



Reliability Pricing Model (RPM) Overview

April 11, 2005



- Generation Net Revenue Shortfall
- Inconsistency between capacity pricing and reliability requirements
- Result has been
 - Generation Retirement
 - Lack of New Capacity
 - Need for short-term corrective action
- Upcoming Reliability Violations in 2008

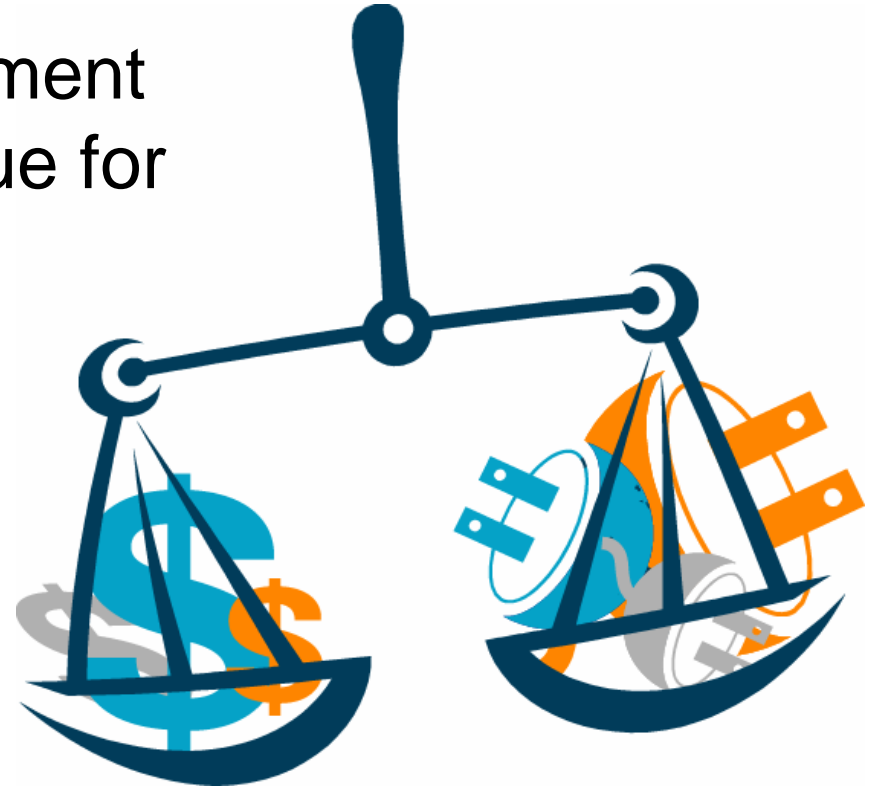
- Do nothing
 - Risk of blackouts
- Retain retiring generators
 - Will not be enough
- Add new generation
 - Need over 4,000 MW of new generation, current capacity construct will not support investment
- Build transmission
 - Need \$600-700 million in transmission upgrades
 - Cannot be built fast enough
 - Some rights-of-way may be unattainable

- Must have an integrated solution – need generation and transmission
 - Cannot build enough transmission fast enough to resolve problems
- Need locational price signals
 - Need to build generation in proper location based on deliverability shortfall
- Need price signals and sufficient lead time
 - Generators must have sufficient incentives and time to respond in order to compete with transmission

