NEW YORK STATE OF OPPORTUNITY. Department of Public Service

Three Empire State Plaza, Albany, NY 12223-1350
www.dps.ny.gov



May 9, 2022

Hon. Michelle Phillips
Secretary to the Commission
New York State Public Service Commission
Three Empire State Plaza
Albany, NY 12223-1350

Re: Case 20-E-0197 – Proceeding on Motion of the Commission to Implement Transmission Planning Pursuant to the Accelerated Renewable Energy Growth and Community Benefit Act.

Dear Secretary Phillips:

The presentations from the virtual technical conference held on April 28, 2022 are enclosed. A recording of the conference can be viewed at the following web address: https://www.youtube.com/watch?v=ScMidLPkhy4 and a link to the recording will be available on the Coordinated Grid Planning Working Group webpage: https://on.ny.gov/3LOMzy5.

Sincerely,

Jalila Aissi
Assistant Counsel

# New York Joint Utilities Planning Processes

*Current Practices and Needs to Meet the CLCPA*

4/28/2022

# Overview

## 01 Existing Planning Processes

- Distribution Planning
- Local Transmission System Planning
- Bulk Transmission System Planning

## 02 Proposed Coordinated Grid Planning Process

- Bulk Transmission Planning
- Local Transmission & Distribution Planning for CLCPA
- Incorporation of Advanced Technology

# Background / Context

New York set targets for the electric system to be powered by 100% clean energy by 2040.

The Accelerated Renewable Energy Growth and Community Benefit Act ("the Act") requires:

- Studies to identify T&D investments needed to achieve the CLCPA targets
- September 2021 Order directed the utilities to file a coordinated grid planning proposal.
- In December 2021, the JU filed a Coordinated Grid Planning Process (CGPP) framework.
- Included in this filing was a plan to further develop the process, with stakeholder input, by the end of 2022.

# Purpose and Goals

## Existing Planning Processes

- Modeled around mandates from regulators as well as local utility criteria;
- Necessarily limit the inclusion of generation expansion and system load scenarios to certain levels of confidence
- Not sufficient to proactively plan the electric system to meet CLCPA goals

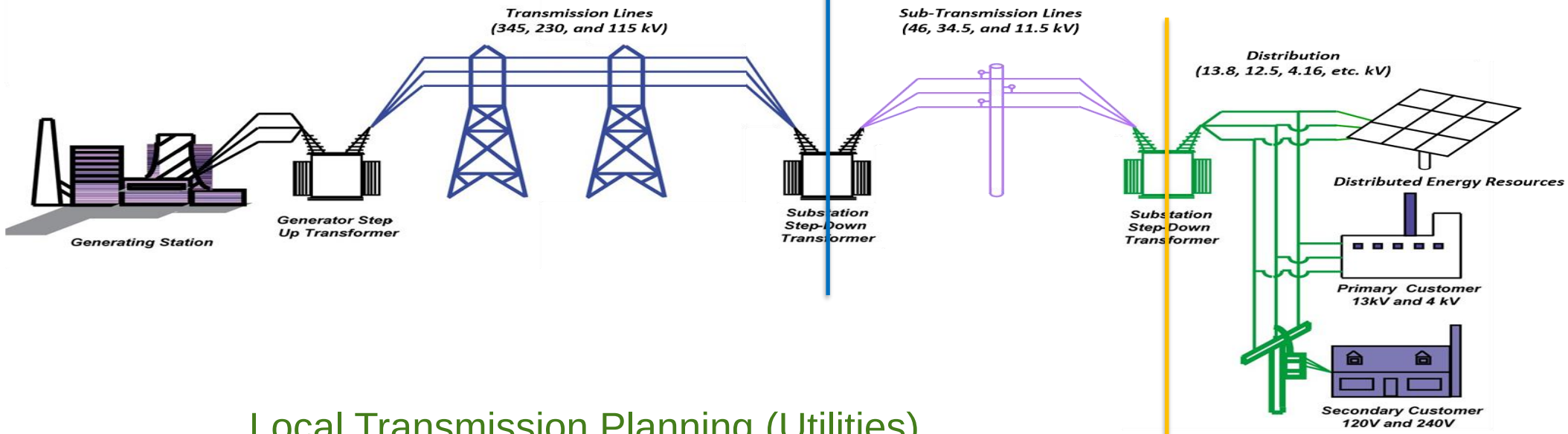
## Coordinated Grid Planning Process

- The CGPP is envisioned as a new planning process that supplements existing utility and NYISO planning studies.

