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Resource Adequacy and Capacity Markets in California

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Resource Adequacy and Capacity Markets Are Two Closely Related But Different Concepts

Resource Adequacy

- ❑ Assurance that there is adequate physical capacity in existence to serve likely peak load (i.e., ICAP); and preferably the ability of the ISO to call on it to perform when needed for reliability (i.e., ACAP)



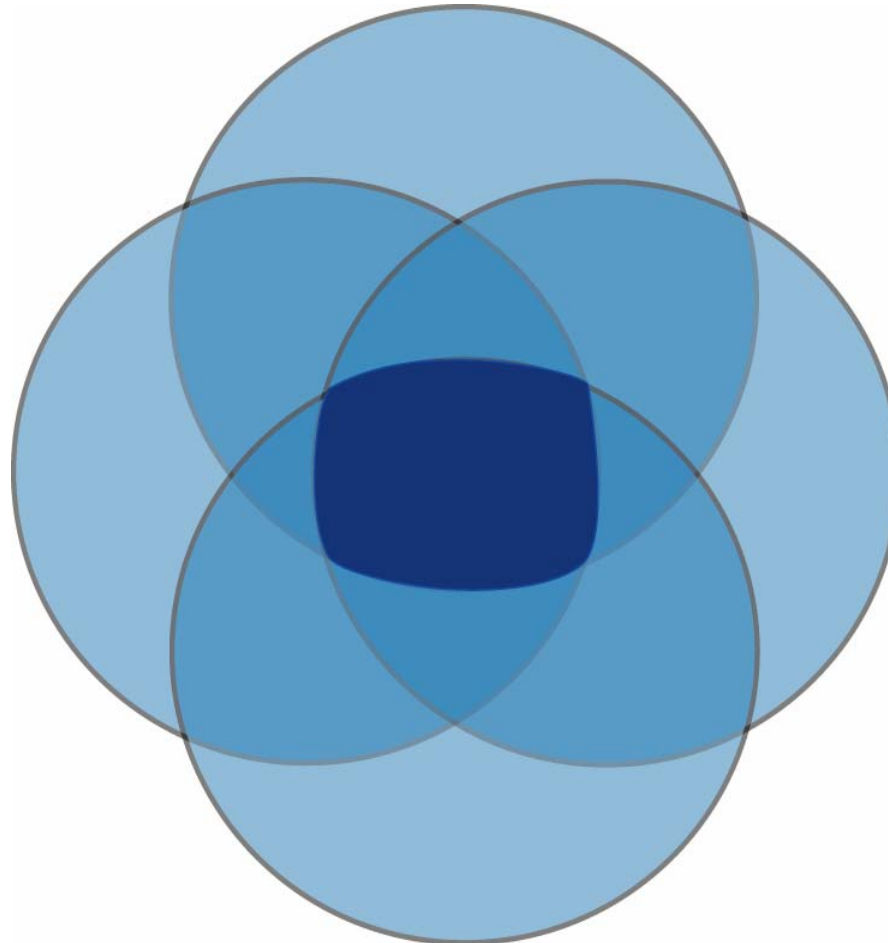
“Capacity” Market

- ❑ Creation of a liquid secondary market for whatever supplier characteristic/obligation “product” satisfies the RA requirement

Multiple Objectives of Resource Adequacy and “Capacity” Markets

Provide for real-time operating
reliability (both global and local)

Mitigate exposure
to the exercise of
market power
(both global and
local)



Facilitate retail
competition
(through a liquid
secondary market in
“capacity”)

Support investment
in new generation

Was There A “Missing Market” in the California Market Structure?

- ❑ The three Eastern ISOs evolved from “tight” power pools of vertically integrated utilities
 - Each had longstanding rules requiring members to maintain sufficient resources

- ❑ The initial UK market design had an administratively determined VOLL “adder” to provide capital recovery for peaking generators
 - And the UK market was also quickly awash in new gas-fired generation capacity (the “Dash for Gas”)

- ❑ The California ISO was formed *de novo* on a philosophical foundation of “*reliability through markets*”
 - But from the beginning, some critics believed there was a “*missing market*” for “capacity” (i.e., contribution to system reliability)

“Capacity” Is a Word with Multiple Meanings

(This is a source of constant confusion)

- 1) *Ability to produce an instantaneous flow of power*
 - ❑ “The plant has a capacity of 1000 MW.”

