

# Capacity Market Issues Matrix

## Capacity Market Advocate Working Group

July 10, 2006

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This presentation identifies a number of issues/options under consideration for capacity market development in California. Its purpose is to engage discussion, identify areas where there is a general consensus, and explain the range of options under consideration. Participants are encouraged to request clarification or additional information on any of the content included. The results of the discussion will be included in the final report prepared and presented in the CPUC's ongoing resource adequacy proceeding.

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# Consensus Issues

1. A centrally administered capacity market is necessary in California.
2. The capacity market design should support and facilitate bilateral contracting.
3. The capacity requirement should be established and procured in a manner that is verified by an independent entity.
4. The capacity requirement should be established and publicly stated several years in advance.
5. Separate capacity requirements should be established for defined transmission constrained locations and non-transmission constrained locations.
6. The CAISO should administer the capacity market.
7. Specific procedures should be established to qualify physical generation including imports, and dispatchable demand resources as eligible to meet the capacity requirement.

# Shorthand

C = Constellation proposal

E = SCE proposal

N = NRG proposal

S = SDG&E proposal

NY = NYISO capacity market

NE = ISONE FCM mechanism

PJM = PJM RPM proposal (latest version)

# Commitment Timing

## **Four Years Forward – [E,S,N,NE,PJM]**

Proposed and existing resources commit to be available to meet specified demand forecast 4-years before commitment period

## **Month Ahead – [C,NY]**

Load forecast and capacity pricing parameters established 4-years forward, commitment demonstration made 1-month ahead of commitment period

# 4-Year Forward Commitment

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- New resources can receive some assurance of revenue before starting construction
- Existing resources can plan orderly retirement
- Allows new entry to mitigate supplier market power
- Similar to timing adopted for PJM and ISONE

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- May reduce incentives for bilateral transactions
- New supply faces regulatory/siting risk
- May need special consideration for import capacity
- Larger CAISO procurement role and potential credit issue
- Untested design

## Month Ahead

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- Encourages bilateral transactions
- Implemented in NYISO
- Forward commitment risk assumed by contracting parties
- Imports and demand response can easily participate

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- Does not explicitly commit new resources sufficiently ahead to assure construction
- Needs separate mechanism to mitigate market power
- Assumes forward market for new resources

## Market Timing Consensus

- Requirement should be established and publicly available several years in advance
- Timing trade-off – monthly will result in greater contract diversity, more flexibility, less chance of stranded costs – risk allocated bilaterally. 4 year ahead – favors generic commitment to CAISO
- 4 year forward does more to assure reliability, but it takes capacity away from market and puts it in CAISO
- Month ahead highly reliant on non-compliance costs

# Pricing Mechanism

## Sloping Demand Curve Auction [E,C,NY, PJM]

Administrative setting of CONE, pricing curve based on amount of capacity committed, parameters fixed for several years forward

## Vertical Demand Auction [S,N,NE]

Bids determine market value of pre-specified capacity requirement. Can be declining clock or other design

# Sloping Demand Curve

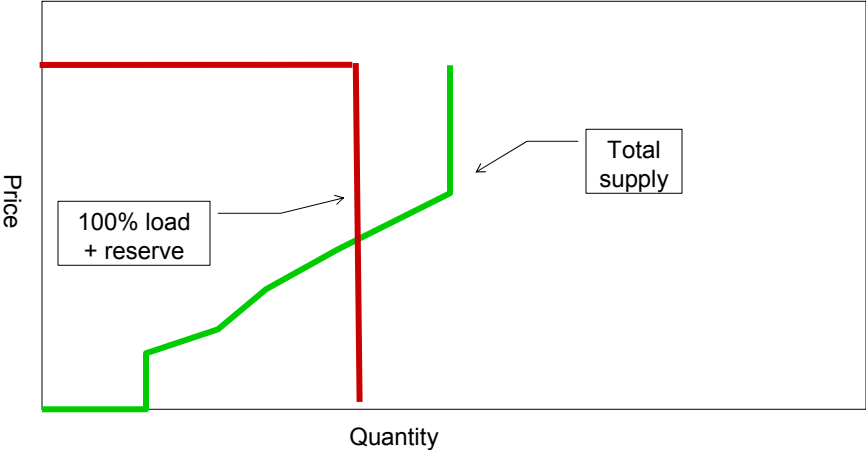
(+)

