

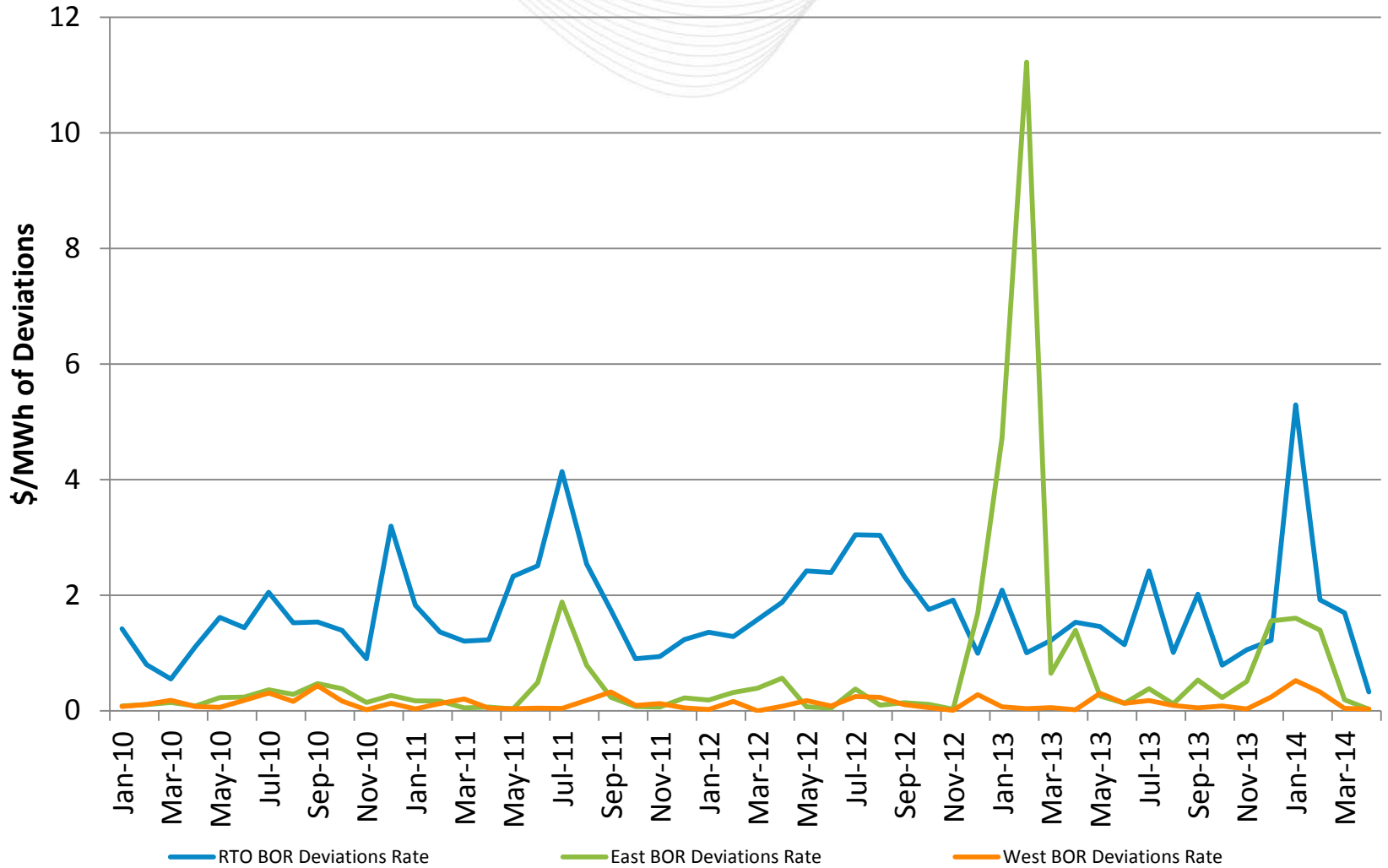


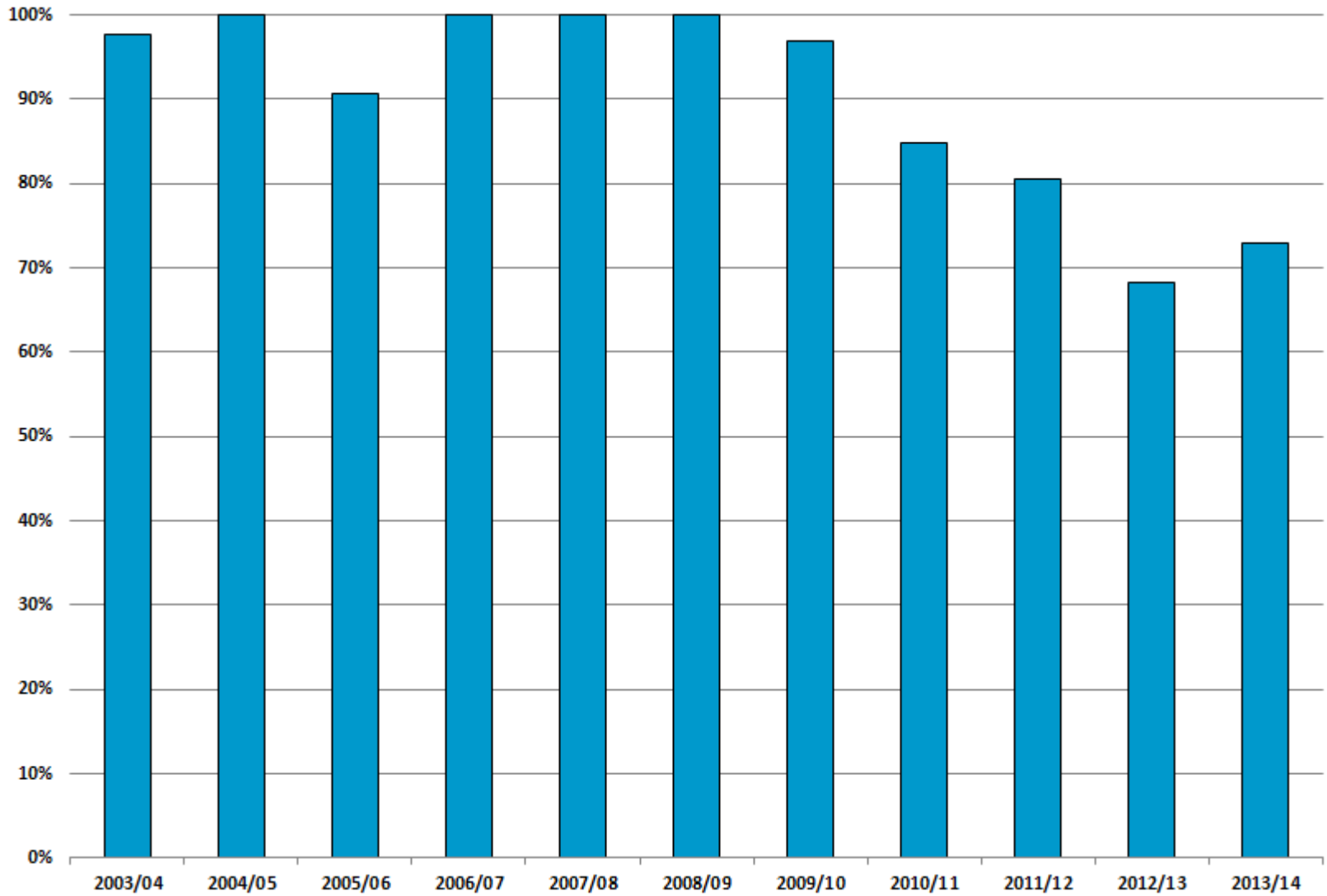
Uplift Downside

Harvard Electricity Policy Group
Stu Bresler
VP – Market Operations
PJM Interconnection, LLC

