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~~PG&E~~ DR Integration

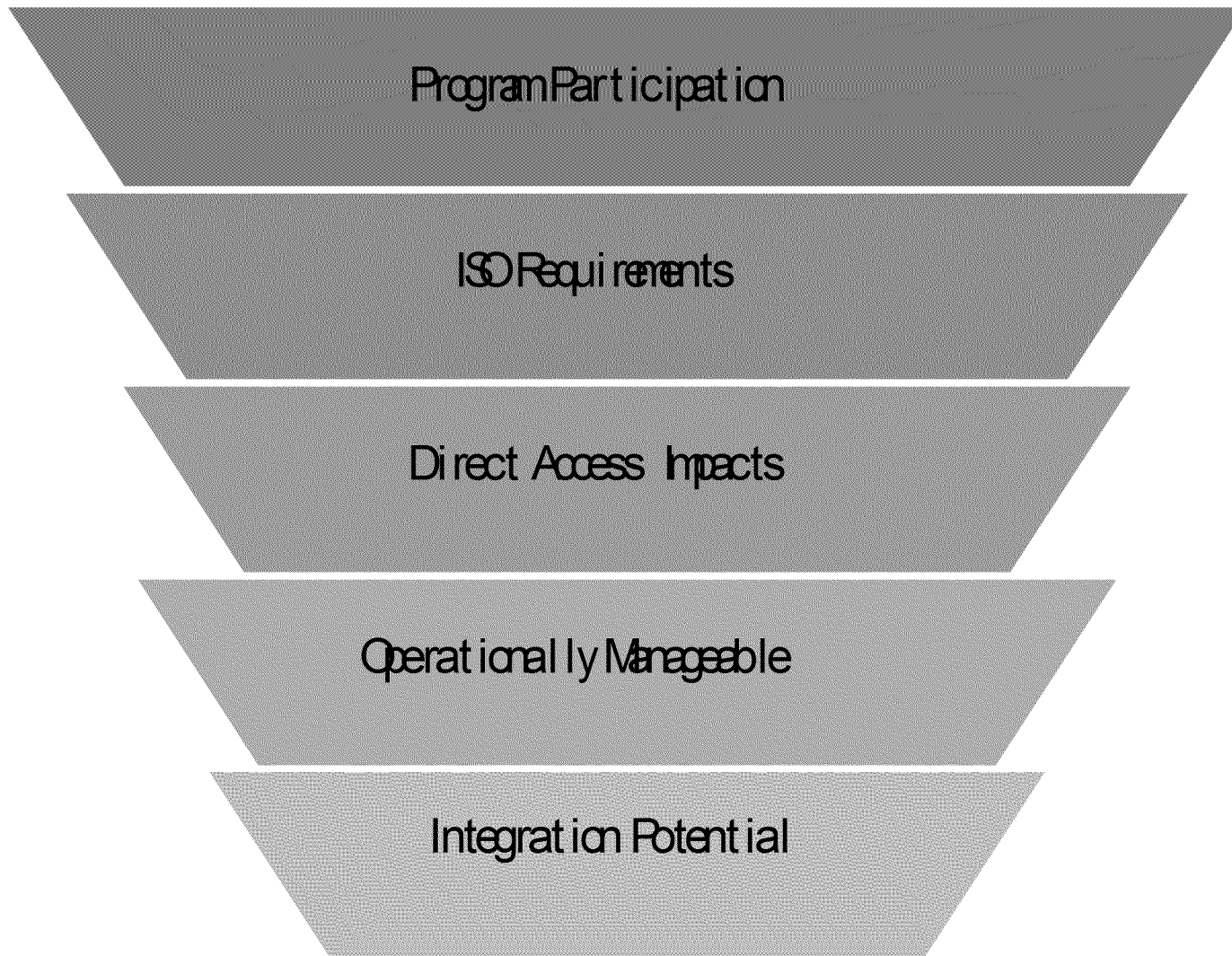
~~CPUC~~ Energy Division Update

Beth Reid

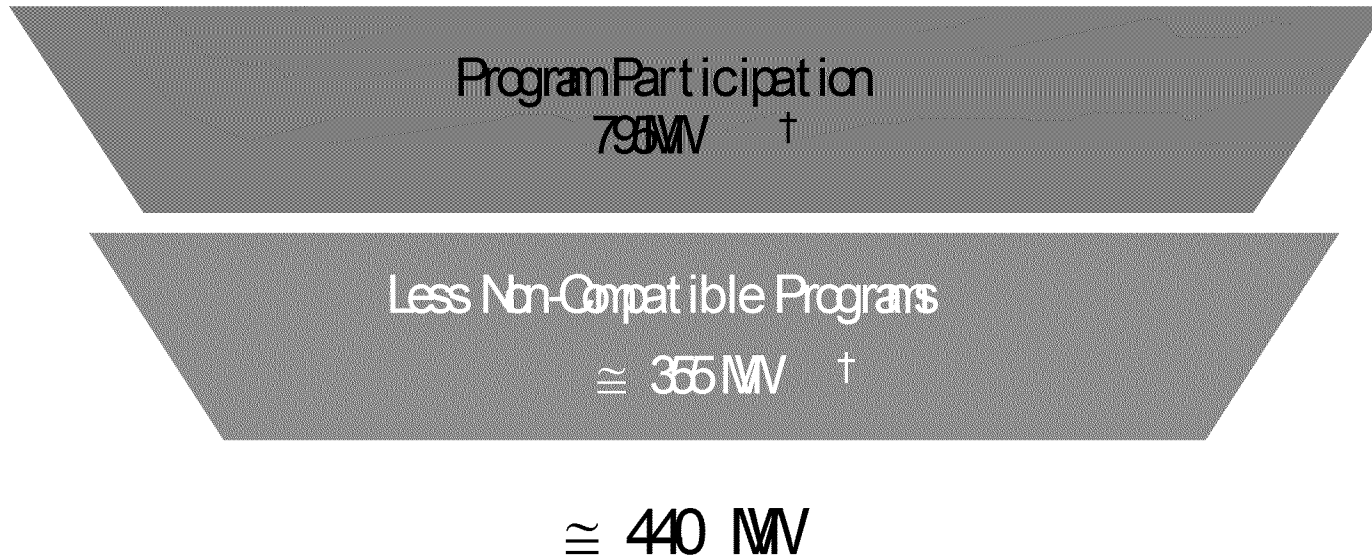
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FDR 2014: Process Funnel



FERC 2014: Program Participation



- Per Olivine's 2013 Evaluation of FERC DR Programs for Wholesale Market Integration, a number of programs are currently incompatible for wholesale market integration.
- Analysis assumes no exceptions to ISO requirements or new revisions to program tariffs

Funnel employs 2013 data. Results subject to revision due to unanticipated future fluctuations in enrollment & nominations
†Based on Ex Post Estimated Load Impacts from FERC September 2013 ILP

