DR as Operational Resource
Economic DR energy market offer process

CSTF
7/17/13

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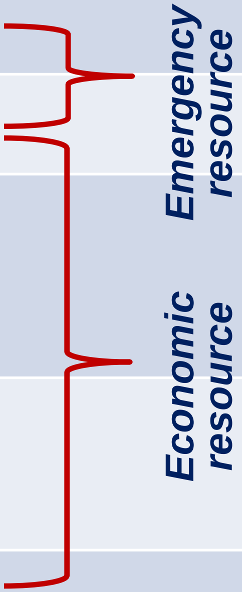
PJM Opportunity by Wholesale Service

Wholesale Service	Demand Side Response
Capacity	Yes
Energy	Yes
Day Ahead Scheduling Reserves (30 min)	Yes
Synchronized Reserves (10 min)	Yes
Regulation	Yes


Emergency resource
Economic resource

Customer decides if they want to participate as emergency and/or economic resource

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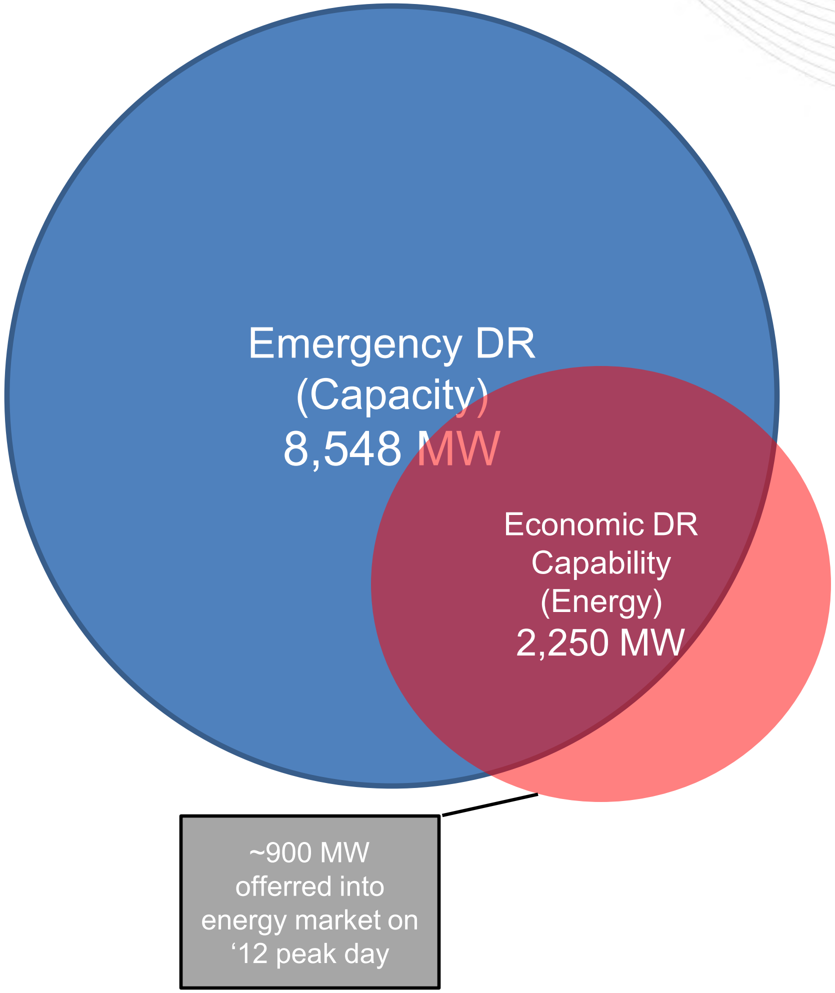
DR summary
Emergency DR participation in Energy market


Emergency DR
(Capacity)
8,548 MW
Economic DR
Capability
(Energy)
2,250 MW
~900 MW
offerred into
energy market on
'12 peak day

