

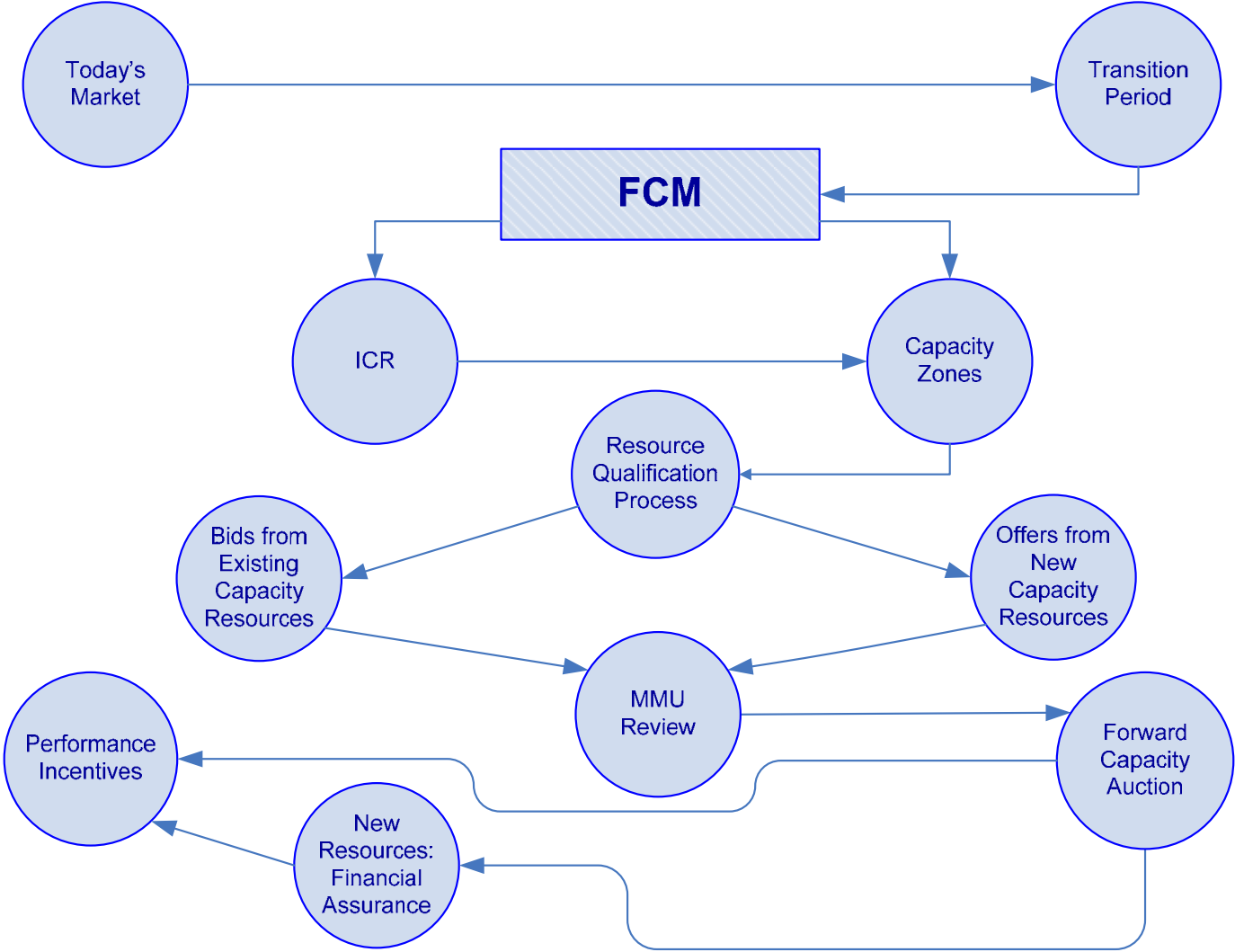
The Forward Capacity Market (“FCM”) in New England

ISO New England Inc.
Roger Bacon
Wholesale Markets Strategy

Objectives of this Presentation

1. Present an OVERVIEW of the FCM
 - Definitions
 - Transition Payments
 - FCM Components
 - Timeline
2. Summarize its Major Components
 - Purpose
 - Qualification Process
 - Capacity Zones
 - Forward Capacity Auction
 - Performance Incentives
 - Financial Assurance
 - Reconfiguration Auctions

New England Capacity Market: Overview



Definitions

Important Terms Used in the FCM

FCA	Forward Capacity Auction
Capacity	Amount of capacity (Qualified MW) that a resource is allowed to offer into the FCM
Offer	Amount of new capacity that a resource owner offers to sell into FCA
Bids	Capacity that wants to leave or not participate in the FCA
CONE	Cost of New Entry – (Fixed Cost of Capacity)
ICR	Installed Capacity Requirement
PER	Peak Energy Rent adjustment to the FCA payment – avoids a double payment by Load
Commitment Period	Whole year obligation to provide future capacity
Reconfiguration Auction	Opportunity to adjust capacity supply obligations to buy and sell capacity after the primary FCA

Transition Payments

Transition Costs: Bridge to FCM

1. Effective December 2006 through May 2010
2. Fixed capacity payments to all resources
 - Existing
 - New
 - Imports
3. Ensures Reliability
4. Payments adjusted for historical availability

Date	Payment (\$/KW-month)	Estimated Total Payment (\$Billion)
12/01/2006 – 05/31/2007	\$3.05	0.6
06/01/2007 – 05/31/2008	\$3.05	1.2
06/01/2008 – 05/31/2009	\$3.75	1.4
06/01/2009 – 05/31/2010	\$4.10	1.6

FCM Design

Objectives of FCM

1. Procure enough Capacity to meet New England's forecasted Demand three years in advance
2. Provide Compensation for the Fixed Capacity Cost of a Generation or Demand Resource
2. Attract New Resources to Constrained Regions
3. Define the Performance of Capacity Resources
4. Implement a Pay for Performance Approach for Capacity
5. Provide an Energy Price Hedge for Load

FCM – Design Parameters

1. Primary Auction for Capacity About Three Years Before the Delivery Year (Descending Clock Auction)
2. Allow New Proposed Capacity Projects to Compete in the Market and Set Price
 - Market is not limited to existing resources
3. Include New Categories of Resources
 - Demand Resources and Conservation
 - Intermittent (Wind, Hydro, Solar, and Other) Generation
4. Market Only Buys Capacity to meet New England's ICR
 - No Obligations Assigned to Remaining Resources
5. Implement a Shortage Hour Availability

Major Components of the FCM

1. Qualification
 - for both Existing and New capacity resource offers
2. Forward Capacity Auction (FCA)
 - to purchase the capacity resources
3. Performance Incentives
 - pay for performance during shortage events
 - PER deduction
4. Financial Assurance
 - Deterrent to frivolous new capacity offers and commitment period defaults
5. Reconfiguration Auctions
 - to buy and sell (exchange) capacity obligations before and during the commitment period

