

# ALWAYS ON CAPACITY EXCHANGE (AOCE)

CONCEPTUAL INTRODUCTION/STRAWMAN PROPOSAL

FEBRUARY 4, 2019



**RELIABLE ENERGY ANALYTICS LLC**

# WHAT IS AN AOCE (PRONOUNCED ACE)

- An online, 24x7, Marketplace for Sellers and Buyers to transact in both Capacity and Energy contracts (i.e. a PPA), operated by Independent System Operators (ISO)
- A platform for ISO's to secure capacity for reliability that honors individual State based energy targets and eliminates the cost of acquiring excess capacity, that is occurring today
- A more flexible platform for acquiring the right amount of capacity, closer to when it's needed, as opposed to the 3-year planning horizon used by some ISO's today, while also supporting long term new capacity projects
- An approach that anticipates, and accommodates, daily increases in new supply coming from behind the meter resources and other distributed energy resources
- A new, dynamic marketplace that properly values Green Capacity/Energy and other characteristics that may be valuable for reliability, i.e. rapid ramping
- A place where anyone: Generators, Energy Suppliers, Traders, Investors, Utility Companies, State's, Companies with their own Green agenda, and of course, ISO's, can buy and sell capacity, on their own terms i.e. duration, type, location, price
  - Buyers and Sellers in AOCE are subject to financial assurance requirements, as specified in market rules
- A method to make excess capacity available across regions that are electrically connected, i.e. the Eastern Interconnect

# WHY DO WE NEED AN AOCE

- Capacity Markets aren't meeting the environmental needs manifested in [State Based Energy Programs](#) (i.e. RGGI, RPS, etc.), as indicated by [FERC Docket AD17-11-000](#)
- [New capacity is coming onto the system](#) from Behind-the-Meter PV, daily, [at an alarming rate](#)
- New capacity from renewable resources is far outpacing capacity from other fuels, i.e. Natural Gas for 2019 according to [EIA estimates](#)
- ISO New England [already has 20,000 MW of NEW Capacity in the queue, indicated on slide 6](#); **there is no shortage of new capacity to meet future needs, and it's accelerating rapidly**
- According to ISO New England's 2019 [Fuel Security Paper](#): "In today's environment, however, we do not face a capacity shortfall problem (indeed, **the system is awash in capacity**)."
- Capacity Markets are [hitting headwinds](#) due to tensions from capacity entering the system outside of ISO control, such as [State sponsored programs that subsidize Green Energy](#)
- Current capacity market designs, with their [inaccurate 3-year planning horizon](#) are unable to accurately forecast future electricity demand, largely due to the amount of [new capacity coming online](#) from Behind-the-Meter Solar/DER/Battery resources and [are not flexible enough to handle the realities of today's energy evolution](#)
- Protests to [FERC Docket ER19-467-000](#) provide clear evidence that real change is needed.
- A group of 18 US Senators [issued a letter to FERC](#) emphasizing urgency for FERC to take the lead to solve the problems inherent in today's capacity markets.

# AOCE OBJECTIVES

- Accommodate new capacity coming on to the system daily resulting from State Energy initiatives, Green Buyers and other drivers
- Achieves State Energy Goals as a top priority, that properly charges the beneficiaries of that State, without burdening other States consumers with costs of the program
- Be flexible enough to integrate new technologies to generate electricity and manage grid operations
- Be market based so that each resource is properly valued for what benefit it provides to grid operations, consumers, the environment and society at large
- Efficiently secures future capacity using a just-in-time approach that eliminates the excessive over-buying of capacity that occurs today by ISO's while supporting new, long term capacity construction projects
- Incentivizes investment in the most beneficial technologies used to generate electricity and manage grid operations reliably (including DR) that achieves Societal and Environmental goals determined by each individual State, such as clean air and water
- Provide a vibrant, 24x7, marketplace for Green Energy Buyers to secure PPA's and Investors to trade
- Ensure that we have a reliable electrical system for all, at a just and reasonable cost

