On Ramps and Off Ramps: Initial Discussion of Reliability Approach and Market Design Features

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Agenda

- Project Design Statement and Project Milestones
- Market Design Guiding Principles
  - Purpose of Capacity Localities
- Components of Market Design
  - Alignment with RPP
  - Mitigation
- Next Steps -2017 Sequence of Events

Agenda: Components of Market Design

- **Proposed Alignment with Reliability Principles: Transmission Security Methodology**
  - Discuss Alignment with RPP
  - Discuss Proposed N-G_C-1-1 Method for Locality Creation
  - Discuss Proposed N-G_E-1-1 Method for Locality Elimination
  - Discuss how to determine “G” or “headroom”
  - Permanence of Zones J and Zones K
- **Regulatory Filing Timing**
- **Administration of Locality Creation and Locality Elimination**
- **Mitigation Objectives and Proposals**
- **Other Considerations**
  - E.g., Import/UDR Issues, Class Year Issues, SDU Determination Issues

Project Design Statement and 2017 Milestones

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

- **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

Project Milestone: 4Q17 BIC Vote

- **Bring market design criteria for Locality creation and Locality elimination tests to November 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
      - Tariff development will be undertaken only if proposal has broad stakeholder support
      - Vote will inform whether 2018 On Ramps and Off Ramps Project should continue in 2018

2018 Project Work Occurring After the BIC Vote

- Draft necessary Tariff language
  - Take to BIC and MC for action
- File revised Tariff language with FERC
- Draft NYISO ICAP Manual revisions
- Address any outstanding administrative process issues
- Identify any implementation project work required
  - Software, etc.

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Components of Market Design

NYISO Proposal for 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.
- The NYISO will complete the Locality Assessment analysis no later than March 1 of the calendar year following the year in which the RNA was conducted.
- The NYISO will present a report to stakeholders summarizing the findings.

Aligning Biennial RPP with Other Critical Processes Impacting the ICAP Market

Processes to be Coordinated with the Proposed Reliability Based, Biennial Locality Assessment Process

- Reliability Planning Process (RPP) – biennial, RNA begins in even years (2018, 2020, 2022, etc.)
- Annual ICAP Event Calendar and NYISO Capacity Auction Processes
  - Capability Year runs May 1 – April 30
- Annual Installed Reserve Margin (IRM)/Locational Minimum Installed Capacity Requirement (LCR) Processes
- Demand Curve Reset (DCR) – quadrennial even years

Coordination of the "Locality Assessment Process" with these existing processes would enable implementation of Locality creation or Locality elimination into the capacity market (i.e., On Ramps and Off Ramps) biennially

- In essence the objective is to align the test with the existing processes administered in the capacity market in order to fully effectuate the results of the test in the market as soon as practicable

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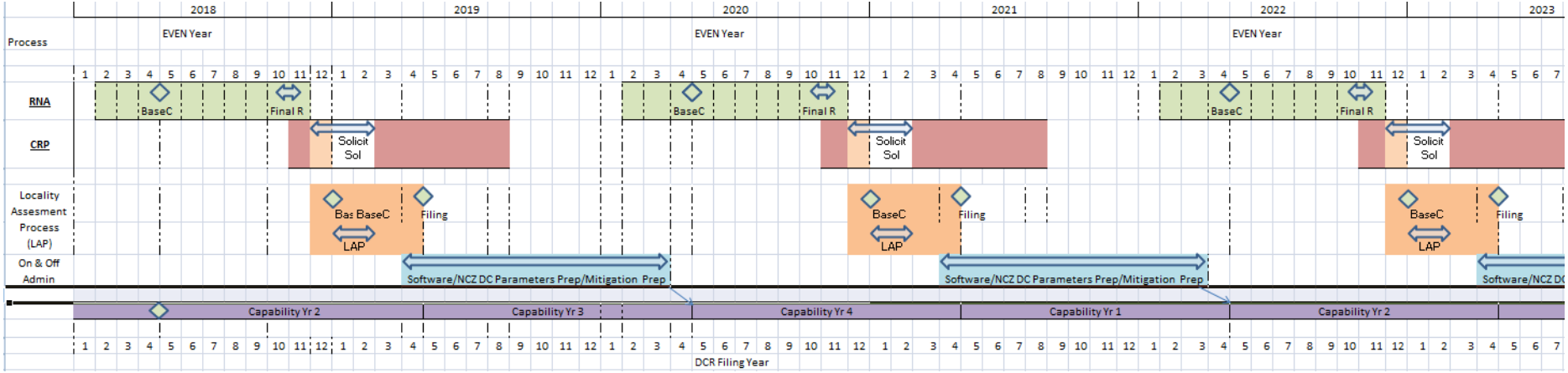
Biennial RPP Process Critical Dates* for On Ramps and Off Ramps