- Values capacity beyond minimum reserve margin
- Advance price discovery
- Mitigates binary pricing & mkt power
- Reduces capacity price volatility
- Facilitates month ahead market

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- Potentially contentious administrative process to calibrate
- “Requires” energy rent offsets
- May require adjustment to allow fully-hedged self-supply

# Near Term Vertical Demand Curve

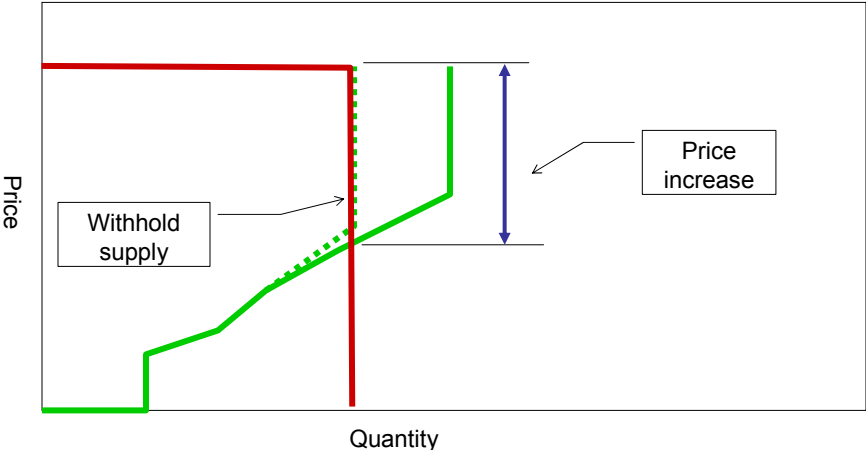


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# Vertical Demand Curve Market Power Exercise

