type]; C --- C3[Obligations cost 7.5-10%]; D --- D1[Settled at lesser of awarded qty. or CRR/output schedule]; D --- D2[Purchase price = $0]; D --- D3[Not tradeable in CRR Auctions];
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Baseload

- Up to 100% of grandfathered contract/plant capacity
- Options cost 10%
- Obligations cost 5%

Capacity

- Limited to 40% of calendar year MW-hrs
- Options cost 15-20% depending on unit type
- Obligations cost 7.5-10%

Refund

- Settled at lesser of awarded qty. or CRR/output schedule
- Purchase price = \$0
- Not tradeable in CRR Auctions



Example of matching CRR with a contract

- Generator = Big Coal, Load/delivery point in South Load Zone (LZ_South), 100MW
- This contract is hedged by 100MW Source = Big Coal, Sink = LZ_South (PtPObligation/Option CRR)
- Hedging contracts is conceptually simpler with CRRs than TCRs

Congestion Revenue Rights

CRR Auctions

	Period	Network Capacity
Annual Auction	2 calendar years	55% of capacity for year 1 15% of capacity for year 2
Monthly Auction	1 month	90% capacity
Balance * of Year Auction	7 months (balance of year after 6 monthly auctions)	55% capacity

*Occurs once, several months after Nodal Go-Live

Congestion Revenue Rights

Network Capacity if no PCRRs:

- Basically the line rating in the model is “reduced” to the percent being auctioned.
- So for 100MVA line,
 - 15 auctioned off two years into future
 - Up to 55 available in annual (less the sales of up to 15 from previous auction), and
 - Up to 90 available in the monthly (less the previous sold qty of up to 55 in previous auctions)

Note that previous sales/allocations can be offered in by other CRRAs.

Congestion Revenue Rights

Network Capacity if PCRRs:

- Example, 180MVA line with 80 PCRRs allocated
- PCRRs get 100% of their allocation staged in as:
 - Annual auction-
 - Line is reduced to (assuming Year 1 of annual Auction) $0.55 \times 180 = 99$,
 - but $.55 \times 80 = 44$ of the capacity is consumed by the PCRR,
 - So only 55 is up for sale

Congestion Revenue Rights

Network Capacity if PCRRs:

- Same example, 180MVA line with 80MVA PCRRs allocated
 - Monthly auction-
 - For monthly, ERCOT does not reduce the PCRR amount by the 90% scaling factor, so
 - Line is reduced to $0.90 \times 180 = 162$,
 - But $100\% \times 80 = 80$ of the capacity for PCRR
 - So only 82 is up for sale (Scaled capacity – PCRR)

Again noting that previous sales/allocation can be offered in by others

Congestion Revenue Rights

CRRs are allocated, traded or auctioned in:

- Time-of-Use Blocks (3)
- Sold in 1-month strips (ie monthly granularity)
- Linked bids respected in Annual Auction
(single times of use for contiguous mos. within calendar year)

Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
		Off-Peak (0100 – 0600)				
	Peak Weekday (0700 – 2200)				Peak Weekend (0700-2200)	
		Off-Peak (2300 – 2400)				

Congestion Revenue Rights

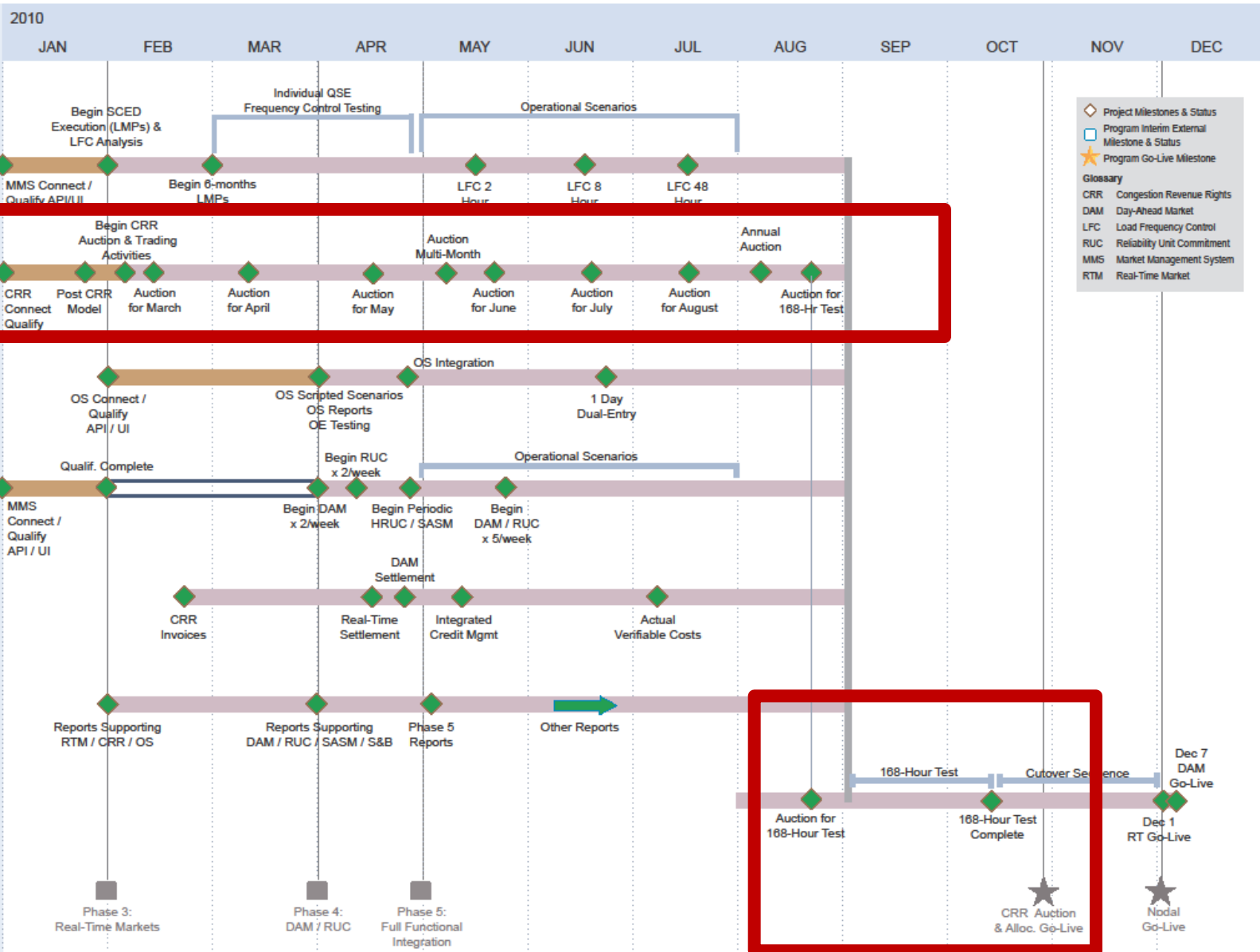
CRRs are allocated, traded or auctioned in (continued):

