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PG&E DR Integration

CPUC Energy Division Update

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PDR 2014: Process Funnel

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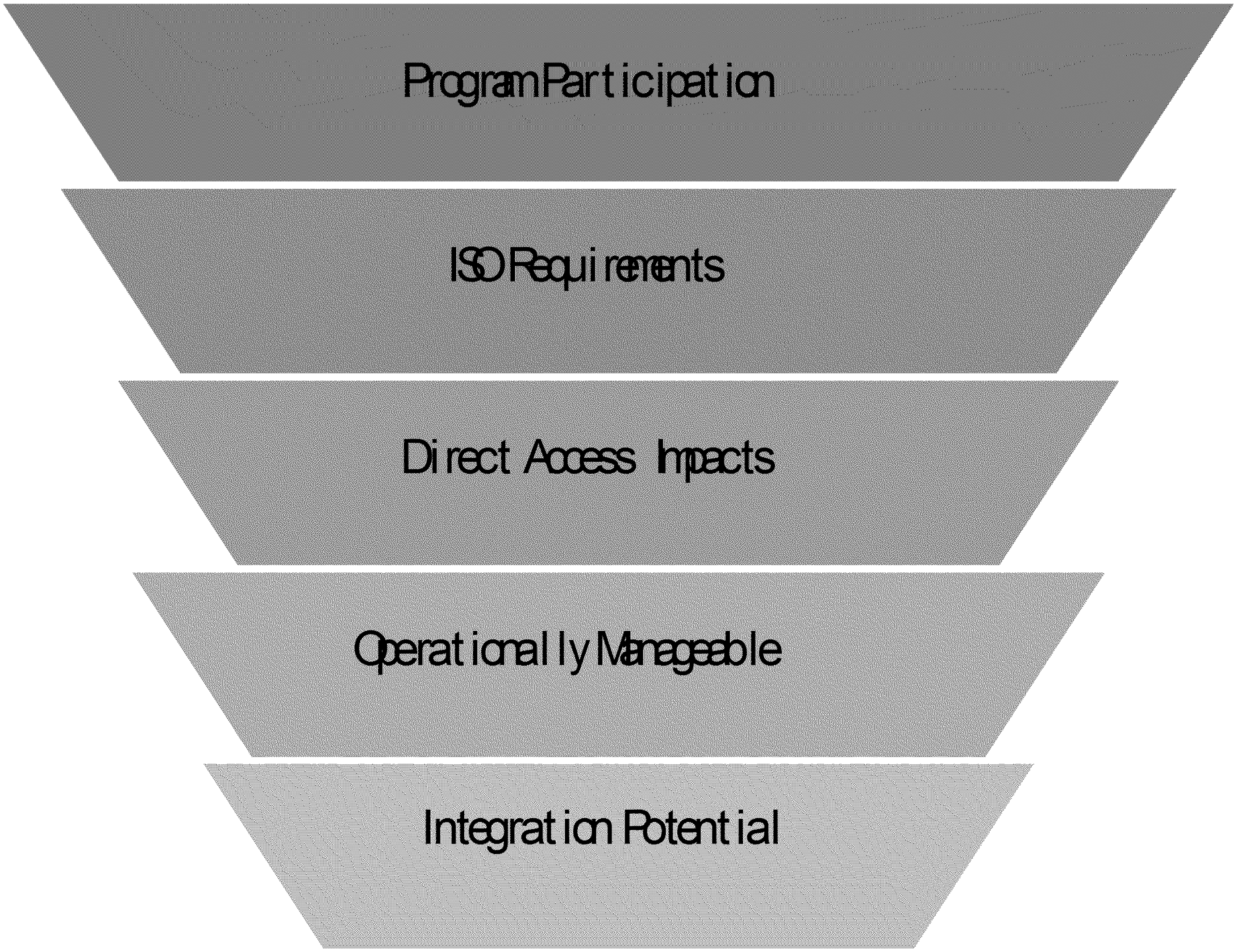

PDR 2014: Program Participation

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Program Participation
795 MW †

Less Non-Compatible Programs
≅ 355 MW †

≅ 440 MW

- Per Olivine's 2013 Evaluation of PG&E's 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 PG&E's September 2013 ILP

RDR 2014: Program Participation

Program Participation
440 MW †

Less BIP Participation
BIP ≅ 210 MW †

≅ 230 MW

- CAISO RDRR implementation delays
- RDRR not economically dispatched by CAISO market
- Full RDRR 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

PDR 2014: ISO Requirements

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Remaining Integration Potential
≅ 230MW

ISO Requirements
≅ 90 MW †

≅ 140 MW

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

Funnel employs 2013 data. Results subject to revision due to unanticipated future fluctuations in enrollment & nominations

†From PG&E's April 1st DR Load Impact Filing 2013

PDR 2014: Direct Access Impact

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Remaining Integration Potential
≅ 140 MW

Less Direct Access Impact
≅ 100 MW †

≅ 40 MW

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

Funnel 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

Remaining Integration Potential
≅ 40MW

Less Operationally Manageable
≅ 20MW

≅ 20 MW

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

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

PDR 2014: Process Funnel

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Program Participation
≅ 230 MW

