Equilibrium of Electricity Market Efficiency and Power System Operation Risk

- A IEEE Task Force Discussion Review

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PJM Interconnection

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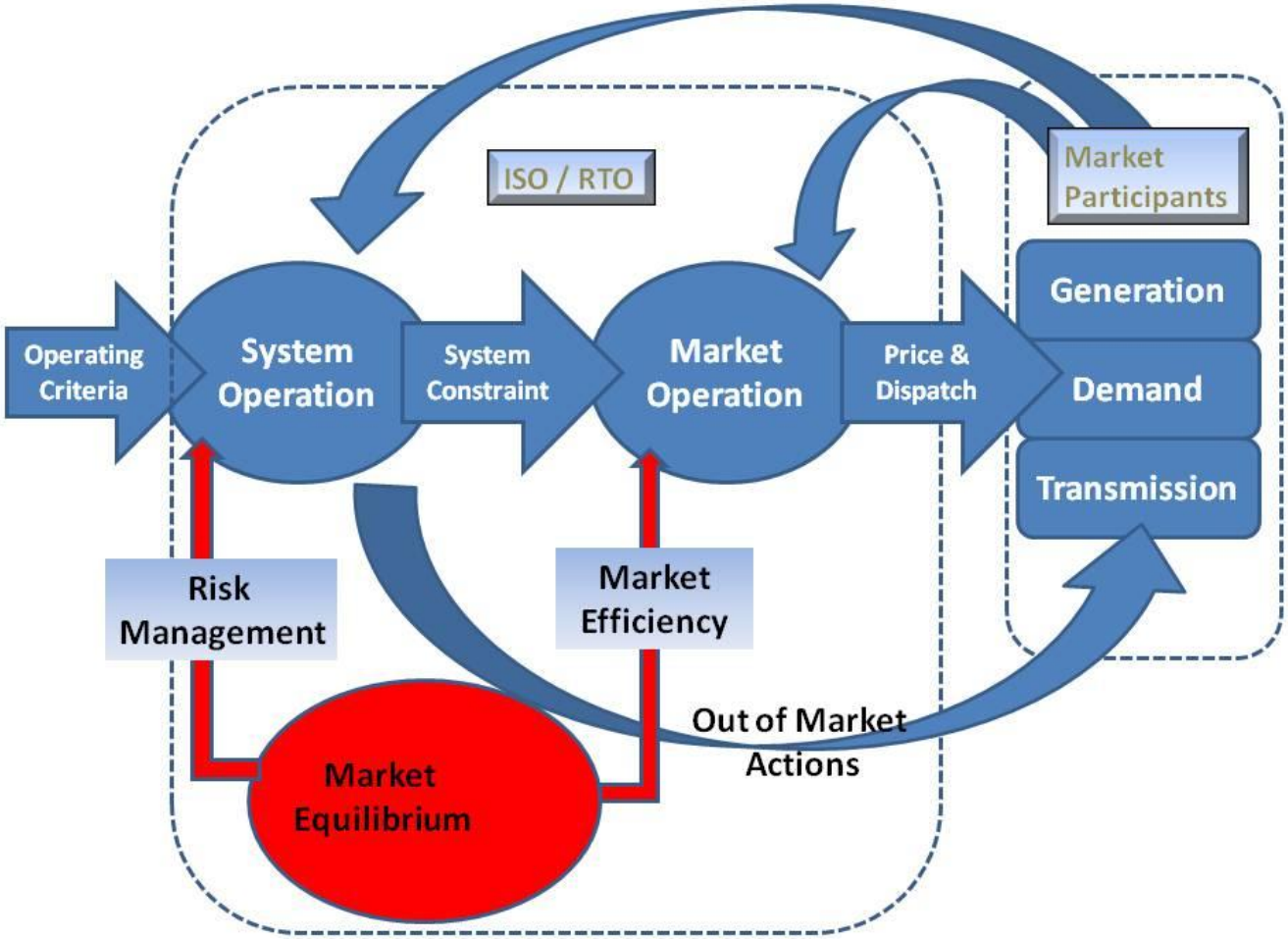
System and Market Operation