- ~25% of DR Capacity has Economic registration
- ~10% of DR Capacity had economic offer into energy market on peak day
- ~3% of DR capacity provided load reduction in energy market based on economics on peak day

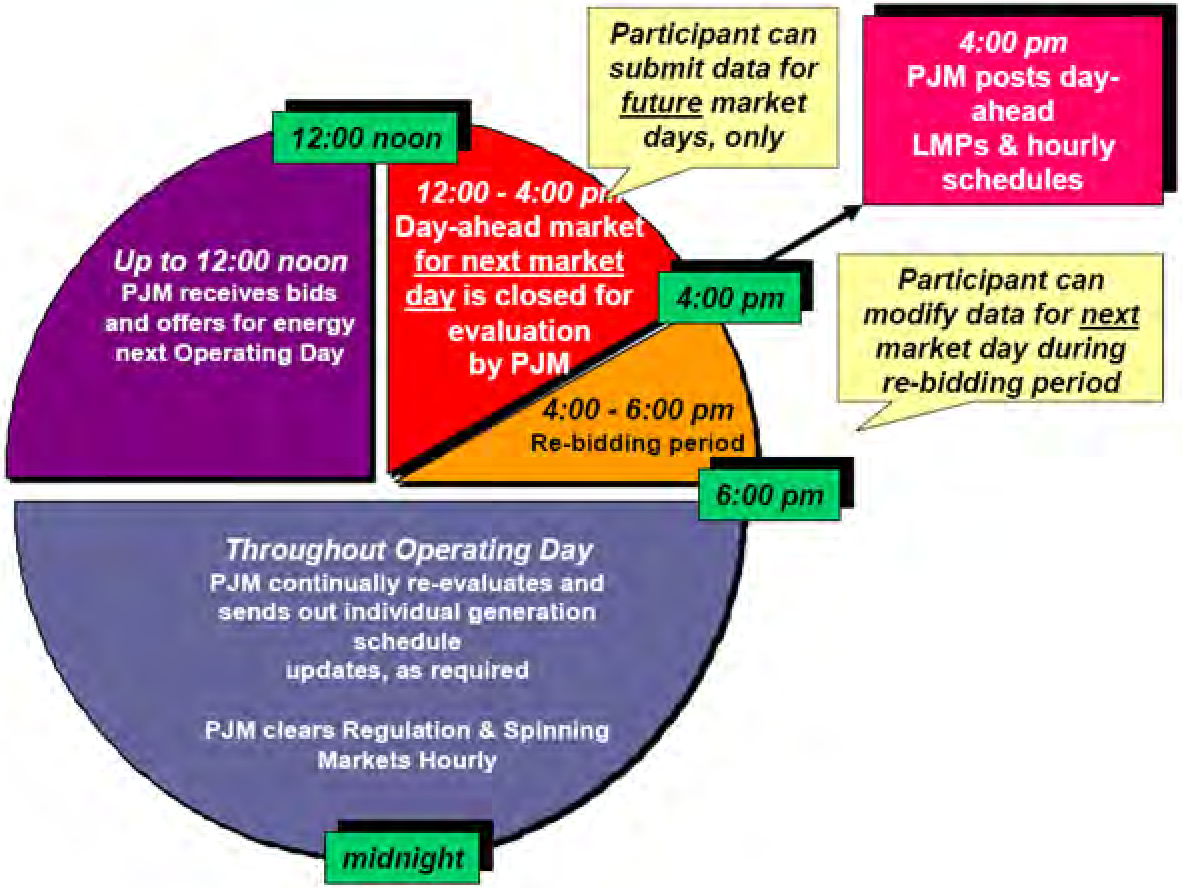
PJM eMKT Timeline

All Economic DR offers need to respect the Day-Ahead market clearing timelines:

1) *Offers entered by 12 Noon*

2) *From 12 Noon to 4PM, PJM runs the DA market for the next operating day*

3) *At 4PM, PJM will post DSR resources that cleared the DA market, along with DA LMPs*



