CCA Bond Calculation Walk Through

July 12, 2010

Guiding Principles

- Guiding Principles for the CCA bond calculation
  - Based on risk assessment using market data
    - Forward curve
    - Implied Volatility
    - Consistent with commission approved methodologies
  - Semi-annual updates to reflect market changes

CCA Bond Calculation

Data gathering: Forward Price & Implied Volatility

- Determine the forward price of a flat annual strip of energy
  - There is an actively traded forward market for power
  - Typically one can either directly find annual peak and off-peak prices of power or get peak and off-peak prices for each month
  - Forward price for a flat strip, similar to the one used for market price benchmark calculation, is calculated as a weighted average, by the number of peak and off-peak hours, of average peak and off-peak prices
  - Calculate the average of daily observations for a month to eliminate the effect of any unusual, short-lived events
- Determine the implied volatility of a flat annual strip of energy
  - There is an actively traded options market for power
  - Typically brokers such as ICAP publish implied volatility for forward months
  - Use square root of time weighted average variance of forward months as the implied volatility of the annual strip
  - Calculate the average of daily observations for a month to eliminate the effect of any unusual, short-lived events

CCA Bond Calculation

Stress Energy Price and Price Stress Factor

- Data inputs
  - Adjusted Forward Price (MPB) = Forward Price * (% Losses)
  - Estimate of the implied volatility: V
  - Average time to expiration: 0.5
  - Confidence interval of 95%
- Now we use the standard integral of a normal distribution of price changes up to the average time to expiration, similar to TeVaR methodology, and the specified confidence interval to calculate the stress energy price
  - Adj. Forward Price *Exp[(-0.5*V*V*T)+(V*sqrt(T)*1.64)]
- The result is the 95% confidence Energy Stress Price
- Calculate the Price Stress Factor
  - Energy Stress Price/ Adjusted Forward Price

CCA Bond Calculation

Stressed RA Price

- Data inputs
  - Specific IOU RA price adder used in the Market Price Benchmark
  - Price stress factor
- Calculate stressed RA price
  - Price stress factor *RA price adder
- X% is the CCA specific RA requirement
  - The default value of X% is 115% but would be modified to account for the IOU's procurement of capacity for so-called "benefiting" customers per D.06-07-029. The 115% requirement will be reduced by the percentage of capacity procured pursuant to D.06-07-029 relative to the IOU service territory peak load.

CCA Bond Calculation

Stressed RPS Premium

- Data inputs
  - Stressed RPS premium :The difference between the 95th percentile RPS premium and the average RPS premium as reported on the Department of Energy website
  - RPS waiver or not

- Calculate stressed RPS premium
  - Zero if the RPS waiver is granted
  - Otherwise, stressed RPS premium as above

- Y% is the then current RPS requirement
  - 20% is the current value

CCA Bond Calculation

Bundled generation cost to serve involuntarily returned CCA load under a 95th percentile stress scenario

- Data inputs
  - Stressed energy price
  - Stressed RA price and RA requirement
  - Stressed RPS premium and RPS requirement

- Returning CCA Bundled Generation Cost = Stressed Energy Price + (X%)*Stressed RA Price+ (Y%)*Stressed RPS Premium

CCA Bond Calculation

Bundled generation revenue from the involuntarily returned CCA load under a 95th percentile stress scenario

- Data inputs
  - IOU system average bundled generation rate at the time of calculation
  - $10/MWh stress adder

- IOU Stressed Bundled Generation Rate = System Average Bundled Gen Rate + $10 per MWh

CCA Bond Calculation

Procurement –related cost exposure

- Estimated Procurement-related Cost Exposure = (Returning CCA Bundled Generation Cost – IOU's Stressed Bundled Gen Rate)* Annual CCA MWh

CCA Bond Calculation

Incremental Administrative Cost

- Estimated Administrative Costs = IOU's authorized service fee rate for voluntarily returning CCA customer accounts (for PGE, currently $3.94; for SCE, currently $1.49; and, for SDG&E, currently $1.12)*Forecasted number of CCA accounts

CCA Bond Calculation

- Required Gross Bond Coverage = (Returning CCA Bundled Generation Cost – IOU's Stressed Bundled Gen Rate)* Annual CCA MWh + Estimated Administrative Fee
  - Minimum coverage required is the administrative fee