RDR 2014: Program Participation

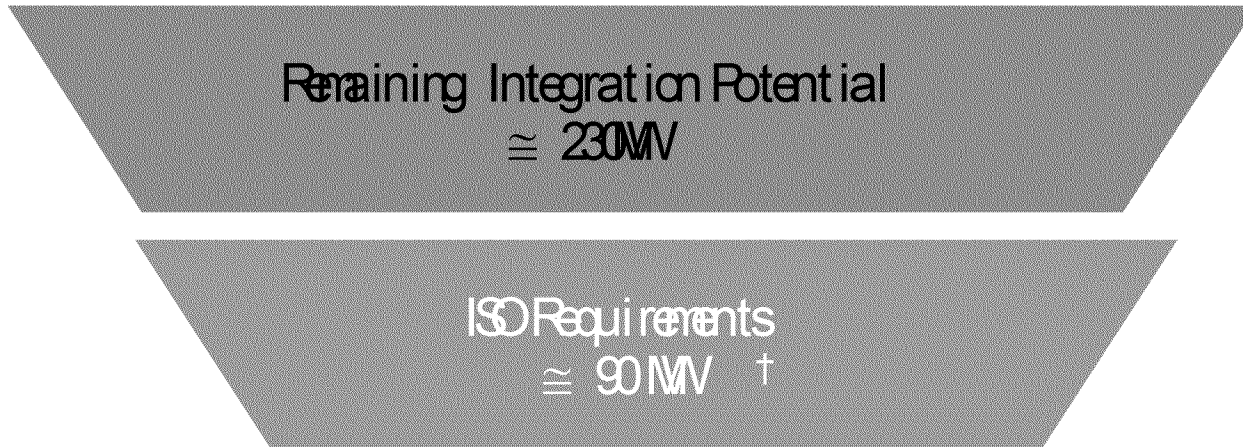


- CAISO RDR implementation delays
- RDR not economically dispatched by CAISO market
- Full RDR dispatch may be required in an emergency

Funnel employs 2013 data. Results subject to revision due to unanticipated future fluctuations in enrollment & nominations
†Based on Load Impacts from 2013 Events



FDR 2014: ISO Requirements

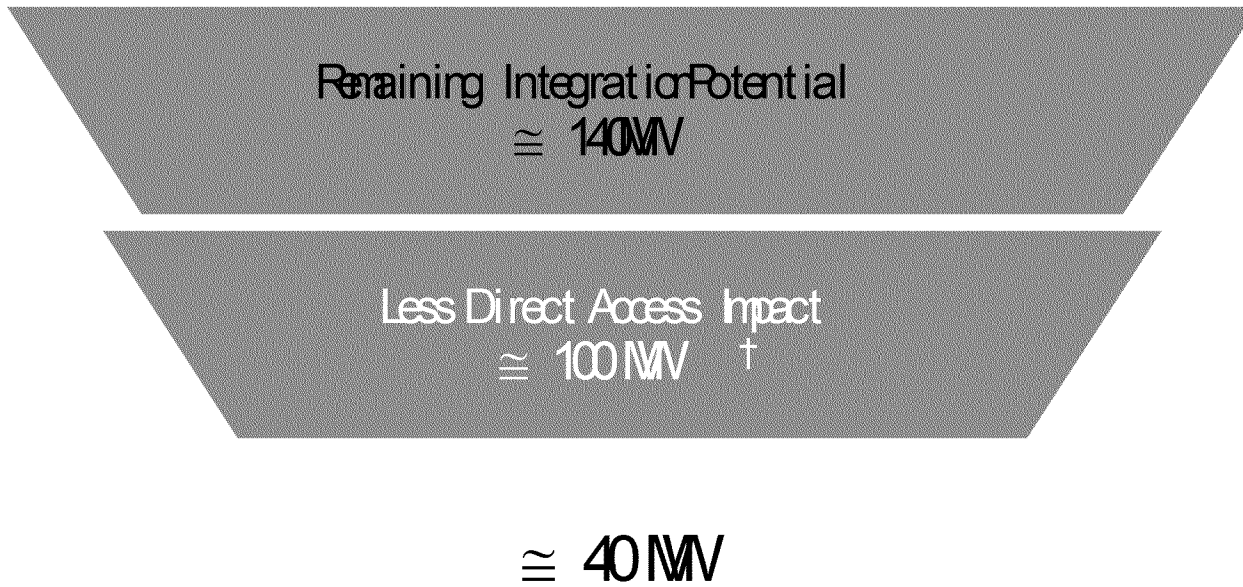


$\cong 140 \text{ MW}$

- Sub-LAP versus System dispatch, no LAP option in Wholesale Market
- Minimum load reduction 100 MW
- Maximum resource size 10 MW
- Each FDR must be associated with a single LSE (see next slide)

