

MODELING OF EXPORT SALES FROM A LOCALITY IN NYSRC IRM STUDIES

Executive Summary

Currently sales into external Control Areas' Forward Capacity Auctions are not modeled in the IRM studies. These forward sales and obligations, historically emanating from NYCA non-Localities, tended to disappear before the start of their respective capability periods. Recent changes, such as higher capacity prices along with modified market rules in external markets and sales from NYCA Localities, have led the ICS to re-evaluate this treatment.

At this time, the NYISO does not believe it is reasonable or practical to alter the current approach. The three principle reasons for this conclusion are:

- It is extremely difficult to predict which FCM obligations will remain, if any, at the time of the capability period.
- Creating the NYCA capacity requirements independent of these sales is complemented by the current FERC-approved solution of adjusting monthly auction Unforced Capacity Demand Curve values to accurately reflect the need for additional capacity and ensures the effect of the sale will be captured when satisfying requirements.
- It has not been demonstrated that a simple, transparent, and robust modeling technique exists for evaluating the effect of locality sales.

Introduction

The New York State Reliability Council (NYSRC) and the New York Independent System Operator (NYISO) have worked collaboratively since 1999 in order to ensure the reliability of the New York Control Area ("NYCA"). In terms of Installed Capacity (ICAP) requirements, the NYSRC is charged with establishing the New York Installed Reserve Margin (IRM) based on a criterion of no less than 0.1 days/year Loss of Load Expectation (LOLE). The NYISO is charged with setting the NYCA Minimum Installed Capacity Requirement ("NYCA Minimum ICAP" (by multiplying the NYCA peak Load forecasted by the ISO by the quantity of one plus the NYCA Installed Reserve Margin) and the Locational Minimum Installed Capacity Requirements (LCRs).

The NYISO enforces the NYCA Minimum ICAP and LCR criterion by requiring the Load Serving Entities (LSEs) in New York to procure minimum amounts of the needed capacity (in the form of Unforced Capacity, "UCAP"). LSEs in Localities are required to buy a certain percentage of their capacity obligation from resources electrically within those areas.

LSEs are required to meet their requirements on a monthly basis. To satisfy their requirements, LSEs can enter into bilateral contracts and participate in NYISO-administered auctions. The NYISO conducts Capability Period Auction (6 month "strip") Monthly Auctions (for the upcoming month and any future month in the future months in

the Capability Period), and ICAP Spot Market Auctions. The Spot utilizes a demand curve, and the clearing price is established by the amount of capacity offered clearing against the demand curve. The Spot has a large volume of activity.

It is possible that some suppliers located in the NYCA may not be able to find buyers to enter into a bilateral contract, or their offers may not clear in the NYISO-administered auctions, or they may elect to offer their capacity as exports outside of the NYISO-administered markets. Qualified external generators can enter into bilateral contracts with a NYCA LSE and can offer capacity into the NYISO-administered auctions as imports, and they have sold and cleared in the NYISO market. External capacity cannot be used to satisfy an LSE's Locational Minimum UCAP requirement unless it using Unforced Capacity Deliverability Rights over a controllable line ("UDR facility").

To date, the sales of capacity from generators electrically located in the NYCA into neighboring Control Areas have been short term in nature.¹

A forward capacity sale from the NYISO's G-J Locality cleared in ISO-NE's Forward Capacity Market auctions for the period of June 2018 to May 2019. That sale and a change in ISO-NE's rules raised questions about the impacts potential sales into ISO-NE or PJM FCMs would have on the NYCA requirements for capacity in the Locality (as well as on the impact to the market price of capacity in the localities). It also raised the question of how to determine the reliability impact of sales from Localities into External Control Areas, given that the generator continues to operate within the Locality.

Purpose

The purpose of this paper is to examine potential capacity sales emanating from New York's Localities to neighboring Control Areas and recommend a treatment for them in the IRM study.

