

Short Term Capacity Reserves



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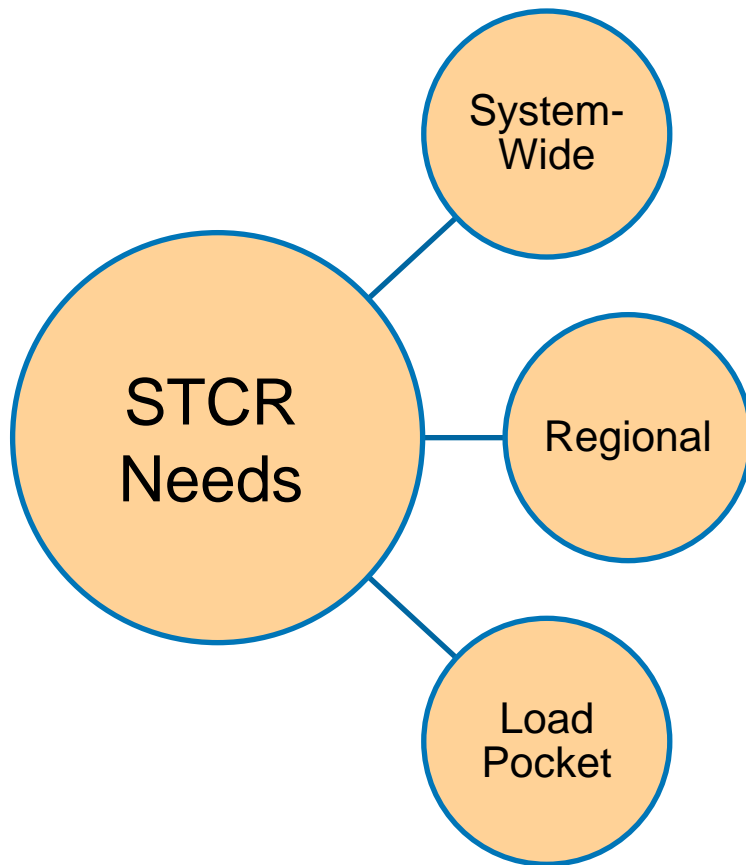
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Key Takeaways