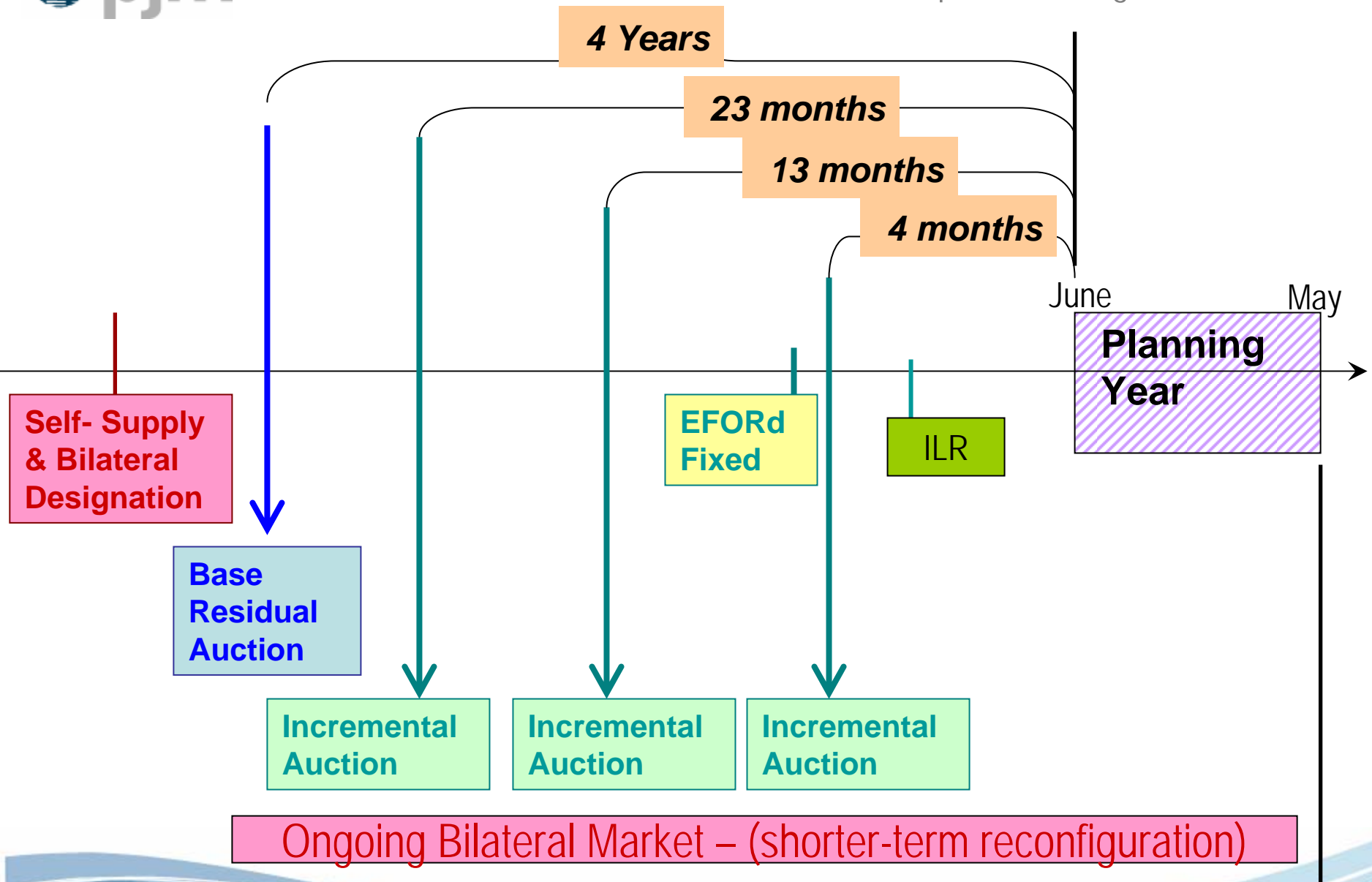
- Reliability Pricing Model (RPM) is PJM staff's proposal for a new resource adequacy construct
- RPM is part of an integrated approach to ensuring long term resource adequacy and competitively priced delivered energy
- RPM aligns the price paid for generation capacity with overall system reliability requirements

- Forward auctions
 - residual procurement after specification of self-supply and bilaterals
 - cleared based on generation offers, demand obligation and reliability metrics
- Reliability metrics
 - locational constraints
 - generator operating characteristics that enhance reliable operations
 - cycling units, dispatchable units
 - units capable of supplying supplemental reserve
 - fuel diversity

- Match payment to benefit
- Targeted capacity payment structure driven by value for reliability



- Bilateral Market
- Base Residual Auction
- Incremental Auctions
- Demand response participation