- 2) *The technological characteristics of the plant—especially, its fuel source*
 - ❑ “Gas-fired capacity”
 - ❑ “Coal capacity”
 - ❑ “Renewable capacity”
 - ❑ “Load-following capacity”


- 3) *The operational economics of the generator (or the strike price of a call contract)*
 - ❑ “Baseload capacity”
 - ❑ “Intermediate capacity”
 - ❑ “Peaking capacity”

Capital Is Invested in Generation Capacity for Three Reasons, and Two of them Are Subject to Free-Riding

- *1) To produce an instantaneous flow of power to assure system reliability
 - So-called “pure capacity” (i.e., ability to meet load)
- 2) To gain access to lower operating costs
 - e.g., cheaper fuels (coal), lower heat rates (CCGTs vs. CTs)
- *3) To pursue public policy goals
 - e.g., renewables development

**The results of these two types of investment are commonly shared by all system users and , therefore, are subject to “free-rider” incentives.*

How Might Resource Adequacy Be Procured?

- 
1. By all LSEs on a bilateral basis
 - Possibly “backstopped” by a default provider at an onerous penalty price
 2. By a central independent agent (e.g., ISO)
 - All load requirements?
 - Only residual requirements already not self-provided?
 3. By utilities on behalf of all LSEs
 - Recovered through “wires” or non-bypassable charge

In the second two models, exactly what is the “capacity” product that is procured?

Chronology of Early Interest in Resource Adequacy in California

- Early 2000:*** FERC focuses on California's congestion management
- Later morphs into Market Design 2002 (MD02) and, later, MRTU
- Summer 2000:*** California Electricity Crisis
- March 2001:*** Legislature creates California Power Authority (CPA)
- June 2001:*** FERC imposes "must offer" requirement on all CAISO generators
- Sept 2001:*** FERC launches SMD docket and FERC Staff solicits comments on ensuring sufficient capacity through ICAP-type mechanisms
- Spring 2002:*** IPP "merchant generator" business model implodes
- April 2002:*** Reliant files motion requesting FERC to require CAISO to establish a "capacity market"
- July 2002:*** CPA initiates rulemaking to determine appropriate reserve margins
- July 2002:*** FERC issues Proposed SMD Rules

FERC's Standard Market Design (SMD) NOPR

(July 2002)

Why is a resource adequacy requirement necessary?

- ❑ Spot-market prices may not produce an adequate incentive for generation investment, especially when they are subject to price caps to mitigate market power

- ❑ As long as outages due to resource insufficiency are socialized across all LSEs, individual LSEs will not be adequately motivated to invest in resource adequacy
 - If it were feasible, “privatizing” the unreliability impacts to individual LSEs that are capacity-short might solve the problem

FERC's SMD NOPR (cont'd)

FERC's Proposed Requirements:

- ❑ RTO must forecast area demands
- ❑ RTO must provide a forum and assistance to Regional State Advisory Committee to establish appropriate RAR reserve margin by region
 - SMD is designed to complement—not supplant—existing state RAR policies
- ❑ RTO must assign each LSE in its area a pro-rata share of resource need
- ❑ Eligible resources: owned generation, contracts, biddable demand, demand-response programs
- ❑ RTO must penalize LSEs who are deficient during actual shortages
 - Deficient LSEs must be curtailed to the maximum extent feasible before curtailing others
- ❑ The RA planning and commitment horizon should be a matter of regional choice determined by the Regional State Advisory Committee, but should be *long enough to achieve construction of new generation*

Resource Adequacy Takes on a Special California Political Flavor

- ❑ In 2001, the CAISO was developing a month-ahead ACAP requirement as part of its MD02

- ❑ In 2002, California asserted its aversion to placing resource adequacy rules under FERC jurisdiction through the CAISO
 - CPUC was placed in charge of determining RAR for IOUs
 - CAISO will implement and enforce CPUC-adopted policies

- ❑ Ramifications of California's approach:
 1. CPUC cannot impose market power mitigation on suppliers; only FERC can do this
 2. CPUC has no jurisdiction over municipals' resource adequacy
 3. Extent of CPUC jurisdiction over ESPs and CCAs is untested

SCE Remarks at FERC SMD Technical Conference on Resource Adequacy (Nov. 6, 2002)

- ❑ SCE supports placing capacity requirements on all LSEs
- ❑ FERC should not order the creation of ISO-run capacity markets
- ❑ Local reliability problems should be handled separately
- ❑ Enforcement penalties should not be imposed solely ex post based on *actual* operations. Instead, penalties should be based on a failure to secure commitments on a forward-looking *planning* basis.