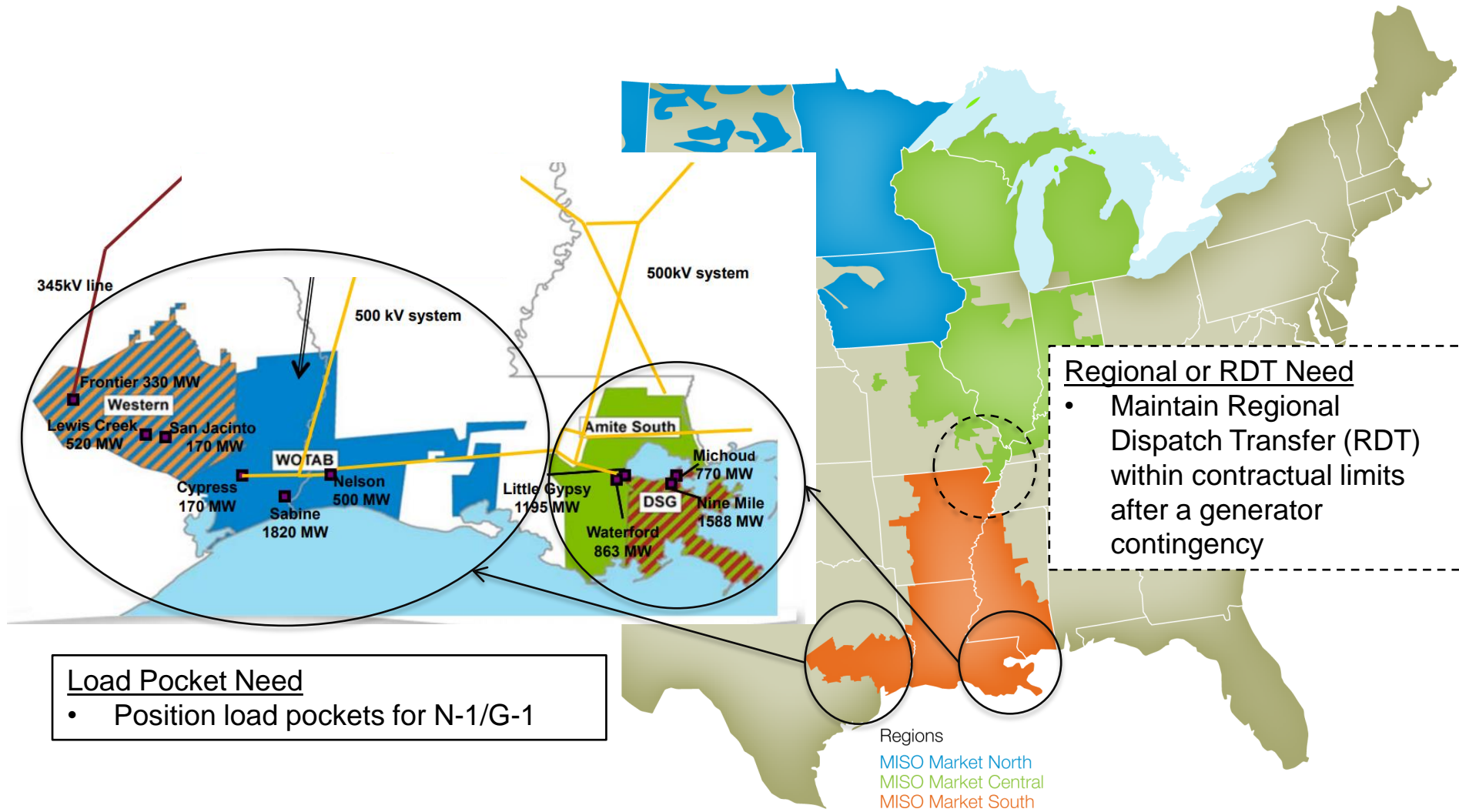
- MISO plans to introduce a new reserve product
 - Immediately improve efficiency and reliability by optimizing procurement of locational Short-Term Capacity Reserve (STCR) within the market framework.
 - Position MISO for explicitly addressing non-locational STCR need within the market framework. Non-locational STCR flexibility historically provided as by-product of economic operations.

STCR is the flexibility of resources to respond within 30 minutes to address operational needs

