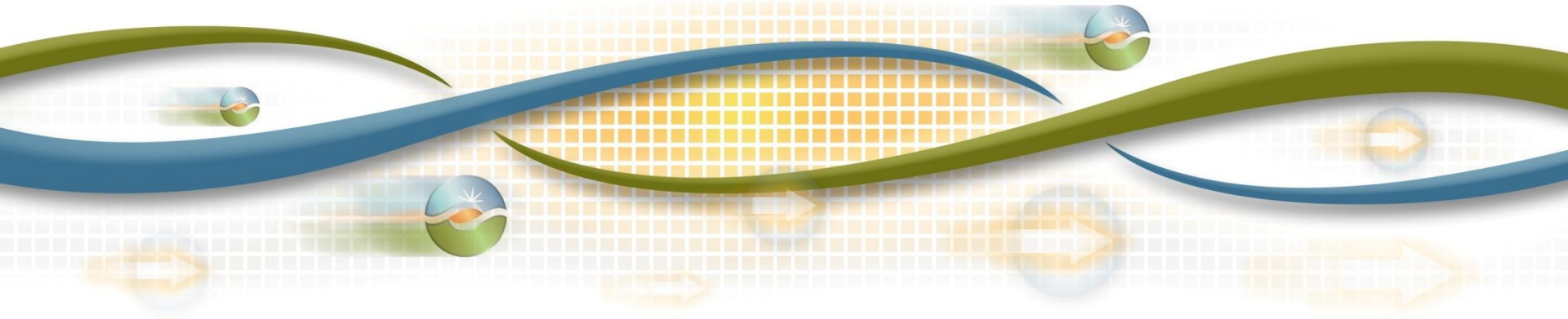


# Contingency Modeling Enhancements

Second Revised Straw Proposal Discussion  
March 20, 2014

Delphine Hou  
Senior Market Design and Policy Specialist

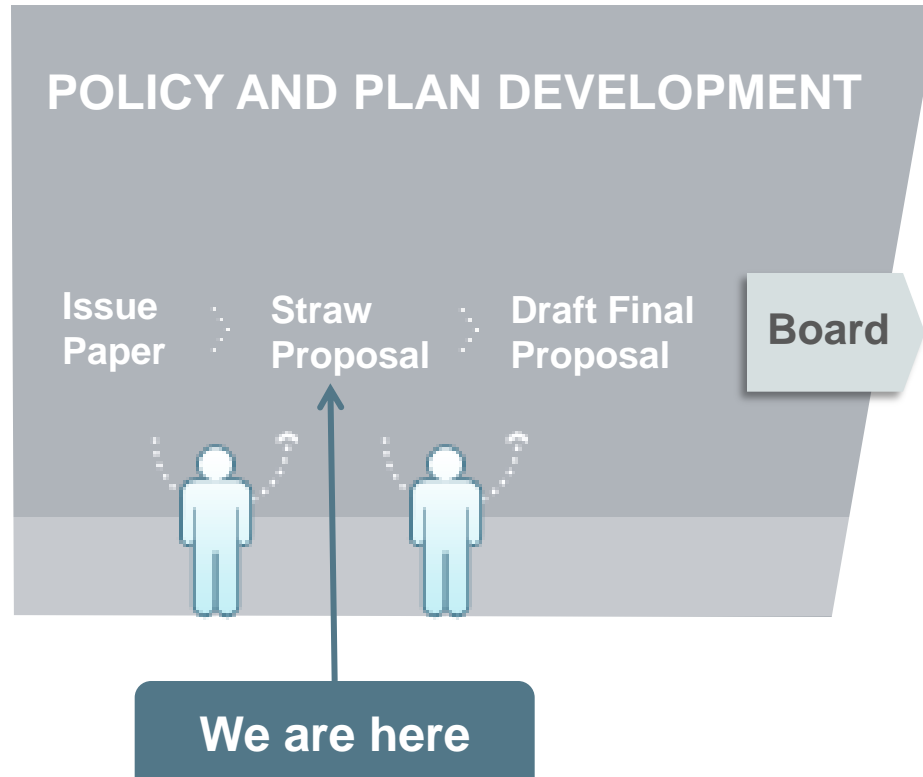


# Agenda

Time	Topic	Presenter
9:00 – 9:05	Introduction	Tom Cuccia
9:05 – 10:00	Changes and updates from revised straw proposal	Delphine Hou
10:00 – 10:45	Local market power mitigation	Roger Avalos
10:45 – 11:45	Southern California Edison proposal	Jeff Nelson / Wei Zhou
11:45 – 12:00	Next steps	Tom Cuccia