Funel employs 2013 data. Results subject to revision due to unanticipated future fluctuations in enrollment & nominations
†From FDRs April 1st DR Load Impact Filing 2013

2014: Direct Access Impact

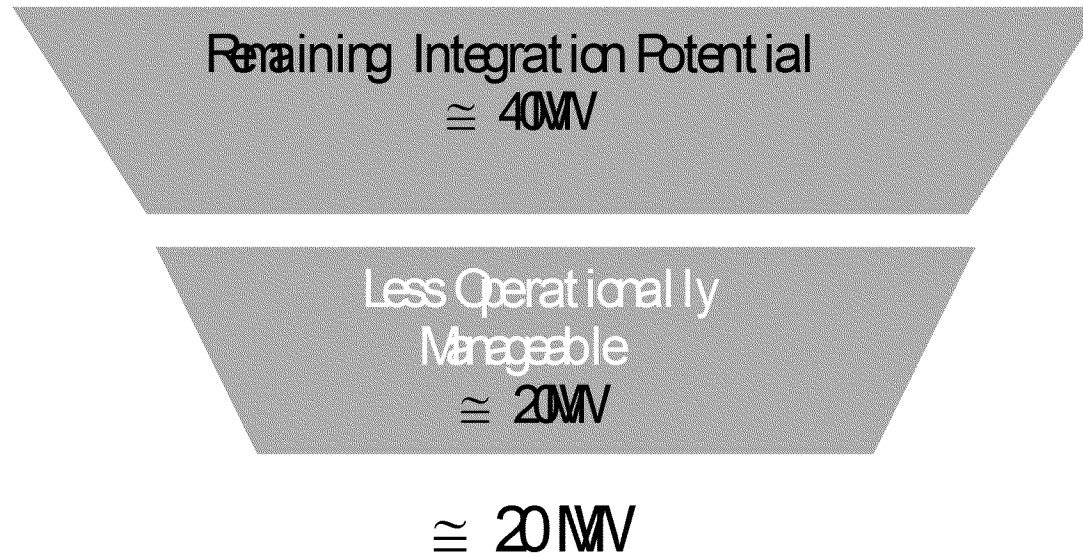


- There are approximately 50 MW of Direct Access Participation in AMP & CB
- Aggregator Portfolios Comingle Bundled and Direct Access
- Approximately 100 MW of Comingled participant load in Sub-LAPs with a significant direct access impact

Funel employs 2013 data. Results subject to revision due to unanticipated future fluctuations in enrollment & nominations
†Based on Load Impacts from 2013 Events