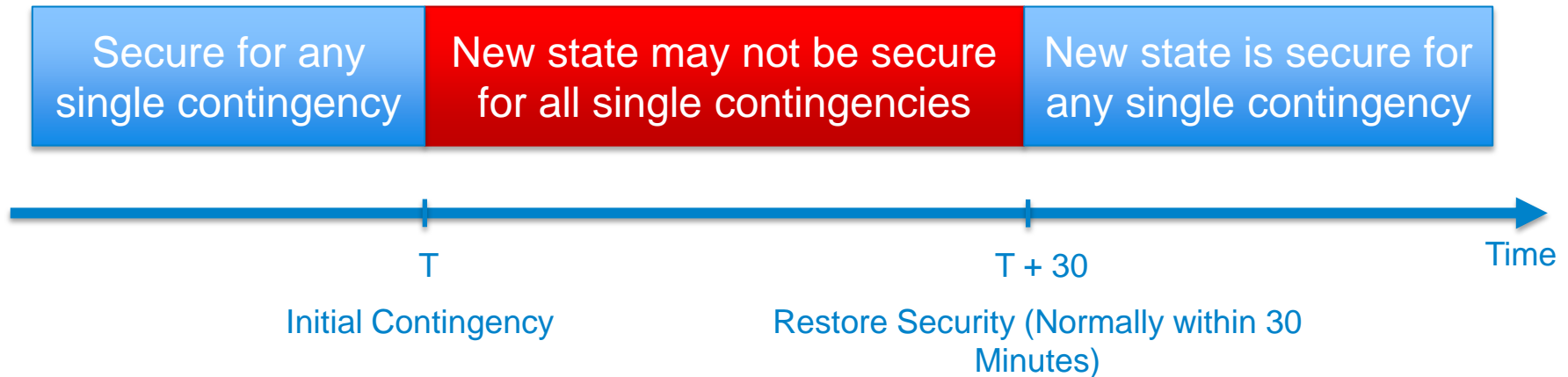


- Recover large deviation in ACE triggered by non-Disturbance Control Standard (DCS) events
 - Replenish deployed reserves
 - Non-locational need & response
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- Manage regional transfers
 - Locational need & response
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- Manage voltage and local reliability
 - Locational need & response

MISO's Regional and Load Pocket STCR needs



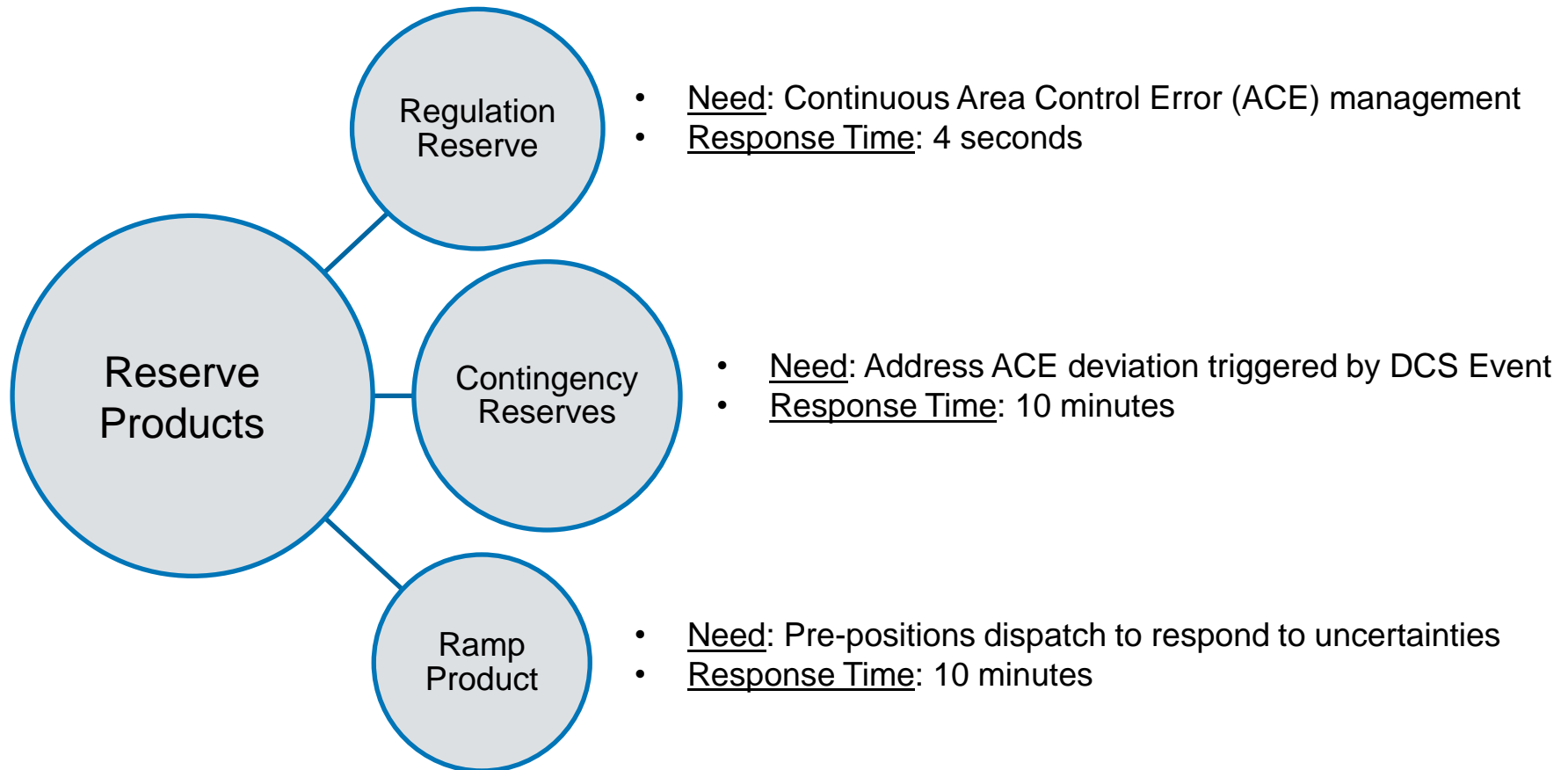
Limited flexibility and import constraints necessitates operating load pockets to N-1/G-1



