Day Ahead Scheduling Reserve(DASR)

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DASR History

- The RPM settlement agreement approved by FERC required implementation of markets and/or market rule changes that address additional reserve products by **June 1, 2008** .
- Reserve Markets Working Group discussed a basic construct for a market based mechanism for the procurement of supplemental, 30-minute reserves on the PJM System and worked create a set of business rules for consideration by PJM stakeholders .

The Day-ahead Scheduling Reserve Market was endorsed by the PJM Members Committee without objection on January 24, 2008. Filing (ER08-780) submitted to FERC on March 31, 2008

Purpose of DASR

The Day-ahead Scheduling Reserve product is :

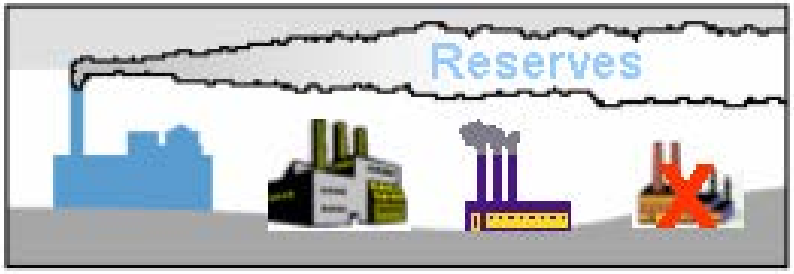
- Offer-based market for 30-Minute Reserve that can be provided by both Generation and DR
- Market that is designed to clear existing Day-Ahead Scheduling reserve requirements as defined by reliability standards: (RFC & VACAR)
- Day-ahead, forward market that is co-optimized with Day-Ahead Energy Market
- Market effective from June 1st, 2008

Purpose: To encourage and incent generation and demand resources to provide the flexible capability to provide 30- minute reserves

DASR Requirement

• PJM schedules reserves on a day-ahead basis in order to ensure that differences in forecasted loads and forced generator outages do not negatively impact system reliability.

• Day-ahead Scheduling Reserve Requirement is calculated on an annual basis.



DASR Requirement Calculation

Day-ahead Scheduling Reserves = Underforecasted LFE + FOR

Load **F**orecast **E**rror Component **(LFE)**

Forced **O**utage **R**ate Component **(FOR)**

Applies to the RFC DASR Requirement Only!

Load Forecast Error Component

Day-ahead Scheduling Reserves = Underforecasted LFE + FOR

Load **F**orecast **E**rror Component **(LFE)**

- Focus is on under-forecasted Load Forecast errors which can result in a capacity deficiency.
- Based on the 80th percentile of a rolling three year under forecasted average
- Effective January 1, 2014 LFE error component of Day-ahead Scheduling Reserve is 2.11%

Applies to the RFC DASR Requirement Only!

Forced Outage Rate Component

Day-ahead Scheduling Reserves = Underforecasted LFE + FOR

Forced **O**utage **R**ate Component **(FOR)**

- Based on a rolling three year average of forced outages that occur from 18:00 the scheduling day (day-1) through the operating day at 20:00
- Duration covers timeframe after the Reserve Adequacy Run through the evening peak period for which the system is scheduled
- Additional reserves can be scheduled if Hot/Cold Weather Alert is issued
- Effective January 1, 2014 the FOR error component of the Day-ahead Scheduling Reserve is 5.06%

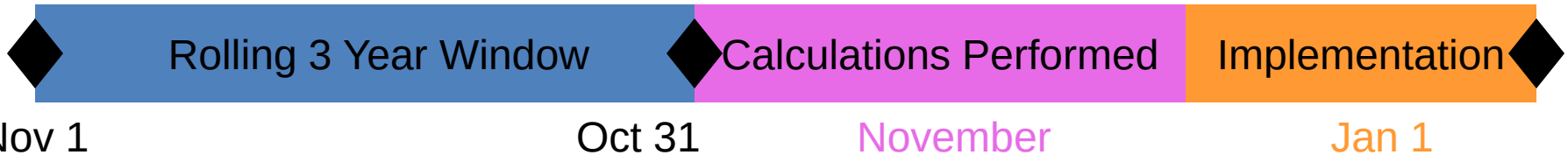
Applies to the RFC DASR Requirement Only!