# HOW DOES AOCE WORK; CAPACITY COMMITMENTS (CC)

- Each ISO that wishes to establish a capacity market capability operates an AOCE node, where trading takes place 24x7
- Each AOCE node is synchronized to ensure that all bids and offers are accessible to parties across regions/control areas
- Capacity buyers place bids into the AOCE describing the characteristics of capacity they wish to acquire, along with other details (start date/end date, hours, capacity type (i.e. Solar, Wind, ANY), location, bid price, quantity of capacity MW's, etc.)
- Capacity Resource owners, must have their resources qualified by the ISO controlling the area in which the resource is located, before being allowed to place an offer into the AOCE
- Capacity Resource owners, with qualified resources, place offers into the AOCE describing details about their capacity offer (start date/end date, hours, capacity type (i.e. Solar, Wind, Hydro, Natural Gas, etc.), location of resource, offer price, quantity of capacity MW's, etc.)
- A binding transaction, called a "Capacity Commitment" (CC), is created in AOCE for bids/offers that align, forming a contract
- The buying party in a CC becomes the owner of the CC



# APPROVED CAPACITY COMMITMENTS (ACC)

- A CC must be approved by an ISO for both feasibility and adherence to market rules, creating an Approved Capacity Commitment (ACC). Failure to receive approval invalidates a CC and no contract is established
- An ACC may be mitigated based on market rules, which would be indicated in the ACC record
- An ACC is a tradeable object in AOCE
- An ACC containing terms to provide Energy Revenue to the ACC owner is similar to a Power Purchase Agreement
- The Owner of an ACC may offer to sell an ACC by placing an offer into AOCE, however only the Energy Revenue Percentage and Price components of the ACC may be changed, all other characteristics must remain the same

# INTER-AREA CAPACITY COMMITMENTS (ICC)

- Bids and Offers whose locations exist in differing ISO control areas may form an inter-area capacity commitment (i.e. Import/Export arrangement), or ICC
- An ICC must indicate that inter-area transmission capacity has been secured (i.e. e-tags) for the entire route from the location of the qualified capacity resource to the location specified by the buying party in the bid details
- The ISO's controlling the locations specified in the bid and offer must approve an ICC.
- An ACC is created in AOCE when both ISO's approve the ICC.
- ACC's that are associated with ICC's are tradeable objects in AOCE and must also adhere to the requirements stated above for ICC's

# CAPACITY SUPPLY OBLIGATIONS (CSO)

- At some point, based on *Market Rules*, the ISO must issue Capacity Supply Obligations (CSO) to Resource Owners to secure capacity for reliability purposes
- Based on *Market Rules*, the ISO should be required to compensate ACC owners as part of the process that issues CSO's to resources in an ACC
- Resource Owners holding CSO's are required to place offers into the Energy Markets, just like today



# CSO ISSUANCE PROCESS (CSOIP)

- Market Rules determine when this process is executed
- The ISO will prioritize the issuance of CSO's for ACC's as follows:
  1. Satisfy State based energy targets using a cost curve. State targets that are greater than the amount of ACC MW's available in ACOE will result in all ACC Resources receiving a CSO, provided there are no reliability issues in doing so.
  2. Satisfy Reliability Requirements by issuing a CSO to ACC resources based on a **priority services hierarchy** (see **Note** below) specified by Market Rules, using a cost curve
  3. The ISO may refuse to issue a CSO to an ACC resource, based on reliability concerns
  4. In the event that an ISO is unable to secure enough capacity to meet reliability requirements, via this process, one or more ISO Reliability Bid's (ISORB) may be placed into the AOCE to secure required capacity

**NOTE:** A priority services hierarchy instructs an ISO on the type of capacity to be acquired in precedence order. For example, Green Energy Resource may have a higher precedence than a Natural Gas Resource, likewise a Natural Gas unit may have a higher precedence than a Coal Unit. A rapid ramping unit may take precedence over all other resources during certain periods when rapid ramping (up and down) is needed for reliability. Each market would determine the priority services hierarchy