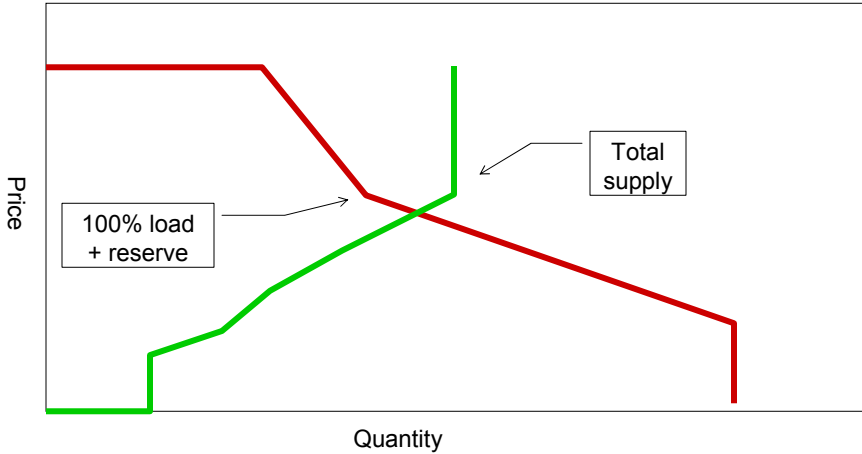


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# Sloping Demand Curve

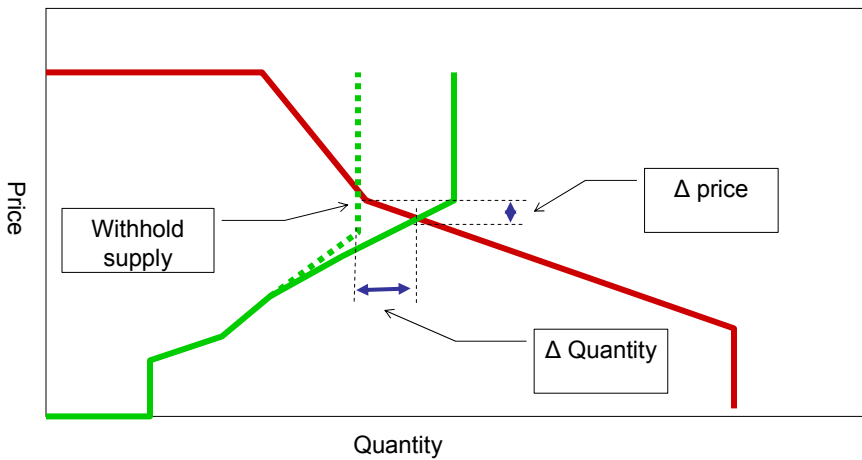


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# Market Power Mitigation – Sloping Demand Curve



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# Vertical Demand Auction

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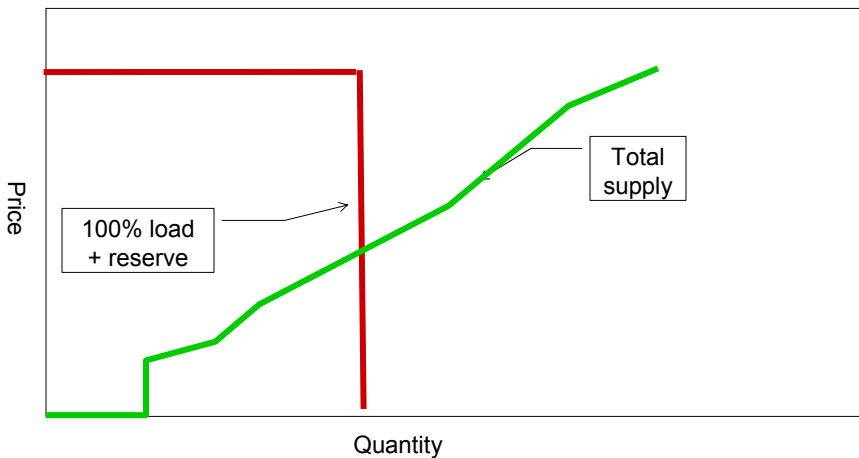
- Market decides market value of capacity
- Energy rents can be internalized
- Less administrative interference in setting actual price
- Obligation pre-defined – no need to adjust for self-supply
- Needs rules/ parameters to avoid binary pricing
- Requires 4-year forward commitment for potential new entrant participation to mitigate market power
- No value for capacity in excess of requirement
- Centralized procurement may reduce incentive for LSE bilateral procurement

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## Vertical Demand Curve 4 years forward



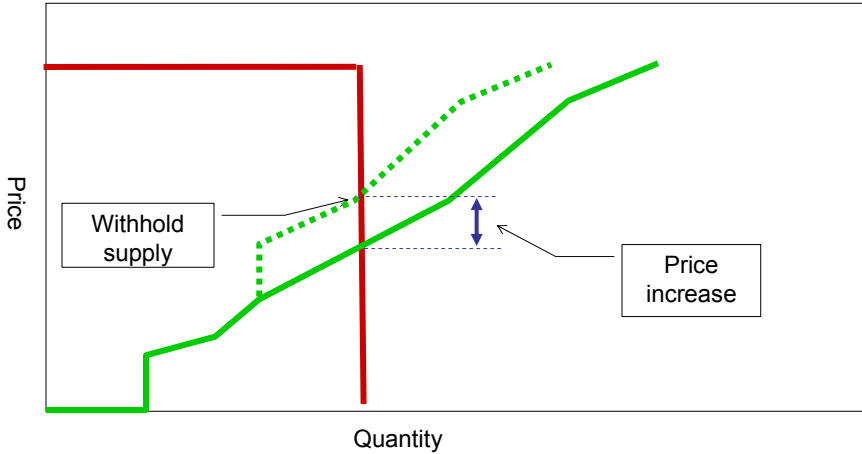
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# Vertical Demand Curve Market Power Exercise