*The meeting is scheduled till 2pm in case any of the discussion items require more time*

# ISO Policy Initiative Stakeholder Process



# Resources eligible to count as corrective capacity

- The types of resources eligible to provide corrective capacity include:
  - generating units (online and offline),
  - demand response,
  - system resources also certified to provide ancillary services; and
  - participating load/pumped storage
- These resources will be included in the preventive-corrective constraint to the extent they
  - Have an energy bid,
  - Have sufficient ramping capability within time requirement;
  - Is appropriately located to address an SOL violation; and
  - Not on the list of resources not eligible for corrective capacity.
- May have an operating reserve award

# Resources not eligible to count as corrective capacity

- The following resources are not eligible to provide corrective capacity:
  - Intertie resources that cannot provide ancillary services
  - Any portion of a resource that is self-committed
  - Capacity procured under the flexible ramping constraint

# Flexible ramping product and constraint

Capacity type	Objective	Pre-contingency	Post-contingency
Preventive-corrective constraint	Prepare for contingencies pursuant to WECC TOP-007	<ul style="list-style-type: none"> <li>• Procure in IFM, RUC, FMM, and RTD</li> <li>• Capacity reserved for contingencies</li> </ul>	Use corrective capacity
Flexible ramping constraint	Address net load variability/uncertainties	<ul style="list-style-type: none"> <li>• Procure in real-time at 15 minute granularity</li> <li>• Use capacity as needed</li> <li>• Should not overlap with preventive-corrective</li> </ul>	Use flexible ramping capacity
Flexible ramping product ( <i>initiative in progress</i> )	Address net load variability/uncertainties	<ul style="list-style-type: none"> <li>• Procure in IFM, FMM, and RTD</li> <li>• Use capacity as needed</li> <li>• May overlap with preventive-corrective</li> </ul>	Use flexible ramping capacity

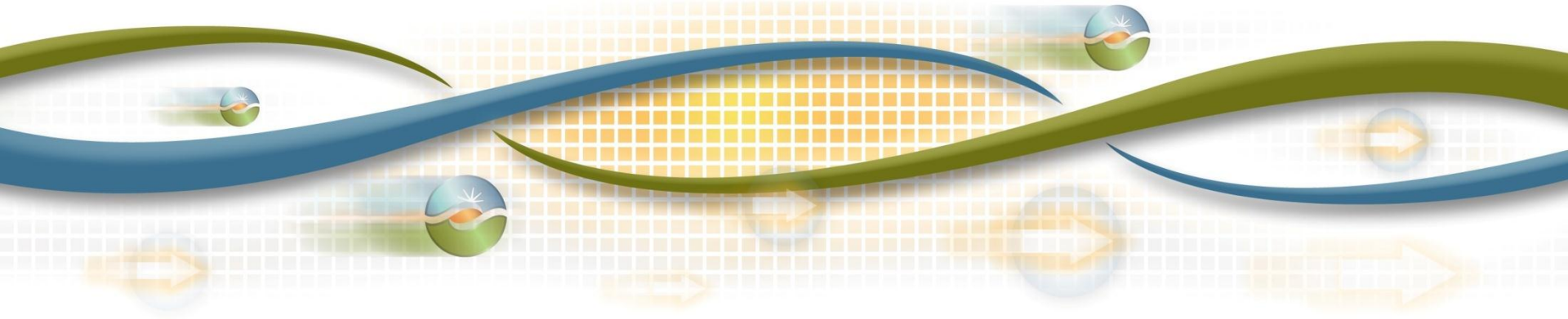
# Commitment, dispatch, and settlement of corrective capacity

- Constraint will be in day-ahead, RUC, and real-time markets
- Constraint will be fully re-optimized in each run
  - Economic buy-back is possible and will be compared against providing energy
- Corrective capacity will be dispatched via real-time contingency dispatch
- Settlement will occur in day-ahead and real-time markets
- Corrective capacity payments and charges will be included in bid cost recovery
- No pay provisions will apply
- No grid management charge

# Proposed Alterations to DCPA / RSI to Accommodate Corrective Constraints

March, 2014

Department of Market Monitoring  
Roger Avalos  
Senior Market Monitoring Analyst





# Overview

- Reasons for Adjustment
  - Corrective capacity affects SCF preventive constraints
  - Uncompetitive energy bids could increase LMCP or LMP
  - Corrective constraints could cause preventive constraints to not bind, potential for missed LMPM
- Residual Supply Index Overview
- Current Real-Time SCF
- Proposed Real-Time SCF for Corrective
  - Account for dual energy and capacity nature of product
- Proposed alteration to Real-Time SCF for Preventive
- Proposed Day-Ahead RSI for Corrective
  - How to account for capacity from min load or self-schedule?
  - Should Day-Ahead RSI for preventive be adjusted as well?