N-1/G-1

MISO's Load Pocket needs are often driven by sequential losses of a transmission element and a generator

STCR needs go beyond the purview of current MISO Reserve products

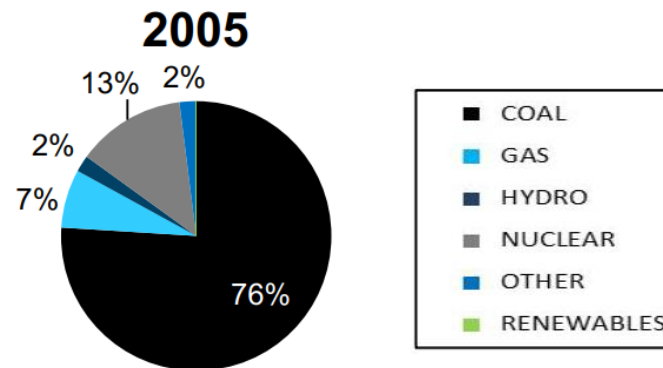


STCR Need: e.g. RDT, Replenish Reserves, N-1/G-1

STCR Response Time: 30 minutes

STCR needs currently addressed by out-of-market commitments

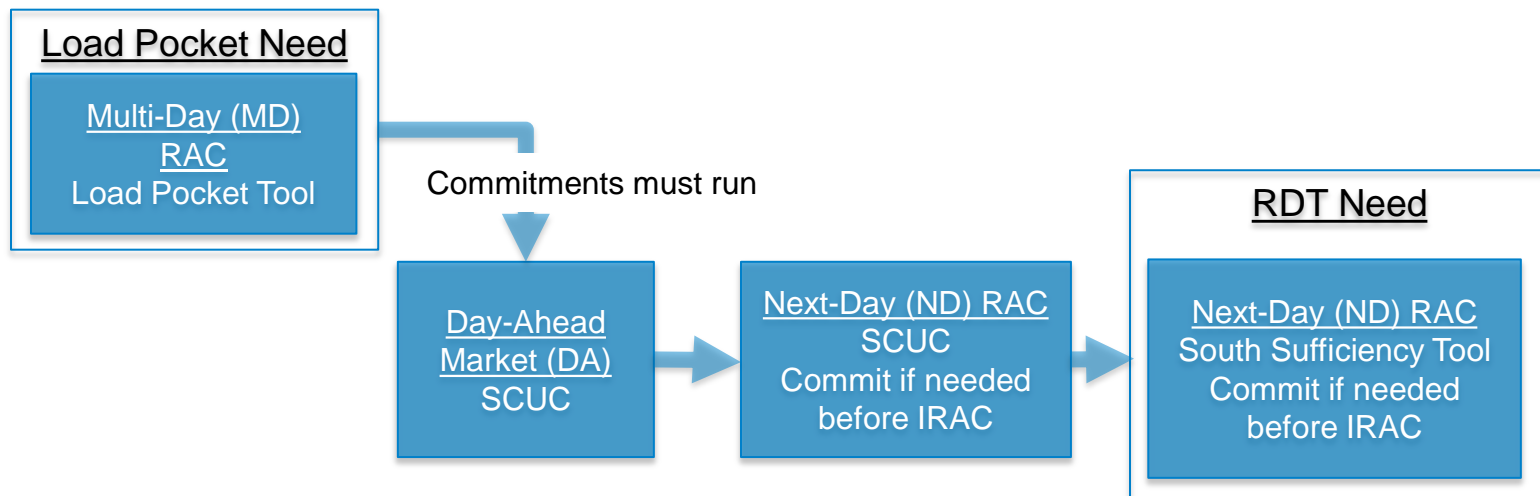
- System-Wide Need: Offline quick start capacity
 - Economic operations historically provided many capabilities, including offline quick start capacity, needed for reliability naturally with no additional cost



