

On Ramps and Off Ramps: Market Design Proposal Summary

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NYISO ICAP Working Group

November 6, 2017



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Agenda

- Review Project Design Statement and Market Design and Guiding Principles
- Review Components of Market Design
- Discuss Next Steps
- Appendix

Agenda: Review Components of Market Design

- **Locality Assessment Methodology for Locality Creation and Locality Elimination**
 - Discuss High level example of zone creation
- **Zone J and Zone K Will Be Permanent Localities**
- **Mitigation (see separate presentation)**
- **Market Administration Requirements**
- **Alignment with Biennial RPP and Other Critical Processes Impacting the ICAP Market**
- **Other Market Design Considerations**
 - E.g., CRIS/ Import/UDR Issues
- **Regulatory Filing Timing**
- **Tariff Review**

Project Design Statement and Market Design Guiding Principles

Project Design Statement

- **Develop a robust and transparent process for the creation and elimination of Localities based on reliability principles to ensure locational capacity prices reflect system reliability needs and market conditions**

NYISO Proposal: Align Create & Eliminate Rules with Reliability Planning Process (RPP)

- **Guiding Principles: Open, Transparent, Robust, Predictable, Stable**
 - Use accepted and familiar reliability planning approach
 - Use established planning cases from the existing Reliability Planning Processes
 - Focus primarily on transmission capability between LBMP zones
 - Use of transmission security and/or resource adequacy

Market Design Guiding Principles

Efficient Market Signals

Transparent and Robust

- Maintain reliability
 - Timely creation of zones sufficiently in advance of reliability concerns
 - Timely elimination of zones when reliability concerns are sufficiently resolved for planning horizon
- Incent appropriate investment
 - Locational price signals
 - Adequate supply where needed
- Stable and Predictable
 - Anti -toggling
- Market risk borne by Market Participant
- Functions well over wide range of system/market conditions

Reliability Through Markets

- Market should compliment and reinforce system reliability
- Utilizing the proven reliability construct of transmission security to determine when to create or eliminate a Locality:
 - Ensures locality price signals direct efficient investment needed to retain and attract supply where it provides the greatest reliability benefit
 - Provides transparent and predictable outcomes, allowing developers to make informed and efficient investments that enhance grid reliability
 - Permits NYISO to leverage the reliability criteria, analysis, procedures, and rules utilized to manage system reliability for market design
 - OATT Attachment Y Reliability Planning Process
 - NERC TPL-001-4, NPCC Regional Reliability Reference Directory#1, NYSRC Reliability Rule 1

Components of Market Design

Proposed Locality Assessment Methodology for Locality Creation and Locality Elimination

Locality Assessment Methodology

- Objective
- Methodology Concept
- Reliability Design Criteria
- Headroom Rationale
- Locality Creation Method
- Locality Elimination Method
- Appendix 1: G-J Locality Elimination Example