# ISO RELIABILITY BIDS (ISORB)

- The ISO's may place one or more reliability bids (ISORB) in the AOCE in advance of the time frame when this capacity is needed; **Market Rules dictate the time frame for submitting this bid**
- The start and end dates/times expressed in the ISORB is referred to as the Commitment Period (CP). **(NOTE: The CP is not the same as ISONE's capacity commitment period (CCP), which is one year. The CP is defined by the start and end times expressed in the ISORB which could be as short as 1 day or even 1 hour in the future.)**
- The submittal of the ISORB is determined by the ISO, based on forecasted capacity requirements over the CP.
- An ISORB may be submitted anytime prior to the CP, as dictated by market rules. A minimum of one week prior to the CP may be in order.
- The ISO's may place one or more reliability bids (ISORB) in the AOCE for **new capacity projects** requiring construction, provided there is ample lead time prior to the CP to accommodate construction and commercial operation startup
- The amount of MW's in the ISORB is calculated using Forecasted Reserve MW + Forecasted Peak Power from Grid Resources (PPGR) for a specific (time period, hours, type of capacity required, location, etc.) minus the amount of CSO MW's already issued in the AOCE, during the same time period specified in the ISORB
- The amount of capacity MW's expressed in the ISORB is referred to as the ISO Reliability Target (ISORT)
- For example, an ISO reliability bid for 1000 MW of ISORT would be submitted into AOCE if the forecasted Reserves + PPGR is 3000 MW and there are already 2000 MW of CSO's issued in AOCE
- CSO's are issued based on the priority services hierarchy (see slide 8 for a description)
- Only parties with new, approved capacity construction projects, or an existing qualified resources or ACC Owners with no assigned CSO may place offers to satisfy an ISORB
- An ISO may issue CSO's for multiple capacity supply offers in order to meet the ISORT MW's and other parameters of the bid.
- New capacity construction projects must allow ample time to complete construction and achieve commercial operation

# PAYMENTS

- As in today's capacity markets, ISO's are responsible for settlement functions; issuing payments and billing appropriate parties
- Market Rules determine settlement details associated with AOCE
- ISO's should consider compensating parties that own an ACC which is bound to a CSO; perhaps 10% of the price paid by the ACC owner, in addition to the total value of the ACC. This is referred to as the capacity payment
- ACC's that are not bound to CSO's receive no capacity payments
- ISO's shall also pay ACC owners the energy settlement amount (final LMP\*MW) \* Energy Revenue Percent, specified in the ACC. This is referred to as the PPA payment.
- PPA payments may still be issued to ACC owners if the resource backing the ACC receives revenues from energy produced during the time period specified in the ACC, even though no CSO or Capacity Payment may have been issued, i.e. self scheduled units with ISO approval to run.

# CHARGES

- As in today's capacity markets, all payments made to ACC and CSO owners must be charged back to the beneficiaries of this capacity
- Load Serving Entities (LSE) are responsible for these charges and are billed accordingly by the ISO
- Unlike today's capacity markets, the AOCE approach identifies the beneficiaries of capacity at a much more granular level, as expressed in the Bid Location.
- An ISORB may indicate a bid location for the entire control area or a specific area, such as load zone; control area charges are allocated to LSE using a fair and reasonable approach, i.e. proportion of nominal load MW over total control area Load MW
- The LSE whose service territory contains the bid location indicated in an ACC, that is bound to a CSO, is charged the capacity payment amount paid to the ACC owners that are bound to a CSO (see slide 9 for a description of capacity payments)

# RESOURCE OWNER PENALTIES

- A resource owner that has received a CSO from the ISO must submit offers into the Energy markets
- A resource owner that is instructed by the ISO to produce energy must meet the requirements specified in the dispatch/commitment instruction
- Failure by the resource to fully perform these functions will result in penalties, with some exceptions, as defined by Market Rules
- Exception Examples:
  - An unplanned grid outage that prevents a resource from delivering energy to the bid location specified in an ISORB or ACC
  - Curtailment by the ISO
  - Force majeure
- Resource Owners are responsible for all penalty charges issued by an ISO