# Reasons for DCPA Adjustments

- Corrective Capacity affects the SCF to preventive constraints currently in market
- Corrective Constraints could have SCF withheld or cost increased from uncompetitive energy bids, increasing LMCPs and LMPs.
- Binding Corrective Constraints may cause preventive constraints to not bind, causing current DCPA/LMPM to not be applied despite demand for local energy and capacity increasing

# Residual Supply Index - Overview

- Dynamic Competitive Path Assessment (DCPA) utilizes a Residual Supply Index (RSI) to assess competitiveness of constraints (RSI  $\geq 1$  is competitive)
- RSI is ratio of Supply to Demand for Counterflow, accounting for potential withholding

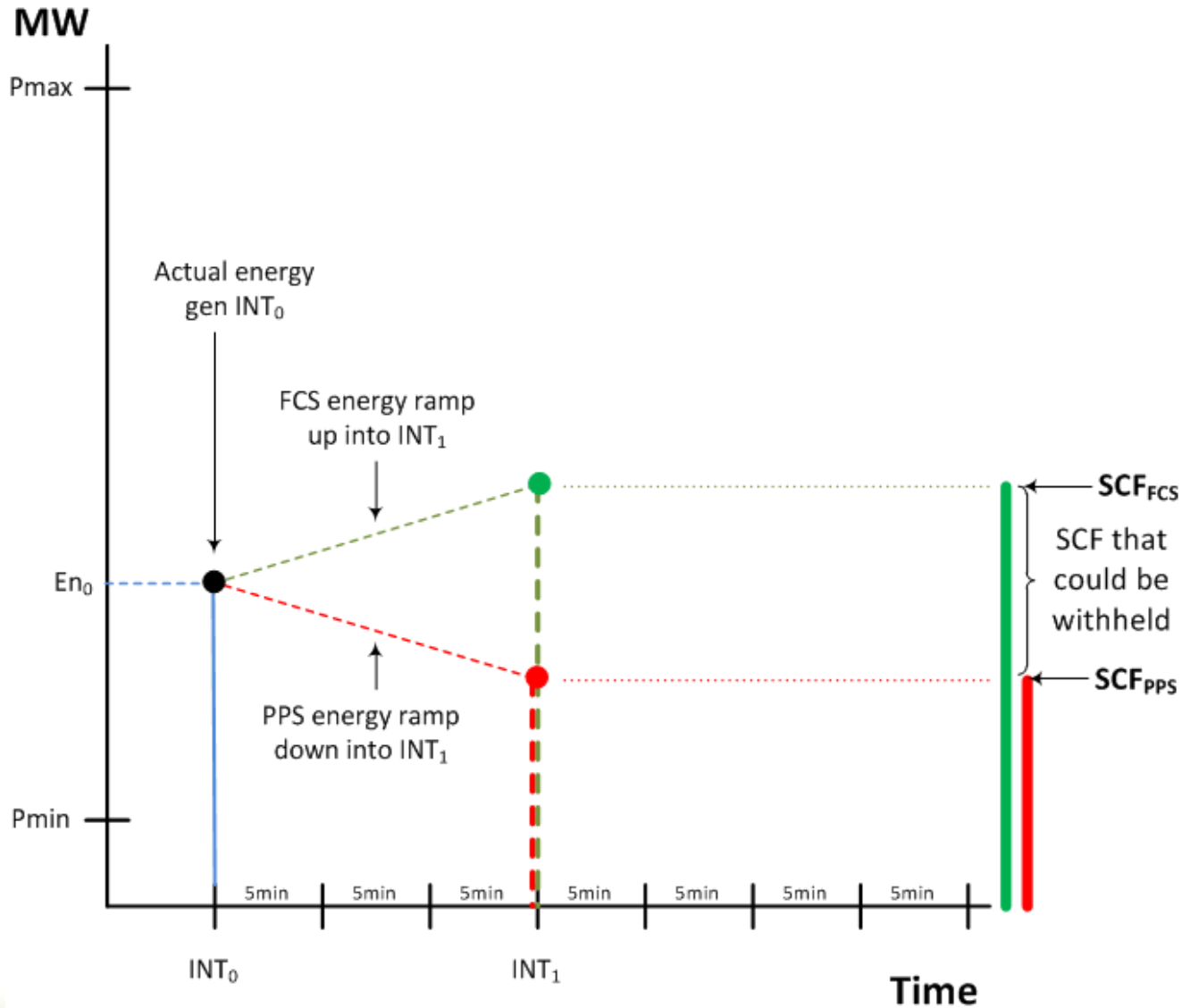
$$RSI_k = (SCF_k^{fcs} + SCF_k^{pps}) / DCF_k$$

- SCF from Fringe Competitive Suppliers plus SCF from Potentially Pivotal Suppliers that cannot be withheld from constraint  $k$ , divided by DCF.