Objective

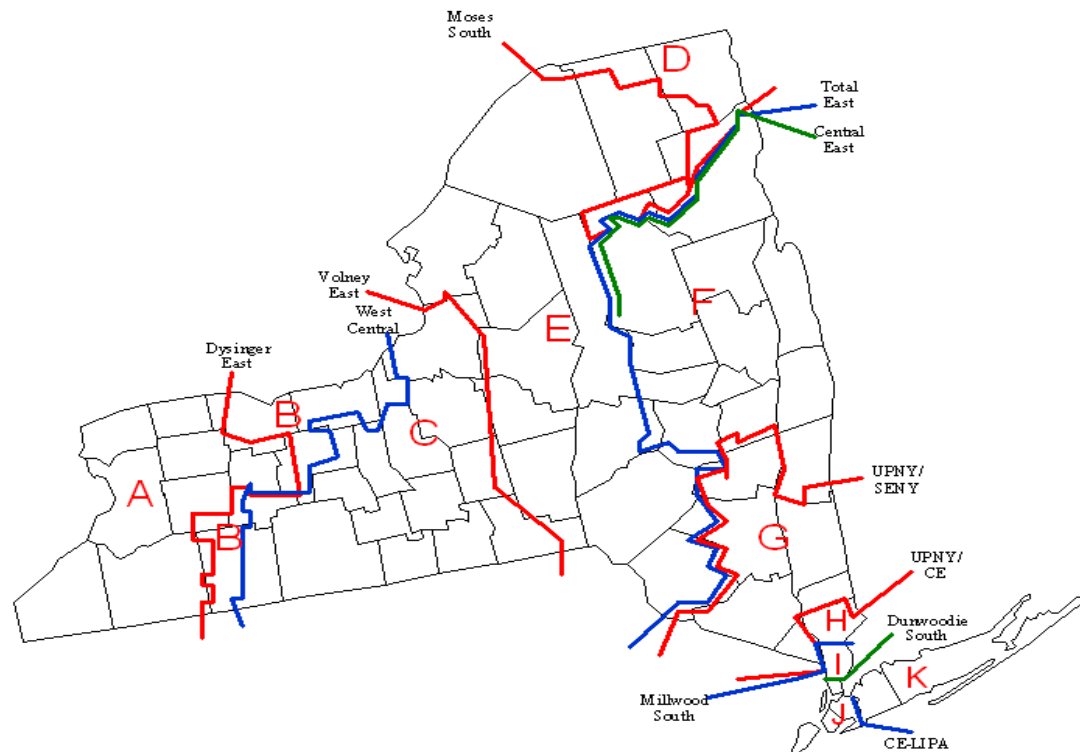
- **Apply a methodology based on reliability planning principles to determine whether to create and eliminate Localities.**
 - The forecasted peak load must be served and the transmission system must be simultaneously secured.
- **Localities should align with NYCA Load Zones that are transmission and resource constrained such that a bulk-level Reliability Need may be identified in the future.**

Methodology Concept

- Using the NYISO Reliability Planning Process base case, identify “load pockets” at the Load Zone level.
- Remove a certain amount of generation (“headroom”) from a given area to stress the transmission system serving load in that area.
 - Sufficient difference in headroom is necessary between create and eliminate tests to avoid toggling
- If the transmission system does not meet transmission planning design criteria under this stressed condition, then that given area should be a Locality.
 - $\text{Load} + \text{Losses} = \text{Generation} + \text{Transmission Capability}$

Locality Boundaries Align with NYCA Load Zones

- Localities will consist of one or more load zones
- Localities will always share boundaries between contiguous load zones



Transmission Planning Design Criteria

- **Per Attachment Y of the OATT, NYISO's Reliability Planning Process evaluates Bulk Power Transmission Facilities in accordance with applicable Reliability Criteria:**
 - NERC: TPL-001-4, Transmission System Planning Performance Requirements,
 - NPCC: NPCC Regional Reliability Reference Directory #1, Design and Operation of the Bulk Power System
 - NYSRC: Reliability Rule B.1, Transmission System Planning Performance Requirements

N-1-1 Criteria

- Using a summer peak load system representation and starting from an all-facilities-in-service base condition (N), system performance is evaluated for one contingency event (N-1) followed by another contingency event (N-1-1).
- A reliability violation is identified when any allowable re-dispatch of the system cannot alleviate a thermal overload.
 - If overloads occur, the system is dispatched to minimize overloads.

N-1-1 Criteria Methodology

- 1. N-1: Loss of any critical generator, transmission circuit, transformer, series or shunt compensating device, or HVDC pole.**
- 2. Any generation and power flow adjustments inside the NYCA that can be made within 30 minutes are applied to secure the system for the next contingency.**
- 3. N-1-1: Loss of any critical design contingency, including multiple lines on a common tower or a stuck breaker.**

Generator Contingency Event

- **Definition by NERC, NPCC and NYSRC:**

Simulate the removal of all elements that protection systems, including Special Protection Systems, are expected to automatically disconnect for each event that involves an AC fault on a generator.

- **Generator contingency events include:**

- Loss of single units
- Loss of combined cycle units on the same train

Headroom Rationale

■ Creation Headroom

- Two generator contingency events
- Triggers Locality creation in advance of a potential Reliability Need
- Allows time for the market to incent retention and timely entry
- Should be larger than a single generator in order to provide sufficient advanced notice prior to a single generator failure.