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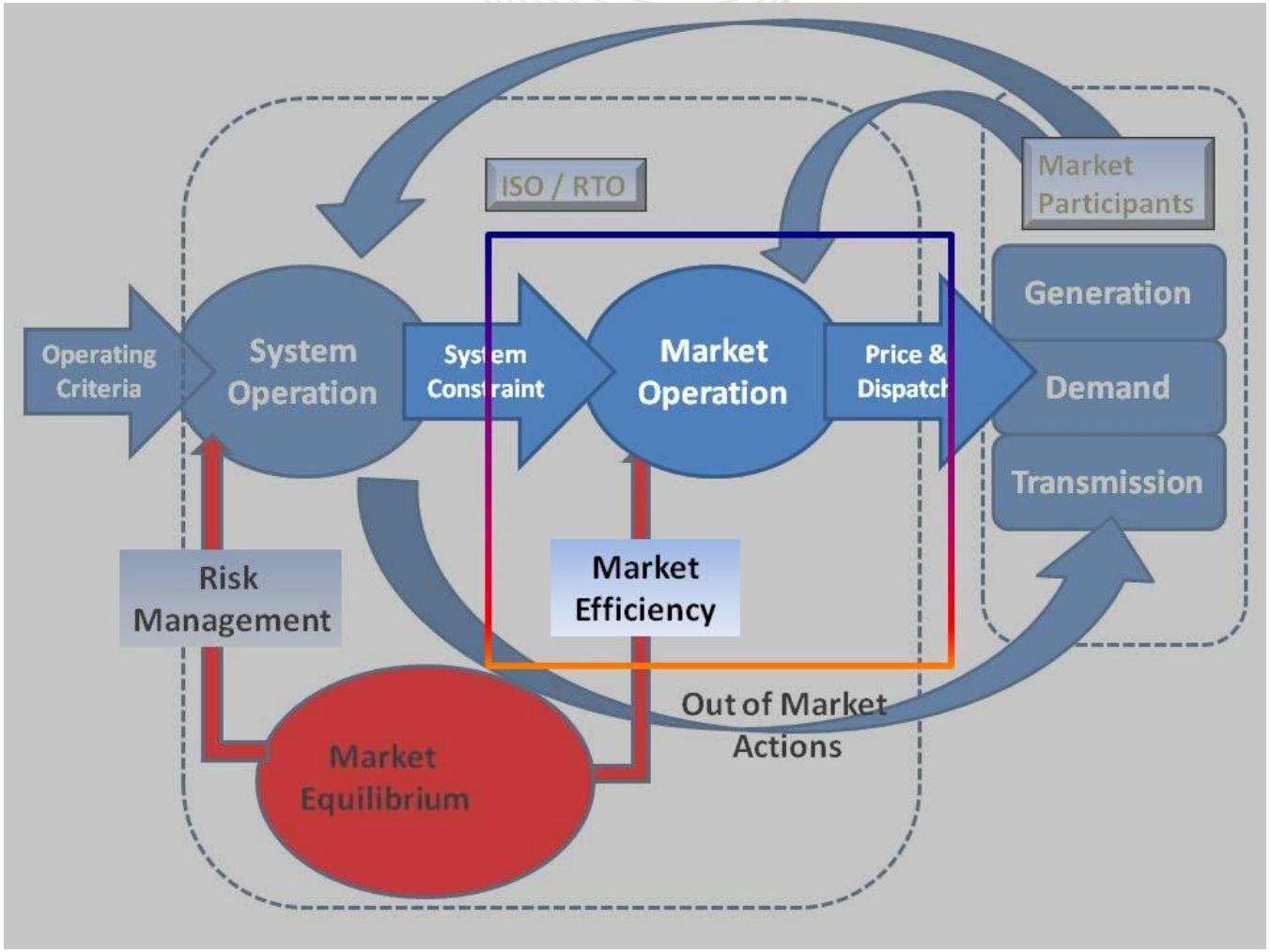
Market Efficiency Improvement