- April 30 – Initial RNA Base Case lockdown
- October/November – Final RNA Report
- November/December – NYISO determines whether to solicit solutions to Reliability Needs (RNs) identified in the RNA
  - If needs have been identified, NYISO prepares for the CRP by updating most recent RPP Base Case available; and updated per ISO Procedures
    - Updates to the RNA Base Case typically include Generator status and LTP updates that meet inclusion rules, and updated load forecast
    - This updated RNA Base Case will be used to evaluate sufficiency of solutions
- If solutions are required, NYISO allows 60 days for response to solicitation

* All RPP dates are “typical” and may vary from RPP to RPP

RPP Biennial Process (Even Years) Timeline*



- **Locality Assessment Base Case Lockdown Date – no later than January 1**
- **Locality Assessment Report - complete by March 1, and will be reviewed with stakeholders starting in March**
- **May 1 - File Locational Assessment Report with FERC**
  - If an NCZ is identified to be created or a Locality is to be eliminated, the NYISO will include implementing tariff changes
- **April 1, Locational Assessment filing year through March 30, Locality Implementation Year - On Ramp and Off Ramp Administration Activities**
  - Auction software changes
  - NCZ Demand Curve parameter preparation
  - Mitigation analysis

* Dates are "typical" and may vary from year to year

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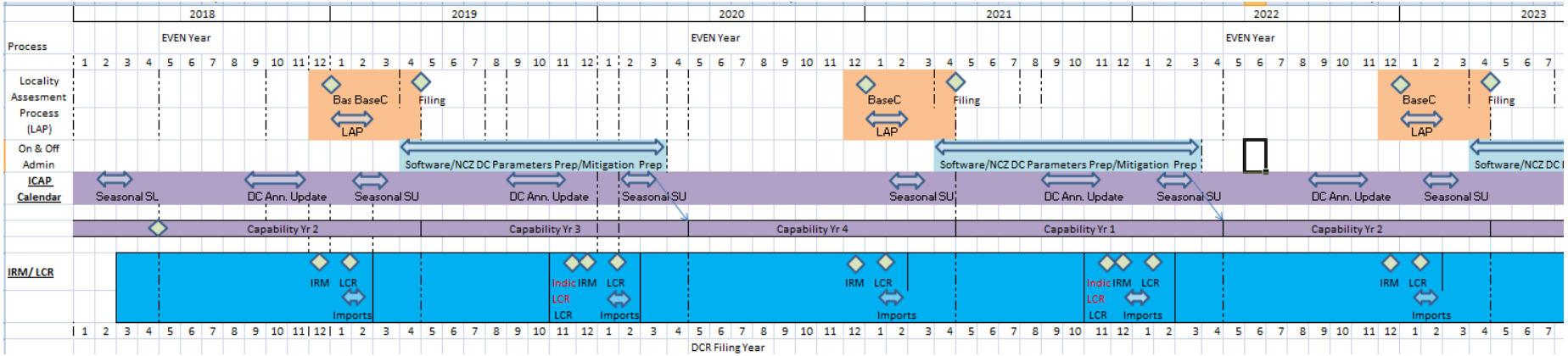
ICAP Event Calendar and IRM/LCR - Critical Dates*/Timeframes

- **ICAP Event Calendar**
  - Annual Demand Curve Update process is September 1 through November 30 in all years but the DCR filing year
  - December 30 - Summer Seasonal Setup LF/LCR Load Forecast
  - Mid March - Annual Summer Seasonal Setup complete for ICAP Summer Auctions
    - March 30 - Summer Capability Period Auction Complete
- **IRM/LCR Process Timeline**
  - October 1 - NYISO finalizes IRM Base Case with load forecast update
  - November - Base Case IRM approved by NYSRC
  - November - NYISO completes IRM scenarios and sensitivities
  - December – IRM Final Base Case Updated for LCR determination
    - Load Forecast
    - NYSRC approved IRM
  - January - LCRs determined by NYISO submitted to OC