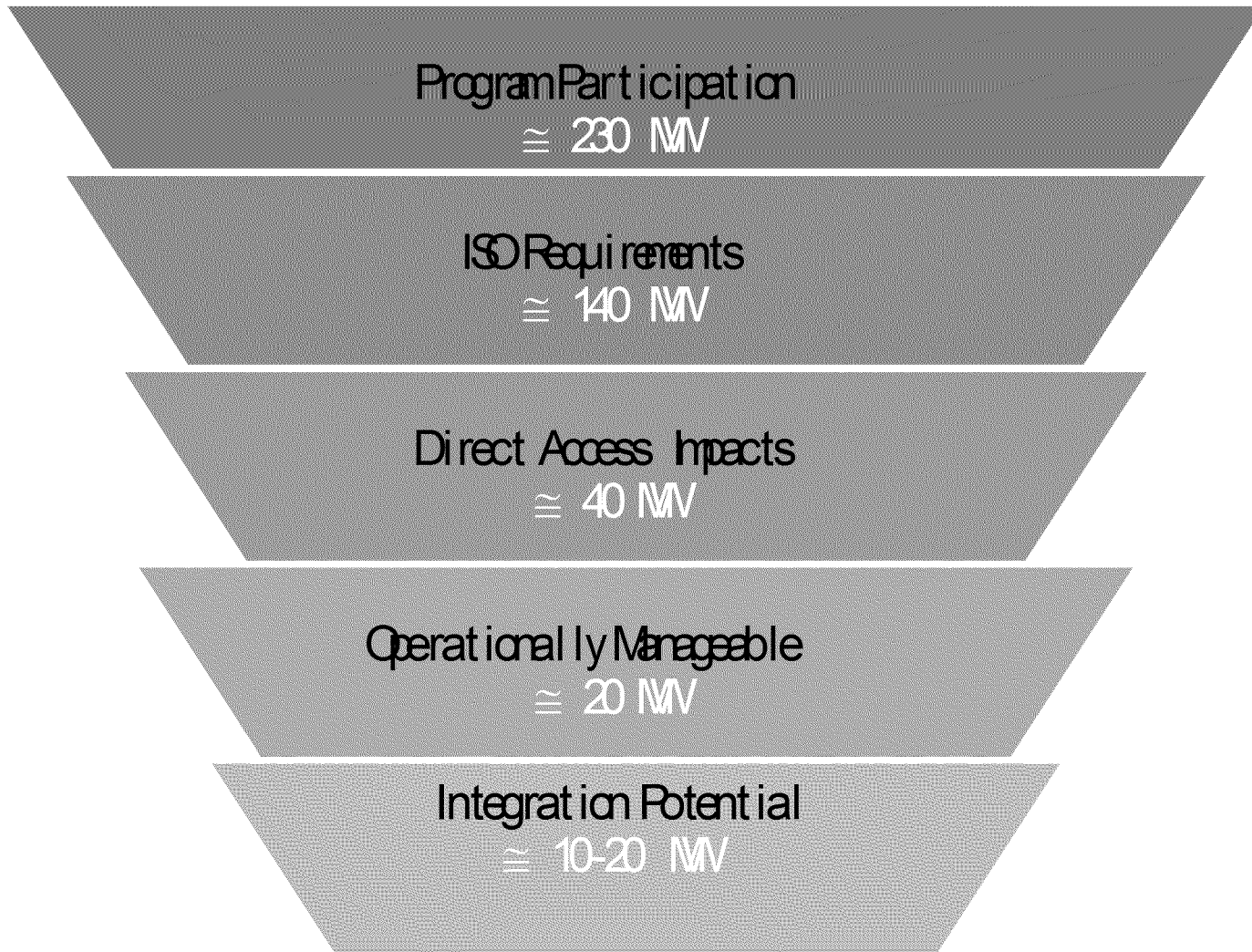
PDR 2014: Operationally Manageable



- Only 13 Sub-LAPs contain quantities feasible to register manually
- Registrations and bidding require new workflows with manual processes
- CAISO currently does not have DR APIs in place
- Bidding all of AMP would require approximately 200 PDRs