# ACC OWNER PENALTIES

- An ACC owner may be charged penalties for non-performance, such as the inability to consume the amount of energy MW specified in the ACC for resources that are committed/instructed to run by the ISO, with some exceptions; based on Market rules
- Exception Examples:
  - An unplanned grid outage that prevents the bid location specified in an ISORB or ACC from receiving energy (i.e. a grid blackout)
  - Load shedding by the ISO
  - Force majeure
- ACC Owners are responsible for all penalty charges issued by an ISO

# OTHER PAYMENTS AND CHARGES

- Other payments and charges may be issued to ACC and Resource owners as deemed necessary by an ISO, i.e. Out-of-merit payments; defined by Market Rules

# NEXT STEPS

The AOCE described in this proposal is not a complete functional specification. It is intended to serve as a catalyst to begin industry discussions to find a more flexible approach to capacity markets. AOCE should be designed and developed within a forum that supports an industry consensus approach engaging all stakeholders (i.e. capacity suppliers/buyers), ISO's, State and Federal regulators, State and Federal policy makers, Companies wishing to acquire Green Power, and consumer representatives.

Transmission Capacity has been successfully administered for over 10 years using a NAESB developed standard and FERC regulation called OASIS

An ANSI standards development organization, with a successful track record for developing wholesale electric industry standards across North America, such as NAESB is a proper forum to produce an industry wide standard for Energy Capacity; AOCE

# AOCE CONCEPTUAL DESIGN; CAPACITY COMMITMENTS

Capacity Sellers receive qualification approval from their local ISO to place offers in AOCE



Capacity Sellers place offers in AOCE, backed by a qualified Resource



Aligned Bids/Offers Result in a Capacity Commitment (CC)



Buyers place bids in AOCE to secure capacity and/or Energy

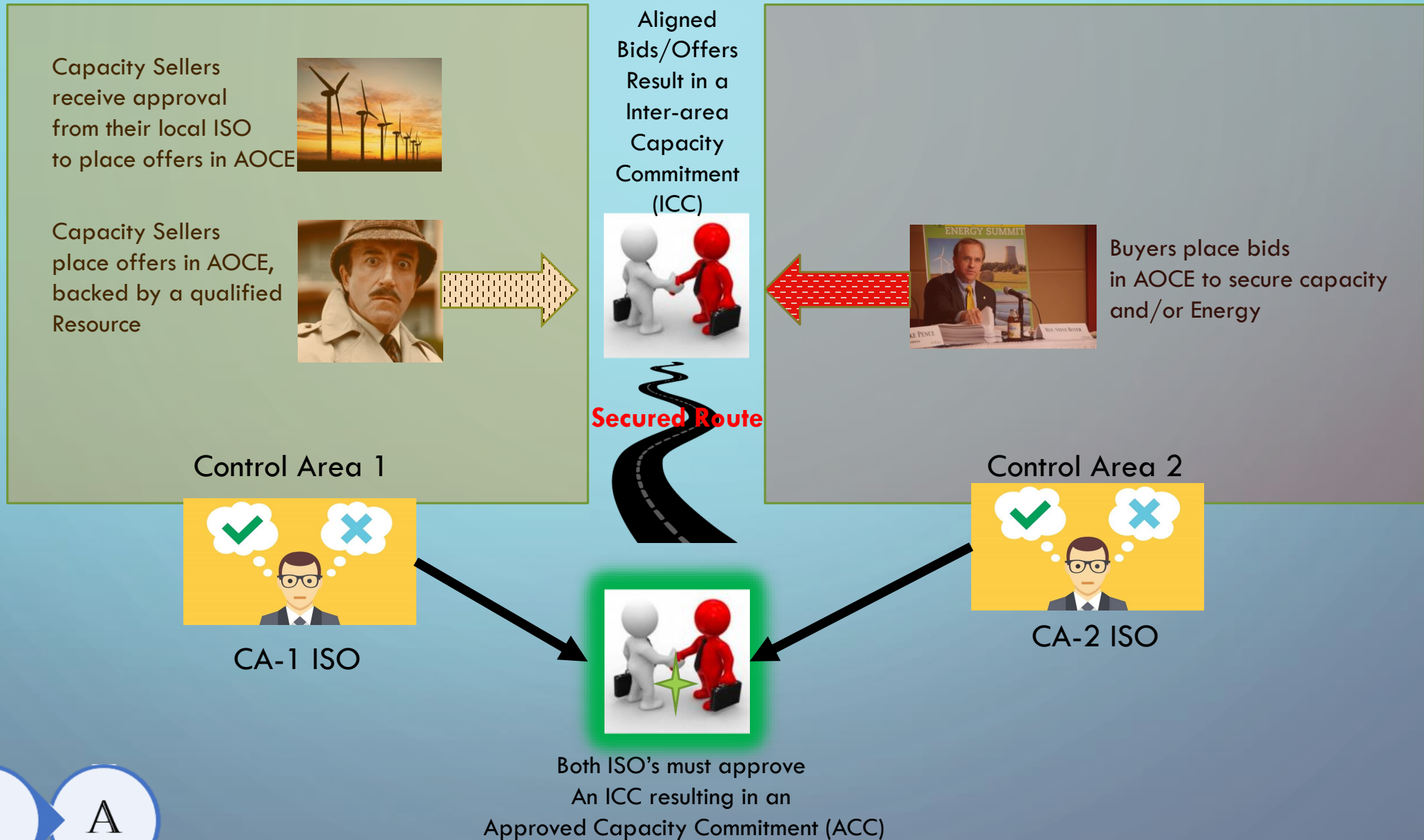
ISO controlling the Locations in the Bid/Offer must Approve a CC for feasibility