- Annual Auction- 7x24 can be bid, but will be awarded in 3 time-of-use pieces (may be struck for different time-of-use amounts)
- Monthly Auction- same as annual for 7x24, but time-of-use will be the same quantity
- Bilateral Trades
 - Can occur at daily granularity, and will be time of use for the day (not individual hours),
 - Also subject to ERCOT credit check

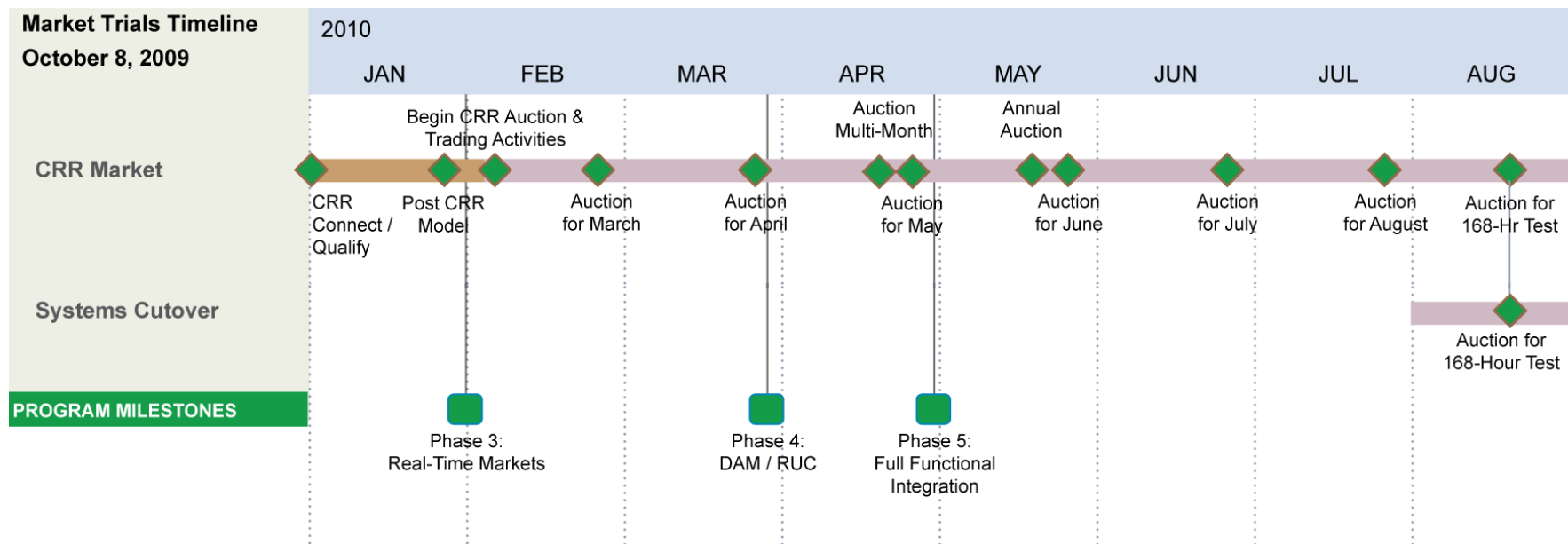