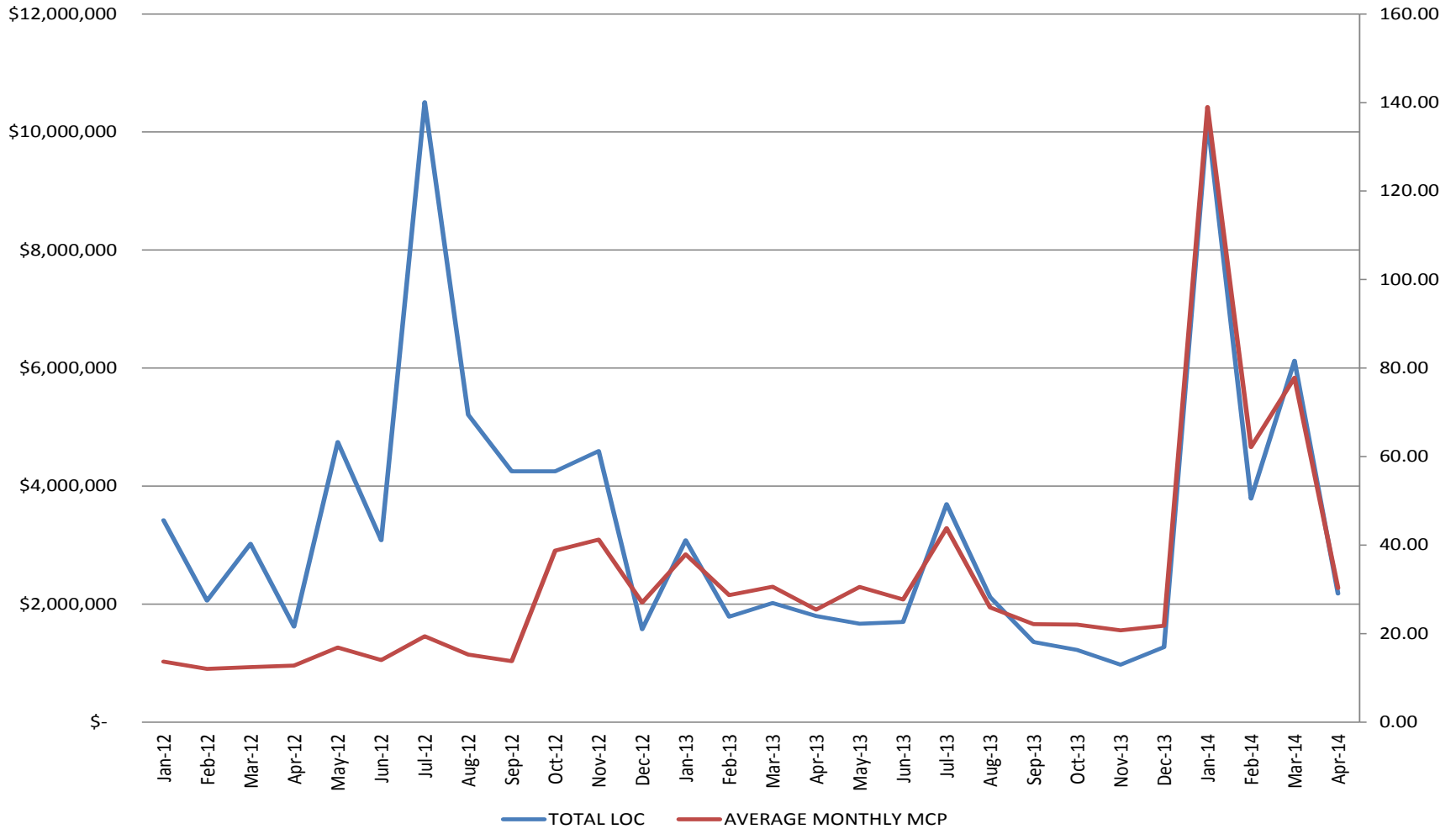
- **Energy Market** – Day-Ahead and Balancing Operating Reserve
- **Financial Transmission Rights** – underfunding allocation
- **Demand Response** – LMP payments to DR providers
- **Ancillary Service Markets** – lost opportunity cost credits