FCM Components: Qualification Process

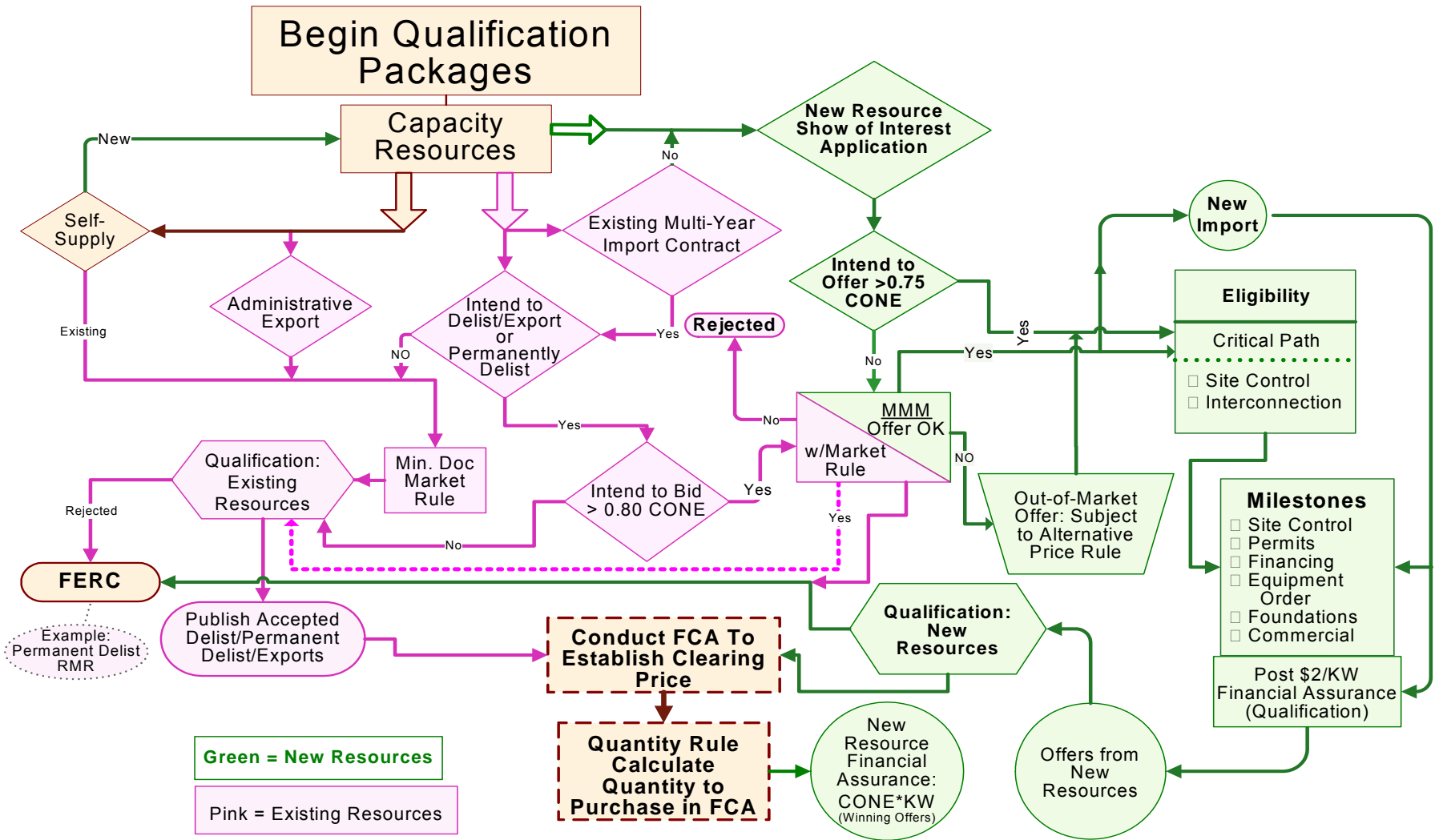
FCM Components – Qualification

1. **Qualification** of the following resources is required:
 - Existing Capacity (Including De-list, Permanent and Partial)
 - Self-Supplied Resources
 - Exports
 - Imports
 - New Resources (Including Intermittent and Demand Resources)

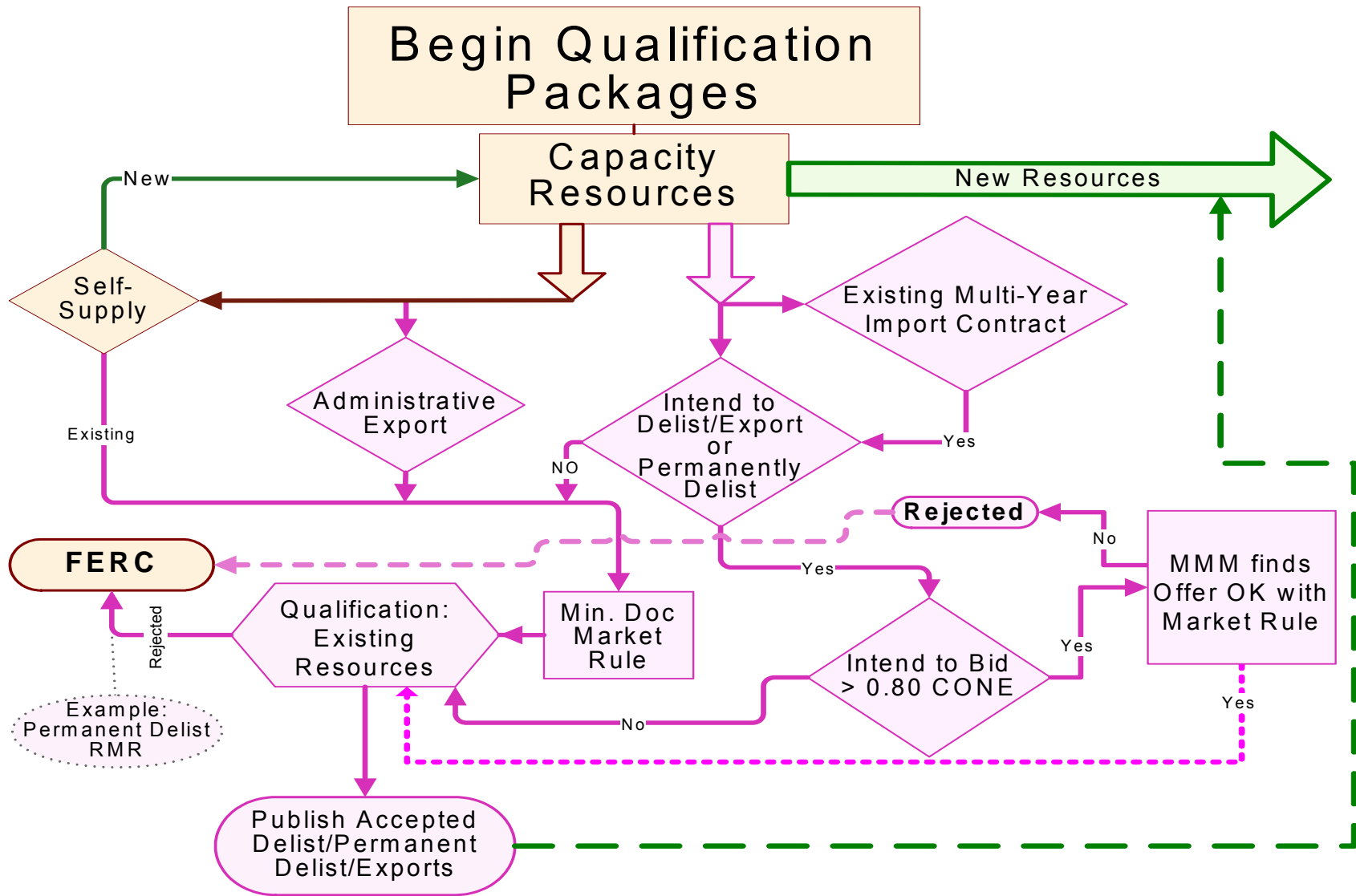
2. **Qualification** Criteria is different for each Resource Type
 - **New capacity resource:** must certify by the qualification deadline, that it will be able to produce a specific MW value for a future Commitment Period

