JDP's Cost of Integration Presentation

June 9, 2014

Agenda

- Categories of DRP Integration Costs
- CAISO Metering and Communications Requirements
- Metering and Communications Requirements of Other ISOs/RTOs
- Why These Requirements Add Costs/Risk
- Local Dispatches

Categories of Wholesale Market Integration Costs

- Connecting to CAISO's systems to submit bids, communicating metering information, etc.
- Becoming or retaining a scheduling coordinator
- Software costs-including programming and testing of logic to comply with the program design and rules. (4-6 man-months)
- Hardware costs to provide curtailment
- Personnel costs
- Operations systems design (one-time cost, with maintenance as required for changes/updates)
- Metering costs
- Customer engagement costs

Description of CAISO Metering Requirements for PDR and RDRR

Source: CAISO Metering BPM

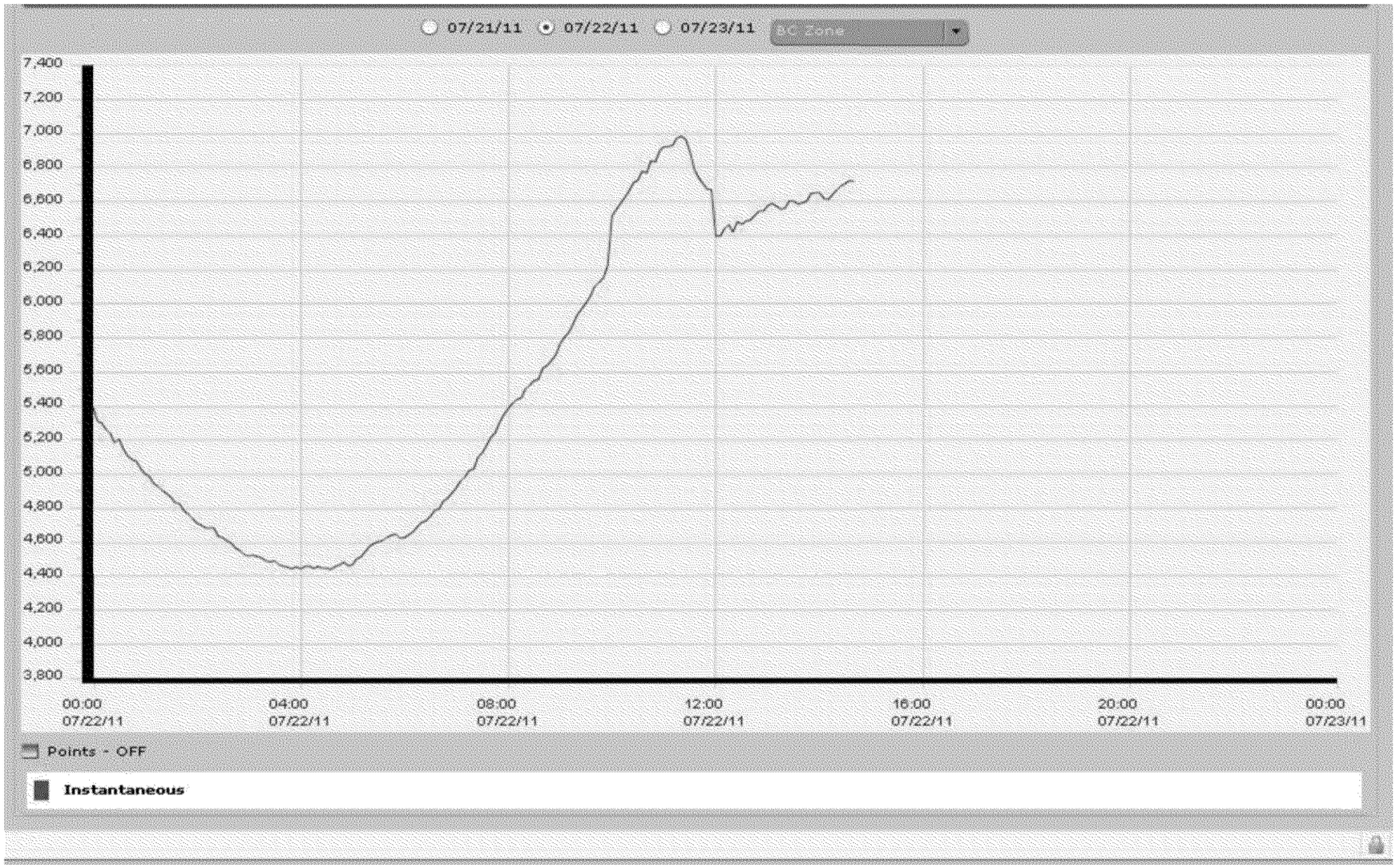
- General Requirement for Telemetry:
  - Resources with a capacity of 10 MW or greater (at the resource level)
  - Resources that provides ancillary services
  - Eligible intermittent resources
- Participating Load and PDR are subject to these requirements
- Telemetry is not required for RDRR
- Remote Intelligence Gateway (RIG) must be present in the sub-LAP where resources reside. This is waived for PDR.
  - Means that a central "RIG" can be used for PDR resources
- All telemetry data must be within +/- 2% of the true value
- Dedicated T1 circuit, backup and a diversely routed T1 circuit
- Requires 1 minute interval data be transmitted
- Maximum of 25 resource IDs may be associated with a single RIG