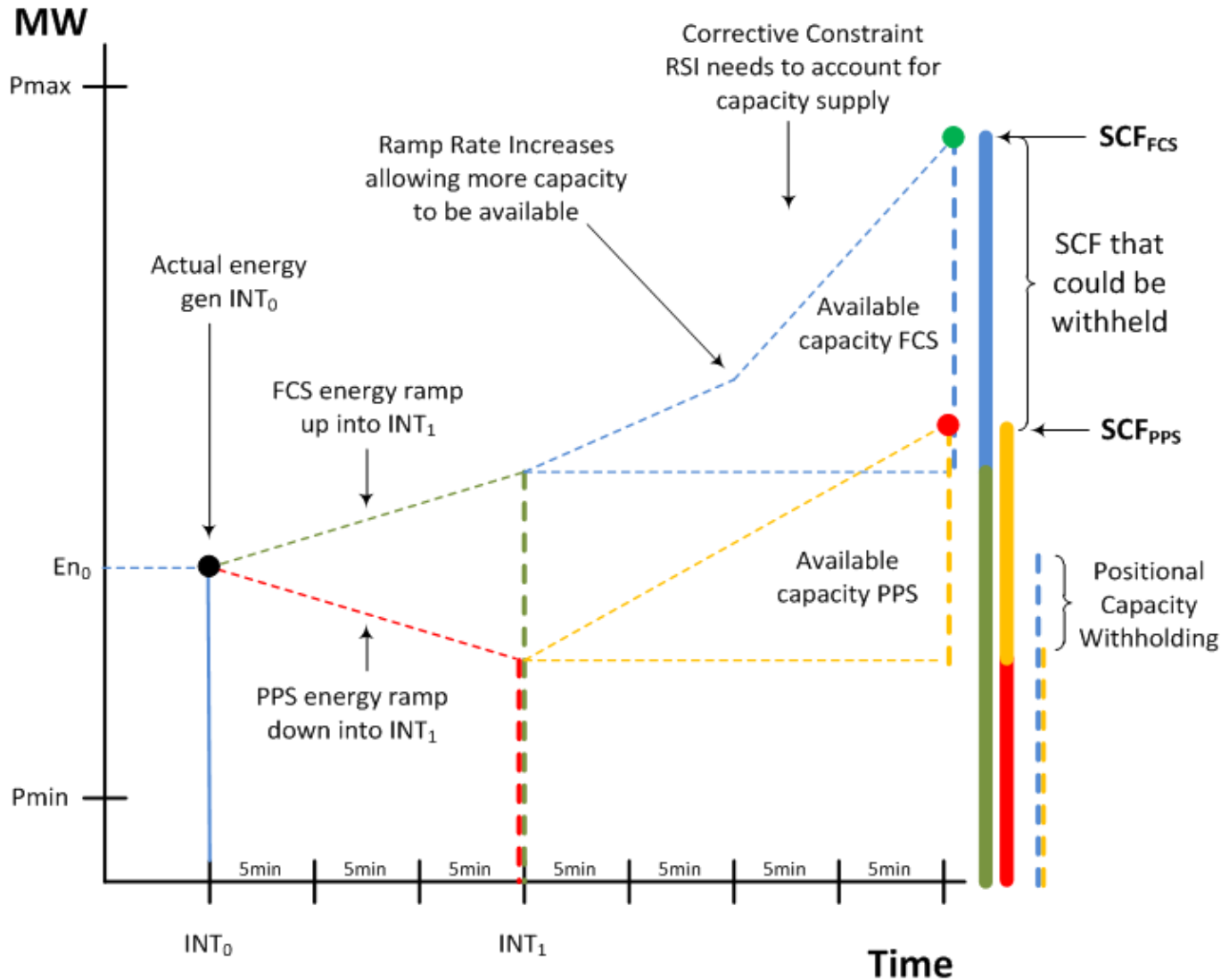
$$DCF_{kc} = \sum_i -SF_{kc,i} * (DOP_i + CC_i)$$