 - **Existing capacity resource:** will be assigned a specific MW value for a future Commitment Period

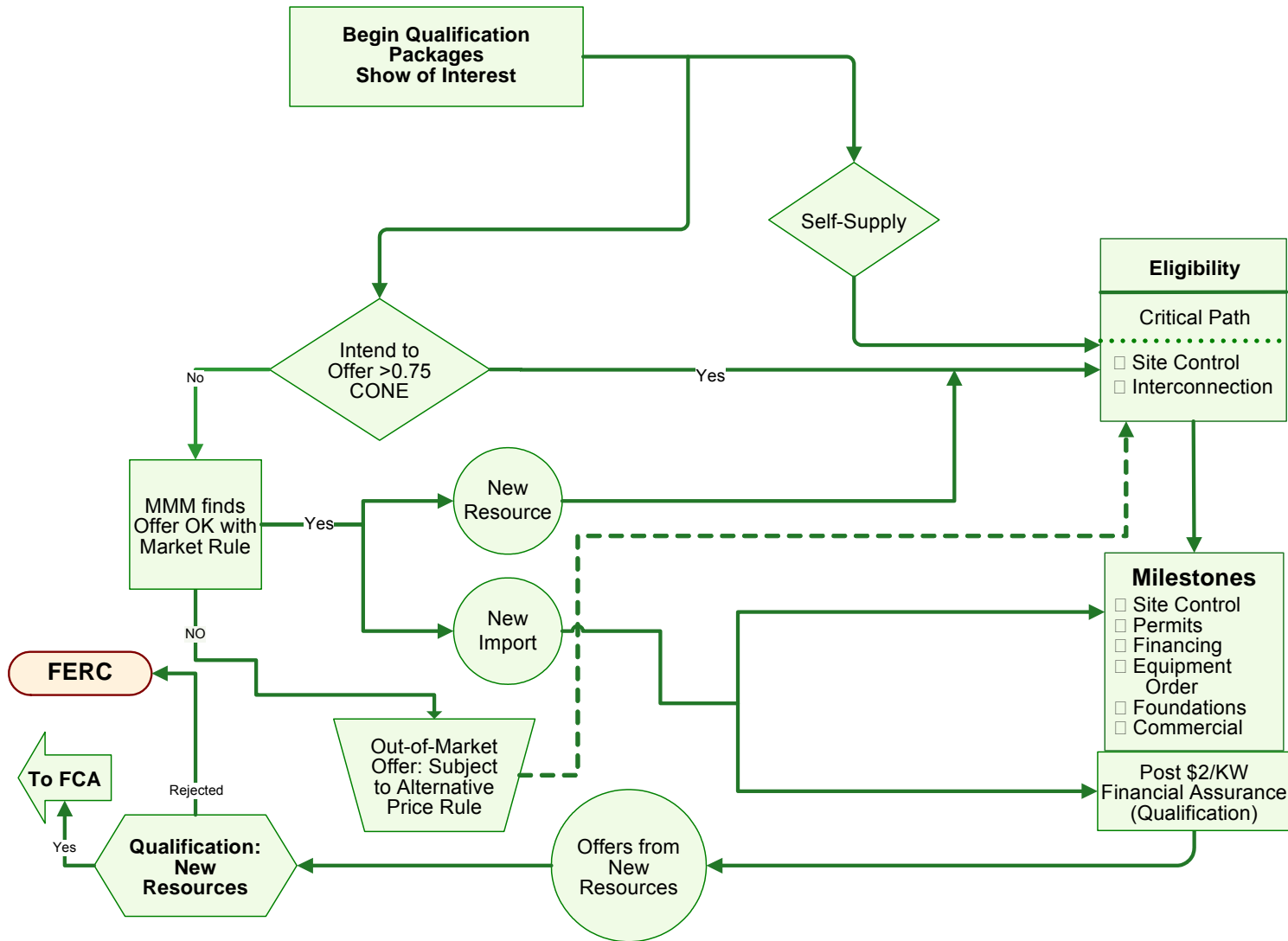
Qualification Process



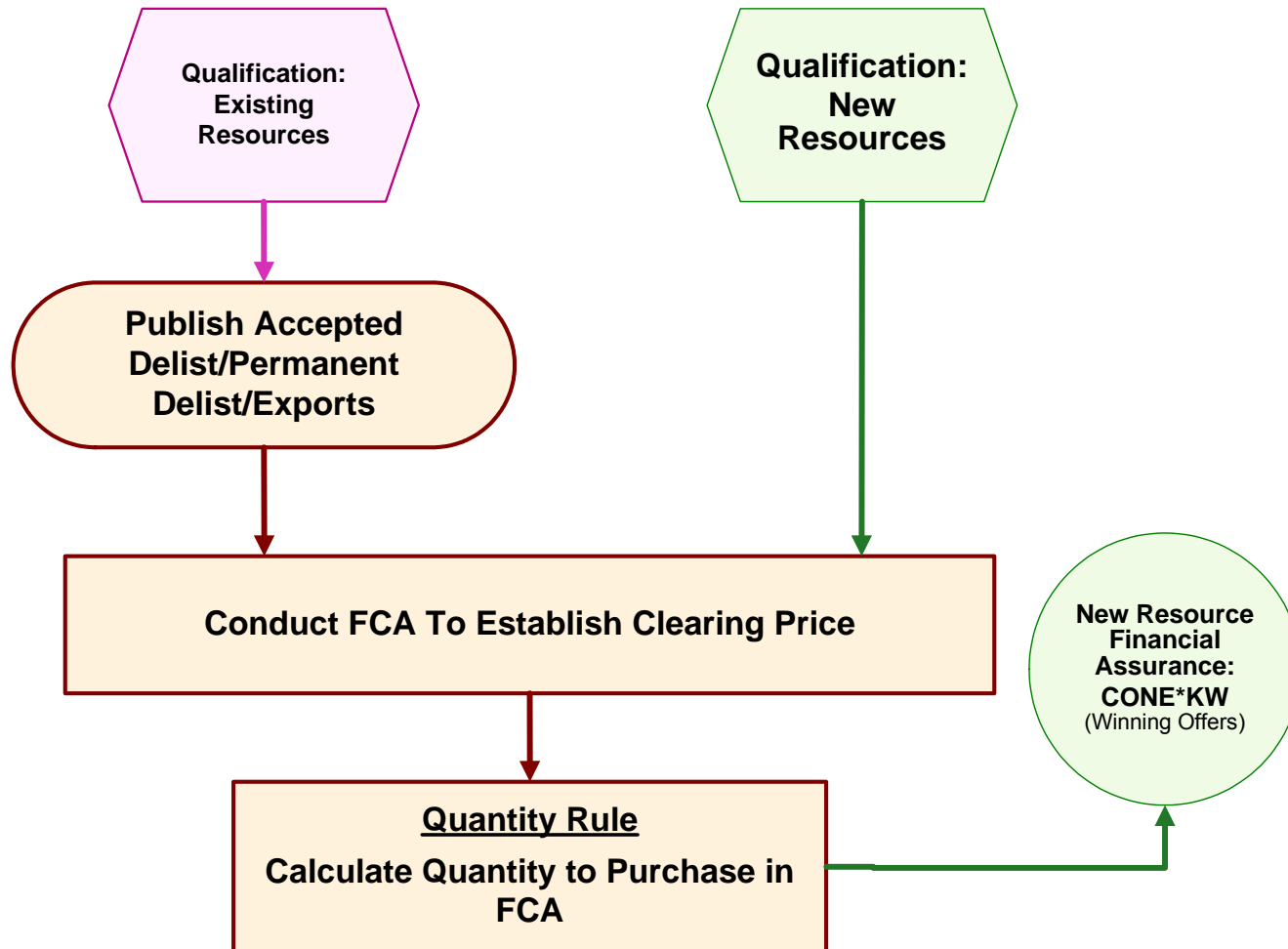
Qualification Process: Existing Resources