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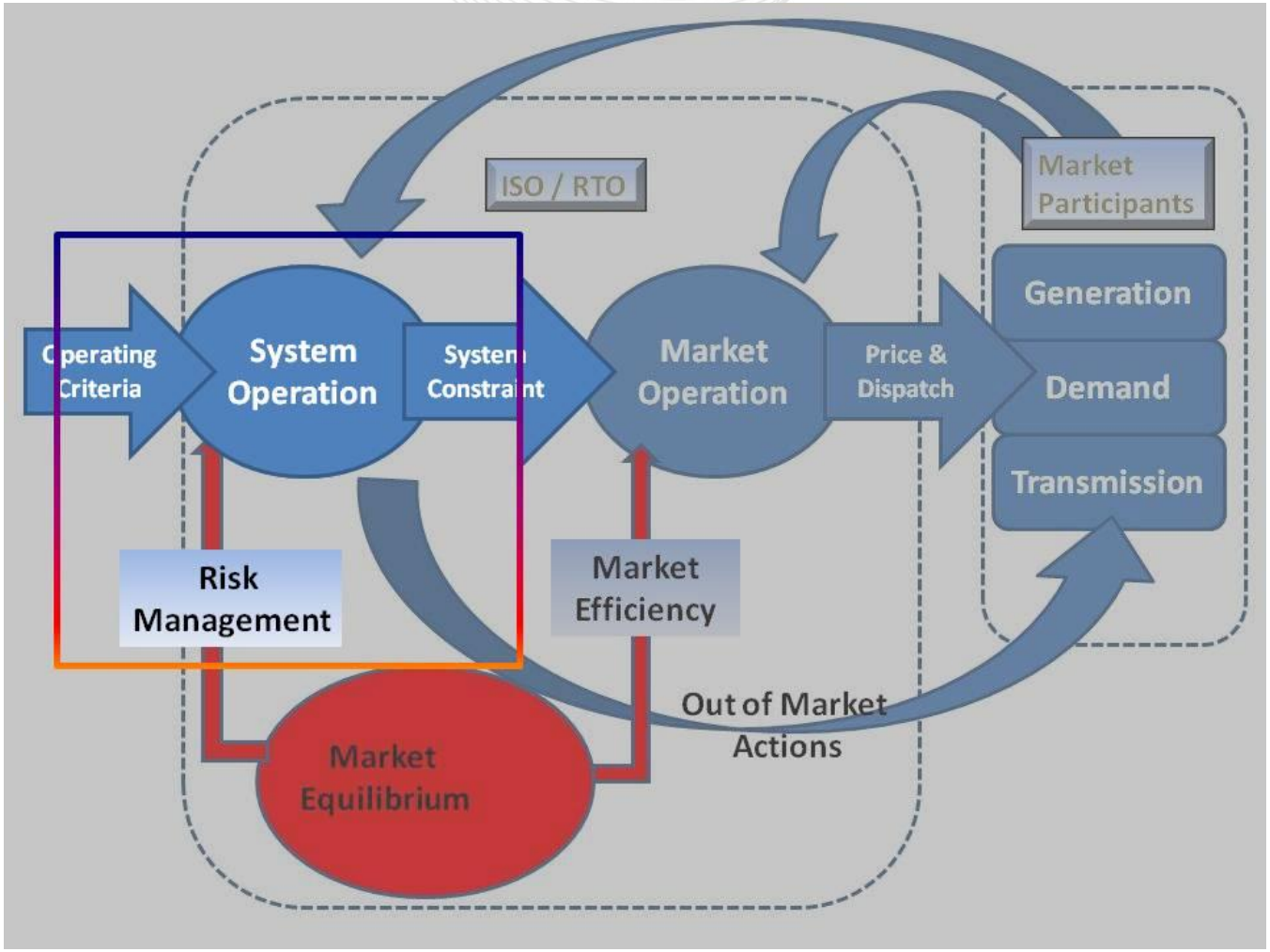
Risk Management in System Operation