Participant can submit data for *future* market days, only

4:00 pm
PJM posts day-ahead LMPs & hourly schedules

12:00 noon

Up to 12:00 noon
PJM receives bids and offers for energy next Operating Day

12:00 - 4:00 pm
Day-ahead market for next market day is closed for evaluation by PJM

4:00 pm

Participant can modify data for next market day during re-bidding period

4:00 - 6:00 pm
Re-bidding period

6:00 pm

Throughout Operating Day
PJM continually re-evaluates and sends out individual generation schedule updates, as required

PJM clears Regulation & Spinning Markets Hourly

midnight

Offer Schedules

DR Offer Curves Overview:

Offer Curves are required for:

1) **Day-Ahead Market clearing**
2) **PJM Dispatch in the Real-Time Market**

Without an offer curve, there cannot be an economic dispatch in either market for any hour of the day.

Offer Curves are not required for sole participation as a Synchronized Reserve Market resource (no energy settlement)

- Offer curves consists of MW/price pair segments. Up to 10 segments can be defined for each offer curve.
- Each registration can have up to two sets of offer curves, but only one offer curve can be made available on a daily basis.
- Market Type participation (Day Ahead, Balancing or Both) is associated with a schedule that can be changed daily by the CSP
    - Special Members are prevented from participating in the Day Ahead Market