*ALJ Walwyn Ruling Solicited Testimony on Three Options for
Providing Resource Adequacy for ESPs
(March 2003)*

1. Require utilities to acquire reserves for ESPs and/or DA customers
2. Require utilities to acquire reserves for ESPs and/or DA customers and charge them directly for this service
3. Require all LSEs, including ESPs, to acquire their own resource adequacy requirements

SDG&E Proposal

(June 23, 2003)

- ❑ *A centralized* procurement approach designed and approved by the CPUC with implementation by the CAISO

- ❑ *Two mechanisms:*
 1. 3-year forward auction for capacity conducted by the CAISO
 - Suppliers agree to a Reserve Capacity Contract—an annual call option with a high strike price indexed to gas prices
 - Auction is subject to a price cap set beforehand

 2. If price cap is hit, this triggers an auction for 10-year stream of supplemental payments to support newly constructed generation
 - Winners of supplemental payments would be obligated to bid into the CAISO's annual capacity auction

SDG&E's Proposal (cont'd)

(June 23, 2003)

Some details of the Reserve Capacity Contract concept:

- ❑ Supplier is obligated to serve control area load
 - Any exports would be non-firm
- ❑ Contracts are unit-specific one-year contracts signed 3 years ahead
- ❑ CPUC to define specific requirements, including local area (with advice from CAISO)
 - Contracts could replace RMR
- ❑ Utilities must offer all their resources into the 3-year forward auction
- ❑ LSEs can hedge by bidding self-provided resources into the auction

CPUC's Interim Opinion or Procurement and Resource Adequacy (January 22, 2004)

- ❑ Each LSE must satisfy its own RAR
- ❑ RAR will include a 15-17% reserve margin
- ❑ RAR must be met no later than 1/1/2008 with gradual phase-in beginning in 2005
- ❑ Utilities must forward contract for 90% as their summer peak one year in advance
- ❑ DWR contracts and preferred resources are to be counted at full capacity value

SCE's Public Positions/Concerns

- ❑ All LSEs must be treated the same
- ❑ RAR should be phased-in to mitigate market power
 - And procurement obligation should also be limited by reasonable “reservation price” to avoid market power abuse
- ❑ ISO should assume “backstop” responsibility for local area reliability (LAR) procurement in the event of market power abuse (e.g., RMR)
 - If utilities are assigned LAR responsibility, any cost differentials must be recoverable from all customers in non-bypassable charge
- ❑ No need for all-hours RAR
- ❑ LD contracts should count, or in worst case, be grandfathered
- ❑ Reasonable delivery standards must be enforced

CPUC's Phase 1 RA Workshops

(March-April 2004)



- ❑ Forecasting LSE loads
- ❑ Phase-in schedule for meeting RAR
- ❑ Counting protocols for various resources
- ❑ Deliverability issues and qualification
- ❑ Non-compliance penalties

Resulted in an extensive Workshop Report in June 2004

Silicon Valley Manufacturing Group (SVMG) Proposal

(April 2004)

- ❑ Independent Entity (IE) conducts 12-month forward load forecast and pre-certifies capacity resources
- ❑ IE conducts 12-month forward auction to determine:
 1. Which resources win assignment of “tags”
 2. Market clearing price for tags (but this price is not immediately paid)
 - To control market power, no one can bid more than three times the “cost of a new entrant”
- ❑ Tagged resources accept a must-offer obligation in the day-ahead and real-time markets
- ❑ Each LSE must purchase sufficient tags to demonstrate year-ahead compliance with RAR
 - LSE’s can hedge market risks by self-providing resources into the IE’s tagging auction
- ❑ LSE’s are charged for capacity ex post based on their actual load at peak
- ❑ Tagged resources are paid ex post based on their satisfying their must-offer performance obligation

Several Significant Events Related to Local Area Reliability in Summer 2004

- ❑ On May 6, in response to a PJM filing, FERC issued general policies regarding “Reliability Compensation Issues” (RCI)
 - Compensation for reliability investments should be achieved by basic market design features that encourage LSEs to engage in long-term contracting
 - RTOs should not contract for local reliability through RMR except as a short-term backstop subject to a clear triggering event

- ❑ On June 17, FERC rejected the CAISO’s preference to permanently apply a must-offer obligation (MOO) in the day-ahead market
 - FERC required CAISO’s must-offer obligation to end by 1/1/2008 or earlier if CPUC’s RAR rules are fully implemented

- ❑ On June 10, Peevey issued an Assigned Commissioner Ruling responding to CAISO’s desire to have utilities address local area reliability concerns in their procurement
 - CPUC Order on July 8 established a utility local area procurement requirement through Summer 2005

CPUC Interim Opinion on Procurement to Assure Local Area Reliability (D.04-07-028)