* Dates are “typical” and may vary from year to year

ICAP Event Calendar with IRM/LCR Processes



- **Locality creation results are needed prior to September 1 in order to develop Demand Curve parameters for any new Locality in the timeframe consistent with the annual update process**
  - Allows new Locality Demand Curve parameters to be posted on November 30, along with the other updated Demand Curves
  - Transparent process, supports market predictability
- **Locality creation and elimination results are needed prior to the final IRM and LCR determinations**
  - Locality creation and elimination will impact IRM and LCR processes
    - Existing IRM and Tan 45 Processes
    - Proposed Alternative LCR Processes

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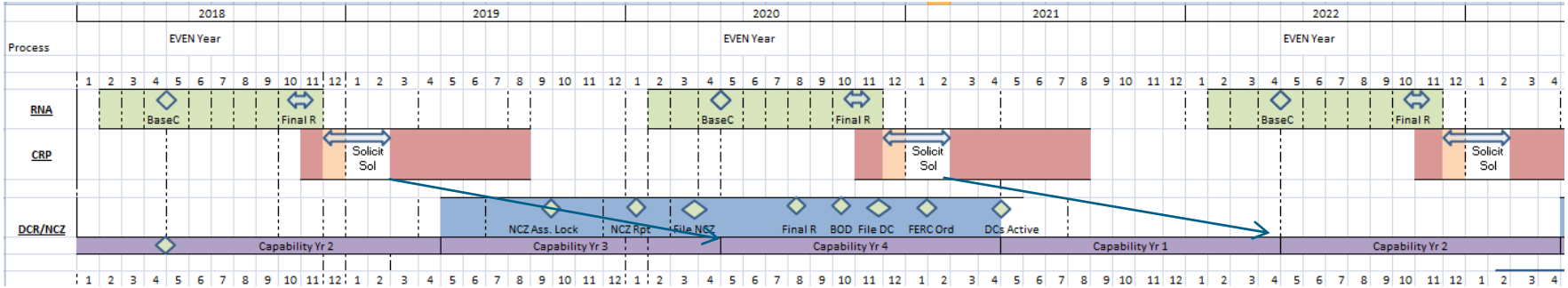
Quadrennial DCR Process - Important Dates*

- October 1, (DCRFY*-1) – Initial NCZ Base Case Lockdown
- January 15, DCRFY – NCZ Report indicating if a new Locality is required
- March 1, DCRFY – NCZ Boundary and Pivotal Supplier Threshold Defined
- March 15, DCRFY- NCZ Indicative LCR
- March 31, DCRFY – FERC filing to modify the tariff to recognize the creation of an NCZ
- Early August – DCRFY – Demand Curve Consultant Final Report
- Early September –DCRFY –NYISO Recommendations
- Early October DCRFY – Market Participant Oral Arguments with BOD
- November 30 DCRFY – DCR FERC Filing
- Typically on or before January 31, (DCRFY +1) – FERC Order on DCR Filing
- May 1, (DCRFY +1) - Demand Curve in effect for Capability Year 1

* DCRFY= Demand Curve Reset Filing Year = 2016, 2020, 2024, etc.

DCR/Existing NCZ Process Overlaid on RPP



- RPP is suited to creating and eliminating Localities in years 2 and 4 between resets
- Entirety of DCR is nearly 2 years long
- Current NCZ process takes 17-18 months
- No current Off Ramp process
- <u>RPP does not align well with DCR and existing NCZ process</u>
  - 2018 RNA is too early, and 2020 RNA too late to coordinate with the DCR
  - 2018 CRP is more up to date than the 2018 RNA, however
    - CRP Base Case lockdown would occur 27 months before any Locality created or eliminated by the transmission security analysis is implemented in the market