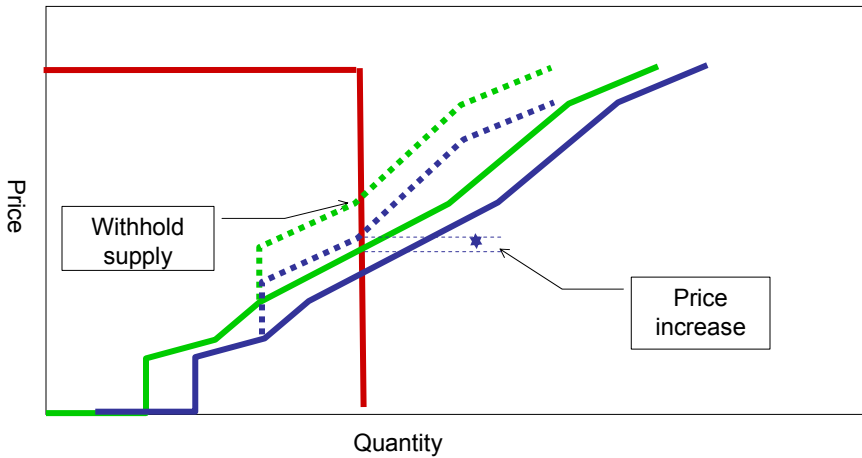


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# Vertical Demand Curve New Entrant Impact



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# Vertical Demand Auction Design

## **Declining Clock [N,NE]**

Price set in bidding round, starts high decreases in successive rounds until excess capacity withdraws, rules to mitigate potential market power

## **SDG&E Auction [S]**

- Suppliers bid capacity price and quantity.
- Bids stacked by price until total requirement is met
- Location issues might require several separate auctions, or a LMP-like solution process.
- Could have a floor and ceiling.

# Backstop Mechanism

## **Four Year Forward**

- Separate Auction, 10 yr contract if deficient [E,PJM]
- New resources that clear auction get 10 year commitment to price [S]
- New resources that clear auction get 4 year price commitment [N,NE]

## **Month Ahead Commitment [C,NY]**

- No explicit backstop, relies on LSE bilaterals
- Regulator can establish obligation for utilities if necessary

# Pricing Mechanism Consensus

- Sloping demand curve necessary for month ahead market timing, less so for 4 year forward.
- Sub group participants – SDG&E, SCE, FPL, Constellation, Williams, NRG, CAISO
  - Task is to develop different hypothetical scenarios and walk through implications for each pricing option
- Different treatment for new and existing resources – is a potential concern
- Look at “Rate base” issue – suggest fixes

# Self Supply Options

## **Clears Market [C,E,S,NY,PJM]**

LSEs with capacity participate as price takers in auction process, all capacity included in market

## **Outside Market [N]**

Self-supplied capacity verified outside market clearing process

## **Opt Out [PJM]**

Self-supplying entity's supply and demand removed from market

## Market Clearing Self Supply

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- All capacity participates in market
- Self-provided supply and demand act as price takers
- No need to audit self-suppliers
- Potential issue with muni participation and no private use requirement for tax free financing

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## Self-supply Outside Market

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- Avoids PX stigma
- Same result as market clearing
- Could reduce credit obligations
- Different rules for self-supply
- Requires administrative verification
- Reduces market size/transparency
- Possible gaming opportunity – in and out of market

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## Opt Out

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- Useful for non-CPUC entities
- Allows LSEs to meet RAR without participating in capacity market

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- Controls needed to avoid “flip flop”
- Removes liquidity from capacity market

## Self Supply Consensus

- No LSE should be able to escape its obligation
- Opt out, if considered, should not provide extra optionality
- PG&E will provide their insight or incite
- Does expectation of substantial rate based generation impact this issue?