Re-entry fee calculation

- Unlike CCA bond calculation, where the stressed prices are estimated based on market forward prices and volatility, re-entry fee calculation is based on actual forward prices the IOUs have to pay in the market
- CCA load shape and load class adjusted generation rates are used to reflect actual cost and revenue values
- Current estimated cost of immediate RA procurement is used
- Current estimated premium for immediate RPS is used

CCA Re-entry Fee Calculation

Adjusted Forward Price

- Collect and average data for 4 weeks for “ask” (i.e. the price to be paid by the buyer) peak and off-peak prices for One-Year period immediately following the actual or expected involuntary return of CCA customers
  - Average Forward Peak Price = PF ($/MWh)
  - Average Forward Off-Peak Price = OF ($/MWh)
  - Estimated CCA Peak Period usage for 12 forward months = PL (MWh)
  - Estimated CCA Off-Peak Period usage for 12 forward months = OL (MWh)
  - F: Load Shape Adjusted Forward price
  - F = [(PF*PL) + (OF*OL)]/(PL+OL)
- Loss adjustment L% (specific to each IOU)
  - Loss Adjusted Forward is AF = (L%)*F

CCA Re-entry Fee Calculation
RA Price

- RA cost to be determined as follows:
  - When CAISO "backup capacity" is determined by either ICPM or Supplemental Revenues:
    - Greater of RA cost in the current Market Price Benchmark or the greater of Interim Capacity Procurement Mechanism (ICPM) payments for next year under ICPM designation or maximum of Supplemental Revenues (SR) payments under Exceptional Dispatch over the previous year
  - When CAISO "backup capacity" is determined by a "new" mechanism that may replace ICPM and/ or Supplemental Revenues:
    - Greater of RA cost in the Market Price Benchmark or the "new" mechanism used to value CAISO backup capacity for 12 months forward

CCA Re-entry Fee Calculation

RPS Premium

- In the event that additional flexible RPS compliance is not confirmed by the CPUC calculate the Re-entry RPS premium as follows:
  - Re-entry RPS Premium = Maximum (Actual premium for resources procured to meet RPS, during the most recent 3 years, for renewable energy delivery to the IOU over the next 5 years).
  - The Re-entry RPS Premium will be applied to the fraction of returning CCA load at the IOU's then existing RPS annual target of Y%.

CCA Re-entry Fee Calculation

Procurement Cost

- Average Procurement Cost per MWh for the involuntarily returned CCA load = AF+X%*RA Cost + Y%* Re-entry RPS Premium
  - X% is determined as follows:
    - The default value of X% is 115% but would be modified to account for the IOU's procurement of capacity for so-called "benefiting" customers per D.06-07-029. The 115% requirement will be reduced by the percentage of capacity procured pursuant to D.06-07-029 relative to the IOU service territory peak load.

CCA Re-entry Fee Calculation

Expected Revenue

- The expected revenue to the IOU from the returning CCA customers depends upon the CCA customer mix
  - CCA Specific Bundled Gen Rate = [System Annual Average Gen Rate for Class A*Annual MWh for Class A + System Annual Average Gen Rate for Class B*Annual MWh for Class B +... for all classes] / [Annual MWh for Class A + Annual MWh for Class B+ … for all classes]

CCA Re-entry Fee Calculation

Entry fee

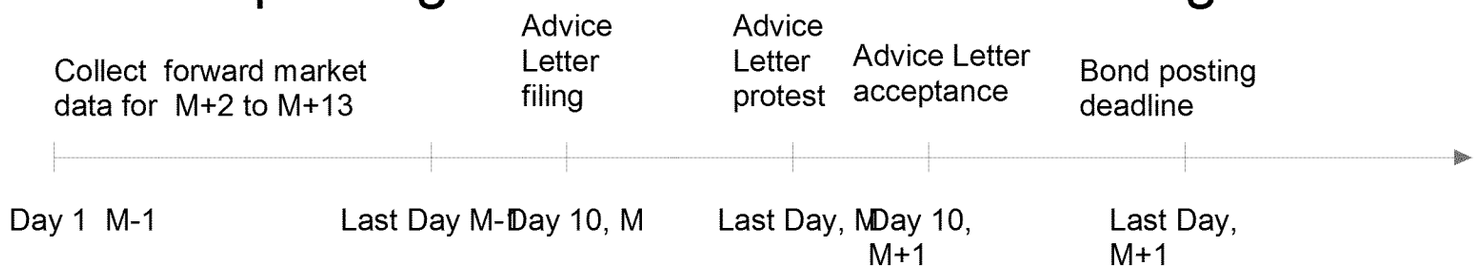
- Re-entry fee =
  - Max(Average Procurement Cost – CCA Specific Bundled Gen Rate, 0)*Annual CCA MWh
  - Plus
  - Estimated Administrative Costs = IOU's authorized service fee rate for voluntarily returning CCA customer accounts (for PGE, currently $3.94; for SCE, currently $1.49; and, for SDG&E, currently $1.12)*Forecasted number of CCA accounts