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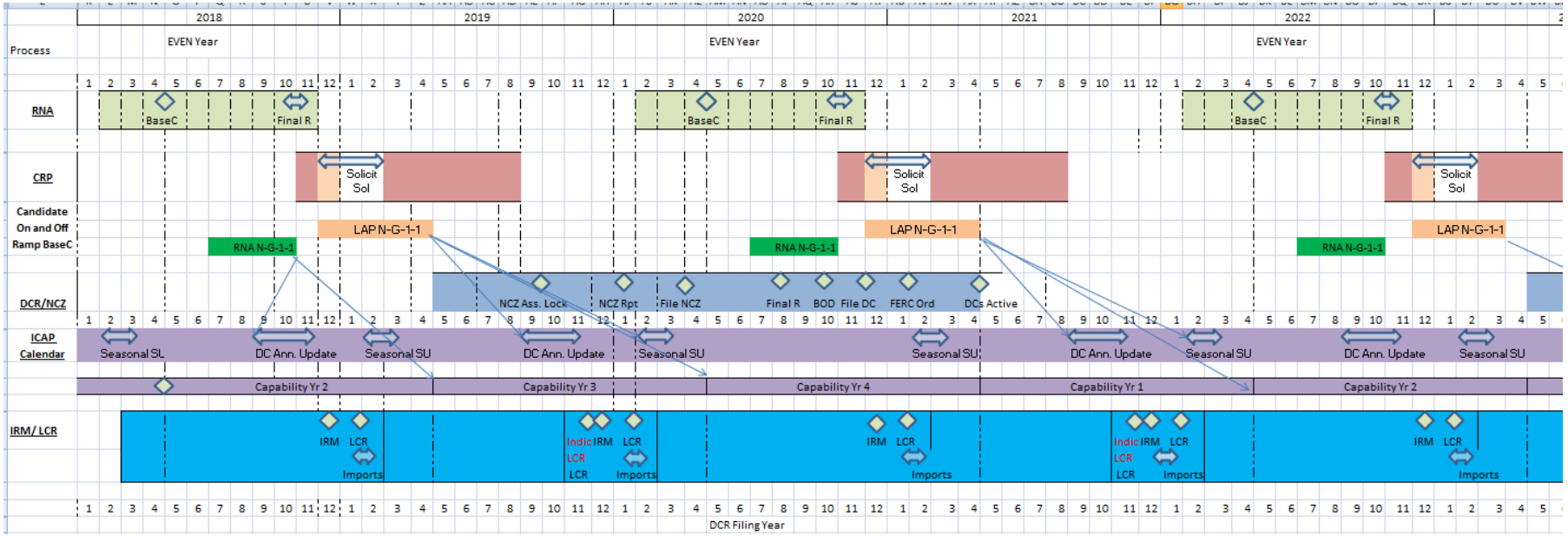
Selecting Locality Assessment Base Case to Align with the ICAP Event Calendar



- Conducting the Locality Assessment Process in the end of Q4 in the even year going into the odd year , allows the NYISO to align the RPP with the Locality Assessment Process with sufficient time for NYISO Market Operations
- 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

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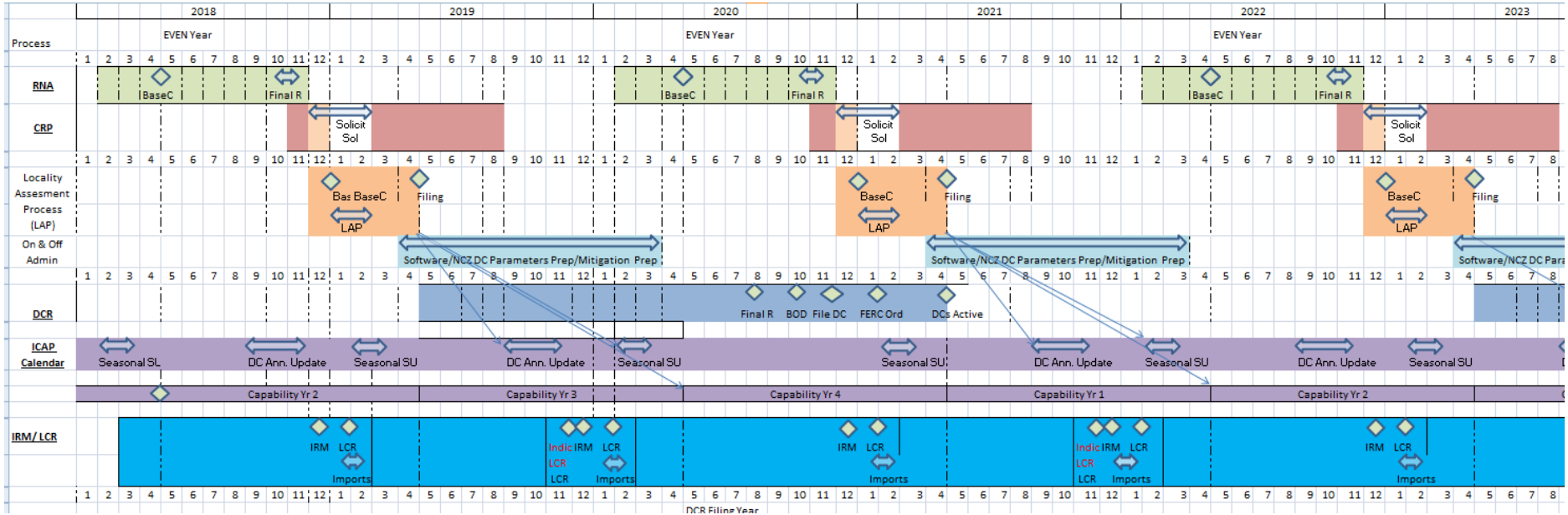
Recommendation – Conduct Locality Assessment After RNA Report Is Complete