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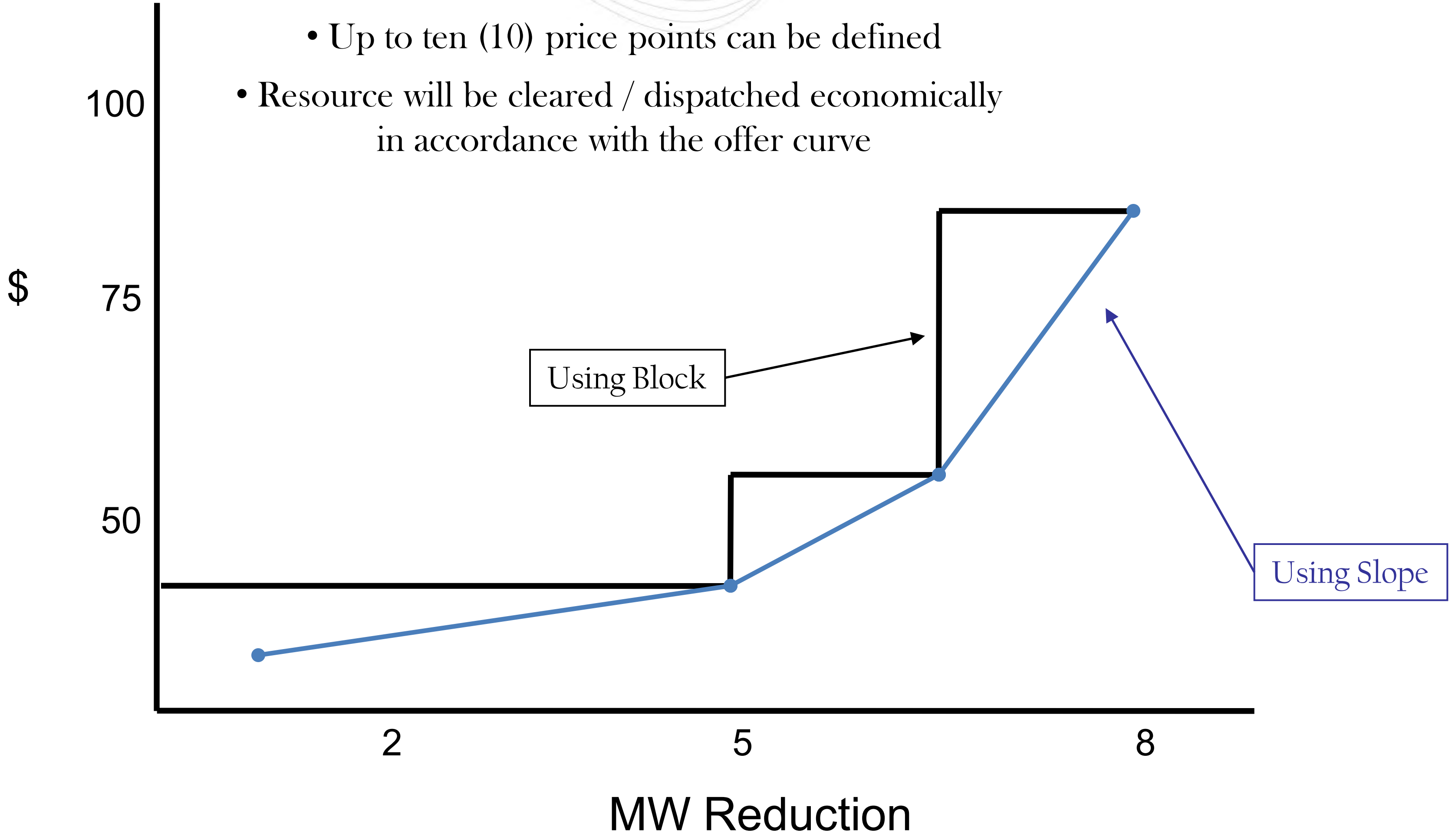