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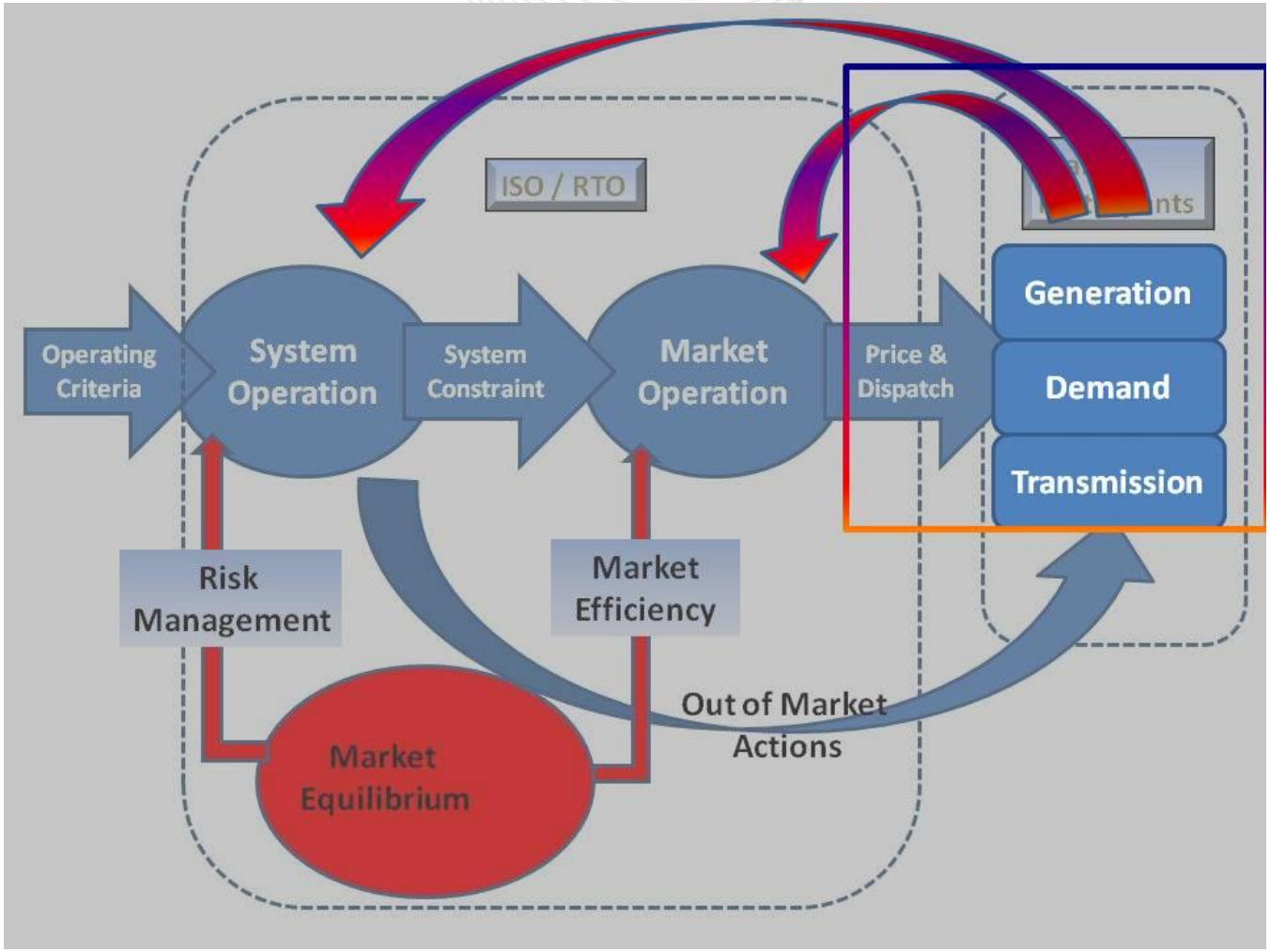
Increased Flexibility and Controllability