Recommendation

The NYISO recommends that the existing policy of not modeling future capacity sales from resources in the NYCA to outside of the NYCA be continued for the purpose of determining the IRM. The recommendation is based on the following factors:

- 1) ***Current Practice:*** *To date, the Installed Capacity Subcommittee of the NYSRC ("ICS") chose to not model capacity exports in the IRM. Evidence suggested that there is large uncertainty that these sales into FCM auctions would ultimately occur. This reasoning for not modeling FCM sales still holds true.*
- 2) ***Volatility of markets:*** *ISO-NE reconfiguration auctions have demonstrated volatility in both clearing prices and participation levels (i.e., the MW of capacity transacted). Such variability decreases the predictability of the level of the sale. Market rule*

¹ There have been long term firm sales of approximately 300 MW from the St Lawrence and Moses Niagara hydroelectric plants into ISO-NE and PJM. These sales pre-date the formation of the NYISO and are anticipated to continue into the foreseeable future.

changes further increase the challenge of predicting how actual sales will differ from forward obligations.

- 3) ***Need for stable requirements:*** *The annual requirement setting process is designed to remain fixed over the course of the Capability Year and there is no process to make changes in the middle of that period. The Spot market design, because it is monthly, does offer the flexibility to react to changes in the supply. The NYISO's market rules, accepted by FERC in 2017, reflect capacity export sales from Localities.*
- 4) ***Excess Capability:*** *The Spot market auction clears offers against the demand curve, allowing excess to be procured if available.*
- 5) ***Implementation Complexity:*** *The current IRM process handles the retirements of generation units well. The modeling of generators with sales from a Locality is more complex given that the units continue to operate, continue to be available for commitment and dispatch by the NYISO, may offer a portion of their capacity to the NYCA and a portion externally, and may change their positions on a monthly basis. Given this complexity, the NYISO is examining and reviewing modeling with stakeholders. Developing an assumption of sales from a Locality to include in the IRM base case for 2018 has additional complexity and consequences that cannot readily be addressed within the modeling.*

Observations

Current Treatment of Capacity Sales in the IRM

The NYSRC and the NYISO have contemplated sales from the NYCA into the ISO-NE FCM in the previous three IRM studies. In these cases, all of the capacity was sourced outside of the Localities and once awarded, very few MW, if any, actually sold in the market at the time of the obligation period. That is, the capacity sellers that were awarded positions eventually bought out of their positions prior to the start of the delivery period.

The evaporation of the above FCM sales is one reason the ICS chose to not model these potential contracts. Another reason is because of their potential impact. For example, if the sale is from a poor performing unit, the IRM tends to decline since the remaining pool of resources' overall availability is improves. Similarly if a better performing unit sells out of the NYCA, the remaining pool of resources exhibits lower availability and the IRM rises. In either case, if it were modeled and the sale did not materialize, the performance assumptions would impact the IRM determination and ultimately the market dynamics. Lastly, the ICS chose not to model these external sales (contracts) because of their locations. Sales from Rest of State (ROS) (Load Zones A-F) have very little impact on securing the supply since they come from zones with excess capacity where the LSEs only have a NYCA requirement and not also an LCR requirement

Looking Ahead

There are four recent changes:

- Resources located in NYCA Localities have been awarded sales in ISO-NE FCM. In the past there were only external sales from ROS.

- ISO-NE's recent rule change allows suppliers from external areas (*e.g.*, the NYCA) that qualified for a later auction to participate in earlier auctions, which raises the possibility that these resources could eventually be providers of capacity as early as during 2017-2018 Capability Year.
- The price differential between the NYISO and ISO-NE could result in NYCA resources offering capacity into external Control Area auctions.
- ISO-NE recently changed its demand curve rules for its reconfiguration auctions leading some to believe it may be more difficult for awardees to buy out of their positions.

The above changes have promoted an interest in re-evaluating what a capacity sale means to the reliability of the system.