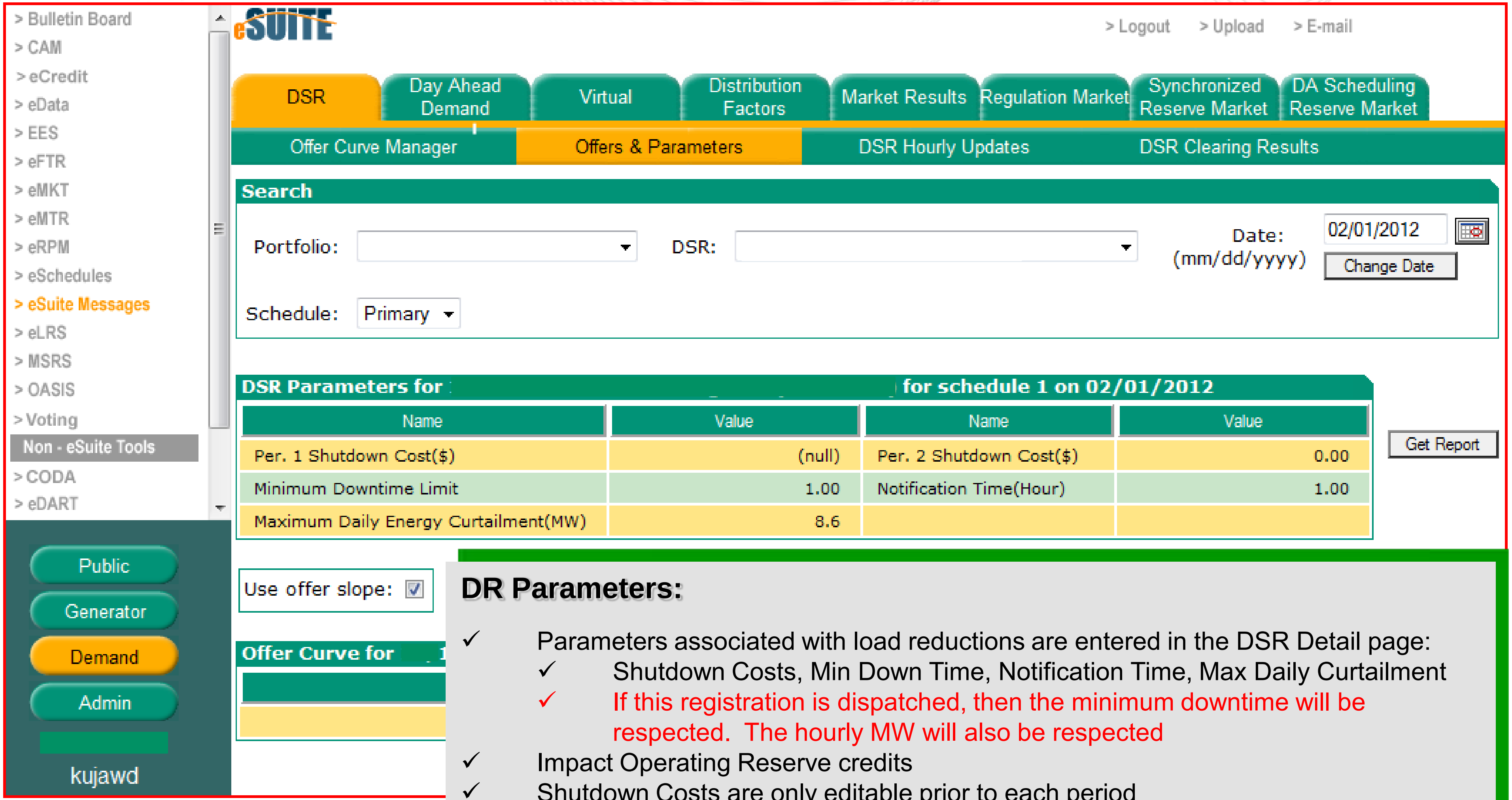
Example of Incremental Offer (Slope vs. Block)