III. Overview of System Implementation

- A. CRR Market Trial Events
- B. CRR Go-Live Events

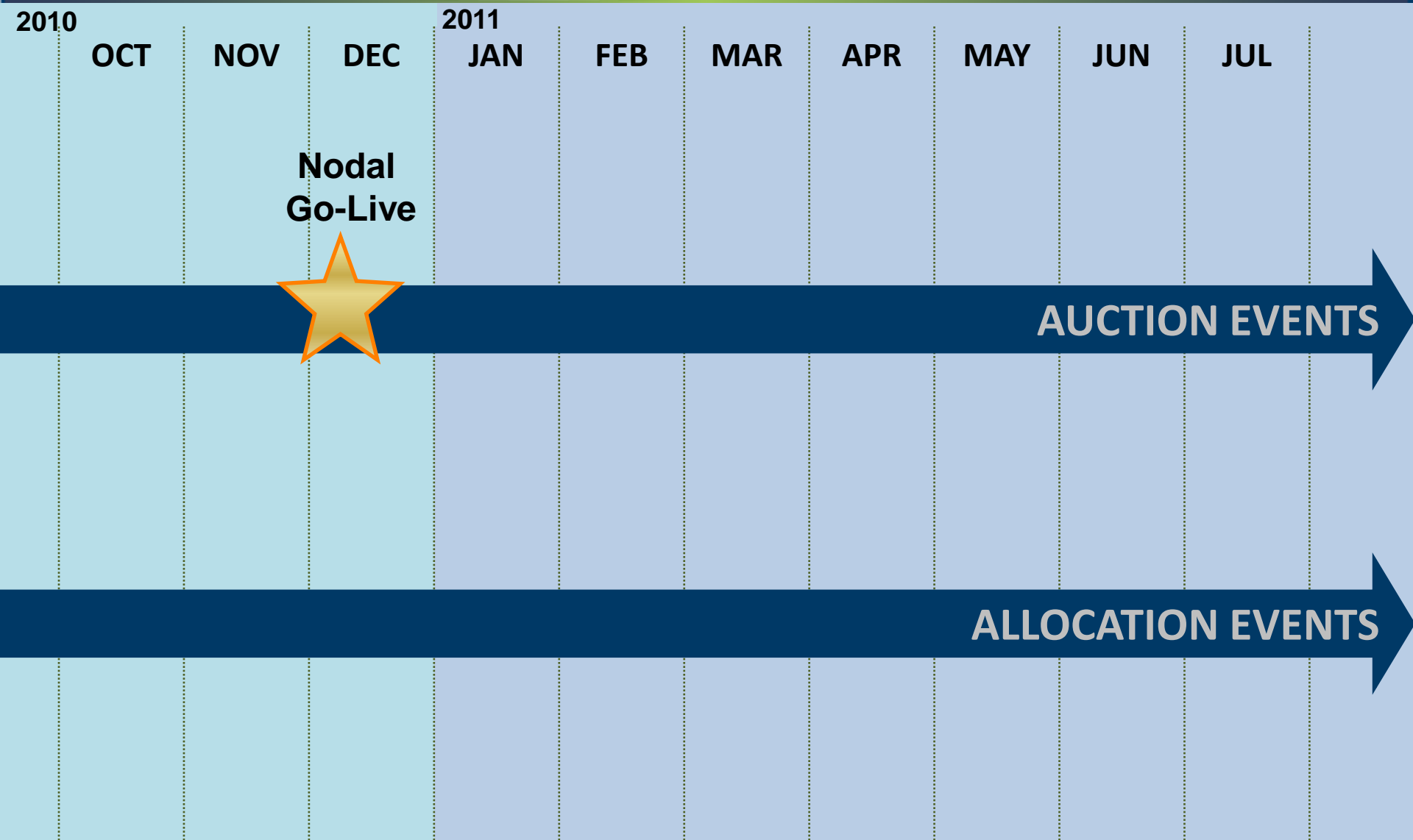
MARKET TRIALS
January 4, 2010



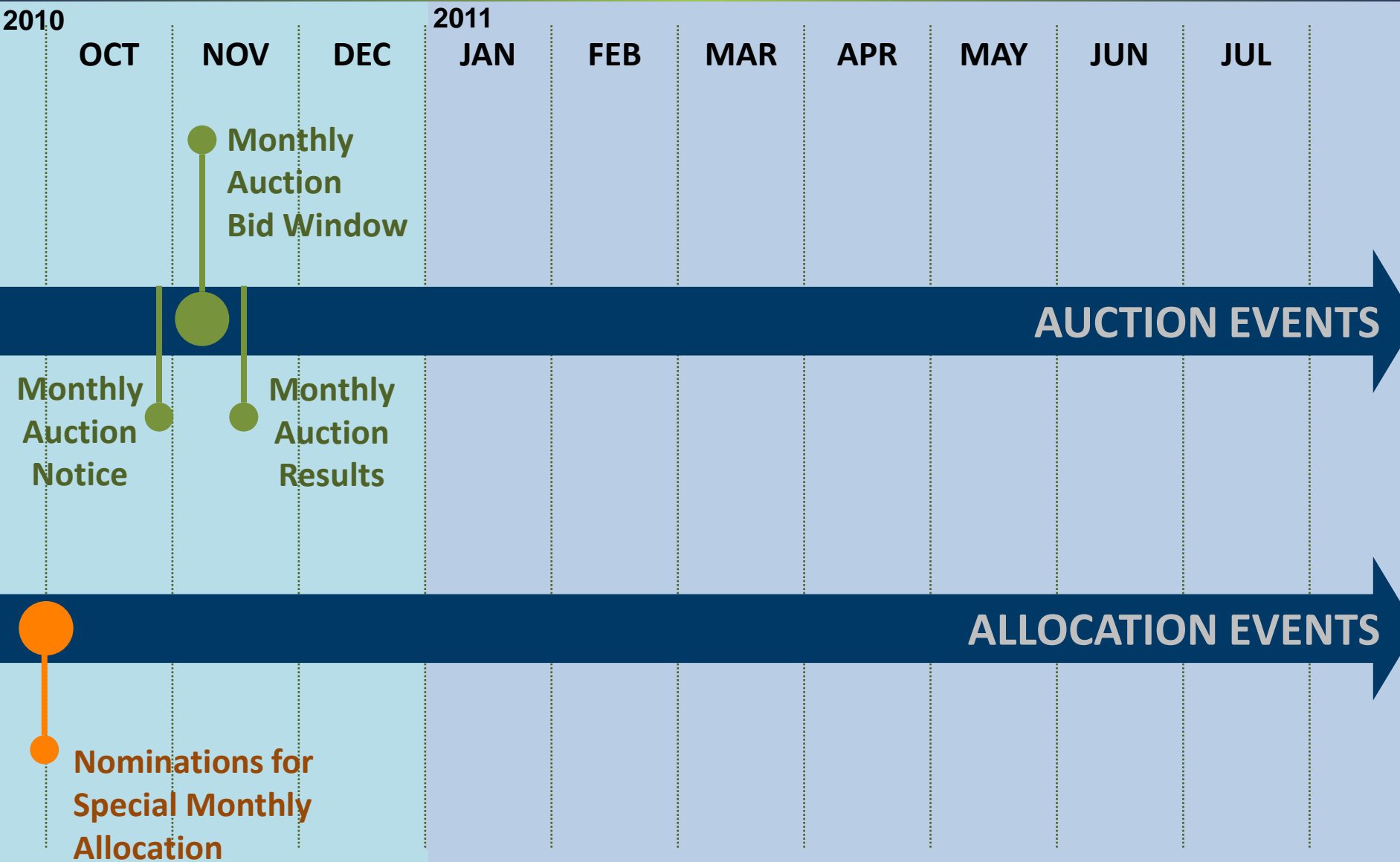
CRR Market Trials Events



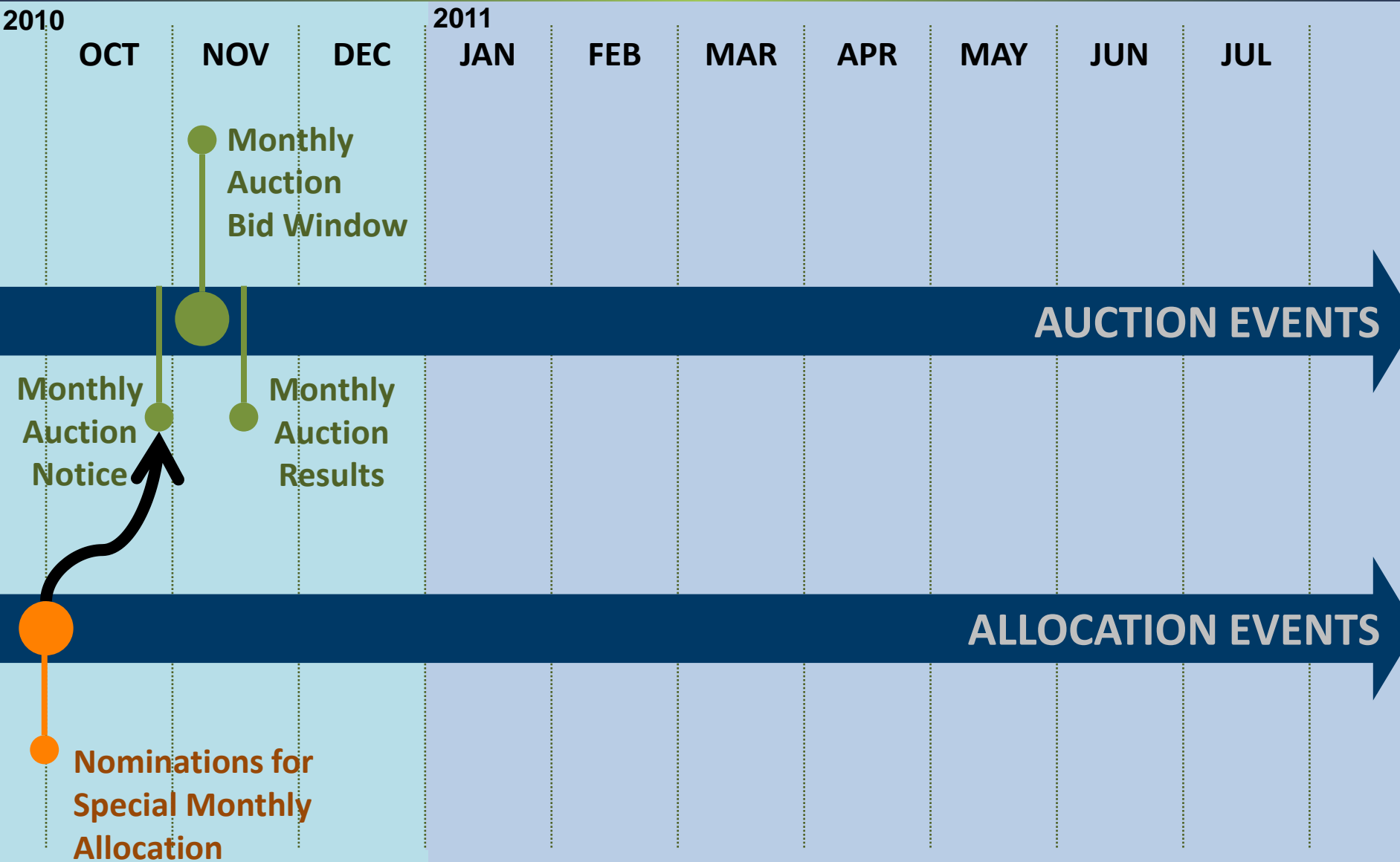
CRR Go-Live Events



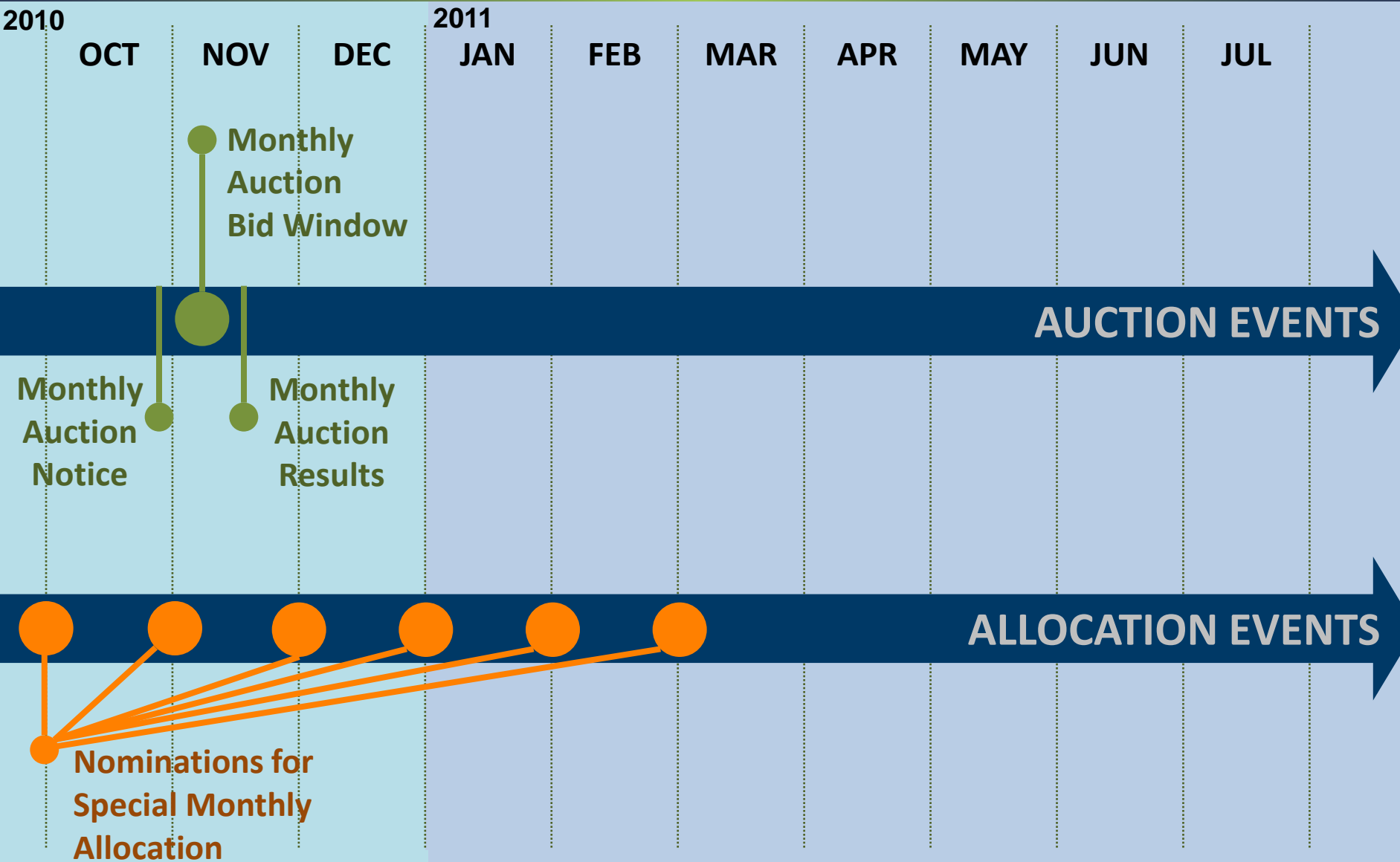
CRR Go-Live Events



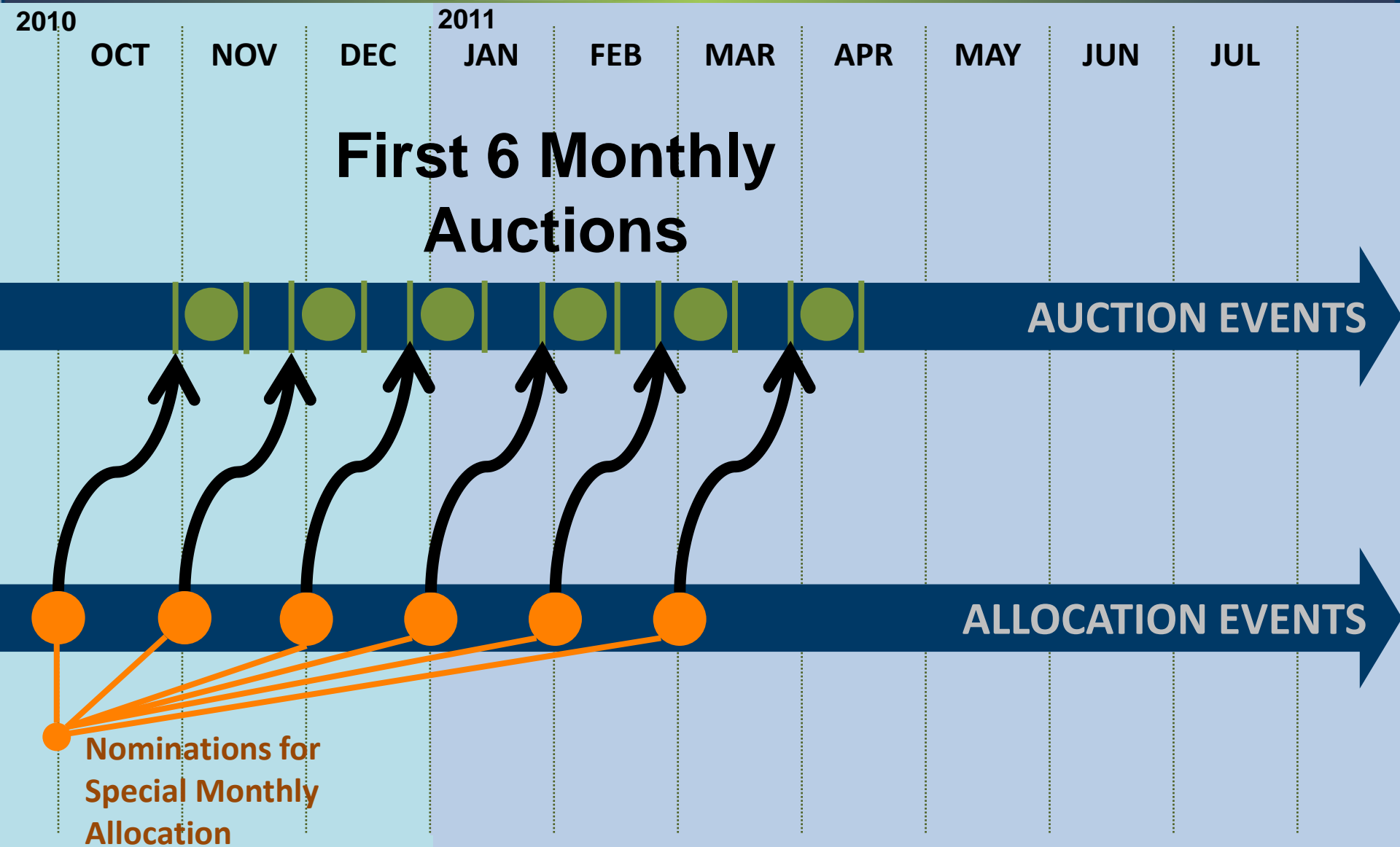