Qualification Process: New Resources



Qualified Resources: Eligible for the FCA



Role of Market Monitor in the FCA

1. Review Offers and Bids for potential Market Power abuse
 - Examine for attempts to lower or raise the price outside target price thresholds
2. Existing Capacity is assumed to be in the FCA unless it takes action to leave (De-list)
 - Addresses potential Market Power abuse
 - Existing Capacity dwarfs New
 - Long-run costs are small relative to cost of new entry
 - Existing Capacity treated as a Zero-Bid in the FCA
 - Receives auction clearing price for only 1 year
 - Already invested

Role of Market Monitor in the FCA - Continued

3. Evaluate Bids from Existing resources that De-List in the FCA
4. Evaluate Offers from New Capacity Resources that intend to Offer below $0.75 \times \text{CONE}$
5. Review if sufficient quantity is present to conduct a competitive FCA or invoke reserve pricing (Inadequate Supply or Insufficient Competition)
6. Report on the conduct and results of the FCA to the FERC

Existing Capacity: De-List Bids

De-Listed Capacity Resources opt out of FCA for entire Commitment Period (or Forever if its a Permanent De-List)

De-List Bid Category	Category Definition	Market Monitor Approval	Time of Submission
Static	Bids above 0.8 CONE	Required	At Qualification
Dynamic	Bids below 0.8 CONE	Not Required	During Auction Cycle
Permanent	Bids above 1.25 CONE	Required	At Qualification
Export	Bids above 0.8 CONE	Required	At Qualification

All De-List bids submitted during Qualification are binding for that FCA

FCM Components: Forward Capacity Auction

Prior to a FCA Descending Clock Auction

1. Capacity Zones designated before the FCA
 - Based on transfer limits expected to bind in the auction
 - Import constrained zones
 - Local Sourcing Requirements > available Capacity in Zone
 - Export constrained zones
 - Maximum Capacity Limit < available surplus capacity in Zone
2. FCA begins with a single system wide price
 - All capacity initially treated as a single Capacity Zone
 - Price separation only occurs if and when a transfer limit binds
3. A Capacity Zone for that FCA Commitment Period exists only if price separation occurs
 - Capacity Zones remain the same for the Reconfiguration Auctions

FCA: Offers and Bids

1. Primary FCA: 2-3 years ahead of delivery
 - e.g. – Auction held in early 2008 for delivery in mid-2010
2. Existing Resources
 - Price takers (cannot set market price for capacity)
 - De-List bid
 - Sets a price at which it wishes to remove existing capacity from the FCA
 - Annual Commitment
3. New Capacity
 - Offers
 - The quantity it wishes to Offer into the market
 - Selects commitment period of 1 – 5 years
 - Whole-year commitment
 - Longer commitment reduces investment risk
 - Auction price indexed for inflation after first year

Note: These Definitions
are also used
in Reconfigurations

FCA: Offers and Bids (con't)

4. Imports

- Annual Commitment
- Existing Import Capacity
 - Capacity that has a multi-year contract
- New Import Capacity
 - Capacity offered into the FCA each year

5. Exports

- Annual Commitment
- Multi – Year Exports
 - Administrative Export De-list
- Treated as a de-list bid

Note: These Definitions are also used in Reconfigurations

Market Power Safeguards in the FCA

1. Existing Capacity assumed in the FCA unless it De-lists
 - Potential market power
 - Existing capacity dwarfs new
 - Long-run costs small relative to CONE
 - Already invested
 - FCA rules minimize market power potential
 - Existing capacity treated as zero-bid in FCA
 - Commitment period limited to one year

2. MMU reviews Offers and Bids for potential market power abuse
 - Evaluates De-List bids for attempted withholding
 - Target price thresholds (1.5 x CONE, 1.25 x CONE, 1.20 X CONE, 0.8 x CONE)

Auction Mechanics: Overview

1. Held 2 – 3 years in advance of commitment period
2. Local Sourcing Requirements for each Capacity Zone and a Maximum Capacity Limit for an Export Constrained Zone
3. Bidders offer new capacity they are willing to supply at each price in “Real Time”
 - Starting price = 2 x Cost of New Entry (“CONE”)
 - Initial starting price = \$15/kw-month but end round price is set by Auctioneer
 - Bidders offer quantities they are willing to supply at that price
 - Descending Clock Price until finished

Descending Clock Auction Mechanics

1. Clock auction is done in discrete rounds
2. For each round, Auctioneer announces:
 - Excess supply at the end of prior round
 - Start of round price (higher price)
 - End of round price (lower price)
3. Each participant submits the MW capacity it is willing to supply at prices within range – Up to 5 price/quantity pairs
4. Auctioneer determines excess supply at end of round price
5. If no excess supply, descending clock price stops

Descending Clock Auction: Example

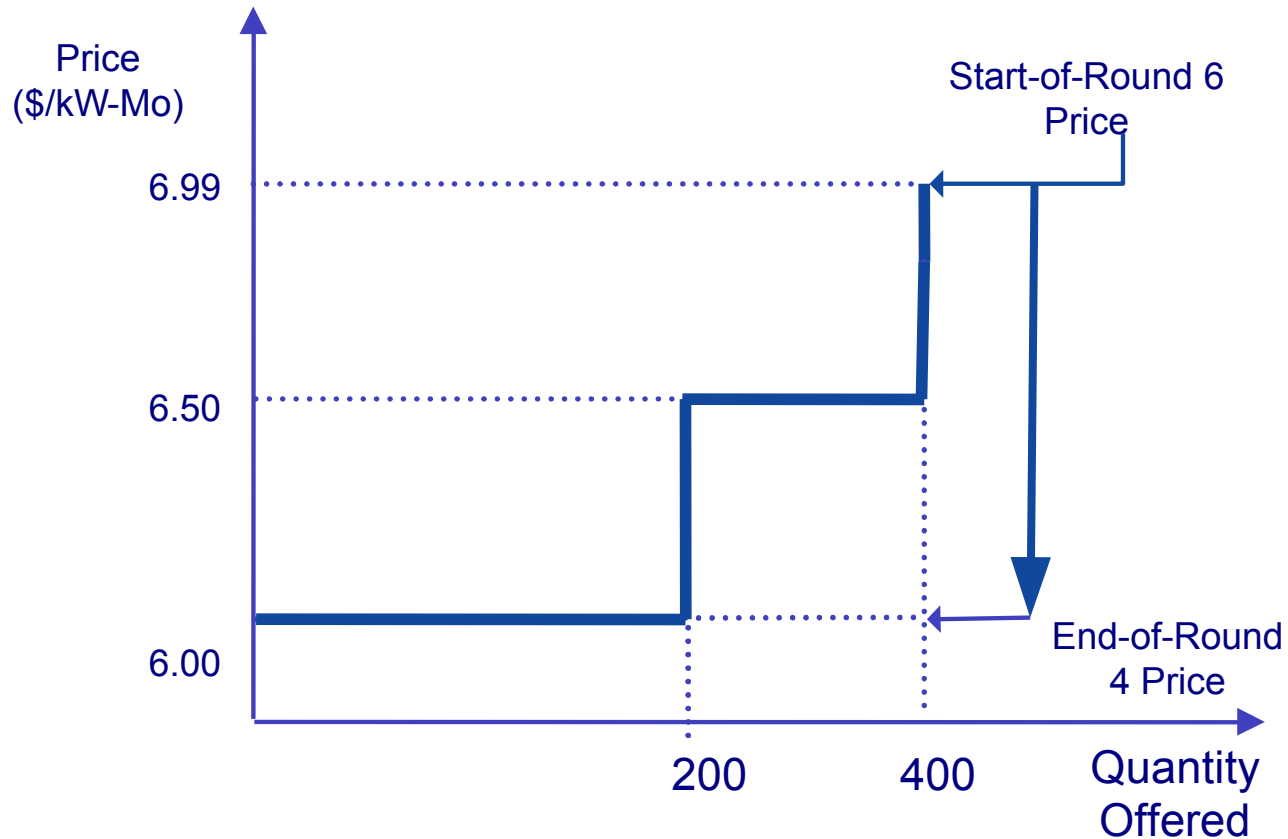
Assumptions:

ICR	30,000 MW
Existing Capability	23,000 MW
New Resources needed to meet ICR	7,000 MW
Participating New Capacity	10,000 MW

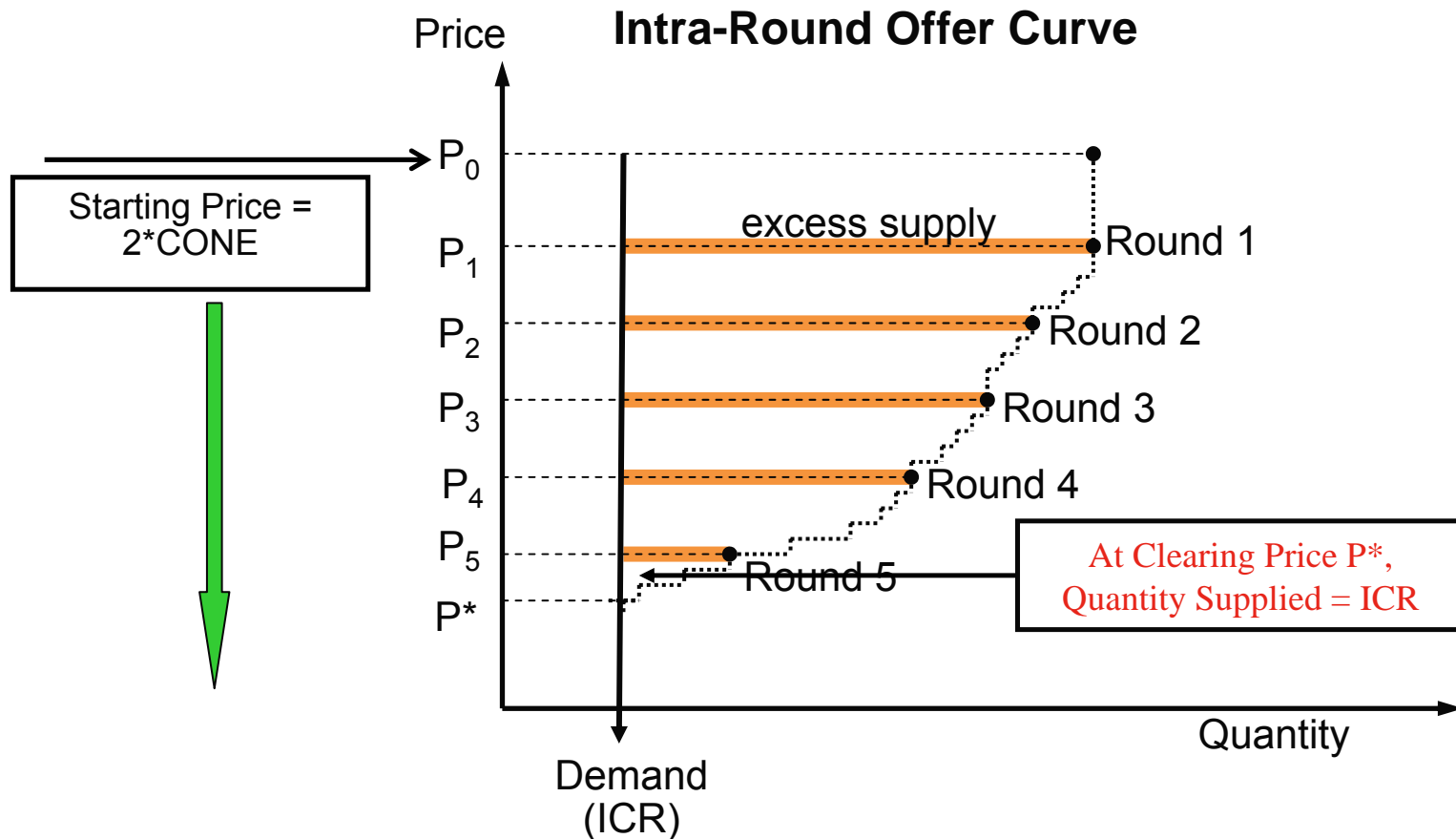
Round	Start of Round Price (\$/kW-MO)	End of Round Price (\$/kW-MO)	End-of-Round Resource Offers (MW)	Excess Capacity (MW)
1	\$15.00	\$ 9.50	33,000	3,000
2	\$ 9.49	\$ 9.00	32,500	2,500
3	\$ 8.99	\$ 8.00	32,000	2,000
4	\$ 7.99	\$ 7.50	31,000	1,000
5	\$ 7.49	\$ 7.00	30,750	750
6	\$ 6.99	\$ 6.00	29,800	-200
FINAL		\$ 6.50	30,000	0

Descending Clock Auction Mechanics

Supply Offer, Round 6



Descending Clock Auction Mechanics (Continued)



Quantity Rule

1. Capacity needed to replace the capacity associated with an accepted Permanent De-list bid shall not be purchased in the FCA if the Capacity Clearing Price equals or exceeds 1.5 times CONE.
2. Capacity needed to replace the capacity associated with an accepted De-list Bid above 1.2 times CONE shall not be purchased in the FCA. Instead, the capacity needed to replace the capacity associated with such De-list Bids shall be advanced into subsequent reconfiguration auctions.