- Regional and Load Pocket Needs: Headroom on long-lead units
 - Specific and non-co-optimized commitment to pre-position Load Pockets and South Region in anticipation of STCR events

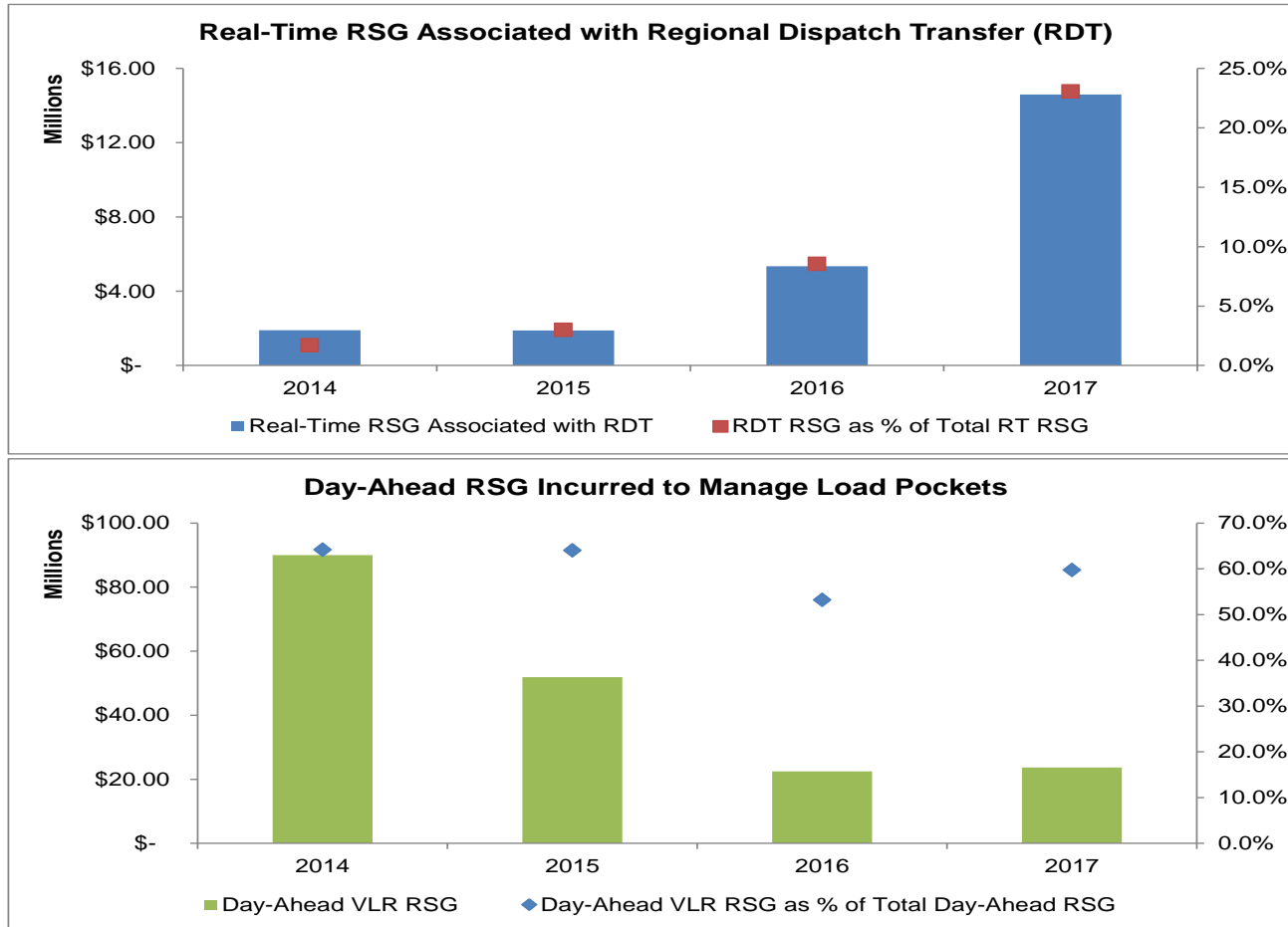
Issue with current approach for addressing STCR need: Regional and Load Pocket