Critical Timeline Takeaways*

- January 1 – Locality Assessment Base Case Lockdown
- March 1 – Locality Assessment Complete
- March - Review Results with Stakeholders
- April - Boundary and Indicative LCR Reviewed with Stakeholders
- May – File Locality Assessment Report with FERC, and proposed tariff changes if an NCZ is identified to be created or a Locality to be eliminated
- September – Demand Curve Annual Update Inputs Due
- November 30 – New Locality Demand Curve Parameters Posted
- January – Locality LCR Determined
- March – New Locality Parameters Included in Seasonal Setup
- March (for May 1 Capability Period Start)– New Locality Demand Curves Active and Eliminated Localities Removed in the Capability Period Auction

*Also See Appendix: NYISO Proposal for Locality Assessment -- Base Case and Schedule-- Draft

Proposed Locality Assessment Methodology for Locality Creation and Locality Elimination

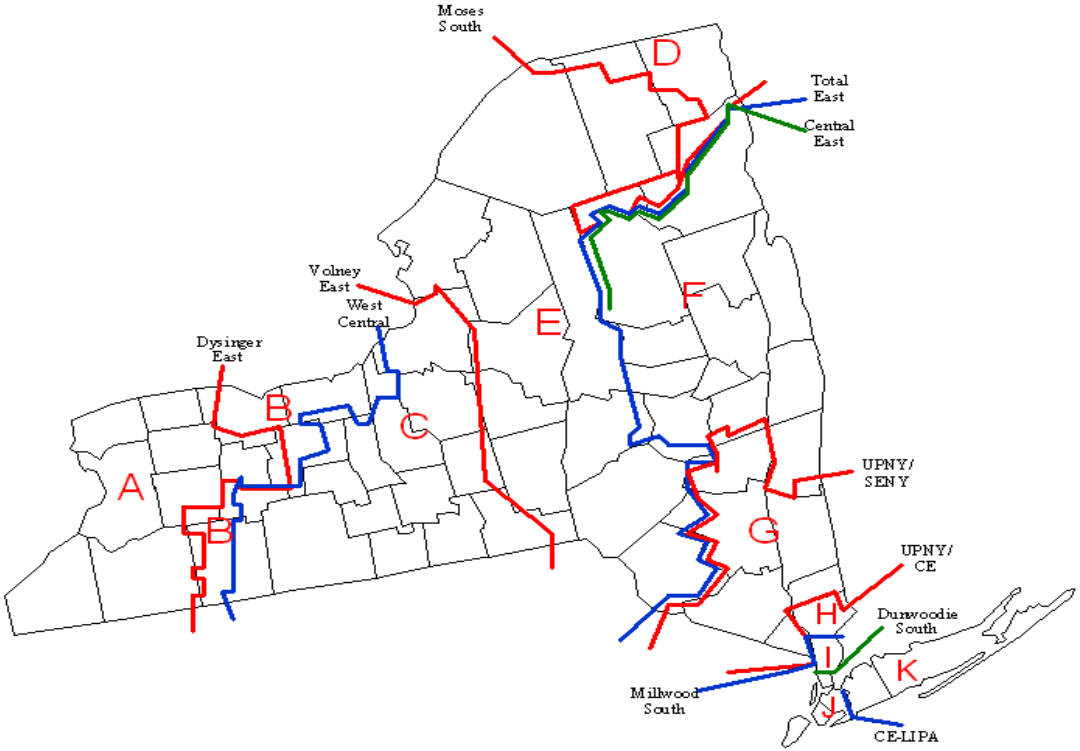
Locality Assessment Methodology

- Objective
- Transmission Security Test
- Locality Creation Method
  - Defining Headroom MW
- Locality Elimination Method
  - Defining Headroom MW
  - Resource Adequacy Backstop