Comparison of CAISO Metering Requirements to Other Markets

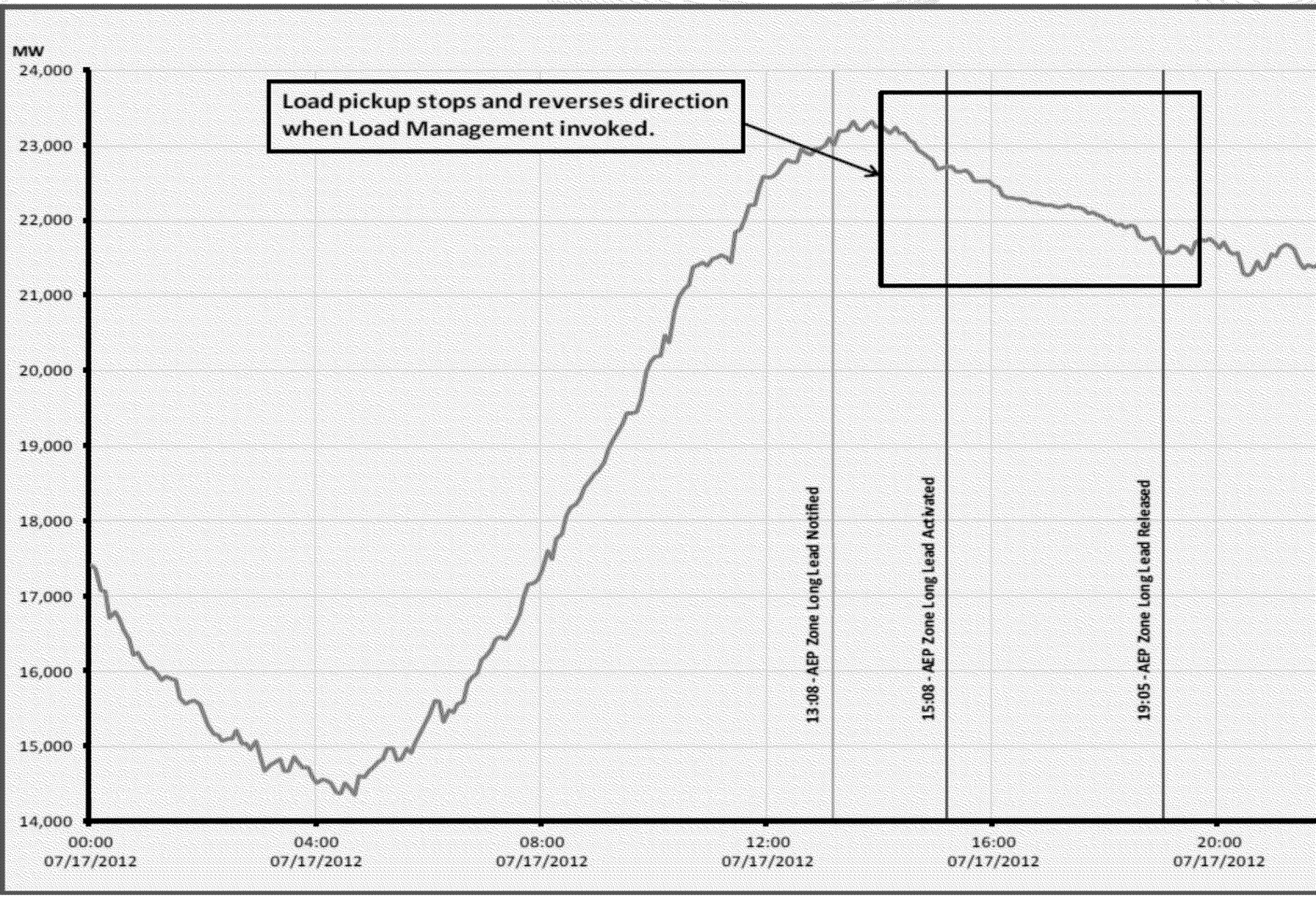
It is unclear why CAISO's requirements need to surpass those employed by other markets.