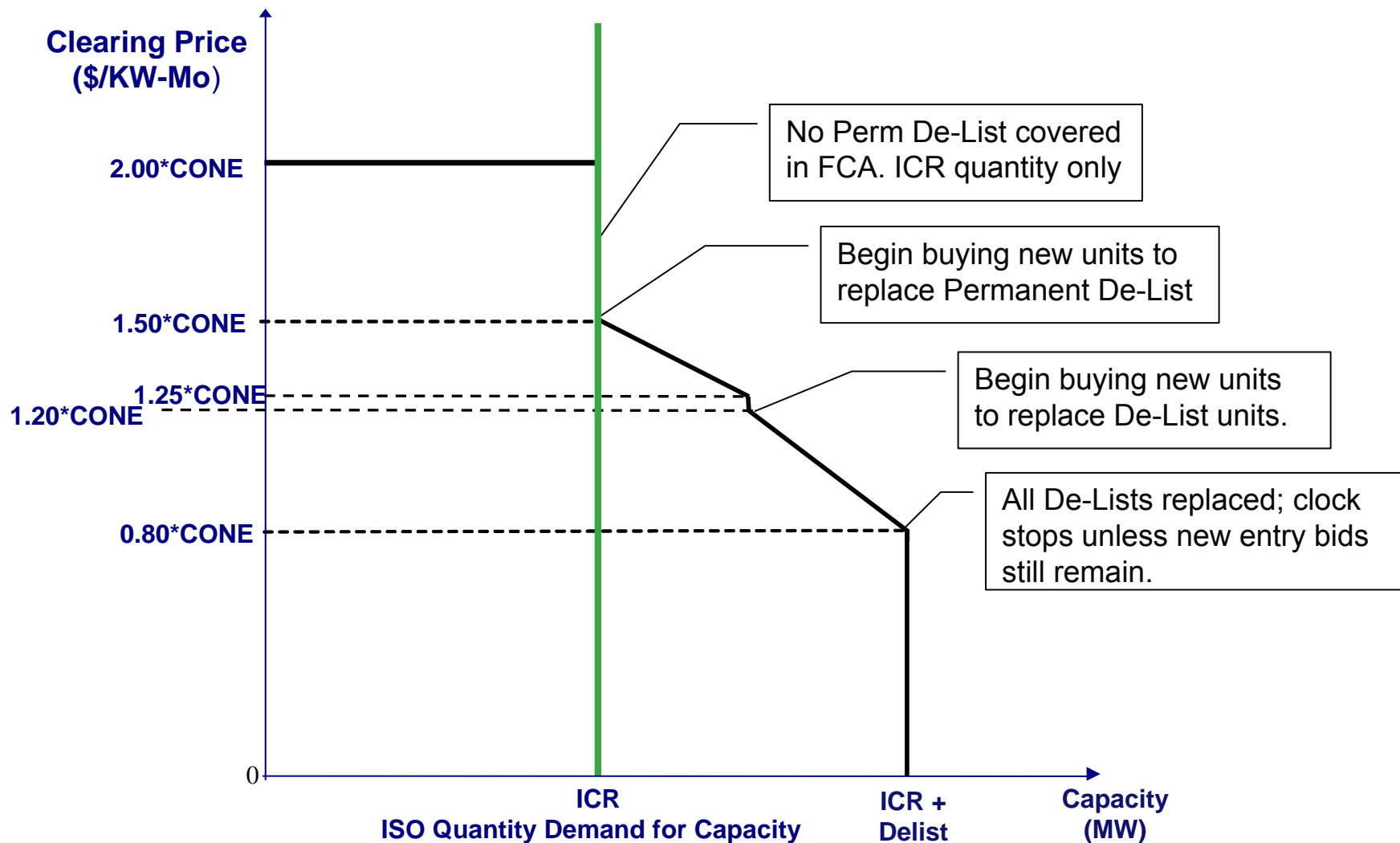
Quantity Rule (cont)

3. For prices between 1.25 times CONE and 1.5 times CONE, the quantity of capacity requirement associated with Permanent De-lists replaced in the FCA increases pro-rata. The amount of capacity needed to replace capacity of an accepted Permanent De-List Bid that is not purchased in the FCA shall be purchased in subsequent reconfiguration auctions.
4. Permanent De-list Bids below 1.25 times CONE shall be eligible to set the price in the FCA. If accepted, the capacity requirements shall be replaced in full in the FCA.

Quantity Rule (cont)

5. For prices from 0.8 times CONE to 1.2 times CONE, the quantity of replacement capacity for accepted De-list Bids purchased in the FCA increase pro-rata. De-list bids below 0.8 times CONE may leave during the auction subject to a reliability review.
6. Any De-list Bids that were not purchased in the FCA shall be purchased in a reconfiguration auction.

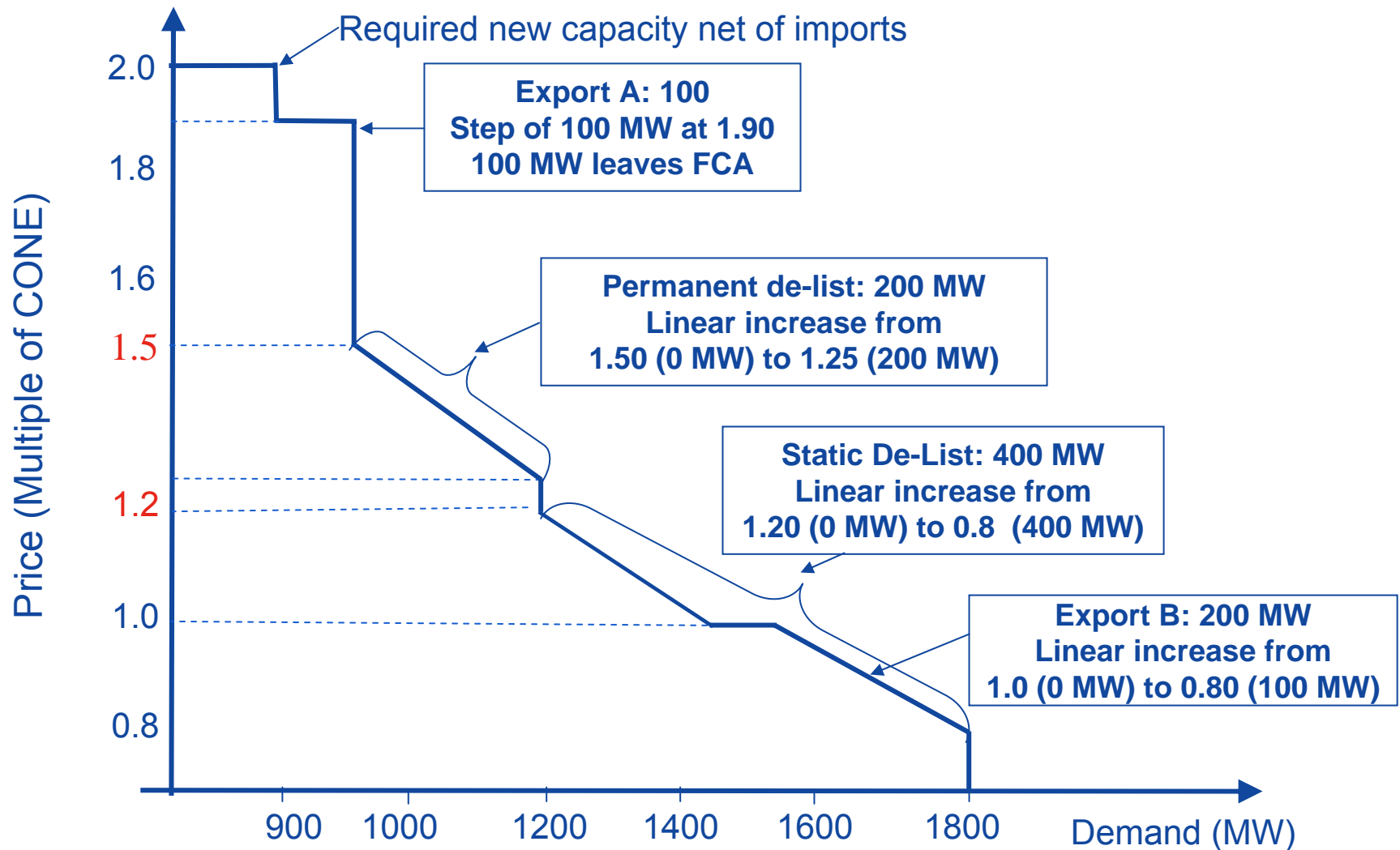
Quantity Rule – Auction Mechanics



Example – Delist Bids as Demand in FCA: Required New Capacity = 800 MW

Type of Bid	Price (CONE X)	Quantity (MW)	Demand Impact
Export A	1.90	100	Export Leaves FCA at 1.90
Permanent De-list	1.80	200	Pro-Rata purchase Linear increase from 1.50 (0 MW) to 1.25 (200 MW) Above 1.50 x CONE: De-List Quantity deferred to Reconfiguration Auctions
Static De-list	1.30	400	Linear increase from 1.20 (0 MW) to 0.80 (400 MW)
Export B	1.00	200	Step of $(.2/.4) \times 200 = 100$ MW at 1.00 Linear increase from 1.00 (0 MW) to 0.80 (100 MW) Below 0.8 x CONE: All De-List Quantity Replaced in the FCA