CRR Go-Live Events



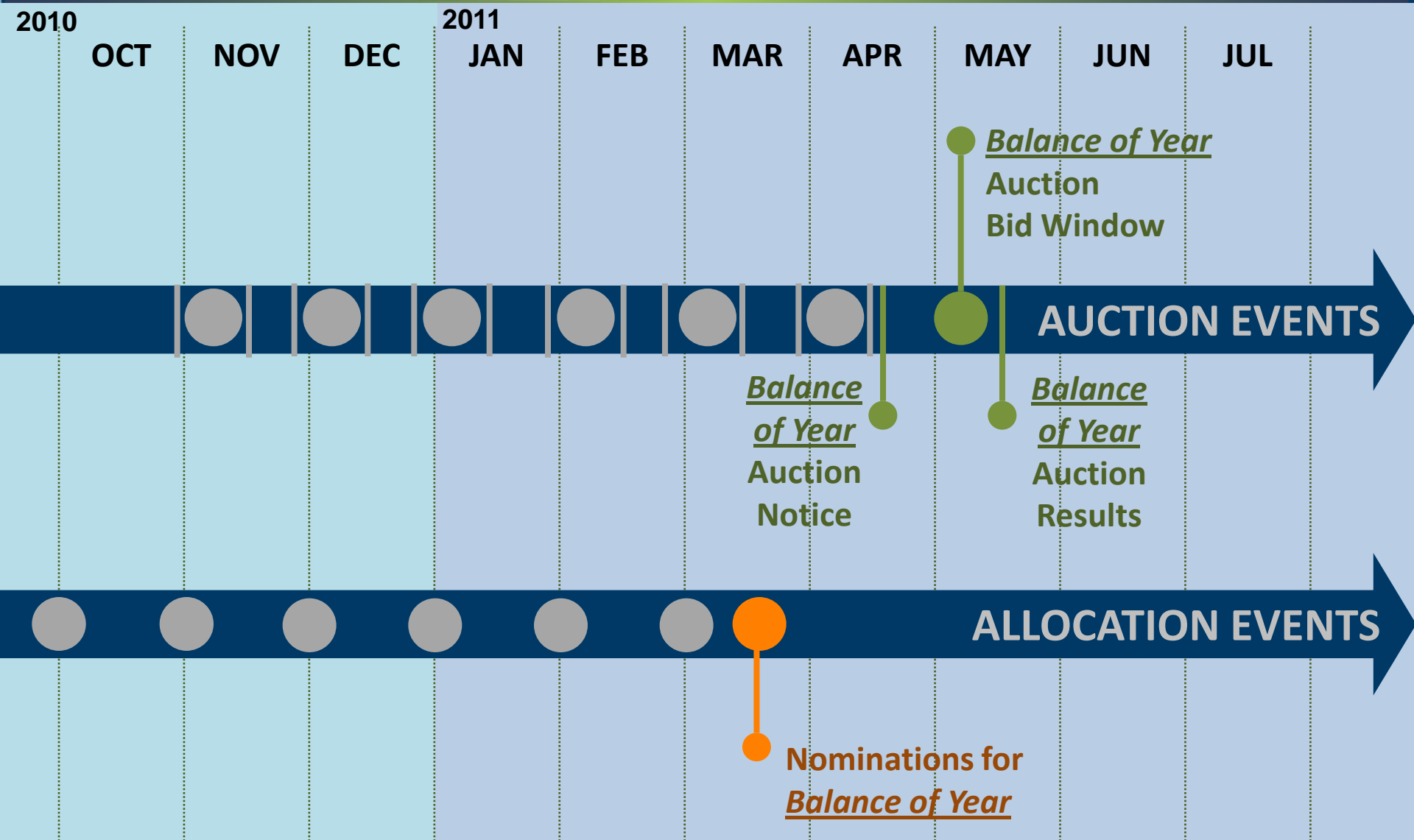
CRR Go-Live Events



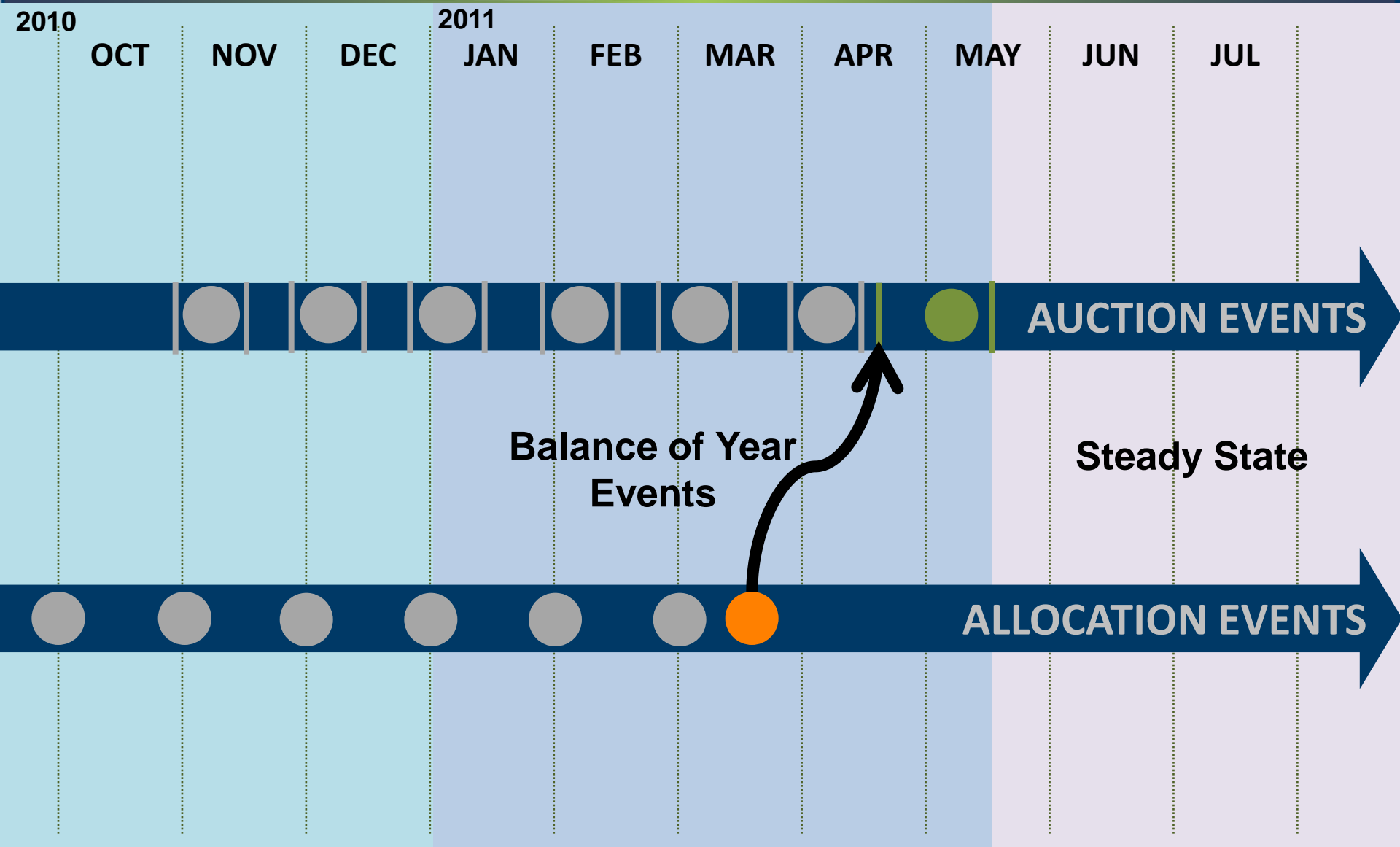
CRR Go-Live Events



CRR Go-Live Events

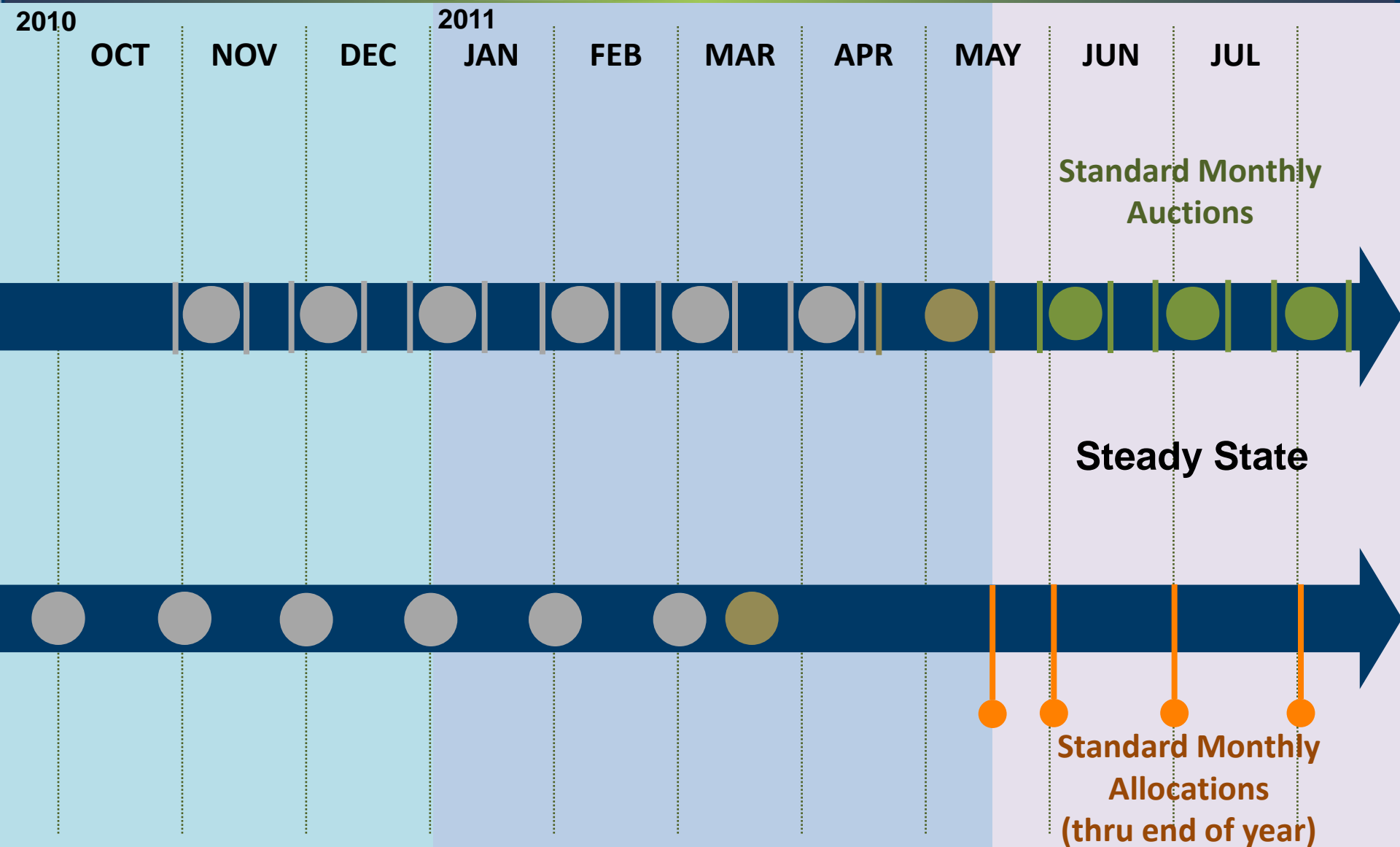


CRR Go-Live Events



CRR Go-Live Events

In September 2011 ERCOT will execute first annual auction for 2012/2013



IV. Available Resources, Documentation, Sources