- eMKT allows for the selection of either Slope or Block
- Up to ten (10) price points can be defined
- Resource will be cleared / dispatched economically in accordance with the offer curve



DR Parameters and Offer Curve


> Bulletin Board
> CAM
> eCredit
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> eMTR
> eRPM
> eSchedules
> eSuite Messages
> eLRS
> MSRS
> OASIS
> Voting
Non - eSuite Tools
> CODA
> eDART
Public
Generator
Demand
Admin
kujawd
eSUITE
> Logout
> Upload
> E-mail
DSR
Day Ahead Demand
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Market Results
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DA Scheduling Reserve Market
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Portfolio:

DSR:

Date: (mm/dd/yyyy) 02/01/2012

Schedule: Primary

DSR Parameters for for schedule 1 on 02/01/2012

Name	Value	Name	Value
Per. 1 Shutdown Cost($)	(null)	Per. 2 Shutdown Cost($)	0.00
Minimum Downtime Limit	1.00	Notification Time(Hour)	1.00
Maximum Daily Energy Curtailment(MW)	8.6		

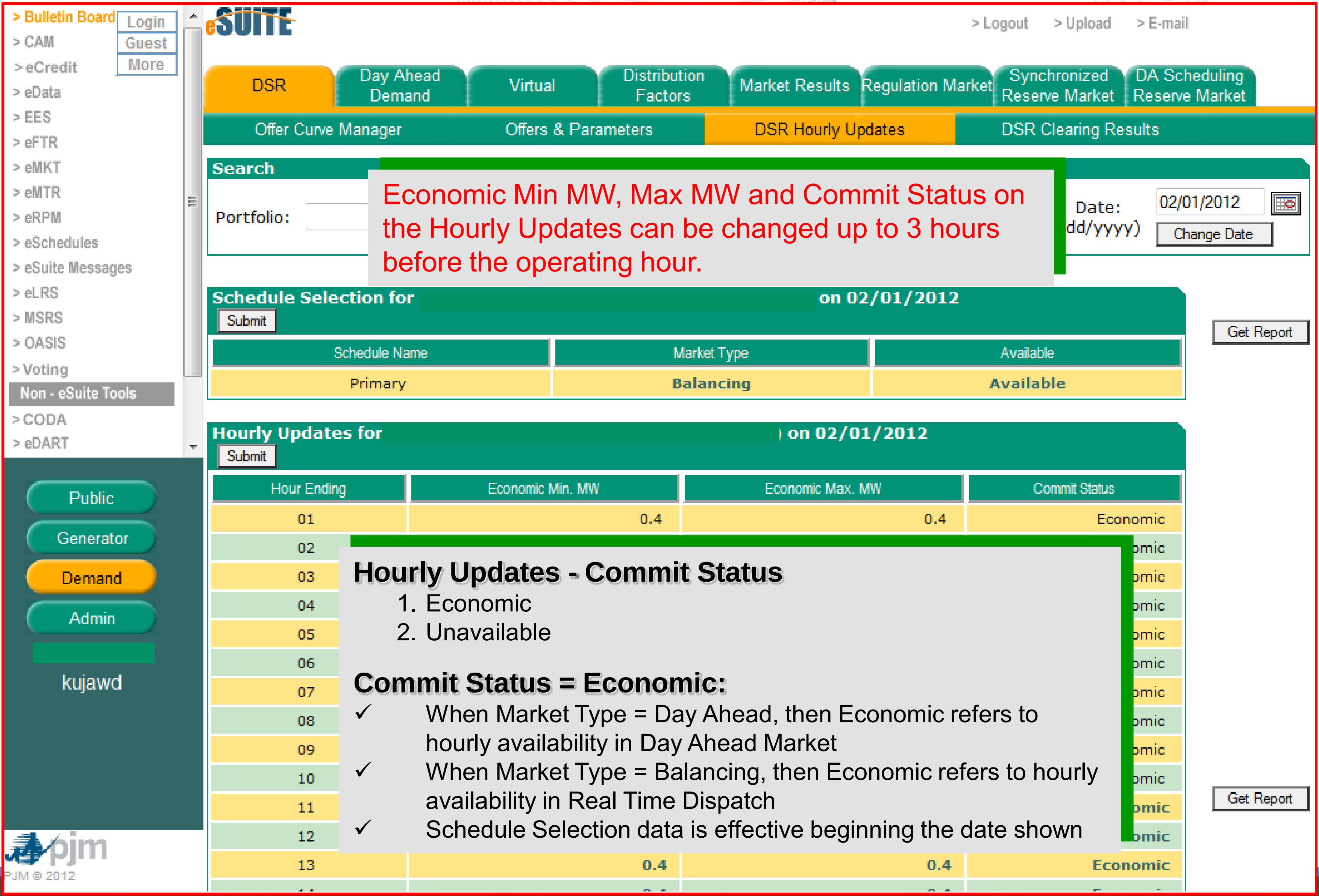
Use offer slope: ☑

Offer Curve for

DR Parameters:

- ✓ Parameters associated with load reductions are entered in the DSR Detail page:
  - ✓ Shutdown Costs, Min Down Time, Notification Time, Max Daily Curtailment
  - ✓ If this registration is dispatched, then the minimum downtime will be respected. The hourly MW will also be respected
- ✓ Impact Operating Reserve credits
- ✓ Shutdown Costs are only editable prior to each period
  - Per. 1 = April 1 – September 30
  - Per. 2 = October 1 – March 31
- ✓ Parameters are effective beginning the date shown

Schedule Selection and Hourly Updates



> Bulletin Board
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> eMTR
> eRPM
> eSchedules
> eSuite Messages
> eLRS
> MSRS
> OASIS
> Voting
Non - eSuite Tools
> CODA
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dd/yyyy)
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Economic Min MW, Max MW and Commit Status on the Hourly Updates can be changed up to 3 hours before the operating hour.

Schedule Selection for [redacted] **on 02/01/2012**

Schedule Name	Market Type	Available
Primary	Balancing	Available

Hourly Updates for [redacted] **) on 02/01/2012**

Hour Ending	Economic Min. MW	Economic Max. MW	Commit Status
01	0.4	0.4	Economic
02			omic
03			omic
04			omic
05			omic
06			omic
07			omic
08			omic
09			omic
10			omic
11			omic
12			omic
13	0.4	0.4	Economic

Hourly Updates - Commit Status

1. Economic
2. Unavailable

Commit Status = Economic:

- ✓ When Market Type = Day Ahead, then Economic refers to hourly availability in Day Ahead Market
- ✓ When Market Type = Balancing, then Economic refers to hourly availability in Real Time Dispatch
- ✓ Schedule Selection data is effective beginning the date shown