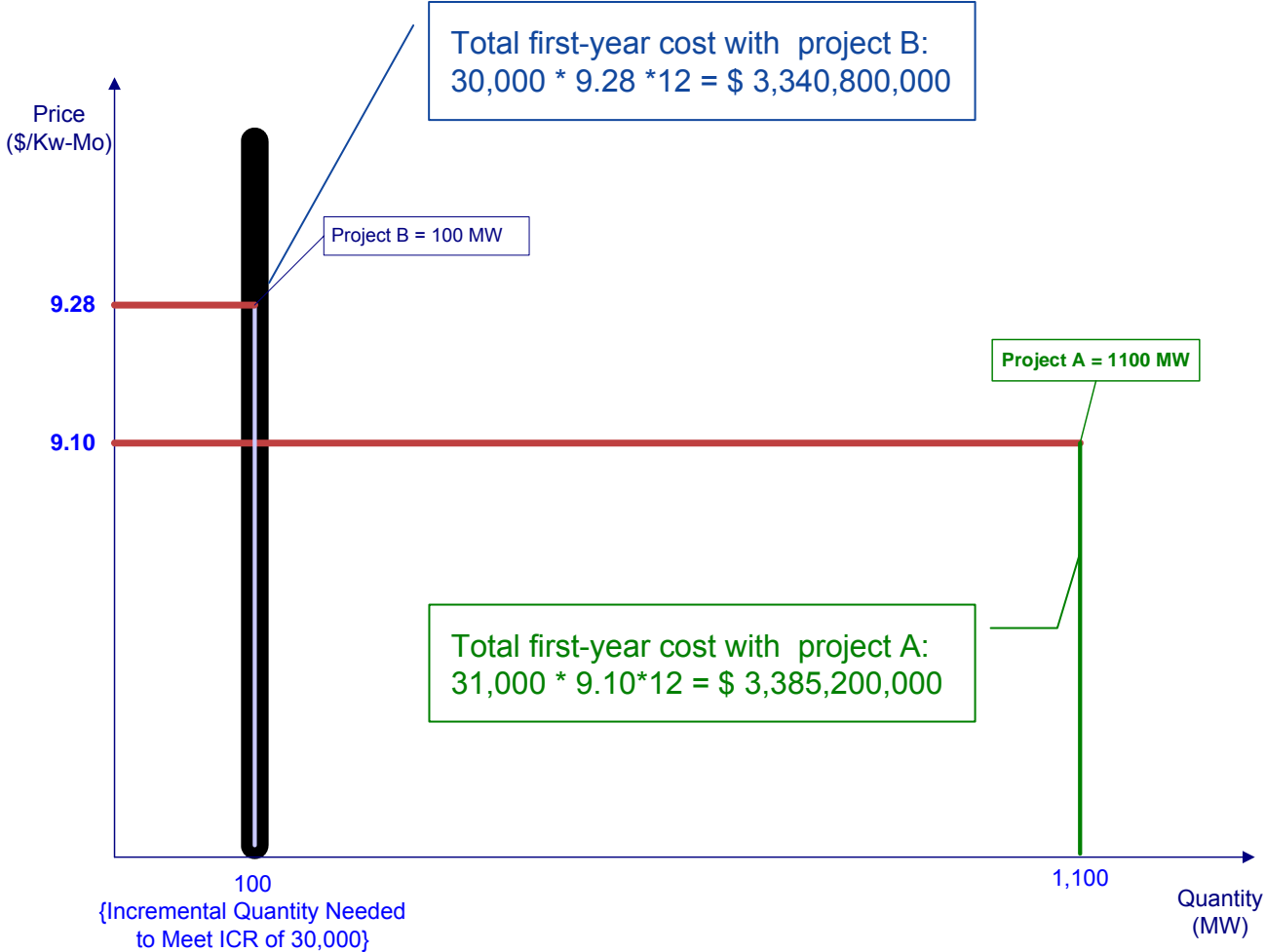
De-list Bids Shown as Demand in the FCA



Clearing In The FCA – Treatment Of Offers and Bids

1. Dynamic De-list bids are entered during the clock auction when prices drop below $0.8 * C_{ONE}$
2. Dynamic De-list bids are subject to Reliability Review by the ISO.
3. Dynamic De-list bids will be accepted on a pro-rata basis if more are submitted at a price than are needed
4. New Resources Accepted in Qualification must enter the full amount of the Qualified Capacity in the first round of the FCA
5. The Quantity of an Offer can be reduced (By the Supplier) in subsequent rounds as the price drops

Closing the Auction: Minimizing Total Cost



Clearing In The FCA -- Zones

1. Import-Constrained Capacity Zone

- FCA for that Capacity Zone concludes on the first of the following conditions:
 - Total system capacity \leq ICR OR
 - Remaining Capacity offered into zone \leq Local Sourcing Requirement (LSR)
- Clearing Price for that Zone is the price at which either of these conditions is met
- The auction for that Zone is then complete

Note: Clearing Price May Be Higher in Import Zone

Clearing In The FCA – Zones (Continued)

2. Rest-of-Pool Zone

- FCA for the ROP Capacity Zone concludes when
 - Total system capacity \leq ICR
- Clearing Price is set for that Zone by this condition

3. Export-Constrained Capacity Zone

- FCA for these Capacity Zones concludes on the last of the following conditions:
 - Total system capacity \leq ICR **OR**
 - Capacity offered into zone \leq Maximum Capacity Limit
- Clearing Price for that Zone is determined when last condition is met

Note: Clearing Price May Be
Be Lower in Export Zone

FCA Mechanics – Auction Failure Protection: Inadequate Supply

1. Capacity Zone

- Inadequate supply to meet local sourcing requirement
 - New capacity is paid $2 \times \text{CONE}$
 - Existing capacity is paid $1.1 \times \text{CONE}$
 - FCA is conducted for other Zones with adequate supply
 - De-Listed bids remain as capacity resources

2. System Wide

- Inadequate supply to meet ICR
 - Auction is conducted only for Export Constrained Zone(s)
 - In all other zones
 - New capacity is paid $2 \times \text{CONE}$
 - Existing capacity is paid $1.1 \times \text{CONE}$
 - De-Listed bids remain as capacity resources

Note: Not Enough New Capacity Shows Up

FCA Mechanics – Auction Failure Protection: Insufficient Competition

1. System-Wide or individual Capacity Zone:

- Existing Capacity < ICR or Local Sourcing Requirement; and
- At FCA starting price:
 - Less than 300 MW of new capacity is Offered
 - New capacity required < New capacity < 2 x new capacity required;