Primary Objective for Locality Assessment

- **Identify whether there is adequate generation & transmission capability to serve load in a location/load zone**
  - Align market design criteria for locality creation and locality elimination with system reliability
- **Transmission Security Test (N-1-1) meets this objective**
  - Informs the identification of Locality boundaries
  - Is rooted in existing planning evaluation that is conducted in the NYISO biennial Reliability Planning Process
    - For purposes of Locality creation/elimination, the process will be slightly modified from current analysis as described in following slides

Monitor/Evaluate Flows on Zonal Boundaries to Identify Binding Constraints



Transmission Security Test

- **Locality creation and Locality elimination tests will leverage the RPP transmission security process (N-1-1)**
  - Utilize same methodology and basecase, but first remove generation from LBMP zones (“headroom MW” or “G”)
- **Use the N-1-1 methodology to conduct 2 separate tests: Create and Eliminate**
  - Purpose of Locality creation test headroom is to trigger Locality creation in advance of a reliability need
  - Eliminate test will have a higher headroom value to address toggling concerns

Defining Headroom MW ("G")

- **G_C – Creation Headroom**
  - Triggers Locality creation in advance of the need
  - Allows time for the market to incent retention and timely entry
  - Should allow for the catastrophic loss of capacity in the Locality
- **G_E – Elimination Headroom**
  - Larger than G_C to create an anti-toggling threshold that enhances market stability
  - Threshold should be sufficiently large to prevent large decreases in DCR amortization period due to toggling risk
- **G_C and G_E MW to be 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 Methodology Description

- **Starting with the RPP base cases, use the 5th year NYCA coincident peak powerflow case to evaluate contingencies required by NERC, NPCC, NYSRC**
- **Apply 2 generator contingencies (G_C) followed by two transmission contingencies (N- G_C-1-1)**
  - Contingency definitions and databases are maintained in accordance with the NYISO Reliability Analysis Data Manual.
  - Generator contingency: Simulate the removal of all elements that protection systems are expected to automatically disconnect for a fault on a generator. In the case of a combined cycle plant, this may result in loss of more than one generator unit.
- **Identify zonal boundary constraints when any allowable re-dispatch of the system cannot alleviate a thermal overload on BPTF facilities under any N- G_C-1-1 combination**
  - System must be secured within applicable ratings (normal for pre-contingency, LTE or STE post-contingency (depending on the facility)

Locality Creation Methodology Description (Continued)

- If an identified overload is associated with an LBMP zonal boundary, a Locality will be created.
- Utilize the location of the binding constraints to inform the selection of Locality boundary
  - E.g., if generator contingencies in LBMP Zones A and B resulted in constraints from LBMP Zone C to LBMP Zone B, it suggests an AB Locality could potentially be created.

Locality Elimination Methodology Description

- **Similar methodology as the Locality creation test with the following exceptions:**
  - Applies greater headroom MW to avoid toggling Localities
  - Evaluates both the 1st and 5th year of the planning horizon
  - Generator contingencies would only be applied within the subject Locality
- **For each Locality, apply 4 generator contingencies (G_E) followed by two transmission contingencies (N- G_E-1-1)**
- **Identify overloads when any allowable re-dispatch of the system cannot alleviate a thermal overload on BPTF facilities under any N- G_E-1-1 combination**
- **If no overload associated with the boundary of the subject Locality is identified in either years 1 or 5, then the Locality will be eliminated unless it is associated with an identified Reliability Need.**
  - As a backstop, any existing NYISO Locality associated with an identified Reliability Need will not be eligible for Locality elimination regardless of the results of the Locality elimination test.