# Basis for Setting Capacity Requirement

## **Annual Peak** **[C,N,S,NE\*,PJM]**

Requirement based on single highest month peak demand (plus reserves) during year, single obligation for entire year

## **Seasonal Peak [NY]**

Requirement based on highest peak demand in each season/month (plus reserves), obligation changes with each season/month

# Annual Peak

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- Provides capacity to cover maintenance during shoulder months
- Reflects fixed nature of capacity cost

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- Must account for seasonally available capacity
- Appears to over-commit in shoulder months

# Seasonal Peak

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- Purchase capacity only when needed
- Seasonal capacity can limit offering to when available
- Potential lower cost if capacity has value elsewhere off-season

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- Capacity cost is annual, regardless of term of commitment
- Reduced flexibility in off peak months may require greater reserve margin
- Little if any value of excess capacity in non-peak months
- Less uniform capacity product reduces liquidity

# Seasonal/Annual Consensus

- To extent annual requirement factors in seasonally available resources and planned outages it should be okay
- Mechanism should not require LSEs to replace seasonal capacity in months when clearly not needed

## Import Treatment – 4 year forward

### **Set Aside [E]**

Capacity requirement reduced by expected import capacity that cannot commit 4-years forward

### **No special treatment [S,N,NE,NY,PJM]**

Imports commit forward like any other resource, subject to penalty if not available 4-years later

## Import Set-Aside

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- CA dependent on imports for ~20% of needed capacity, if imports cannot participate, import capacity must be replaced
- Imports have (pretty much) always been available when needed

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- Does not commit all needed resources 4 years ahead
- New capacity could have same problems
- May not be able to replace easily on shorter notice.
- Creates unequal treatment



## Import Consensus

- SCE will provide proposal – some numbers – how big of a carve out
- CAISO will help – import support on critical days
- Review with BPA – do a call
- PJM to send out stuff from BPA [done]

## Capacity Revenue Adjustments

### **Peak Energy Rent Adjustment**

**[C,E,N,NE,NY,PJM]**

Reduces capacity payment by net revenue available for proxy new unit

### **Implicit in capacity price [S]**

Expected energy revenues reflected in capacity bid price, assuming low entry barriers

## Explicit Energy Rent Adjustment

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- Connects energy to capacity markets
- Assumes risk profile
- Can include “normal” energy revenues
- Provides incentive to provide energy
- Based on assumption of accuracy of adjustment

## Implicit Energy Rent Adjustment

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- Allows new entrant to internalize potential energy revenues
- Capacity cost to load fixed – load benefits from supplier risk management
- May reduce credit exposure
- Not clear how would work in conjunction with sloping demand curve
- No incentive for supplier to minimize energy prices
- Lack of perceived stability could result in less supplier offset

# Peak Energy Rent Adjustment

## Ex Ante Adjustment [C,N,S,NY,PJM,NE]

Adjust going forward based on historical or forecasted energy revenues. Terms of adjustment pre-defined

## Ex post Adjustment [E?]

Reduce capacity payment based on actual net energy revenues in the period.

# Ex Ante Adjustment

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- Adjustment reasonably predictable
- Does not directly impact energy markets
- Stable, consistent with proxy mechanism

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- Does not match actual energy rents
- Could diverge from actual prices (should average out over time)

# Ex Post Adjustment

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- Direct price connection

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- Removes incentive for load to respond to energy prices
- Unpredictable, cannot be hedged
- Potential problem if energy and capacity owned by different parties

# Revenue Adjustment Consensus

- Adjustment based on historic data (year before delivery) better than forecast
- Basis, not price, fixed 4 years in advance
- Ex post adjustment, based on current period price, not desirable.