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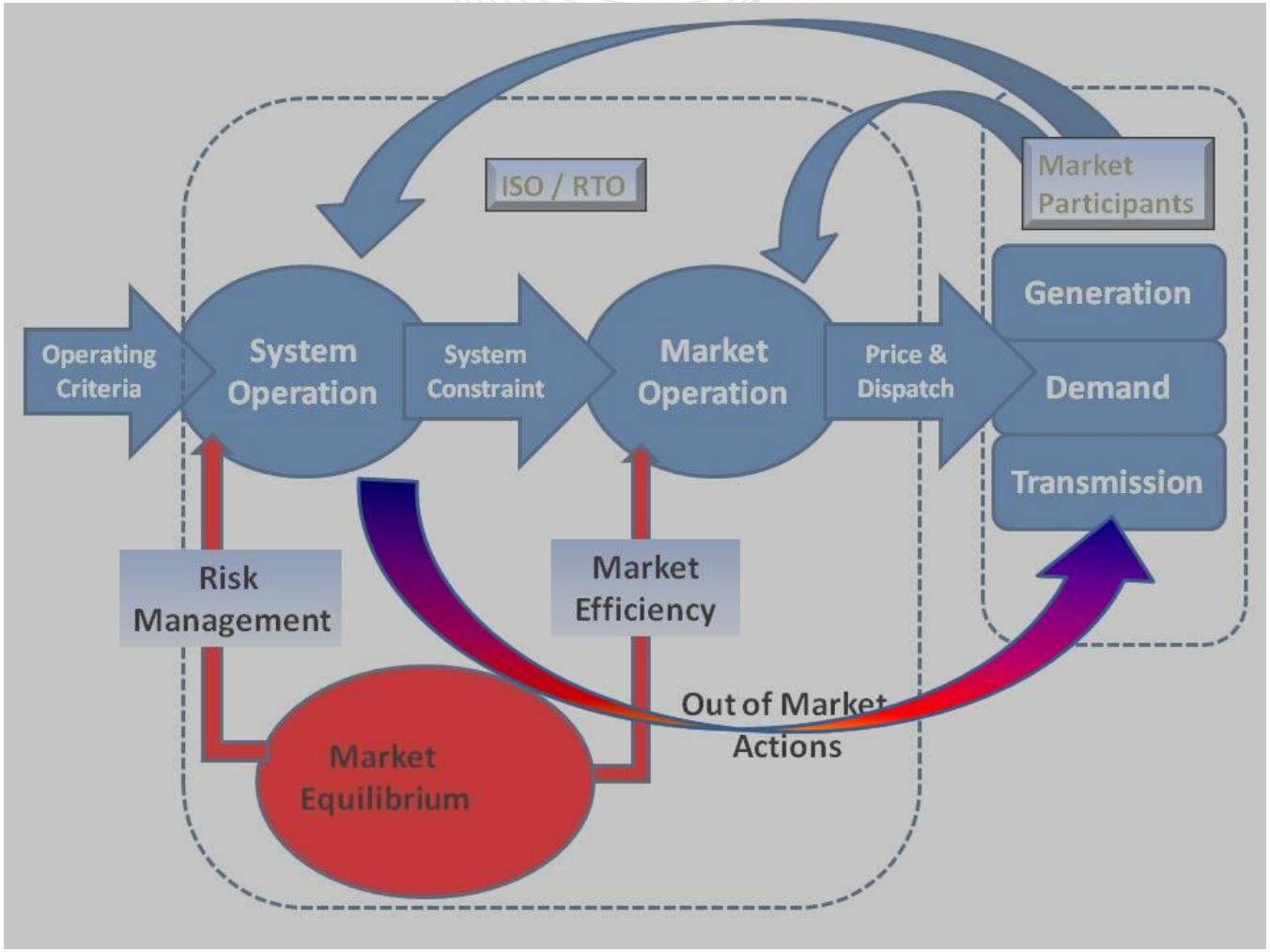
Reduced Out of Market Actions