CRR Courses Offered by ERCOT

Congestion Revenue Rights Course

- Discussion of basic CRR and CRR Settlement Concepts
- Online and Classroom

CRR Market User Interface Training

- Takes user on a guided tour of all the CRR application screens
- Online

Both available via ERCOT LMS

– <https://www.ercottraining.com/lms/default.asp>

Nodal Market Education Curriculum

- ERCOT Nodal 101
- ERCOT 101 for Wind Generation
- Economics of LMP
- Transition to Nodal Markets
- Basic Training Program
- Load Serving Entity 201
- Network Model Management
- *Congestion Revenue Rights*
- Transmission 101
- Generation 101
- Generation 201
- Generation 301
- Settlements 301
- NOIE QSE Operations

Nodal Market Education Website: <http://nodal.ercot.com/training/courses/index.html>

Contact: NodalTraining@ERCOT.com

Hands-On Settlements Workshops

- **Workshop 1:** *Congestion Revenue Rights Settlements*
- **Workshop 2:** Day-Ahead Market Settlements
- **Workshop 3:** Reliability Unit Commitment Settlements
- **Workshop 4:** Real-Time Settlements

2010 Workshops

Workshop Type	Date(s)	Location
RUC/RTM	February 23	Austin – MET Center
RUC/RTM	March 9	Garland - City of Garland Fire Administrator Building
Congestion Revenue Rights	March 9	Houston - Norris Conference Center
RUC/RTM	March 23	Houston - Calpine
RUC/RTM	March 29	Newark, NJ - PSEG

Available Resources, Documentation, Sources

For CRR information, see these resources:

- Nodal Protocols Section 7
- CRR Market Trials Handbook
- CRR Market Submission Interface Handbook
- TCR-CRR Transition Plan
- CRR Handbook (User Guide-future release)