■ Elimination Headroom

- Four generator contingency events
- Larger than the creation headroom to establish an anti-toggling threshold for market stability
- Threshold should be sufficiently large to prevent large decreases in DCR amortization period due to toggling risk

■ Creation and Elimination Headroom based on actual units in the Localities

- Tied to physical grid characteristics, reflecting the actual resource mix in each Locality
- Utilizes generator contingencies defined and maintained for the RPP process

Locality Creation Test

- Evaluate year 5 of the RNA Study Period
- Model two generator contingency events, then determine whether a transmission security (N-2G-1-1) violation arises on the BPTF.
- If any combination of contingency events results in a violation associated with a boundary between Load Zones, a new Locality will be created.
- The new Locality would consist of one or more contiguous Load Zones. The boundaries of the new Locality will be based on the transmission constraints identified in the Locality creation test.

Locality Elimination Test

- An existing Locality will only be evaluated for elimination if the most recent RNA does not identify a resource adequacy Reliability Need associated with the existing Locality.
- Evaluate years 1 and 5 of the RNA Study Period
- Model four generator contingency events within the existing Locality, then determine whether a transmission security (N-4G-1-1) violation arises on the BPTF.
- If all combinations of contingency events do not result in a violation associated with a boundary between Load Zones, the existing Locality will be eliminated.

Zone J and Zone K Will Be Permanent Localities

Zones J and Zones K Were Originally Established as Permanent Capacity Localities

- **NYSRC has imposed higher reliability standards in Zones J & K than all other zones**
 - “...more stringent and more specific than other NYSRC Reliability Rules because of the need to protect the reliable delivery of electricity to these zones in light of their specific electric system characteristics and load density.” *
 - “...characteristics include unique circumstances and complexities related to the maintenance of reliable transmission service, and the consequences that would result from failure to provide uninterrupted service” *
- **NYSRC Local Reliability Rules (G1-G3)**
 - G1 J Required to secure N-1-1 to normal limits
 - G2 J Dual Fuel/Auto Swap
 - G3 K Dual Fuel

* NYSRC Reliability Rules & Compliance Manual, Version 41, September 8, 2017, Page 83

Zones J and Zones K Were Originally Established as Permanent Capacity Localities

- The unique geographic nature (islands) and system configuration of these areas makes it appropriate to make them permanent
 - Supports system reliability
 - Supports predictability for investors
- The number of sites on which to locate new generation in these Localities are severely limited
- Long history of unique permitting and NAAQS Air Quality and compliance issues
 - E.g., Designated Ozone Nonattainment Zones
- For these reasons, the NYISO has concluded any toggling would be problematic

Mitigation

Lorenzo Seirup – Separate Presentation

Market Administration Requirements

Overview of Market Administration

- The Locality Assessment Process can result in the need to revise existing or create new ICAP Demand Curves or eliminate existing ICAP Demand Curves
- Data/parameters to accommodate such changes are provided by three separate processes: quadrennial Demand Curve reset, Locality Assessment, and Demand Curve annual updates
 - Data/parameters used to identify changes to existing or establishment of new ICAP Demand Curves will be developed as part of the quadrennial ICAP Demand Curve reset (DCR) process
 - Annual gross cost of new entry (CONE) values, net Energy and Ancillary Services (EAS) revenue offset values, and resulting net CONE values
 - Methodology for determining zero-crossing point (ZCP)
 - Indicative LCRs and boundary of any proposed new Locality will be identified in the Locality Assessment Filing
 - ICAP Demand Curves will be determined as part of the annual update process
 - Quadrennial DCR will develop methodologies and inputs for all Load Zones to facilitate the establishment of ICAP Demand Curve for any NCZ and any required revisions to the NYCA ICAP Demand Curve as a result of implementing any NCZ
 - Selection of peaking plant location for any new ICAP Demand Curve
 - Any required revisions to the peaking plant location for the NYCA ICAP Demand Curve resulting from implementing a new Locality
 - Winter-to-summer ratio (WSR) for any new ICAP Demand Curve
 - Level of excess (LOE) value used in the reference point formula for any new ICAP Demand Curve