- Provides LSEs the opportunity to self-supply and hedge against the reliability rate determined through the base and incremental auctions
- Provides resource providers an opportunity to cover auction commitment shortages

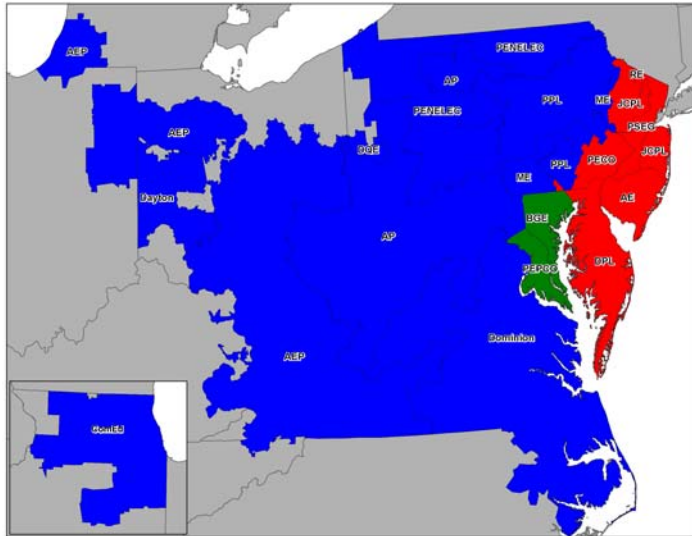
- Allows for procurement of resource commitments required, after the specification of self-supply and unit-specific bilaterals, to satisfy the region's unforced capacity obligation for a future planning year
- Conducted 4 years in advance of planning year
- Cost of procurement is allocated to LSEs serving load in the actual planning year

- Purpose: To allow for an incremental procurement of resource commitments for Delivery Year.
- First and Third Incremental Auction are held to provide customers an opportunity to adjust their positions, no increase in overall system capacity.
 - Auction needed to allow participant adjustments for: resource cancellation, resource delay, resource derating, EFORd increase, etc.
- Second Incremental Auction is held only if necessary to incrementally commit capacity to satisfy increased load obligation. Cost of procurement is allocated to LSEs serving load during the actual planning year.
 - Second incremental auction is held ONLY to mitigate reliability concern.

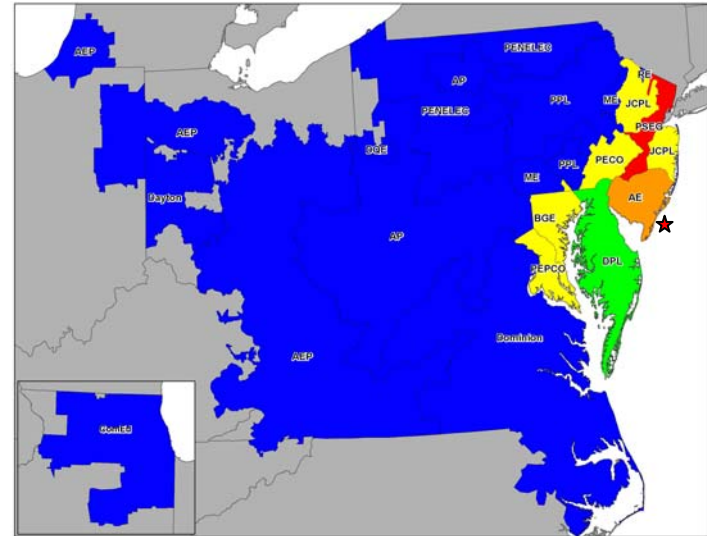
- PJM invites resource-specific sell offers for planning year
- Products that may be offered include:
existing and planned generation; bilateral contracts for capacity resources; and existing and planned demand resources

- Optimization algorithm matches supply and demand components on a locational basis while minimizing total capacity costs
- Algorithm supports a variable resource requirement (demand curve) and multiple constraints:
 - Transmission constraints - locational
 - Generation constraints – (e.g., load following and supplemental reserves requirements)