Total DASR Requirement

- 2014 LFE component is 2.11%
- 2014 FOR component is 4.16%
- 2014 DASR Requirement for RFC is 6.27%
- Dominion Day-ahead Scheduling Reserve is based on their share of the VACAR Reserve Sharing Agreement and is set annually(431 MW for 2014)
- The RFC and Dominion Day-ahead Scheduling Reserve Requirements are added together to form a SINGLE RTO Day-ahead Scheduling Reserve Requirement which is scheduled economically across the RTO.

DASR Requirement Timeline

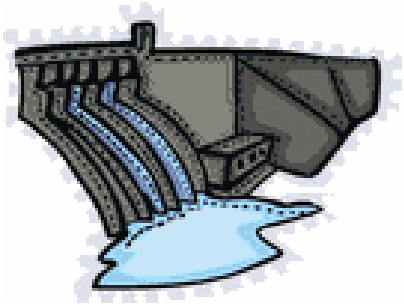
- Calculated annually during the month of November
- Calculation covers three year window
  - November 1st (year -3) through October 31st (Current Year)
- Results communicated to Market Implementation Committee, Operating Committee and System Operations Subcommittees
- Calculations implemented annually on January 1st.
- Example

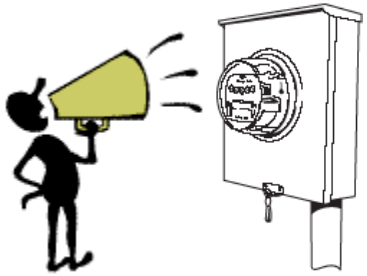


Who Can Provide DASR?

Resources with the ability to provide reserve capability in 30 minutes including primarily:

- ❑ Online Steam generation with capability to increase output from DA dispatch point
- ❑ Offline CTs that can start to provide Reserve
- ❑ Hydro and Pumped Storage Units
- ❑ Dispatchable DSR resources





Calculation Available Reserves - Generators

Generators have a “must-offer” requirement.
If available and no offer price is provided, offer price = zero

If Online: Minimum of

DASR Available MW = (Emergency max – Dispatch Pt)

or

DASR Available MW = (30 * Ramp Rate)

If Off-line:

– And (Cold Startup Time + Cold Notification Time < 30 min)

DASR Available MW = Emerg Max

Hydro Resources

	Avail DASR MW
Run-of-river	(Emer.Max - Dispatch Pt)
Pumped hydro in generating mode	(Emer.Max - Dispatch Pt)
Pumped hydro in pumping mode	(Emer.Max – Pump MW)

Demand Resources – Dispatchable in Real Time

Demand Resources DO NOT have a
"must-offer" requirement.

- Load response resources must be registered in the Economic Load Response program, indicate that they can be dispatchable by PJM in real-time and be able to be reduced within 30 minutes.
- Demand resources may indicate if they are available to provide Day-ahead Scheduling reserve.
  - Default = unavailable.

Expectations of committed DASR units in RT

- Unlike Synchronized Reserves, the DASR Requirement is not maintained in Real Time
  - There are no DASR events for resources to respond
  - Resources will be responding to normal PJM dispatch instructions
- Those resources receiving a DASR award would receive the hourly clearing price for the awarded MW amount as long as they were capable of providing the reserve in real time as scheduled
- Performance will be measured after the fact
  - No Penalty for non-performance (penalty = forgone revenue)

DASR Settlements

- DASR Credit = DASRMCP * Cleared DASR MWh
- DASR settlement is a zero-sum calculation based on the DASR provided to the market by generation and demand resource owners and purchased from the market by participants.
- Each Load Serving Entity (LSE) on the PJM system incurs a DASR obligation in kWh based its load ratio share within the RTO times the amount of Day-ahead Scheduling Reserve assigned in the RTO.
- Revenue from the DASR Market will be applied against balancing operating reserve credits that correspond to the hour that the revenue was earned

DASR Obligations

Participants may fulfill their DASR obligations by one of the ways stated below:

- Owning Day-ahead Scheduling Reserve resources from which the RTO obtains Day-ahead Scheduling Reserve OR
- Entering bilateral arrangements with other market participants OR
- Purchasing Day-ahead Scheduling Reserve from the Day-ahead Scheduling Reserve market.