NYISO Steps to “On Ramp” (Create) a Locality

- Establish ICAP Demand Curve parameters for a new Locality in Quadrennial ICAP Demand Curve reset (DCR) process
- Establish Indicative LCRs prior to the May 1 Locality Assessment Filing (odd numbered years)
- Prepare software updates to recognize the new Locality in the auction
- Perform Annual Updates
- Determine LCRs for all Localities
- Seasonal Setup for Summer Capability Period Auction

NYISO Steps to “Off Ramp ” (Eliminate) a Locality

- **Establish Indicative LCRs prior to the May 1 Locality Assessment Filing (odd numbered years)**
- **Perform Annual Updates**
- **Determine LCRs for all Localities**
- **Seasonal Setup for Summer Capability Period Auction**

Developing ICAP Demand Curve Parameters to On Ramp a Locality in between the Quadrennial DCRs

- NYISO proposes that the vast majority of ICAP Demand Curve parameters to on ramp a new Locality be developed as part of the quadrennial DCR
- Independent Consultant develops peaking plant data for all 11 Load Zones
 - ICAP Demand Curve data/assumptions for potential New Capacity Zones (referred to in the draft tariff redlines as “Supplemental Locations”) will be determined in the same manner as those for the ICAP Demand Curves, and will be included in the DCR filing to FERC
 - A methodology for determining the appropriate ZCP that would apply to any new Locality that may be implemented during the 4 year reset period will be developed in the DCR
 - Certain parameters for potential New Capacity Zones will be fixed based on the capacity region/Locality configuration at the time of the DCR and not revised in the intra-reset period based on any changes resulting from creation/elimination
 - Level of excess adjustment factors [LOE-AF] used in the net EAS revenues model
 - Deliverability/SDU costs

Developing ICAP Demand Curve Parameters, cont'd

- **Values for the Supplemental Locations will be updated as part of the annual update process**
 - Annual Gross cost of new entry (CONE)
 - Annual net EAS revenues
 - Annual net CONE
- **Certain parameters cannot be determined until the boundaries of a new Locality are identified**
 - Indicative LCR
 - Determined using LCR optimization methodology
 - LOE value used in the reference point formula
 - ZCP - will be established using the methodology developed during the quadrennial DCR and remain fixed for remainder of the reset period
 - Winter-to-summer ratio (WSR) value

Establish Indicative LCRs

- **Required to establish the new Locality ICAP Demand Curve parameters as part of annual update**
 - Impacts LOE in reference point price formula
- **Necessary for the Class Year (CY) Study that starts after May 1 when the Locality Assessment Filing proposes a new Locality or to eliminate an existing Locality**
 - LCRs are utilized in ATBA study case conditioning
- **Utilize the LCR Optimization Methodology (presently under discussion) to establish Indicative LCRs**
 - Assumes optimization methodology is accepted and implemented

Implementing On Ramps (Creation of New Locality), cont'd

- **Peaking plant location underlying the ICAP Demand Curve for a new Locality will be determined based on the data/assumptions developed during the quadrennial DCR and updated as part of annual update process**
 - Gross CONE, net EAS revenues, and resulting annual net CONE for potential new Locality Peaking Plant locations are to be updated annually
 - Once the boundary and Indicative LCR of the New Capacity Zone are defined, WSR and LOE will be defined as part of the annual update process
 - ICAP Demand Curve for a new Locality will be based on the peaking plant location within the new Locality that produces the lowest annual net CONE value for the first year the new curve will be in effect
 - Once identified, the peaking plant location for the new Locality will remain fixed for the remainder of the reset period

Implementing On Ramps (Creation of New Locality), cont'd

- **Initial WSR value for new Locality will be calculated as part of the annual update that occurs immediately prior to the implementation of the new Locality in the ICAP Spot Market Auction**
 - NYISO will utilize CRIS adjusted DMNC values from the Gold Book, CRIS MW values for UDRs and values from monthly SCR reports as the available capacity values for each month covered by the three year historic period
 - In subsequent years, the NYISO will use monthly ICAP Market report data for the new Locality as it becomes available