- PJM
  - No requirement for near, real-time operational data
  - Hourly interval data for energy
  - 1 minute data required for 10-minute and 30-minute reserves, reported within 2 business days
  - Telemetry required for frequency/regulation resources
  - Settlement data for energy required 60 days after dispatch
  - PJM monitors load buses in real time
- MISO
  - No telemetry requirement for energy or A/S
  - Hourly interval data for energy
  - 5-minute interval data for spinning or non-spinning reserves submitted 5 days after dispatch.
  - Telemetry required for regulation only
  - Data reported 5 days after dispatch

PJM Screen Shot for BGE Zone



Instantaneous AEP Zonal Load 7/1



Why Do CAISO's Requirements Add Cost/Risk?

- Telemetry requirement can be avoided by reducing aggregation size below 10 MW; but, there are costs/risks associated with reducing the portfolio size:
  - Increases performance risk by reducing aggregation size and portfolio diversity
  - Increases administration by DRP by increasing number of resources that require management
  - Decreases customer pool from which participants will be accepted into the portfolio
  - May run afoul of internal risk management guidance
- DRP could use NOC to provide operational data by resource to CAISO
  - Must meet communications requirements (Olivine's DER Integration Report, January 6, 2014, at pp. 22-23.)
  - DRPs are not collecting 1 minute data for energy deliveries currently
  - Incurs risk for accuracy of operational data (+/- 2% of true value), despite the fact that DRP does not receive RQMD from LSE's MDMA until T+33 days
  - DRP would have to limit resource registrations from NOC to 25

Sub-LAP Bidding and Settlement

- CAISO's tariff requires DR resources to be bid, scheduled and settled on a sub-LAP basis.
- Other markets allow for a resource to be dispatched as broadly as on a system-wide basis or down to a local area depending upon system needs.
  - PJM, ISO-NE, ERCOT, NYISO do not require local dispatch at all times
- CAISO's current construct does not permit DR to act as a system resource, even if a requirement is developed on a system-wide basis (FRACMOO).
- While JDP's are technically capable of delivering on a local basis, sub-LAP dispatches are more difficult to administer and are more costly, including performance risk, than resources that serve larger geographical areas.
- Sub-LAP portfolios require more customer engagement activity and costs.
- If multiple sub-LAPs are dispatched, allow for settlement across dispatched sub-LAPs.

Recommendations

- DRPs will evaluate costs of participating in CAISO markets relative to the revenue opportunity and determine if it is a cost-effective proposition.
- DRPs will evaluate the CAISO market opportunity relative to other markets and make rational decisions as to how best to allocate resources.
- Customers will have to decide if participation in DR provides a value proposition for them with increased communications costs.
- Exempt DR resources from telemetry requirement
  - It adds unnecessary costs and risks.
  - Allow for reporting of estimated data by T+5 business days.
  - It is a requirement in excess of those required by other markets that have successfully integrated DR.
- Allow resources to submit bids and settle over larger geographic areas than a Sub-LAP (System, DLAP, and LCA) and allow settlement across dispatched sub-LAPs.
- Use sub-LAP dispatches only when local dispatch is required, not as a rule of thumb.