$\forall SF_{kc,i} < threshold$

# Current Real-Time Preventive SCF



# Proposed Real-Time Corrective SCF



# Proposed Change to Real-Time Preventive SCF

- Current Real-Time SCF is capped at maximum operating level less de-rates, awarded operating reserves and awarded regulation up
- Propose that maximum available SCF to Preventive constraint be adjusted for Corrective Capacity awards as is currently done for other operating reserves

$$EnerMax_i = MaxCap_i - Derate_i - OR_i - RU_i - CC_i$$

# Day-Ahead RSI Calculations

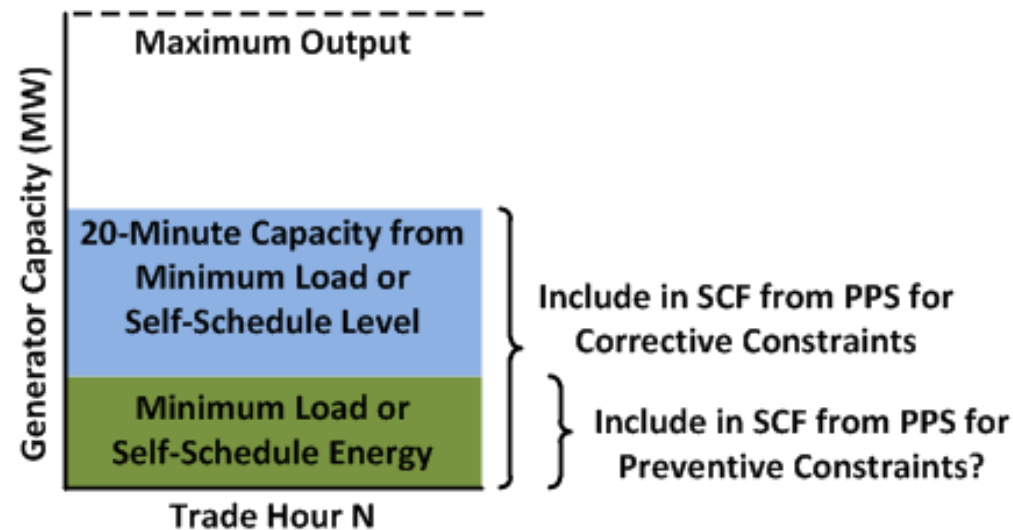
- Currently Day-Ahead RSI and DCPA is similar to Real-Time, but without the ramp constraints, or removal of operating reserve and regulation awards
- RSI includes all FCS and excludes all PPS capacity

However...

- For corrective constraints, cannot withhold 20-minute capacity from Self-Schedule or from min load if committed in MPM run (because there is no capacity offers)

# Day-Ahead SCF Calculation Proposal

- Include self-sched/min load energy plus 20-min capacity in corrective constraint RSI for PPS, if...
  - Resource is self-scheduled in Day-Ahead
  - Or resource is committed in MPM run
- Similar argument can be made for self-schedule / min load energy for preventive constraints





# Triggering Mitigation

- Currently mitigation is triggered when the net impact of non-competitive constraints on LMP is positive
- Congestion from corrective constraints will be added either to the competitive or non-competitive congestion LMP component

$$LMP_i = LMP_{EN,i} + LMP_{CC,i} + LMP_{NCC,i} + LMP_{LOSS,i}$$

- Bid mitigation would occur as is currently done, with the competitive LMP excluding congestion from non-competitive constraints (either preventive or corrective)

Thank you

# Glossary (for reference, not official definitions)

- **Preventive Constraint** – Normal N-1 transmission limit (currently used in market)
- **Corrective Constraint** – Post-contingency constraint that must be recovered to within 30 minutes (CME proposes to include in the market)
- **Corrective Capacity** – 20-Minute capacity effective on corrective constraint
- **LMPM** – Local Market Power Mitigation
- **DCPA** – Dynamic Competitive Path Assessment
- **RSI** – Residual Supply Index, index to determine path competitiveness as part of DCPA
- **FCS** – Fringe Competitive Supplier
- **PPS** – Potentially Pivotal Supplier
- **SCF** – Supply of Counterflow, amount of potential counterflow to constraint included in RSI
- **DCF** – Demand for Counterflow, quantity of counterflow demanded to meet constraint
- **MPM Market Run** – Market run used to determine binding constraints and DCF for DCPA

# Next Steps

Item	Date
Second revised straw proposal	3/13/2014
Stakeholder call	3/20/2014
Stakeholder comments due	3/27/2014
Prototype results	TBD
Draft final proposal	4/22/2014
Stakeholder call	4/30/2014
Stakeholder comments due	5/6/2014
Board meeting	7/17-18/2014

Please submit comments to [ContingencyModeling@caiso.com](mailto:ContingencyModeling@caiso.com)