May 2007 – June 2008

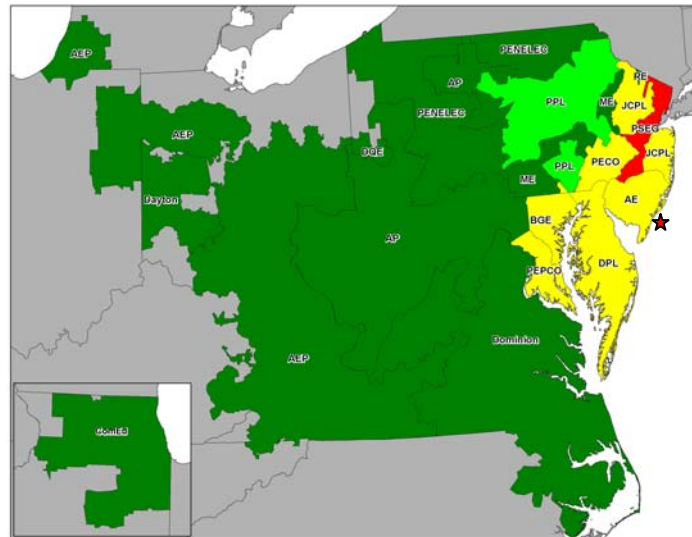
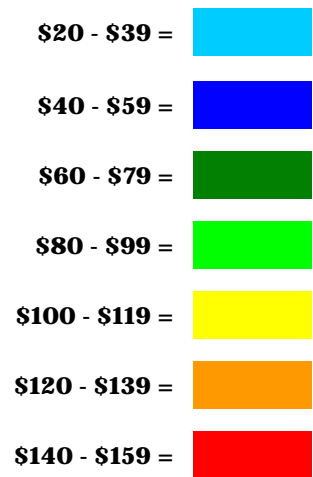


May 2008 – June 2009



May 2009 – June 2010

Value of Capacity (\$/MW-day)



★ The increase Capacity Import Capability into Southern NJ is due to Transmission upgrades effective May 2009

- Provides integrated Demand Response participation
- Incentivizes new resources to offer into Forward Auction
- Allows merchant Transmission solutions to offer incremental import capability into constrained areas to compete with generation solutions
- Provides stable capacity price signal to incentivize sustained investment

RPM vs. Current Capacity Model



Feature	RPM	PJM's Current Model
Participation	Mandatory for LSEs Voluntary for Resource Providers, but may not physically withhold	Mandatory for LSEs Voluntary for Resource Providers
Forward Commitment	In advance of planning year	In advance of operating day
Procurement	Self-supply or pay auction price	Self-supply or pay deficiency rate
UCAP Product	"Resource-specific" – product differentiated by location, generation type and operational characteristics	Fungible – unforced capacity credits
UCAP Requirement	Variable Resource Requirement (demand curve)	Requirement based on single IRM
Load Management	Treated as capacity resource or as obligation reduction	Treated as reduction in obligation
Bilateral Transactions	Resource-specific	Unit-specific and capacity credit

Feature	RPM	PJM's Current Model
Market Term(s)	Annual (planning year)	Daily, Monthly, Multi-monthly (interval, remainder of interval, annual)
Market Clearing Pricing	Multiple prices if constraints are binding	Uniform Price
Auction Clearing	Optimization algorithm	Match buy bids and sell offers
Offer Caps	Offer cap based on unit costs. Applicable only if market power test fails	No offer cap (deficiency charge acts as de-facto offer cap)
Planning Horizon	4 Years	1 Year
Committed resources required to bid into day ahead energy market?	Yes. If unit is chosen to satisfy one of the operational constraints, the unit will be required to offer the unit appropriately in the PJM energy market.	Yes.

Feature	RPM	PJM's Current Model
Deficiency Charges	Assessed to resource providers	Assessed to LSEs and short resource providers
Allocation of deficiency charges	Allocated on pro-rata basis to LSEs	Allocated to LSEs that have met their obligation for the interval and resource providers with committed excess based on the "alternate value" of capacity