1. Opportunities to improve status-quo commitment process to pre-position system for STCR needs



Issue with current approach for addressing STCR need: Regional and Load Pocket

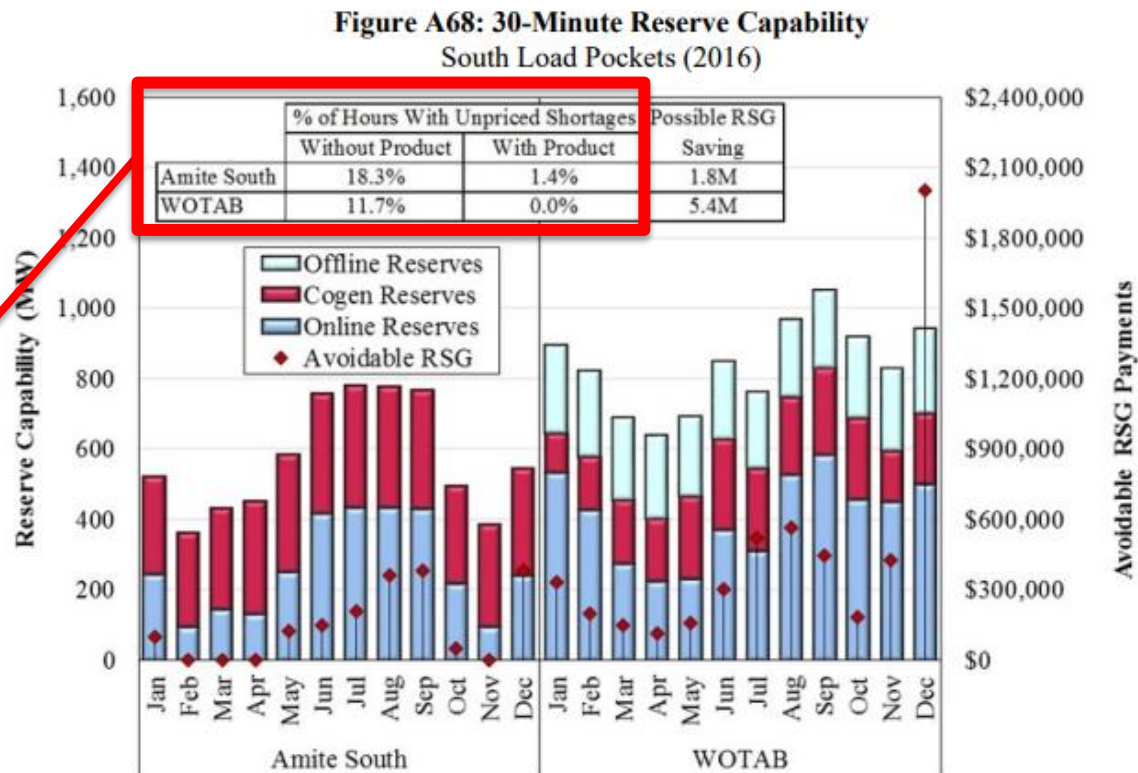
2. Uplifts and inadequate market transparency