PJM Deviations Balancing Operating Reserve Rates





MONTHLY REG LOC & MCP



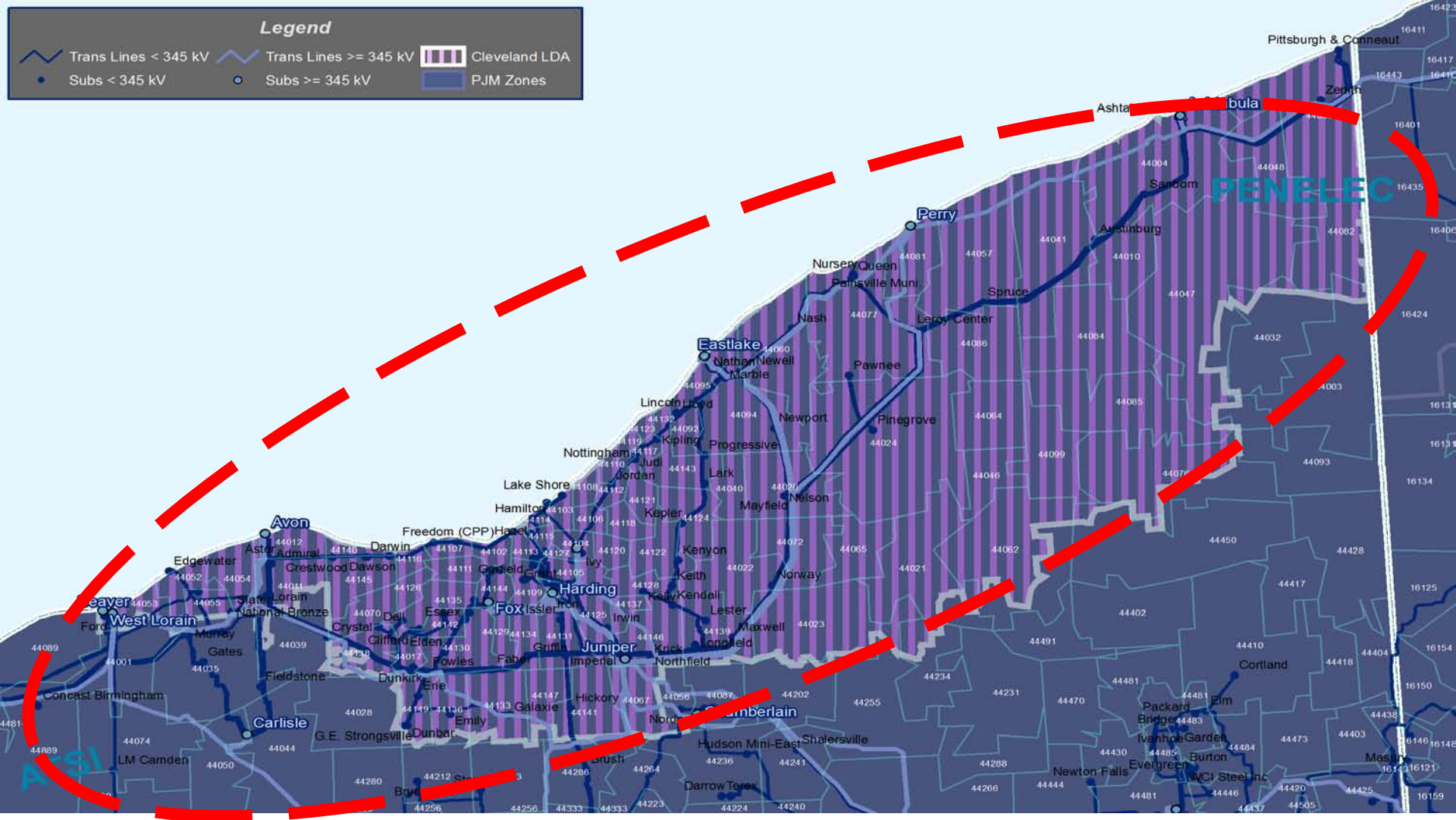
- Fairly Infrequent
- Largely the result of FERC Order 745
- Need I say more?

- Non-transparent and unhedgeable costs
- Unquantifiable risk that impacts cost of serving load and/or financial trading
- Dilution of price signals as drivers of investment and innovation

- “Leaner” scheduling practices
 - Schedule fewer large units and rely more on CTs
 - Higher prices for short durations, less uplift
 - Local issues still may require running uneconomic generation
- Implemented “closed loop” interfaces
- Transmission upgrades

Legend

- Trans Lines < 345 kV
- Trans Lines >= 345 kV
- Cleveland LDA
- Subs < 345 kV
- Subs >= 345 kV
- PJM Zones



- Allow more inflexible units to set LMP
 - Already done in PJM for CTs that are not dispatchable
- Model and bind the constraints these generators are running for in real-time and day-ahead
 - Likely closed-loop interfaces
- ***Ensure these facilities are modeled appropriately in ARR Allocations and FTR Auctions***