Back Up

Bond calculation and posting timeline

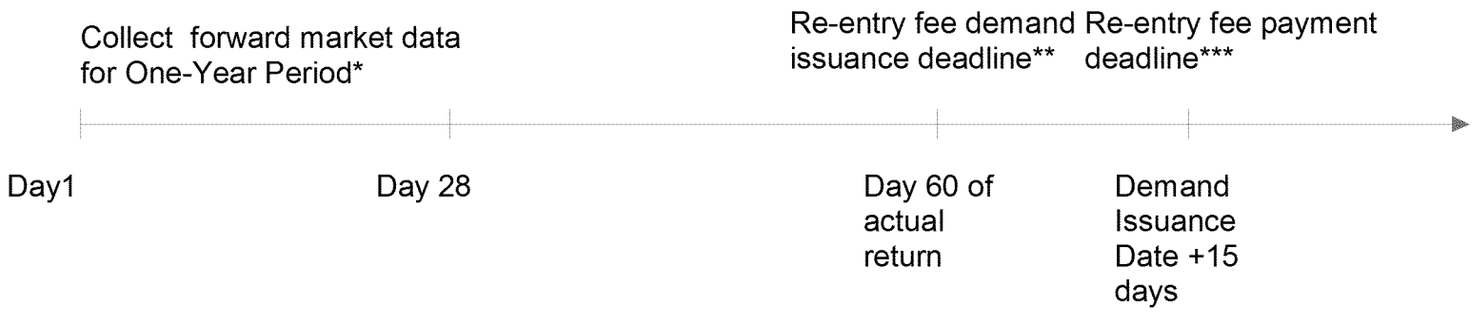
- Regular schedule for semi-annual bond update

- Bond posting for new CCA/Phase starting in Month M+2



Re-entry fee calculation timeline

- Earlier of the notice of involuntary return or actual involuntary return of CCA customers is Day 1



•*One-Year Period starts either on the date of actual involuntary return, without prior notice, or on the date of expected involuntary return, with prior notice

•**Re-entry fee demand may be issued anytime between Day 28 of the data collection period and Day 60 from the beginning of involuntary return

•***Re-entry fee payment by the CCA is due within 15 days of the issuance of demand

Sample CCA Bond Calculation: Step 1 Cost

Prices based on April 2009 data

Market Flat Energy price	$41.51/MWh
RA Price (based on MPB)	$4/MWh
Stress Factor	1.5688
Loss Factor	106%
Stressed Energy Price	1.5688*($41.51*106%) =$69.03/MWh
Stressed RPS Premium	$21.51/MWh
Stressed RA Price	1.5688*$4 = $6.28/MWh
Stressed Gen Cost	$69.03+20%*$21.51+115%*$6.28 = $80.55/MWh
Stressed Gen Cost w/o RPS	$69.03+115%*6.28 = $76.25/MWh

CCA Bond Calculation: Step 2 Revenue

Prices based on April 2009 data

Current Bundled Gen Rate	$93.55 per MWh
Stress Adder	$10/MWh
Stressed Bundled Gen Rate	$93.55 +$10 = $103.55/MWh

CCA Bond Calculation: Step 3
Full Bond Amount
Prices based on April 2009 data

Load	1,992,200 MWh
Number of customers	200,000
Administrative Fee	$3.94 per customer or a total of $788,000
CCA Bond with RPS	Max(($80.55 - $103.55)*1,992,200+$788,000, $788,000) = $788,000
CCA Bond w/o RPS	Max(($76.25-$103.55)*1,992,200+$788,000, $788,000)= $ 788,000