Four new procurement principles:

1. Each utility is responsible for scheduling and procuring sufficient and appropriate resources to permit the CAISO to maintain reliable grid operations.
2. When making resource scheduling and procurement decisions, each utility shall incorporate all CAISO-related forward commitment costs that result from the utility's decisions, including all known and reasonably anticipated CAISO costs such as congestion, re-dispatch, and must-offer costs
3. A utility resource scheduling practice or procurement plan that focuses solely on least-cost energy, without regard to deliverability and reliability, is not reasonable or compliant with AB 57
4. Each utility shall minimize the need for RMR contracts

CPUC's Interim Ruling on Phase I Resource Adequacy Issues (D.04-10-035)

- ❑ 15-17% reserve margin applies to the entire year—not just the summer
- ❑ LSEs must acquire resources capable of satisfying their RAR for the number of hours in which forecast load is within 10% of the peak
- ❑ The deadline for meeting RAR is now June 1, 2006 (no more phase-in)
- ❑ Year-round obligation to procure 100% one month ahead
- ❑ To count for RAR, all future contracts must be bid into the day-ahead markets if not previously scheduled and must then be subject to the RUC if the day-ahead bid is not accepted
 - Details to be considered further in Phase 2 workshops

Issues Unresolved by Interim Ruling (Kicking the can down the road...again)

- ❑ LD contracts have certain advantages and disadvantages; their counting for RAR is deferred to Phase 2 workshops
 - DWR LD contracts should be fully counted, but subject to the deliverability screens to be developed in Phase 2
- ❑ Counting treatment of energy-limited resources is deferred to Phase 2 workshops
- ❑ Details of how to implement the month-ahead forward commitment obligation are deferred to Phase 2
- ❑ Certain “second generation” topics are deferred until after Phase 2 workshops:
 1. Unit-specific adjustments to average forced-outage rates
 2. Multi-year forward commitment concept
 3. Resource tagging and trading concept

Scope of Phase 2 Workshops

(January-March 2005)

- ❑ Refinement of implementation mechanics
 - Load forecasting protocols
 - Resource counting conventions
 - Deliverability screens and local resource adequacy requirements
 - Allocation of DWR contracts to all LSEs for RAR satisfaction
 - Development of standard contract language requiring supplier performance

- ❑ Reporting and enforcement
 - Reporting process
 - Review and verification processes
 - Penalties and sanctions

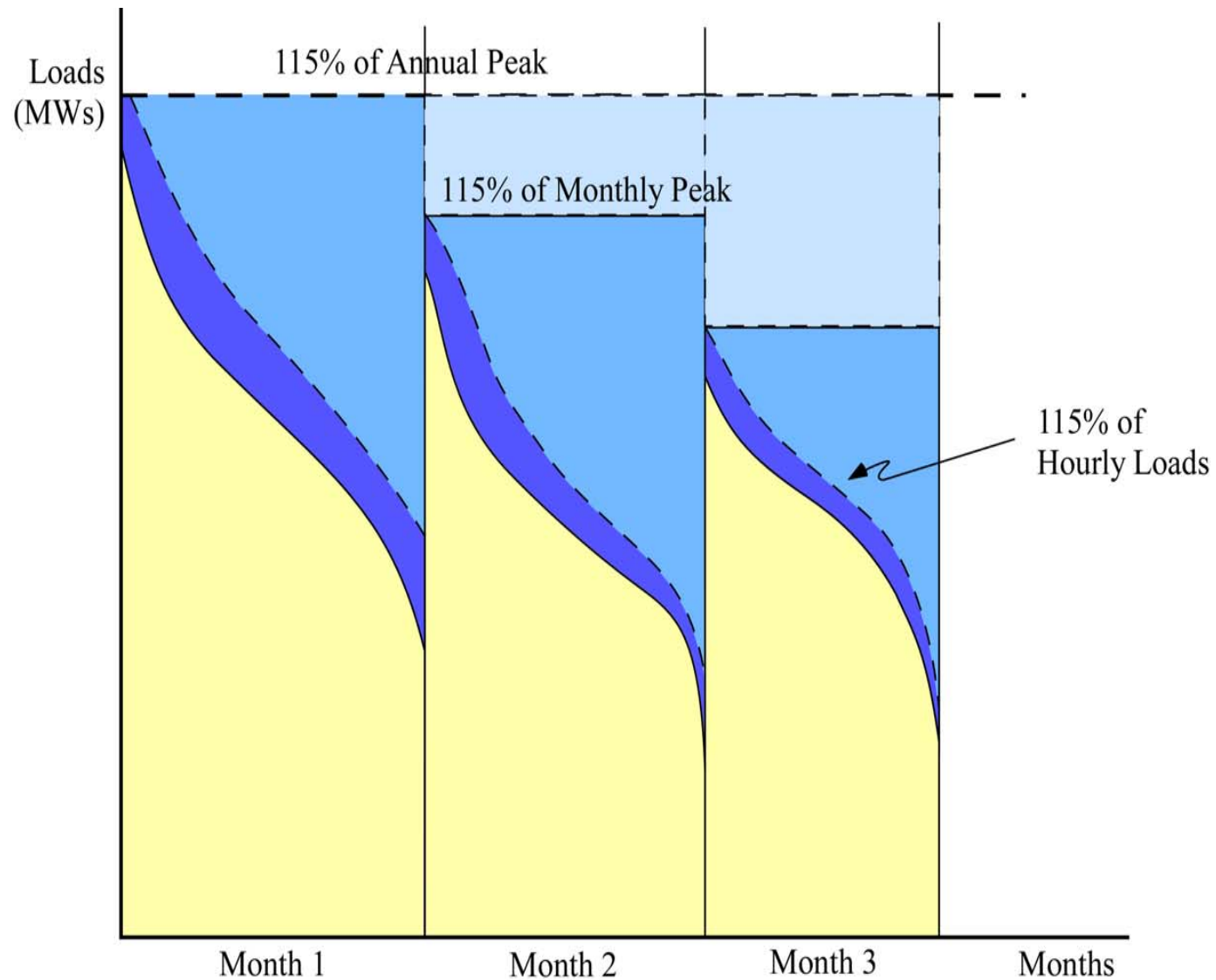
Ultimate objective is the adoption by June 30, 2005, of a General Order applicable to all LSEs