Implementing On Ramps (Creation of New Locality), cont'd

- **LOE value used in reference point formula for a new Locality**
 - Will be calculating LOE using the Indicative LCR determined for the new Locality established in the Locality Assessment Process and the MW value of the applicable peaking plant determined in the quadrennial DCR
 - Once established, the LOE value remains fixed for the remainder of the reset period
- **ICAP Demand Curve values for a new Locality will be calculated as part of the annual update that occurs immediately prior to implementation thereof in the ICAP Spot Market Auction and posted as part of annual update results on or before November 30**
- **For the remaining years of reset period, the applicable ICAP Demand Curve values will be calculated and posted as part of the annual update process**

Implementing On Ramps (Creation of New Locality), cont'd

- If the boundary of a proposed new Locality includes the location of the peaking plant underlying the NYCA ICAP Demand Curve, the NYCA ICAP Demand will also be revised based on the data/assumptions during the quadrennial DCR and updated as part of annual update process
 - Revised NYCA ICAP Demand Curve will be based on the peaking plant location within the remaining Rest of State that produces the lowest annual net CONE value for the first year the revised curve will be in effect
 - Once identified, the revised peaking plant location for the NYCA ICAP Demand Curve will remain fixed for the remainder of the reset period, unless an additional new Locality is created during the same reset period that would result in removing the revised location from Rest of State
 - Further revised peaking plant location for NYCA ICAP Demand Curve selected using same process described above

Implementing On Ramps (Creation of New Locality), cont'd

- ZCP for NYCA ICAP Demand Curve, as established during the quadrennial DCR, remains unchanged for the reset period
- LOE value for NYCA ICAP Demand Curve, as established during the quadrennial DCR, remains unchanged for the reset period
- WSR value for NYCA calculated in accordance with the standard process using monthly ICAP Market report data
- Any revisions to the NYCA ICAP Demand Curve will be determined during the annual update process that occurs just prior to implementation of the revised curve in the ICAP Spot Market Auction and will be posted as part of annual update results on or before November 30
- For the remaining years of reset period, the revised NYCA ICAP Demand Curve values will be calculated and posted as part of the annual update process

2022 Hypothetical New Locality Creation Example

- **F-J fails the “create” test, triggering F-J Locality creation**
 - F peaking plant from 2020 DCR becomes the F-J peaking plant (unless the plant utilized for the G-J or Zone J Demand Curve had a lower net cost)
 - Most recent DCR defines methodology to identify the ZCP
 - WSR, LOE, ZCP and final ICAP Demand Curves determined as part of the annual update completed in November 2021, for the 2022-2023 Capability Year ICAP Demand Curves
 - LCR determined in January 2022
- **NYCA ICAP Demand Curve becomes based on lowest net cost peaking plant evaluated in the ROS (A-E)**
 - Transparent, based on vetted information, predictable,

Implementing Off Ramps (Elimination of Locality)

- **When a Locality is eliminated the ICAP Demand Curve is no longer applicable in the capacity market**
 - Capacity to serve load in an eliminated Locality transacts in the parent Locality and/ or the NYCA (e.g., if the G-J Locality was eliminated, the NYCA ICAP Demand Curve)
- **Locality will be eliminated in advance of determining IRM and LCRs**
- **Locality will be eliminated in advance of annual update**

Aligning Biennial RPP with Other Critical Processes Impacting the ICAP Market

Summary of NYISO Proposed Alignment of the Biennial Locality Assessment with Biennial RPP

- The analysis for the Locality Creation Analysis and Locality Elimination Analysis will be conducted by NYISO beginning in the biennial RPP period between the RNA and the CRP (generally starting in November of each even year)
- The NYISO will use the latest available RPP base case available at that time, likely the RNA base case, updated in accordance with ISO procedures by January 1, if practicable
- Conducting Locality Assessment Process (LAP) in end of Q4 in the even year going into the odd year, allows NYISO to align the RPP with the LAP with sufficient time for NYISO Market Operations to implement On Ramps and Off Ramps

Summary of NYISO Proposed Alignment of the Biennial Locality Assessment with Biennial RPP (continued)