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Commonalities and Differences between Locality Creation and Locality Elimination Tests

Commonalities of Create and Eliminate Tests

- **Tests for create and eliminate will be conducted every two years in alignment with RPP**
  - NYISO is proposing to align the tests in the timeframe between the RNA and CRP
  - Outcome of tests will be reported in a separate NYISO report for Locality Creation and Elimination that will be
    - *Posted in the ICAP section of the NYISO's website*
    - *Presented* to Stakeholders but not subject to action in governance process
  - This report will not be incorporated into the CRP report
- **Tests will be run contemporaneously**
  - Utilizing the same Base case to run the for Locality Creation and Locality Elimination

Commonalities of Create and Eliminate Tests

- **Tests will be pass/fail**
  - Test is failed if applicable zonal boundary transmission facilities are overloaded
  - "Failed test" will cause Locality creation and will prevent Locality elimination
- **Tests will be looking through year 5 of the appropriate RPP planning horizon period**
- **Tests will utilize the same base case, developed using the RPP base case inclusion rules**
  - See the NYISO Reliability Planning Process Manual

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Differences between Create and Eliminate Tests

- **Headroom megawatts will vary**
  - Create Test requires headroom sufficient to avoid a transmission security Reliability Need following the loss of two generators
  - Eliminate Test requires significantly greater headroom to avoid Localities “toggling ” (i.e., being created and then eliminated) within the planning horizon
- **Study years will vary**
  - Create Test will be conducted using RPP horizon year 5
  - Eliminate Test will be conducted using RPP horizon year 1 and year 5
    - A binding constraint found in either year will cause test to fail and require the Locality to be maintained

Should Zone J and Zone K Be Permanent Localities?

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

- **Unique zonal characteristics**
  - The unique geographic nature and system configuration of these areas makes it appropriate to make them permanent
    - *Supports system reliability*
    - *Supports predictability for investors*
  - NYSRC has imposed higher reliability standards than all other zones
    - *NYSRC Local Reliability Rules (G1-G3)*
  - 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

Market Administration Requirements

Implementing On Ramps - Demand Curve Parameters

- **NYISO will need to readily develop and utilize Demand Curve parameters in order to create Localities on a two year cycle that aligns with RPP**
  - Alignment of On Ramps and Off Ramps with RPP will allow the Localities to be created in even years — approximately 12 months after results of N-G-1-1 test are completed
- **Demand Curve parameters for new Locality may need to be:**
  - Developed after the Locality Assessment determines the need for a new Locality
  - "Borrowed" from existing Demand Curves for Localities or NYCA that have similar system and market characteristics and/or
  - Developed by the independent consultant at the time of the quadrennial Demand Curve Reset Process
- **If Locality Creation happens at start of year 2 of Quadrennial DCR process, all Demand Curve Parameters for the new Locality will have to be updated for the CYs 3 & 4 of the 4 year cycle**

List of Demand Curve Parameters & Various Components*

***Note: components that are"grayed out" below means they do not vary among the different Curves**

- **Peaking Plant Technology, Location and Size**
  - Includes Emission Control Technology or Operating Limits
  - Primary Fuel and Back Up Fuel Requirements
  - Local siting requirements – *e.g.,* flood plain requirements
- **Gross CONE**
  - Overnight Costs of Equipment
  - Labor Costs
  - Escalation Factors
  - Financial Parameters
  - Amortization Period\Cost of Capital
  - Interconnection Costs, including costs of any necessary SDUs
  - Cost of interconnecting to Gas Pipeline, or LDC, if necessary
  - Other Fixed Costs

List of Demand Curve Parameters & Various Components (cont'd)

- **Net EAS Revenues/Net CONE**
  - Appropriate Gas Hub Indice
  - Operating Characteristics associated local temperature during system peak conditions
  - Variable costs associated with emission limitations and associated control technologies and/or operating restrictions
  - Emission Allowance Costs
  - Level of Excess Adjustment Factors for LBMPs in Net EAS Model
- **Demand Curve Reference Price**
  - Net CONE
  - Non-coincident Load Forecast for Locality
  - LCR value
  - LOE value (size of proxy plant)
  - Winter Summer Ratio
- **Zero Crossing Point**

Implementing Off Ramps

- When a Locality is eliminated the 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 Demand Curve)
- Define in advance of performing IRM and LCRs
- Define in advance of Demand Curve annual updates

Mitigation

Other Design Considerations

To be discussed at a later ICAPWG Meeting

Next Steps – 2017 Sequence of Events

- Discuss proposal and get additional stakeholder input - Today
- Ongoing methodology discussions–September 28 and October 11
  - Discuss further proposal on Demand Curves for new Locality
  - Continue to discuss market administration requirements and mitigation issues for Locality creation and Locality elimination
  - Initiate discussions on regulatory filing requirement and discuss other considerations
  - Further discuss stakeholder comments and concerns offered to date
- Perform and present market benefits and consumer impact analysis – October
- Address open issues - October
- Stakeholder vote on proposal - November

Questions?

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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