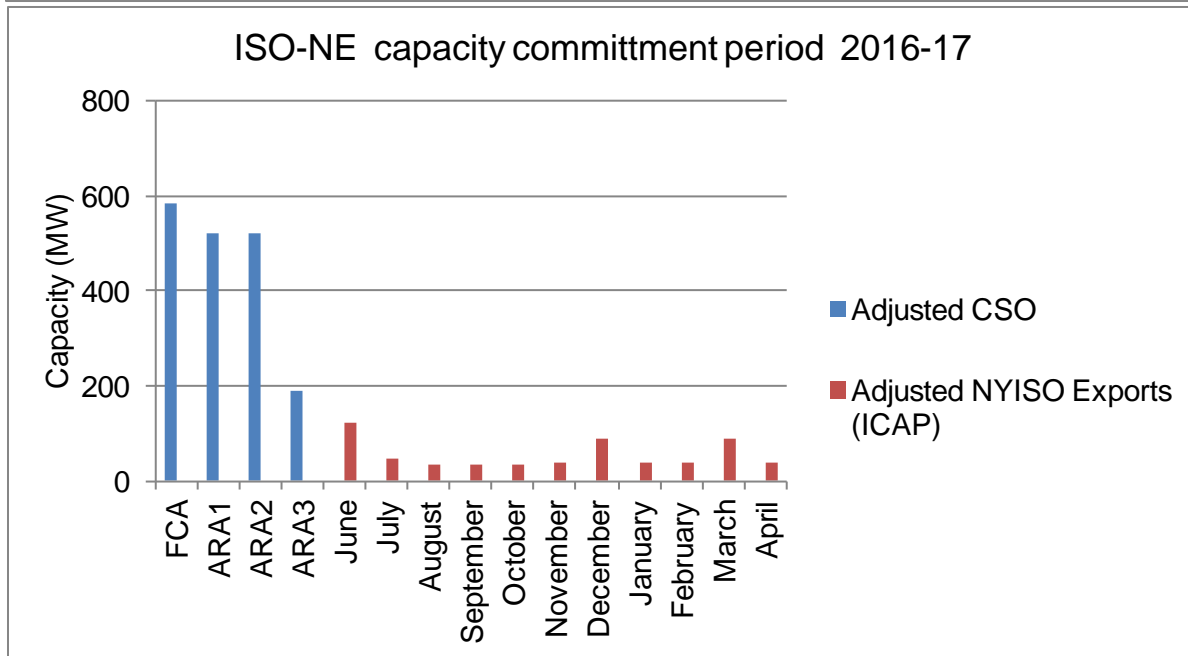
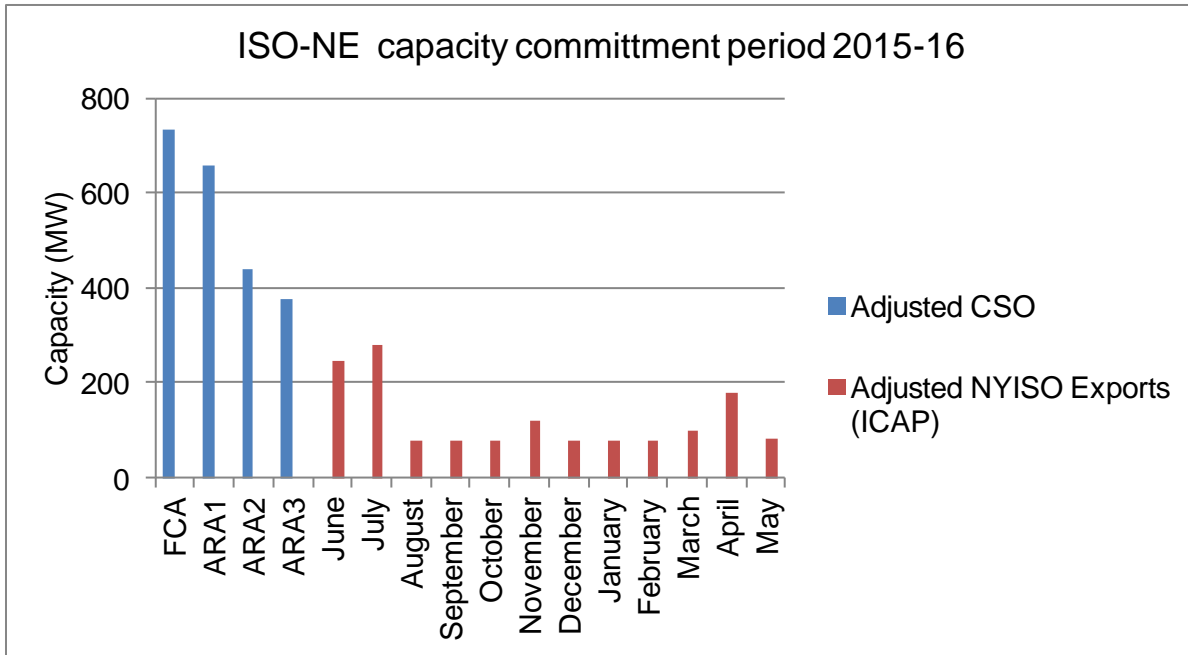
Current Practice