- The NYISO will complete the Locality Assessment analysis and issue a Locality Assessment report no later than March 1 of the calendar year following the year in which the RNA was conducted
- The NYISO will identify the NCZ boundary and Indicative LCR and review with stakeholders between March 1 and April 30
 - NYISO will not commence a new Class Year Study in the two month period between the date of the issuance of the final report and the filing of the report with FERC
- The NYISO will file the Locality Assessment Report by May 1.
 - If an NCZ is identified to be created or Locality to be eliminated, the NYISO will include implementing tariff language in this filing

Summary of NYISO Proposed Alignment of the Biennial Locality Assessment with Critical ICAP Market Processes

- July 1 FERC order on proposed tariff revisions to create and eliminate.
- NYISO executing Demand Curve annual update, establishing demand curve parameters for NYCA and all Localities and reviewing BSM Renewable Exemption cap: Sept. 1-Nov. 30
- NYISO Posts all demand curve parameters: Nov. 30
- The NYISO will implement the creation or elimination of Localities in conjunction with current IRM and LCR determinations and the Demand Curve annual update process
- Implementation of the creation or elimination of Localities will occur at the start of Capability Years 2 and 4
 - First opportunity to implement an On Ramp or Off Ramp is in the 2022 Capability Year

Other On Ramp and Off Ramp Design Considerations

CRIS

- **Deliverability is evaluated and CRIS awarded based on the Capacity Regions defined in the applicable Class Year**
 - Capacity Regions” is a defined term in OATT Attachment S, which presently means Zone J, Zone K, Lower Hudson Valley (G, H, and I), and Rest of State (A-F)
- **Once a project has been awarded CRIS, it is eligible to qualify to offer capacity based on its location**
- **No deliverability retest required if the Locality boundary changes**
- **The definition of Highway and Other interfaces will be modified if Localities are modified or eliminated**

UDRs

- For a facility with UDRs with one terminus in a Locality and the other terminus is an External Control Area or ROS, if Locality is eliminated
 - It continues to be a UDR if it continues to be located in a Locality [E.g., if it has a terminus in Zone J and Zone J is eliminated, but the G-J Locality continues to exist, it would continue to be a UDR]
 - It will be an EDR (pursuant to the EDR proposal currently being discussed with stakeholders) if one terminus is in the “new” Rest of State (i.e., what had been a Locality is now in ROS) and the other is in an External Control Area
 - E.g., if it has a terminus in an External Control Area and the other terminus is in Zone G and the G-J Locality is eliminated, it would be an EDR
 - If it is an internal UDR and the Locality is eliminated, and now the termini are both in ROS, it no longer meets that UDR definition

UDRs

If an EDR has a terminus in a location that becomes a Locality

- If it meets the requirements to be UDR, its EDRs will be converted into UDRs: Controllable transmission
- If an EDR does not meet the requirements to be a UDR, the facility will be unable to offer capacity
- In the separate EDR Project, the NYISO is proposing that stakeholders evaluate this issue as part of the 2018 project prioritization process for a second phase of the EDR Project

Regulatory Filing Requirements for Zone Creation and Zone Elimination

To be discussed at an upcoming later ICAPWG Meeting

Regulatory Filing Requirements for Zone Creation or Zone Elimination

- **Tariff revisions to recognize the new Locality or the elimination of an existing Locality would be required and will be filed on or before May 1**
 - Services Tariff and OATT Revisions (Attachment S) among other provisions
- **The Create and Eliminate Rules and Periodicity proposal factors in the 60 day required length of time from filing for FERC acceptance has to occur so that an order is issued before determining the LCRs, conducting the Import Rights Deliverability Test, and in time for Seasonal Set-up**
- **Regardless of the results of the create and eliminate tests, the NYISO will file a report with FERC describing the results on or before May 1**

Regulatory Filing Requirements for Zone Creation or Zone Elimination

- **Tariff revisions to recognize any modification to the Renewable Exemption Cap will be filed by November 30 in the year a new Locality is filed with FERC**
 - As part of its Buyer Side Mitigation proposal, NYISO is proposing to revisit whether it is appropriate to enlarge the Renewable Exemption cap each time a new Locality is created

Tariff Review

To be discussed at an upcoming later ICAPWG Meeting

Tariff Review

- MST 2.13
- MST 5.14
- MST 5.16
- MST 6.4
- MST 23.2.1 – Attachment H
- MST 23.4.5 – Attachment H
- MST 30.4 – Attachment O
- OATT 25.5 – Attachment S