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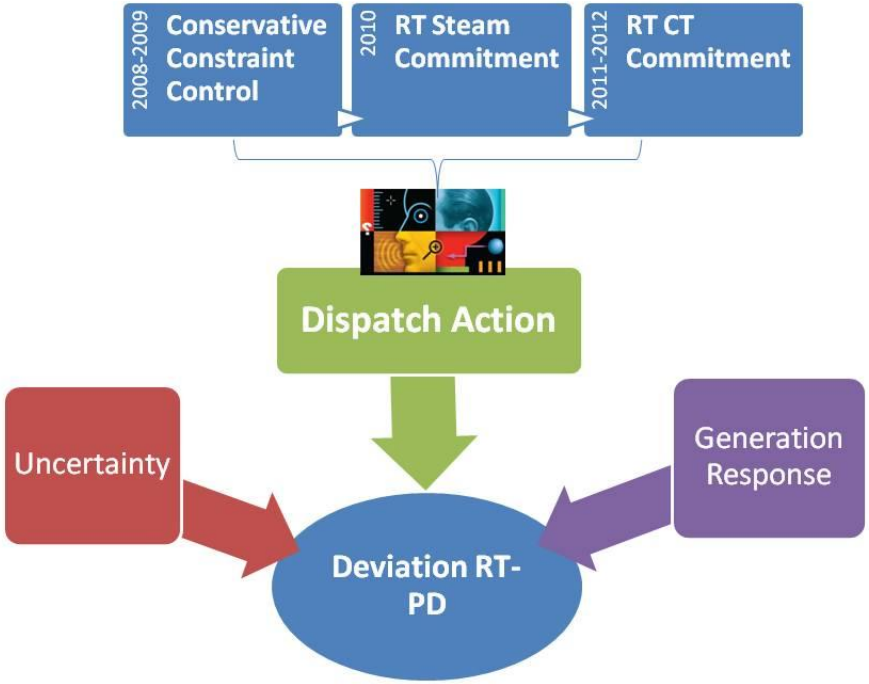
Perfect Dispatch - A PJM approach Toward Efficiency



$199 million saving for 2011

$455 million accumulative saving since 2008

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A Roadmap Toward Equilibrium

Price signals reflect risk mitigation & incent more flexibility

	Capacity Market	
Multi-settlement Energy market	Energy and Ancillary Service Co-optimization	Dynamic ancillary service Requirement
LMP-based Congestion Management	Time-coupled look-ahead commitment and dispatch	Risk-based commitment
	Incorporate Demand response	Transmission Topology Control
Lagrange Relaxation Linear programming	Mixed Integer programming Heuristic method	Stochastic UC Adaptive control

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IEEE TF Panel Presentations

- 2009 panel “Equilibrium of Electricity Market Efficiency and Power System Operation Risk: State-of-the-art and Tomorrow” http://www.ieee.org/organizations/pes/meetings/gm2009/09gm-technical-sessions-3.htm#PSO2
- 2010 panel “Risk-constrained Power System Operation: How Far Are We From Market Efficiency?” http://www.ieee.org/organizations/pes/meetings/gm2010/10gm-technical-sessions-3_linked.htm#pso3
- 2011 panel “Measuring market efficiency in power systems operations: Transmission perspective” http://www.ieee.org/organizations/pes/meetings/gm2011/11gm-technical-sessions-2-linked.htm#pso3
- 2012 panel “Toward Efficient System Operation: Generation Perspective” (to be posted)

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