The current ICS reasoning is still valid despite the recent changes. There is still uncertainty about whether any of FCM sales will occur in the 2018-2019 Capability Year being studied for the IRM. The IRM setting process occurs in advance of the resource's actual capacity supply obligation and the resource's final position cannot be known. The NYCA IRM is established each December -- approximately five months prior to the start of the NYISO Capability Year. Exporting resources' capacity supply obligations to ISO-NE are not final until April -- after ISONE's third annual reconfiguration auction (March), monthly reconfiguration auction (April), and monthly capacity bilateral period (April).²

The figures in the tables below compare NYCA resources' FCA capacity obligations to ISO-NE³ over NYCA AC ties (blue bars) with NYISO-reported capacity exports to ISO-NE over NYCA AC ties (dark red bars). As depicted in these charts, a substantial portion of NYCA FCA obligations were shed prior to the relevant ISO-NE delivery periods in the two most recent years.

² PJM also has an auction structure that provides resources with a capacity obligation the opportunity to attempt to shed their obligation after the NYCA IRM is final.

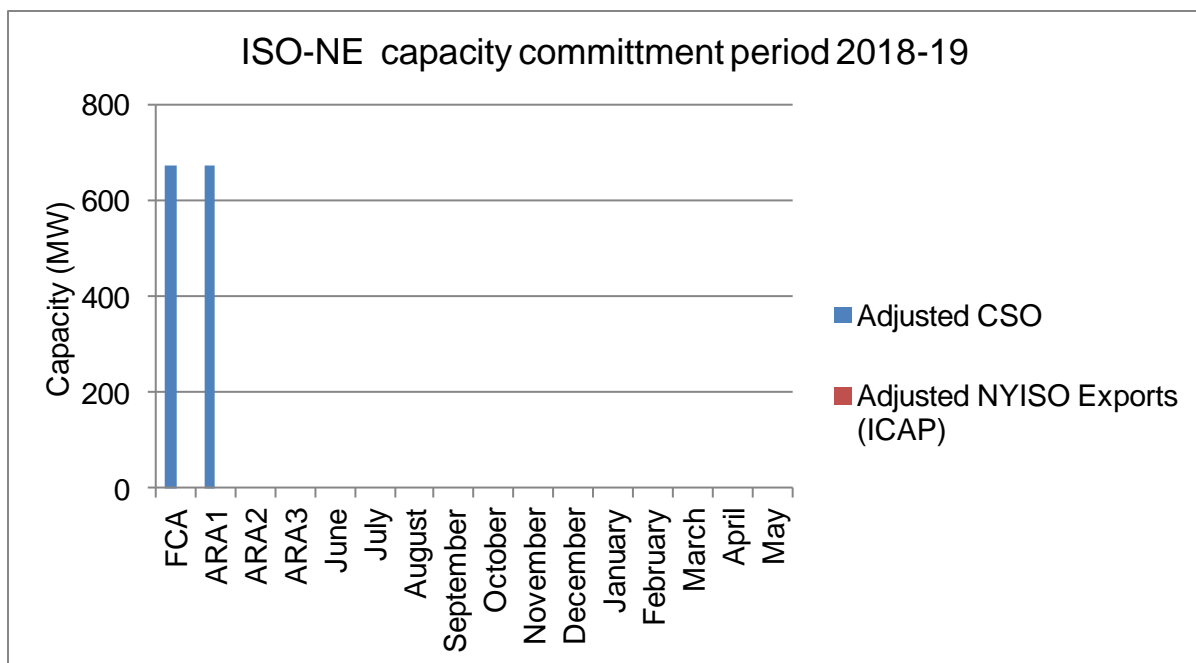
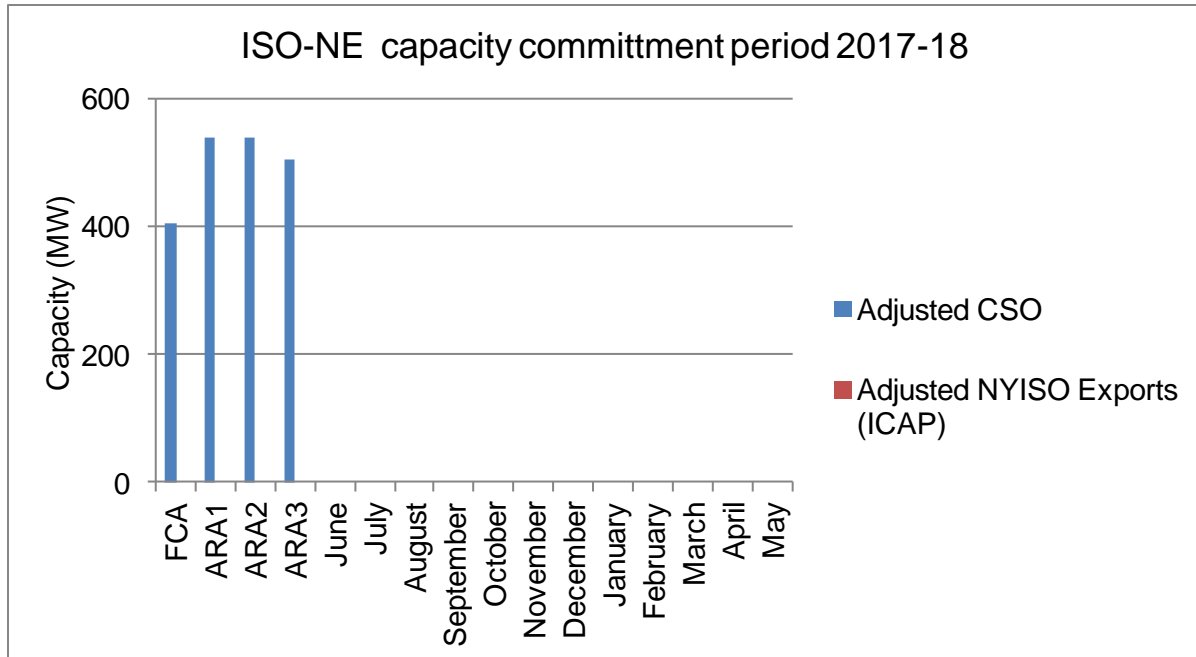
³ These obligations are a full 12 month obligation, for each month of ISO-NE's capability year (June 1 – May 31).



Adjusted CSO⁴: The net CSO over ISO-NE’s “NY AC Ties” interface less the initial (i.e., FCA) CSOs of the HQ wheel and NYPA contracts (based on ISO-NE posted data).

Adjusted NYISO Exports (ICAP): ICAP exports to ISO-NE, as reported in the NYISO’s “Monthly UCAP Reports”, less the initial (i.e., FCA) CSO of the NYPA contracts.

⁴ CSO means capacity supply obligation.



Forecasting resources' actual capacity supply obligations is imperfect. Historically, NYCA exporting resources have not necessarily retained their capacity supply obligations in ISO-NE for the deliverability month. Thus, assuming resources maintain their full capacity supply obligations is unlikely to be satisfactory. On the other hand, the extent to which resources – even those that participate in reconfiguration auctions and bilateral periods – will retain their obligations depends on both the supply of and demand for capacity during the given auction. The historically observed variability in reconfiguration auction prices and quantities does not provide a transparent or certain method of forecasting how exporting resources' capacity supply obligations will change.

Volatility of markets

By way of example, the below table 1 shows the results of the March 2017 ISONE reconfiguration auction.