CC Buyers become the Owners of ACC's

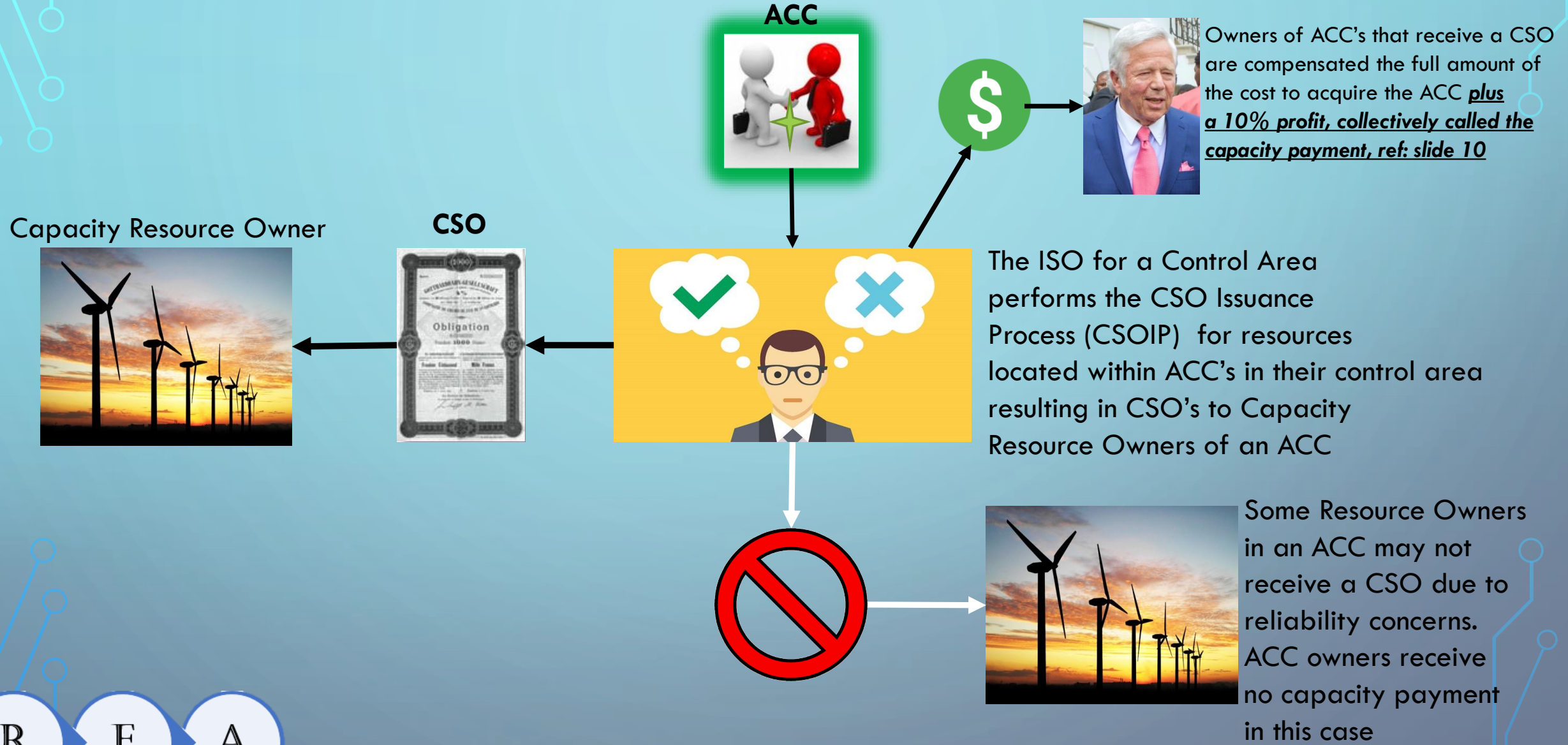
ISO approved CC results in an Approved Capacity Commitment (ACC)