OR

- New capacity or New Import Capacity Offered is pivotal
 - Some of the new capacity Offered is required to meet the ICR at the FCA starting price

2. Auction is conducted

- New capacity is paid the clearing price
- Existing capacity is paid the lower of {clearing price, 1.1xCONE}

Note: Some New Capacity Shows Up – But Not Enough

Carry-Forward Rule: Import Constrained Zone

1. Capacity purchases might exceed zonal requirements
 - FCA must accept entire cleared Offer unless rationing is elected by the supplier (Result is “Lumpy” Offers during Auction clearing)
 - Market clearing is based on minimizing total FCA costs
 - Lumpy Offers accepted in Auction clearing may result in surplus capacity
2. Extra MW are “Carried Forward” to the next FCA
 - Treated as “Out of Market ” subject to the Alternative Price Rule
 - If zone requires no new capacity, clearing price must be \leq clearing price in FCA in which “Carried Forward” MWs were purchased
 - Carried Forward rules apply until carried forward MWs are eliminated

Note: New Resources Must Be Accepted in Whole Unless Rationed

Alternative Price Rule: New Capacity

1. System-wide or Zonal
2. Addresses Buyer's Market Power
 - Market monitor reviews New Capacity Offers below $0.75 \times \text{CONE}$
 - If Offer is deemed unjustified, capacity is considered 'Out of Market'
3. Out of Market Capacity also includes Carry-Forward Capacity and New Self-Supplied Capacity Resources
4. If Out-of-Market capacity $>$ New Capacity needed in a Zone; New Capacity needed $>$ zero; and No Inadequate Supply in FCA:
 - Clearing price = lesser of {CONE, or price $-\$0.01$ at which the last new capacity left the auction}

Starting Price and Determination of CONE: First Three Successful Auctions

1. Collar on the Clearing Price:

- Floor = $0.6 \times \text{CONE}$ (1st FCA = \$4.50/Kw-month [pro-rated for the surplus]). All Capacity gets the same effective price.
- Ceiling = $1.4 \times \text{CONE}$ (1st FCA = \$10.50/Kw-month on clearing price). Existing capacity gets \$10.50 and new capacity gets clearing price.

2. CONE Determination

- Until 1st Successful Auction
 - $\text{CONE} = \$7.50/\text{kW-month}$ (Starting Price = $2 \times \text{CONE}$)
- After 1st Successful Auction & before 2nd Successful Auction
 - $\text{CONE} = \$3.75/\text{kW-month} + \frac{1}{2}$ of Capacity Clearing Price from the 1st Successful Auction
- After 2nd Successful Auction and before 3rd Successful Auction
 - $\text{CONE} = \$1.88/\text{kW-month} + \frac{3}{4}$ of average Capacity Clearing Price from the 1st and 2nd Successful Auctions

Note: Controls The Outcome Of First Three Auctions

Starting Price and Determination of CONE: Continued

- If the 3rd FCA is successful and new capacity sets the clearing price, then:
 - $\text{CONE FCA}_t = (0.70 \times \text{CONE FCA}_{t-1} + 0.30 \times \text{Capacity Clearing Price in year}_t)$
- Otherwise:
 - $\text{CONE FCA}_t = \text{CONE FCA}_{t-1}$

FCM Components: Performance and Financial Assurance

FCM Components – Performance Incentives

1. Performance: Listed capacity resources unavailable in reserve shortage events get reduced Capacity Payments
 - System Wide Reserve Constraint Penalty Factors “RCPFs” trigger a shortage event
2. PER Deduction: $LMP > \text{strike price}$ → capacity payments are reduced by PER calculation
 - PER adjustments affect all listed capacity units (except Demand Resources) – on line or off
 - Reduces market power in energy spot market – removes any incentive to withhold

Performance Requirements

1. Real Time Availability Performance Measures
 - Resources must be available when operating reserves are short
2. Resources unavailable in shortage events get reduced capacity payments
 - Penalty = 5% of annual FCA Payment per event
 - Pro-rated in MW
 - Capped at 10% per day
 - Monthly penalty cannot exceed 2.5 times FCA Payment in that month
 - Annual penalties cannot exceed total FCA Payment less PER adjustments
 - $\text{FCA Payment} = \text{FCA cleared MW} \times \text{Clearing Price}$

Peak Energy Rent Adjustment

1. Prevents

- double payment (Generators keep Energy Market Revenue)
- exercise of market power in the energy market

2. Energy price is deducted from the capacity payment when Energy Prices exceed cost of a peaking unit (assumed 22,000 heat rate)

- At current gas prices, this is approximately \$155/MWH

FCM Components – Financial Assurance

1. Load Serving Entity Obligation

- Monthly Capacity Payment = Actual Credit exposure under the existing Financial Assurance Policy (“FAP”)

2. Supplier Obligation

- Existing Capacity: Existing FAP requirements
- Resource retiring at end of Commitment Period:
 - Additional Financial Assurance = 2.5 times the FCA Monthly Payment
- New Capacity
 - Qualification Phase: Initial Deposit of \$2/kw x Qualified MW Capacity (“Application Fee”)
 - If Selected, Application Fee is applied to 1st Payment below;
 - otherwise it is returned.
 - 1st Payment (Within 5 Business Days) – Monthly CONE x MW awarded
 - 2nd Payment (At Least 15 Days Prior to next FCA) –Monthly CONE x MW awarded
 - 3rd Payment (At Least 15 Days Prior to following FCA) –Monthly CONE x MW awarded.
- Total Financial Assurance Payments = Three monthly payments

FCM Components: Reconfiguration Auctions

FCM Components – Reconfiguration Auction Phase

1. Capacity Products:
 - Supply Obligation trading among physical resources
 - Additional capacity to cover increased ICR
 - Released capacity to match decreased ICR
 - Deferred capacity requirements from existing capacity resources
 - Permanent De-List
 - Static and Export De-List Bids
2. Distinct product for each zone defined in the FCA
3. Clearing price:
 - Reconfigured Supply = Reconfigured Demand

Reconfiguration Auction Phase (con't)

1. Annual Reconfiguration Auctions:

- Full year commitment
- After the primary FCA
- Held approximately 2 years, 1 year and just before the FCA Commitment period

2. Monthly and Seasonal Reconfiguration Auctions:

- Adjust annual commitments during the commitment period
- Begins the first month of the first commitment period
- Permits Participants to adjust (buy/sell) positions

FCM Timeline for 1st FCA

Horizon	Action
01/01/2007 – 10/01/2007	Qualification Review Period
02/15/2007	FCM rules filed with FERC
03/01/2007	Begin First FCA Existing Resource Qualified MW Calculation
04/02/2007	Deadline: ISO-NE sends out Existing Resource Qualified MW Notification
04/30/2007	Deadline: Existing Resource Qualification Packages (De-list requests)
05/03/2007	ISO Posts Export and De-List Bid Information
06/15/2007	Deadline: New Resource Qualification and Imports
10/01/2007	Notify New Resources of Qualification and Financial Assurance Requirements and disposition of de-list requests, based on price
10/12/2007	Deadline: New Resources Post Financial Assurance
11/01/2007	De-List Bids, Capacity Zones, LSRs & ICR filed with FERC
02/11/2008	FCA #1 – Delivery for June 2010 through May 2011
Post-Auction	Notification of De-List Bids accepted, based on reliability