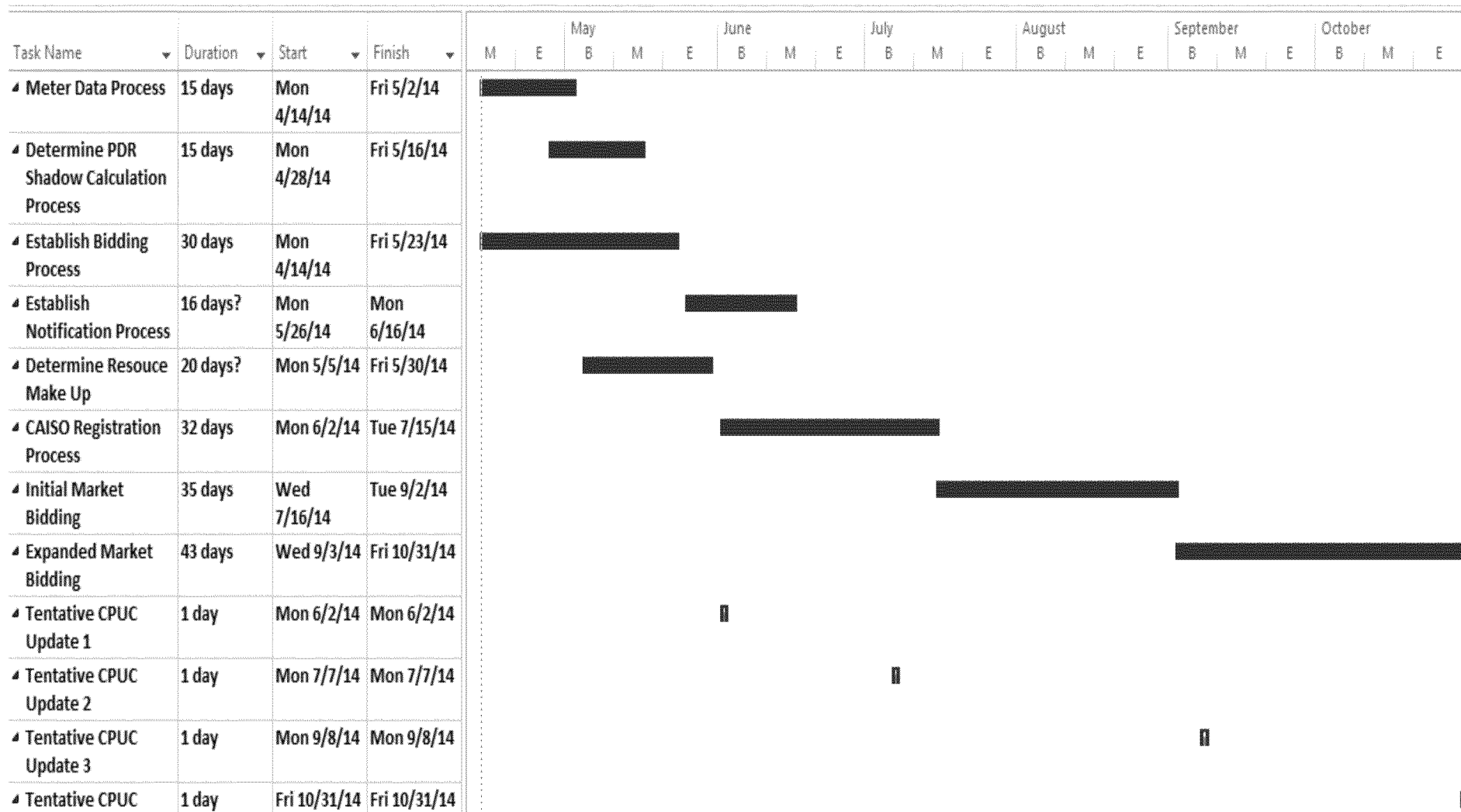
Funel employs 2013 data. Results subject to revision due to unanticipated future fluctuations in enrollment & nominations
†Based on Load Impacts from 2013 Events

FDR 2014: Process Funnel



Funnel employs 2013 data. Results subject to revision due to unanticipated future fluctuations in enrollment & nominations
†Based on Lead Impacts from 2013 Events

Project Timeline





CAISO Integration: 2015 and beyond

- PG&E believes further upside potential exists in the integration of DR with CAISO markets
 - Efficiency / greater comfort from 2014 experience
 - Access to Direct Access customers via agreements with third-party ESPs (\cong 100 MW)
 - Changes to CAISO business rules (\cong 90 MW; more if you include SmartAC)
 - Implementation of DR tariff (\cong 210 MW)
- Automation at PG&E and CAISO is needed to capture most of this potential
 - Automation required to manage significant increases in scale (e.g., resource registrations) and complexity (e.g., real-time dispatch)
 - PG&E intends to pursue additional integration opportunities that do not require automation, likely limited to tens of MW
- Automation will require significant investment of time and money
 - Currently estimated to be tens of millions of dollars
 - DR OIR Phase 3 and next DR funding application (November 2015) should guide investment decision