Issue with current approach for addressing STCR need: Regional and Load Pocket

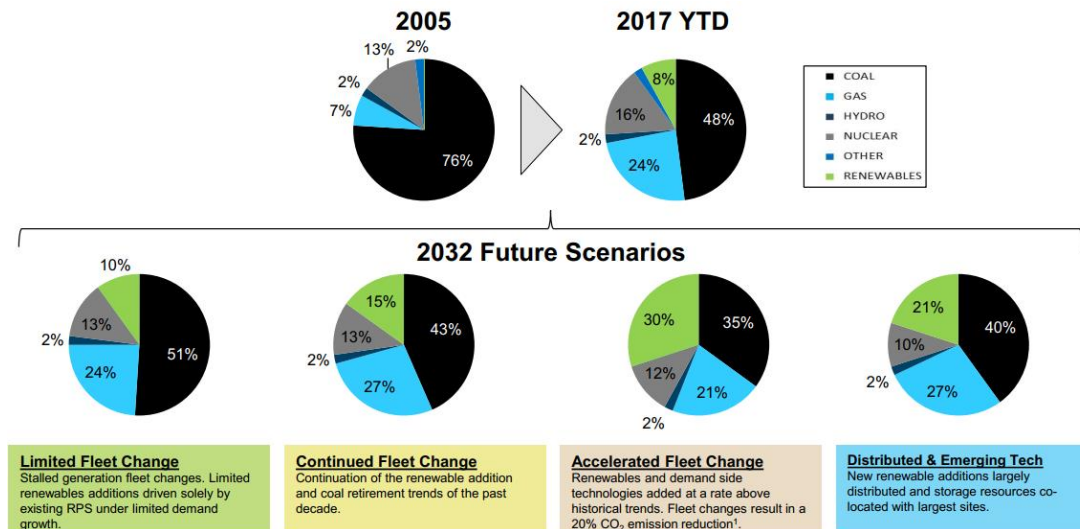
3. Insufficient coverage of STCR need in dispatch

Unmet needs identified in 2016 IMM SOM report due to dispatch not preserving ramp for local needs



Issue with current approach for addressing STCR need: System-Wide

- Issue not immediate but develop market mechanism to prepare for growing economic impact
- Potential future inadequacy of relying on implicit economics
 - Downward pressure from generation fleet changes and fuel prices (fast ramping gas units as baseload due to low gas price)
 - Upward pressure from new operational characteristics



