

Anaheim Public Utilities

FERC

Joint Board on Security Constrained Economic Dispatch

Palm Springs, CA

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Background of the Utility

Anaheim Public Utilities (Anaheim) is a municipal utility that has been serving customers electricity in Southern California for over 100 years. It is committed to providing low cost reliable service to over 110,000 residential and business customers. Anaheim has a peak load of over 560 megawatts and has resource capability to cover over 95% of its energy needs. While Anaheim has made significant investments in transmission, it remains overall a transmission dependent utility, islanded within Southern California Edison's service area. Anaheim is a Participating Transmission Owner with the California Independent System Operator (CAISO).

Background of the Panelist, Marcie Edwards

Marcie Edwards is the General Manager of Anaheim Public Utilities. She has held various executive positions within the Los Angeles Department of Water and Power, acted as the interim Chief Executive Officer of the CAISO during their CEO search, has served on the CAISO board, and is the current president of the California Municipal Utilities Association.

Stakeholder Panel - West

All stakeholders:

Describe the current application of economic dispatch in your part of the West.

- Who performs the dispatch?
There are a number of load serving entities within California that supply their own resources in an economic dispatch fashion for their respective load areas. On a prescheduled basis, Anaheim schedules 100% of its forecasted load and resources with the CAISO, and then uses the CAISO imbalance market (a market that dispatches generation based on bid prices, and system reliability constraints) to manage any unplanned deviations from that schedule.
- How is the dispatch determined?
Dispatch in the CAISO imbalance market is based on dispatching generation based on lowest-to-highest bid price based upon the amount of load required to serve and reliability constraints, including transmission congestion. Any market participant within the CAISO who has a participating generator agreement with the CAISO must bid in their unused capacity.
- What is the geographic scope of the dispatch?
For the CAISO, it covers most of California, with the exception of the other control areas in portions of Northern and Southern California. (SMUD, LADWP, IID to name a few.)

- Are there resources not included in the dispatch? Would including them improve the dispatch?
Resources can “un-include” themselves by pricing themselves to where no one would use them, but, to my knowledge, they are currently required to bid in all unused capacity. Making markets as robust as possible by having as many resources as possible may likely “improve” the dispatch, especially in some reliability constrained areas. However, how the “improvement” costs are allocated to participants may not prove equitable. The goal of economic dispatch should be real system efficiency improvements, not cost shifting between customers.
- Are there resources that present challenges in incorporating them into the dispatch (e.g., hydro resources)?
Yes, as identified, hydro resources are challenging, as are resources that are constrained by environmental related permit conditions such as those issued by the local air pollution control districts, or those constrained by physical unit characteristics or by transmission constraints (generation stranded by transmission constraints may not get used, even when economically priced), system inertia needs, system voltage requirements that may require non-economic operation, projected loads for the following day which may require that uneconomic units be used, large scheduled changes may require that uneconomic generation be used to manage that change, or operating nomogram requirements may require non-economic unit dispatch. NRC has rigid requirements for the operation of the nuclear plants---they can’t be ramped for economics as a result. Generation that is feeble—partially broken—or will trip if you move it around, can’t easily be moved for economic reasons.
- How do transmission congestion and the dispatch affect each other? How would improvements in one affect the other?
Obviously, if a transmission line is congested, then not all the energy needed can flow to demand. Currently, the dispatch can be influenced by economics of the generation bids and the reliability requirements of the system, as well as transmission rights. This could potentially send skewed signals to the market. In theory, congestion will signal the optimal locations for both load and resource. However in the real world, load is not portable over the short to mid term and resources can be difficult to site where optimal. Improvements in transmission can facilitate lower cost energy reaching load, however this is fraught with many issues, not the least of which being who pays for the improvements. Regional transmission planning that takes into account the reliability needs of the system balanced against utilitarian economics (greatest benefit for greatest number) would be beneficial in determining the optimal locations for transmission facilities.
- How are individual dispatches in the region coordinated?
Within the CAISO, bidders can set their own bid price thus in effect controlling their resource dispatch.
- How is the dispatch communicated to affected generation operators?
The CAISO communicates with resources that bid into its system and dispatches them through the Automated Dispatch System, which sends dispatch information to the generator to specified levels of operation. The difficulty in this system is that it may ignore or not understand physical operating characteristics or limitations of specific