# INTER-AREA CAPACITY COMMITMENTS





# CAPACITY SUPPLY OBLIGATIONS FROM ACC'S



# ISO RELIABILITY TARGETS AND BIDS

At some point the ISO calculates the Reliability Target MW's (ISORT) for a specific Commitment Period and Location



Total Amount of Reliability MW needed for a location and timeframe (commitment period), determined by ISO

## MINUS



CSO's already issued for the same location and Commitment Period time frame, determined by ISO

ISO submits one or more Reliability Bids (ISORB) into AOCE, specifying ISORT MW, Capacity type, location and other characteristics



ISO Reliability Target (ISORT) indicating additional MW's that are needed by an ISO to satisfy Reliability Requirements

# CSO ISSUANCE PROCESS FOR OFFERS TO ISORB'S

Capacity Resource Owner  
OR  
ACC Owner  
of submitted/cleared  
offers



CSO



Capacity payments are made by the ISO  
To ACC/Capacity Owners of cleared  
Offers that are issued a CSO. No  
profit/uplift payment is made. Payment  
Is based on MW \* Price

Submitted Offers to ISORB



ACC Owners with no CSO and  
Capacity Resource Owners with  
Available capacity may  
submit Offers to  
satisfy an ISORB



The ISO for a Control Area  
performs a CSO Issuance  
Process (CSOIP)  
resulting in CSO's to Capacity  
Resource/ACC Owners **based on  
their submitted offers** to the ISORB's  
in AOCE

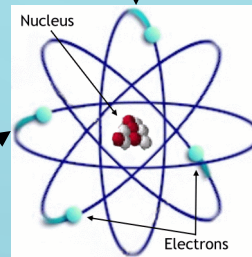
The ISO only awards enough CSO's to  
satisfy the calculated ISORT  
No excess MW above ISORT  
may be acquired



# ENERGY MARKETS, PPA'S AND ENERGY PAYMENTS



Capacity Resource Owners with Capacity Supply Obligations MUST submit Energy offers into the Energy Markets.  
ISO performs SCUC/SCED the same as today's DA/RT Energy Markets



Generators produce Energy throughout the Operating day, some may be self-scheduled



An ACC that specifies an Energy Revenue Percentage  $> 0$  Is a Power Purchase Agreement



ISO processes Settlements to determine payments for Energy and compensates the appropriate party

# CAPACITY CHARGES TO COVER CAPACITY PAYMENTS

Capacity Charges are issued to Load Serving Entities throughout a control area for all capacity payments made by an ISO servicing that area.

**Capacity Charges are allocated to LSE's, based on the location specified in the (ACC/ISORB) Bids**

Bids that apply to the entire control area location will have their Capacity Charges allocated to LSE's based on a fair and appropriate allocation scheme, i.e. proportion or nominal load in the region