Short-Term Reserve is a market based solution for addressing STCR needs

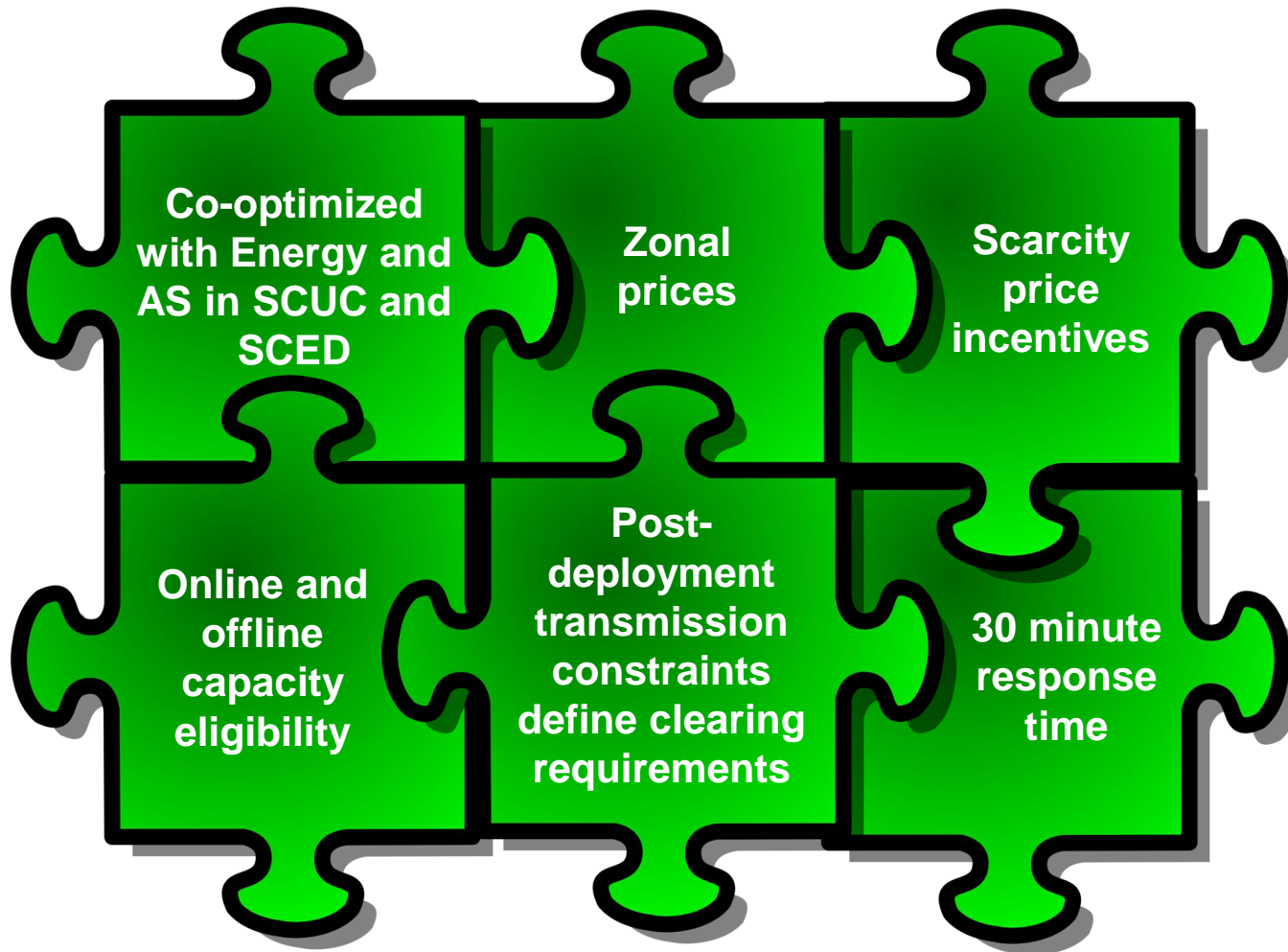


- Allow integrated and consistent modeling of STCR need in market and RAC processes for efficiency gains
- Allow dispatch engine to reserve ramp or price shortage for STCR needs
- Improve market transparency with explicit market prices

Other options considered – STCR product properly aligns needed 30 minute response time with the required resource characteristics

No.	Potential solution	Addresses reliability need?	Provides STCR-specific price signal?	Efficient for 30-min need?
1	Short-Term Capacity Reserve Product	Yes	Yes	Yes
2	Expand use of 10-Minute Contingency Reserve	Yes	No	No
3	Enforce N-1/G-1 Constraints in Market	Yes	No	No

STCR design features



Next Step – STCR design discussions

MW-based Requirements for Voltage Constraints

- Continuous MW-based constraints needed for pricing and dispatch

Local Cost Causation Tracking

- Global optimization decisions are seldom driven by a single need so rules are required to allocate costs related to local requirements

Integration with Existing Reserve Types

- Deployment method for consistent interaction with other reserve deployments
- Product substitution opportunities and related price expectations
- Opportunity for reliable overlap of resource capabilities



Questions?