generators. For example, not all simple cycle peaking units have the ability to start up in 10 minutes and operate at full capacity. Anaheim has experienced numerous occasions where its combustion turbine has been ordered to dispatch at levels it cannot achieve within an integrated value over an hour. In addition, there may be dispatch orders to generators that may cause physical damage to the equipment if ordered to move around in a fashion the generator was not design to operate. Sudden orders to stop or start generators with longer lead times has also occurred which eventually would lead to accelerated wear and tear on equipment.

- Are there technical/infrastructure impediments that interfere with implementing the economic dispatch?

Yes, as above.

Under market driven economic dispatch, generator operational characteristics may not always be recognized by the CAISO such as ramp rate capabilities, ability to start/stop under short time frames and coordination when starting up or shutting down generation. In addition, there may be restrictions on energy-limited resources that may be ignored through a market mechanism. For example, natural gas generation in Southern California require NOx emission credits to operate. It is possible that the dispatch orders could cause the operator to exhaust its credits, making it unavailable to operate at opportunities where the CAISO may need that resource at a later date. A centralized/direct ownership system would recognize what those restrictions are and dispatch the resources in a more coordinated fashion. Finally, a market driven dispatch system doesn't guarantee generation to be available to the CAISO for dispatch, since it cannot require to generators to participate.

- Describe possible improvements to current economic dispatch practices.
Recognition of valid constraints on generation resources such as hydro, and those related to environmental constraints, system physics (nomograms, etc), generator limitations (vibration zones, operating in a fashion that increases wear and tear). Development of scheduling windows that allow maximum flexibility with resources, particularly with respect to transmission dependent utilities, would improve economic options.
- What are the potential benefits and costs of those improvements?
The potential benefits are a more stable system both physically and economically. Greater alignment with the scheduling timelines in surrounding states would certainly improve economic resource options. The costs for these improvements range, but would certainly appear to be out weighed by the benefits they would provide in lower more stable customer costs.
- How would those improvements affect reliability?
They would increase reliability. For instance, close alignment of scheduling timelines with other control areas would allow imports by internal market participants to contribute to reliability issues closer to problems that occur in real-time.

- Are there institutional, regulatory, or statutory impediments to the identified improvements?
Yes, they would require changes to the current CAISO operating practices, as well as regulatory or statutory changes, at least in regard to regional transmission planning.
- If you could start from scratch, how should economic dispatch be accomplished in your region?
I would suggest some type of contracting for dispatch services might work better than a market-driven environment. Market prices for dispatch vary dramatically from day to day, depending upon circumstances and as mentioned above, there is no guarantee that the generation is made available for dispatch. Contract services give price certainty and stability for both seller and buyer (ultimately, load serving entities requiring the energy provided by the CAISO) as well as guarantee generation is secured and directed by CAISO.
- How does economic dispatch affect planning, resource acquisition and trading in your area of the West?
The market mechanisms may not be adequate to send signals to the market to build additional generation or to provide incentive for existing generators to participate in the market. Without that, it is unclear who is responsible for planning additional generation that would be required or ensuring adequate generation is available for reliability purposes. Secondly, does the economic dispatch send the proper signals for local capacity requirements? Having adequate generation to support local load requirements has posed problems not only for CAISO, but in the New England area and New York ISO as well. Locating generation in the right areas is not solved with current economic dispatch.
- What effect do non-participants' (TDUs, IPPs, etc.) have on economic dispatch?
Transmission dependent utilities are not necessarily "non participants." Anaheim, while transmission dependent, is a Participating Transmission Owner in the CAISO, meaning that they have brought transmission assets to the table. Most TDU's perform advance economic dispatch in how they have committed their own resources to match their loads when submitting that balanced schedule to the CAISO.
- Address the findings in the DOE report.
The report has not been reviewed yet.