Table 1 Results of the March 2017 ISONE Reconfiguration Auction

External Interface Name	Capacity Zone ID	Capacity Zone Name	Total Supply Offers Submitted	Total Demand Bids Submitted	Total Supply Offers Cleared	Total Demand Bids Cleared	Net Capacity Cleared	ISO Supply Offer	ISO Supply Offer Cleared	Clearing Price
String	Number	String	MW	MW	MW	MW	MW	MW	MW	\$/kW-month
New York AC Ties	8500	Rest-of-Pool	79.2	309.53	1.8	-35.432	-33.632			3.5

Note that total supply offers were a magnitude lower than purchasers (demand bids) requested MWs and that only 1.8 MW of offers cleared the auction.

Need for stable requirements

The NYCA IRM is an annual parameter while an exporting resource's capacity supply obligation can vary month to month. At first glance, a resource with a fixed, flat, capacity supply obligation to ISO-NE during a given capability year (i.e., the ISONE capability year that runs from June 1 through the following May 31) does not necessarily have any such obligation in ISO-NE during the first month of the NYISO Capability Year (i.e., May 1 through May 31). Additionally, ISO-NE's forward capacity auction results show that resources can obtain seasonal capacity supply obligations (i.e., seasonal CSOs). Finally, even a Locality resource with Locational Export Capacity that obtains a fixed, flat, capacity supply obligation could end up with an obligation that varies month to month if the resource participates in ISO-NE's monthly reconfiguration auctions and/or monthly capacity bilateral periods.

As a result of the fact that exporting resources' actual capacity supply obligations are unknowable throughout the IRM setting process, could reasonably change between the time the IRM is set, the time the auctions are conducted, and the obligation month, and could reasonably vary from month to month, the annual IRM setting process is not the appropriate means of considering the effects of export sales from a Locality. When expanding these concerns to additional External Control Areas and their particular auction schedules and rules, the process required to consider and reflect these sales, becomes even more complex.

Excess Capability

As mentioned above, not all of the NYCA resources that are awarded capacity sales in an FCM end up selling their capacity at the time of the deliverability month. By way of example, table 3 below, shows that of the expected 2017 capacity supply of 41,637 MW, 2,487 MW is excess above the statewide requirement. For that same period Zones G-J contain 1,123 MW of excess reserves. For 2018 the statewide excess reserves grow to 3,028 MW while the G-J surplus grows to 1,399 MW.

Table 3 - 2017 and 2018 Capability Years
Expected ICAP and Forecast Excess ICAP Margin

Locality	2017 Expected ICAP (MW)	2018 Expected ICAP (MW)	2017 Expected Excess ICAP (MW)	2018 Expected Excess ICAP (MW)
NYCA	41,637	42,178	2,487	3,028
Zones G-J	15,819	16,497	1,123	1,399

Implementation Complexity

NYSRC Policy 5 guides the IRM study process. That process includes an appendix that specifies how retirements are to be addressed in the IRM study. Sales from a Locality are completely different from retirements. The generators still exist in the zone from which the capacity is sold and they are still considered as part of the NYISO's commitment and dispatch, even though they are obligated to another Control Area. In the case studied here, counterflow, created by the capacity sale from the G-J Locality to ISO-NE relieves the congestion on the UPNY/SENY interface thereby reducing the amount of capacity that needs to be replaced in the G-J Locality.

Developing a robust model that accurately represents sales from a Locality and their impacts on the NYCA LOLE is complex.

The modeling work is underway but given the complexity, the modeling issues are not likely to be resolved in time to include in the IRM base case for 2018.

On-Going Modeling Work

GE consulting is examining for the NYISO the effects of sales from a Locality into a neighboring Control Area. It is using ISO-NE for an example. Part of this work is to determine if a probabilistic approach to determining replaceability of sales from a Locality yields robust outcomes. In addition, GE is helping the NYISO to evaluate whether a probabilistic approach is an enhancement to the deterministic one to reflect the impact of sales from a Locality in the capacity market.

GE developed two topologies to account for a potential capacity sale from Load Zone G. Figure 2 shows an overview of a modeling approach that determines impacts through a contract methodology to represent the locational capacity sale. Figure 3 shows an overview of a modeling approach that determines impacts through a reserve sharing methodology. This approach allows the unit to first serve ISO-NE, and if ISO-NE is not in need, the unit can serve NYISO.