# Performance Incentives

- How much is needed
- Interaction with energy markets
- Need for scarcity pricing
- Positive incentive versus penalty
- Who bears risk, can it be hedged

# Performance Incentives

- Qualified Capacity adjustment (EFORd)  
[C,PJM,NY,NE]
  - Adjusts capacity (and required reserves) based on historical availability (net of forced outages) using standard NERC reporting tools
- Critical hour penalty [N,NE]
  - Explicit penalty if not available during “critical” hours
- Scarcity energy price hedge
  - High strike price to protect load from scarcity prices
- Seasonal capacity pricing [E,S,NE,NY]
  - Weights capacity payments to peak months

# Qualified Capacity Adjustment

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- Reflects overall resource performance over time
- Can be weighted to peak months
- Retains positive incentive to be available (to sell energy) during high price periods
- Used in other markets
- Fairly slow response mechanism
- Does not correct “fuel arbitrage” issue
- Not directly tied to energy markets

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# Critical Hour Penalty

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- Additional incentive to be available
- Consistent with energy only mechanism
- Could be difficult to hedge risk
- May not work for long start up time resources
- May not accurately reflect scarcity
- Could multiply risk

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## Scarcity Price Hedge

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- Increases value of capacity product to load
- Requires scarcity pricing to provide sufficient incentive

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- Reduces demand response incentive
- Could multiply energy offsets if used with PER
- Limits price signal to load

## Seasonal Capacity Pricing

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- Adjusts price signal to capacity need
- Facilitates seasonally available resources
- Retains annual capacity requirement

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- Increases potential for compliance problems in non-peak months
- Could cause outage scheduling problem

## Performance Incentive Consensus

- Incentives good, complexity bad
- MSC input?
- No consensus on balanced incentive
- Derek will provide information on how to incorporate EFORd
- Does critical hour issue belong in capacity market?
- SCE, Reliant, LS, FPL, NRG, CAISO, SDG&E and Mirant will discuss clear position

## Reconfiguration Auctions

- Allows buyers and sellers to re-position
- Adjust for changes in demand forecast
- Replacement mechanism for failing to meet construction deadlines
- Should not allow capacity speculation



# Credit Issues

## **Supplier Obligations**

- ISONE – 3 months capacity payment for new entrant, 1 month for existing
- PJM – New entrant only, based on expected cost exposure in reconfiguration

## **Buyer Obligations**

- Commitment of load serves as security
- Impact on coming and going rules
- Impact of self-provision

# Local Capacity Requirement

- How do local requirements get incorporated
  - Before, during or after system auction
- What about smaller load pockets and sub-areas
- Setting local area prices
  - Different demand curves
  - Part of auction process
- Cost allocation
- Controlling for market power
  - Is demand curve or forward auction sufficient
- Valuing Transmission expansion
  - Accounting for incremental cost of local capacity only

## Other Operational Requirements

- Is capacity market appropriate mechanism for valuing fast start and load following resources, or should that be part of A/S market differentiation?
- Review w/CAISO

## Treatment for New Entrant

- Longer term fixed price [E,S,N,NE,PJM]
  - How long is needed
  - Is capacity only commitment enough?
- Reliance on LSE procurement [C,NY]
  - Is expectation of stable cap mkt enough?
- Backstop procurement [S,PJM]
  - Who should do it?
  - When should it be done – integrate into market or after
  - What should be included – “bare” capacity or other
  - Will it compromise effective market structures

## Non-CPUC entities

- Is special treatment needed?
- Consistent with MSS?
- Self-Supply/opt out
- Need/desirability for a market separation – opt out resources unable to participate in capacity market

## Next Steps

1. Sub groups identified and “Meet” [7/24]
2. Develop order of attack for CPUC process, review with ED
3. Review report structure and adjust as needed
4. Distribute revised draft [7/28]
5. Finalize report, file by [9/2?]
6. Assist in development of scoping memo for CPUC
7. Discussion with Commissioner(s)