Next Steps – 2017 Sequence of Events

- **On Ramp and Off Ramp Discussions–Today**
 - Complete market design summary
 - Continue to discuss mitigation issues for Locality creation and Locality elimination
 - Present consumer impact analysis
 - Further discuss stakeholder comments and concerns offered to date
- **Address open issues – November 30 ICAPWG**
- **Stakeholder vote on proposal - December 13 BIC**

Project Milestone: 4Q17 BIC Vote

- **Bring market design criteria for Locality creation and Locality elimination tests to BIC for vote**
 - Some stakeholders requested that the NYISO work quickly to develop elimination rules
 - The outcome of the vote
 - Would inform stakeholders of the candidate Locality creation & elimination rules that are being developed and the magnitude of stakeholder support for the design well in advance of implementation
 - Will be used by the NYISO to efficiently allocate resources
 - Vote will inform whether On Ramps and Off Ramps Project should continue in 2018

2018 Project Work Occurring After the BIC Vote

- Present proposal and tariff language to MC for vote
- File Tariff language with FERC
- Draft NYISO ICAP Manual revisions
- Address any outstanding administrative process issues
- Identify any implementation project work required
 - Software, etc.

The Mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefits to consumers by:

- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policy makers, stakeholders and investors in the power system

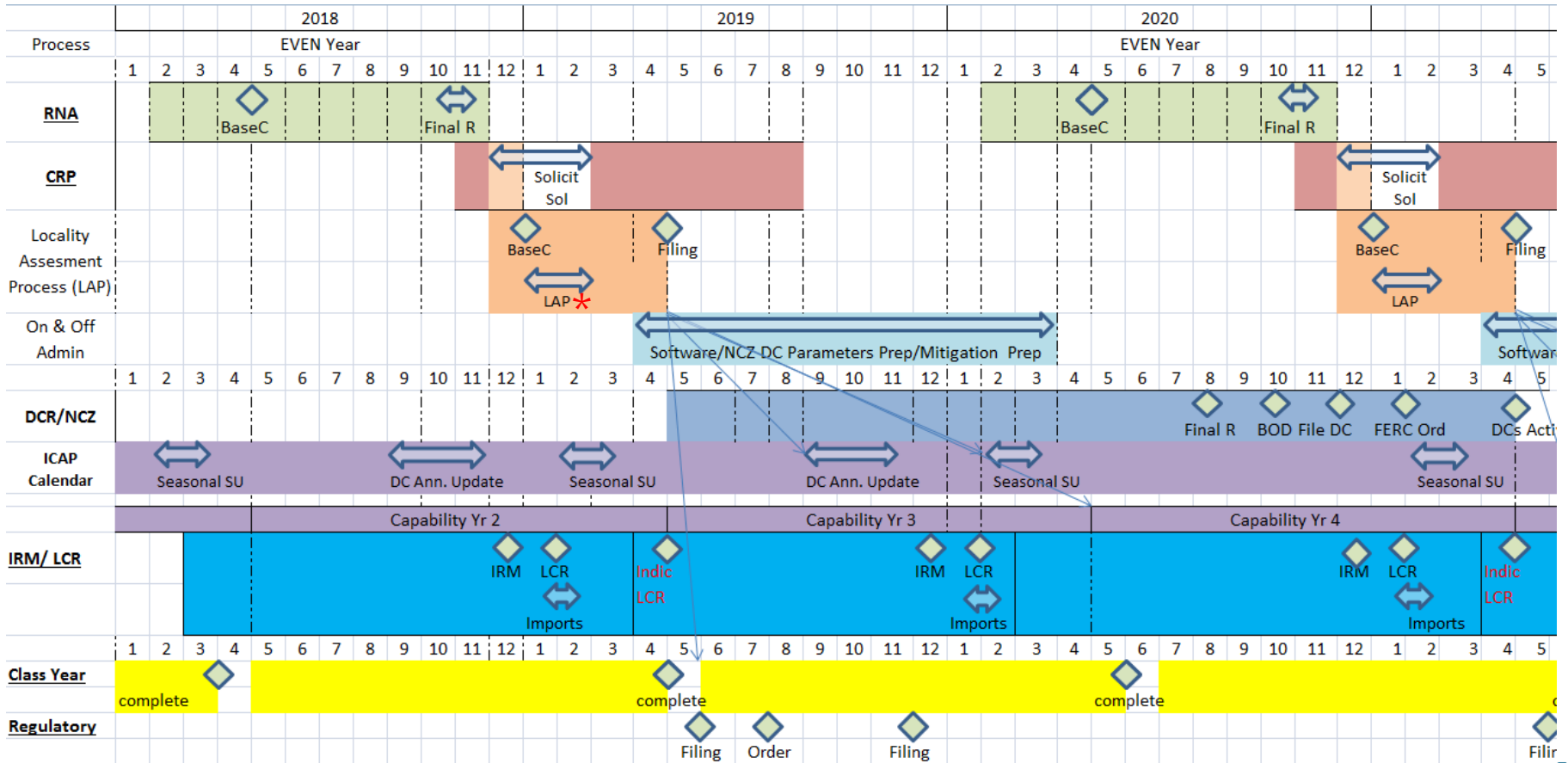


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Appendix

Process Alignment Timelines

Recommendation – Conduct Locality Assessment After RNA Report Is Complete

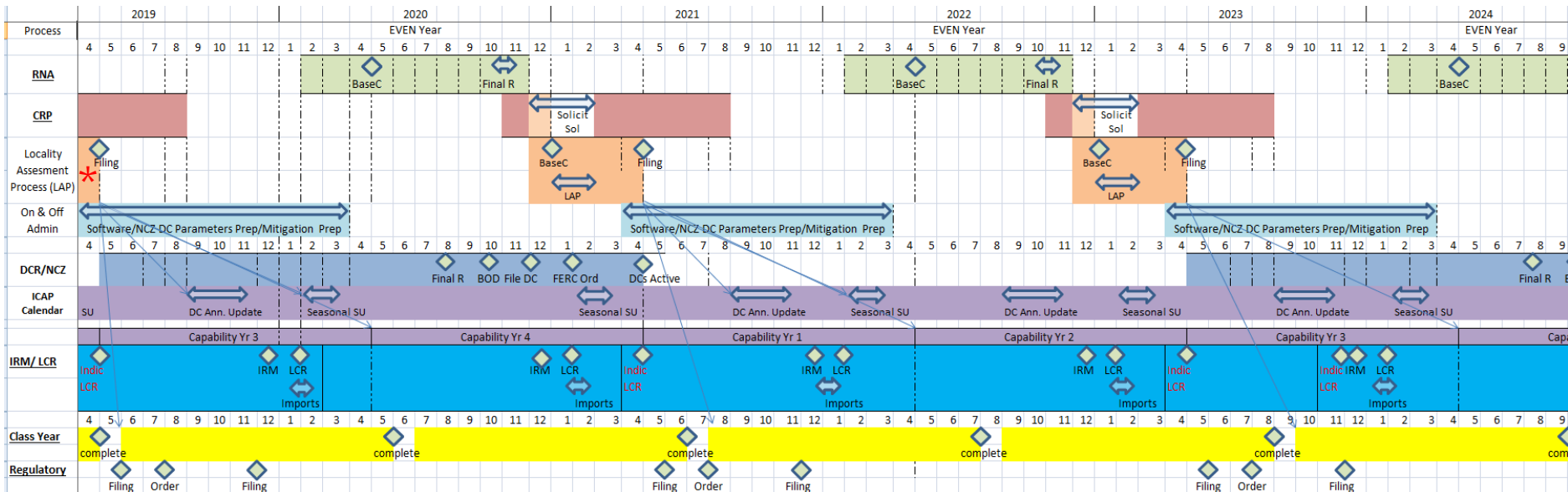


*2019 LAP shown for relative timing only, 1st LAP can only occur after 2020 DCR

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Recommendation – Conduct Locality Assessment After RNA Report Is Complete

Expanded Timeframe Demonstrates How Processes Align Over Time



- LAP Process is suited to creating and eliminating Localities in years 2 and 4

*2019 LAP shown for relative timing only, 1st LAP can only occur after 2020 DCR

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