A large number of sensitivities on these two approaches are currently underway to evaluate the robustness of the models.

Ultimately, in order to include this type of modeling in the IRM process, an approach that is viable for all combinations of resource sales and neighboring external Control Areas would be required on a timely basis.

Figure 2 – GE Proposal for Sales from a Locality Based on Contractual Arrangement

F&G to ISONE Topology

Contract Topology

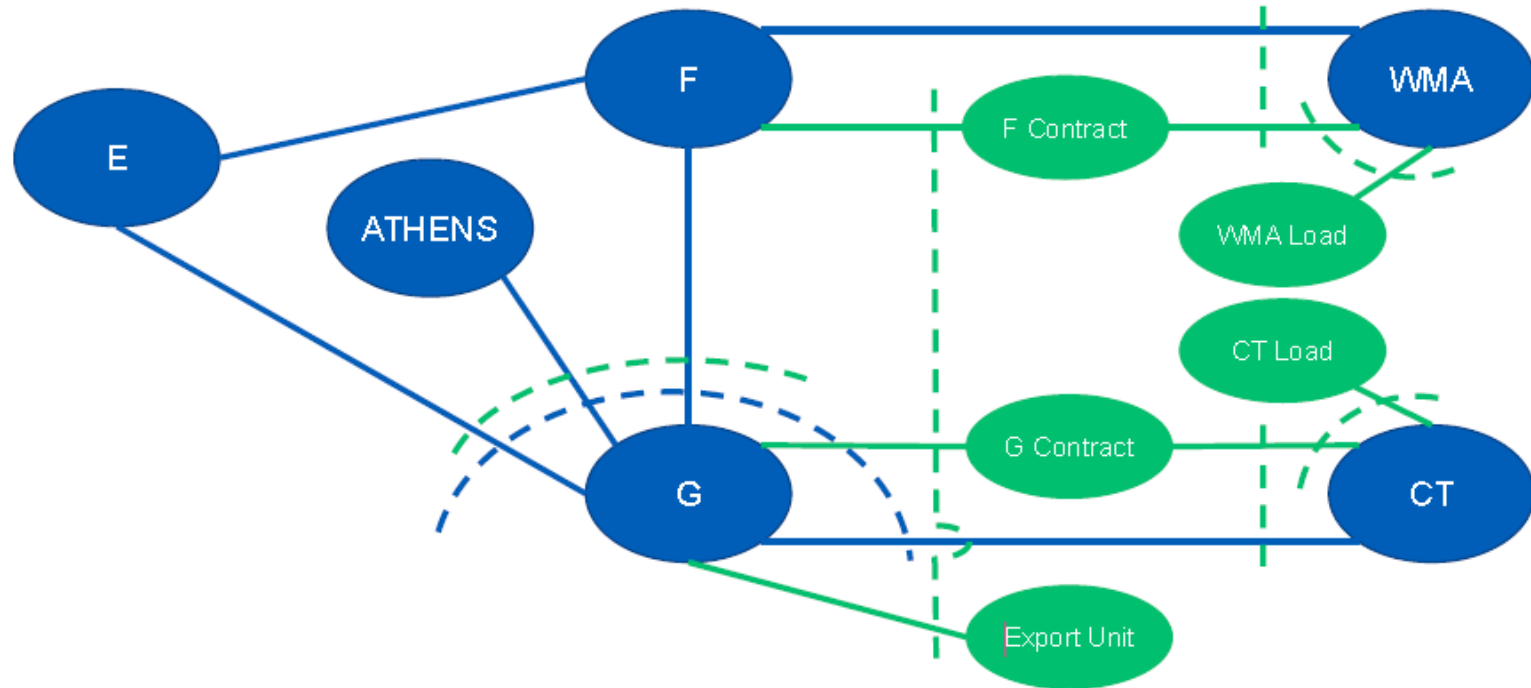


Figure 3 – GE Proposal for Sales from a Locality Based on Reserve Sharing Arrangement

F&G to ISONE Topology

Reserve Sharing Topology