ISO Requirements
≅ 140 MW

Direct Access Impacts
≅ 40 MW

Operationally Manageable
≅ 20 MW

Integration Potential
≅ 10-20 MW

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

Project Timeline

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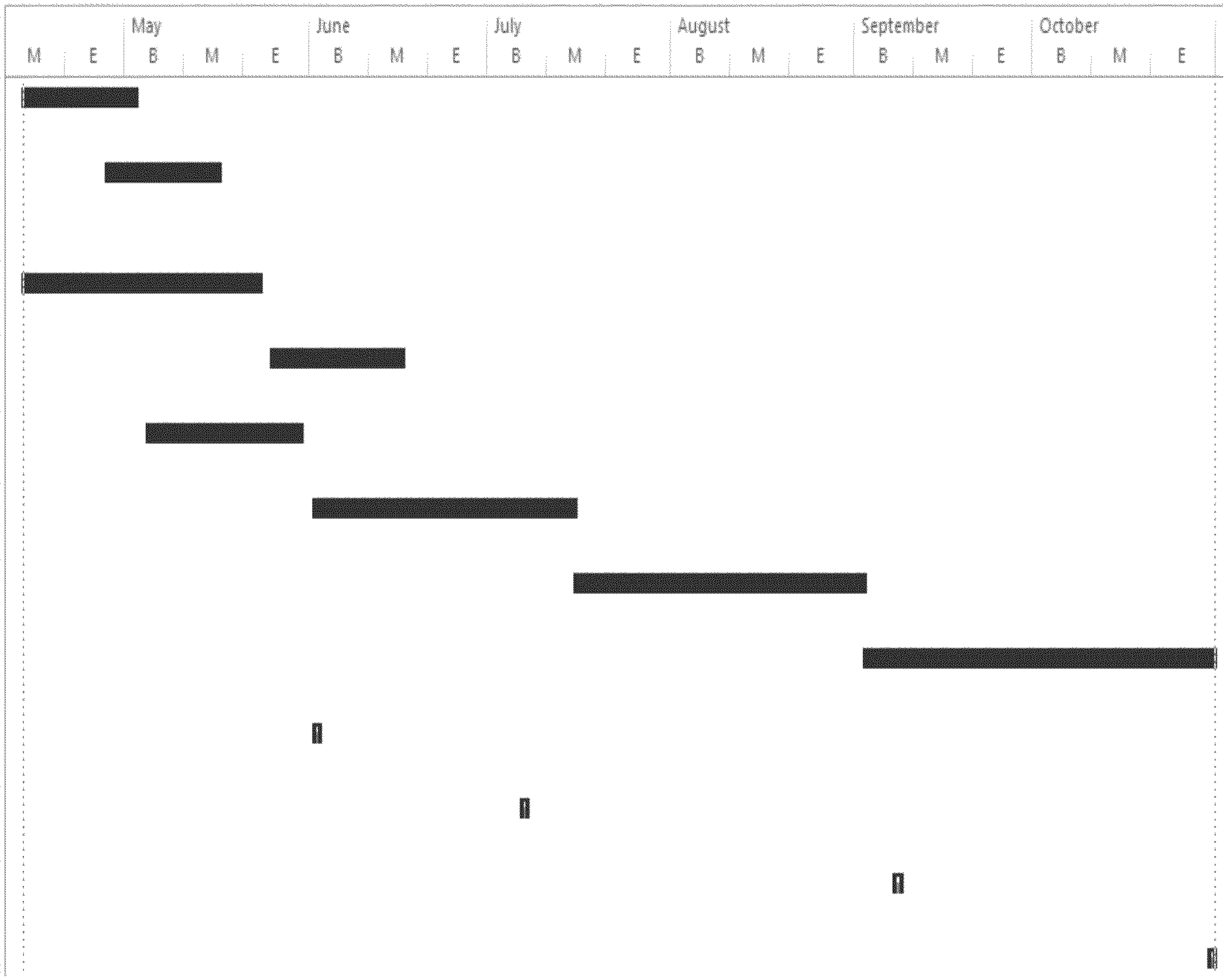
Task Name	Duration	Start	Finish
Meter Data Process	15 days	Mon 4/14/14	Fri 5/2/14
Determine PDR Shadow Calculation Process	15 days	Mon 4/28/14	Fri 5/16/14
Establish Bidding Process	30 days	Mon 4/14/14	Fri 5/23/14
Establish Notification Process	16 days?	Mon 5/26/14	Mon 6/16/14
Determine Resouce Make Up	20 days?	Mon 5/5/14	Fri 5/30/14
CAISO Registration Process	32 days	Mon 6/2/14	Tue 7/15/14
Initial Market Bidding	35 days	Wed 7/16/14	Tue 9/2/14
Expanded Market Bidding	43 days	Wed 9/3/14	Fri 10/31/14
Tentative CPUC Update 1	1 day	Mon 6/2/14	Mon 6/2/14
Tentative CPUC Update 2	1 day	Mon 7/7/14	Mon 7/7/14
Tentative CPUC Update 3	1 day	Mon 9/8/14	Mon 9/8/14
Tentative CPUC	1 day	Fri 10/31/14	Fri 10/31/14



CAISO Integration: 2015 and beyond

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- 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 (≅ 100 MW)
  - Changes to CAISO business rules (≅ 90 MW; more if you include SmartAC)
  - Implementation of PDRR tariff (≅ 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