Peevey ACR to Clarify Meaning of All-Hours RA Requirement

- ❑ States that, despite conflicting statements in D.04-10-035, it was the intention of the CPUC to have an RAR applicable in all 8,760 hours

- ❑ Invites parties to comment on whether it should be:
 1. RAR constant for all hours based on annual peak
 2. Monthly RAR for all hours based on monthly peak load

Three Different Interpretations of an All-Hours RA Requirement



*Joint CPUC-EOB-CAISO Conference on
Eastern Capacity Markets
(October 2004)*

- ❑ Pros and cons of capacity markets
- ❑ Coordination with resource adequacy compliance
- ❑ Pros and cons of centralized ISO-based capacity auction
- ❑ Relationship between potential centralized capacity markets and a bilateral-based resource adequacy approach

Peevey Ruling on Capacity Market Development

(February 28, 2005)

- ❑ Directs Commission Staff to examine NY demand-curve approach to capacity markets
 - Manages market power concerns
 - Addresses locational procurement
 - Provides foundation for new investment
 - Supports Direct Access by providing a basis for addressing “load migration” and reducing stranded costs

- ❑ Staff will complete a discussion paper of advantages and potential problems by the end of Spring 2005

- ❑ Staff will engage CAISO staff to coordinate with MRTU

*\$64,000 Question:
What Will It Take to Support New Generation Investment?*

- ❑ Long-term bilateral contracts?
 - How long-term? (5 years? 10 years?)
 - What credit-worthy buyer is willing to sign?

- ❑ Very large risk-taking vertically integrated generator/retailers?

- ❑ Supplementary payments from some long-term centralized capacity market?
 - e.g., 5-year “demand-curve” payment stream? 5-year stream of capacity “tags”?
 - Can this construct support new generation investment?

Selected Acronyms

ACAP:	An “available capacity” requirement
CPA:	California Power Authority
EOB:	Electricity Oversight Board
ESP:	Electricity Service Provider (a competitive retailer)
ICAP:	An “installed capacity” requirement
LD:	Liquidated Damages (refers to a type of contract)
LSE:	Load Servicing Entity (power provider to an end user)
MD02:	Market Design '02 (the CAISO’s efforts to redesign its markets)
MOO:	Must-offer obligation
MRTU:	Market Redesign Technology Update (a renaming of MD02)
RA:	Resource Adequacy
RAR:	Resource Adequacy Requirement
RMR:	Reliability Must Run
RUR:	Residual Unit Commitment (an additional source of day-ahead commitment)
SMD:	FERC’s Standard Market Design
SVMG:	Silicon Valley Manufacturer’s Group (source of the capacity “tagging” proposal)
VOLL:	Value of Loss of Load (basis for an additional capacity payment in the original UK market)