# Transmission and Distribution System Planning Overlaps

Bulk Transmission Planning (NYISO)

Local Distribution Planning (Utilities)




Local Transmission Planning (Utilities)

# New York Joint Utilities Distribution Planning

*Principles and Practices*

4/28/2022

# Agenda

01 Distribution System Basics

02 Goals of Distribution Planning

03 Planning Process

04 Forecasts and Inputs

05 System Needs and Timing

06 Solution Assessment

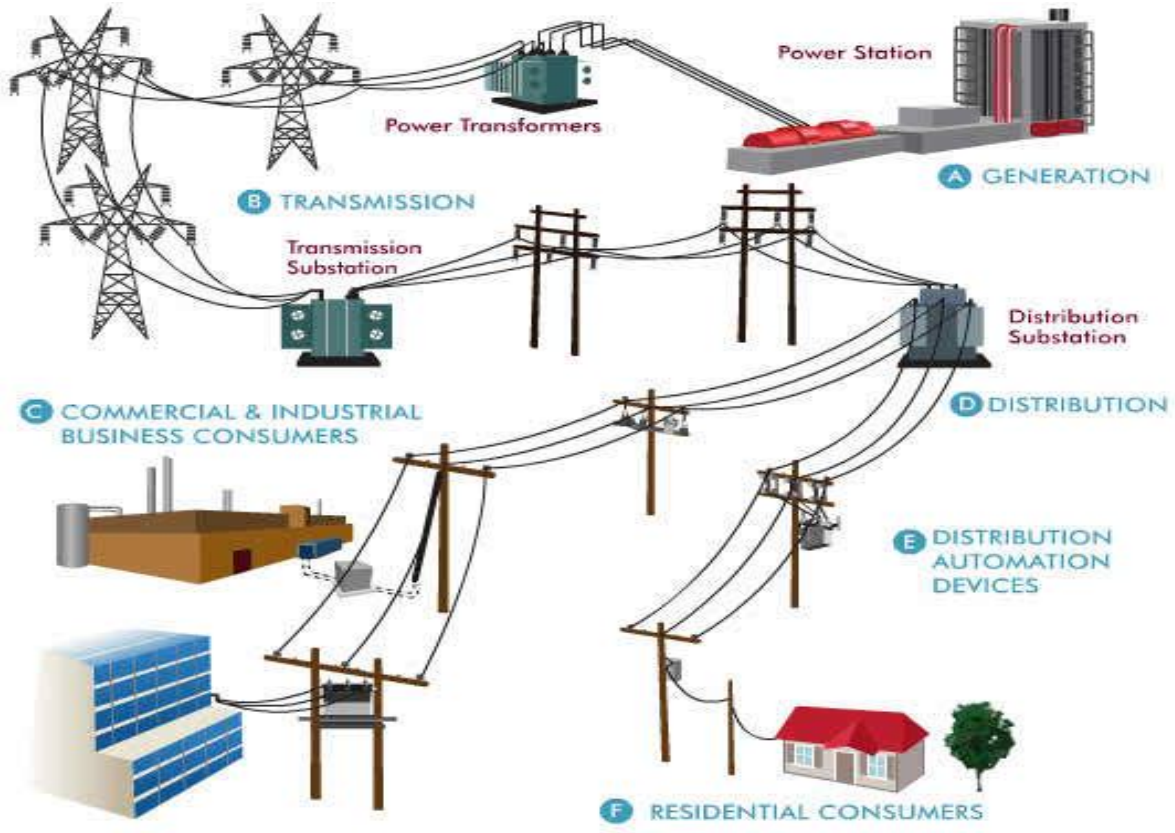
07 Integration with Local Transmission Plans

# Distribution System Basics

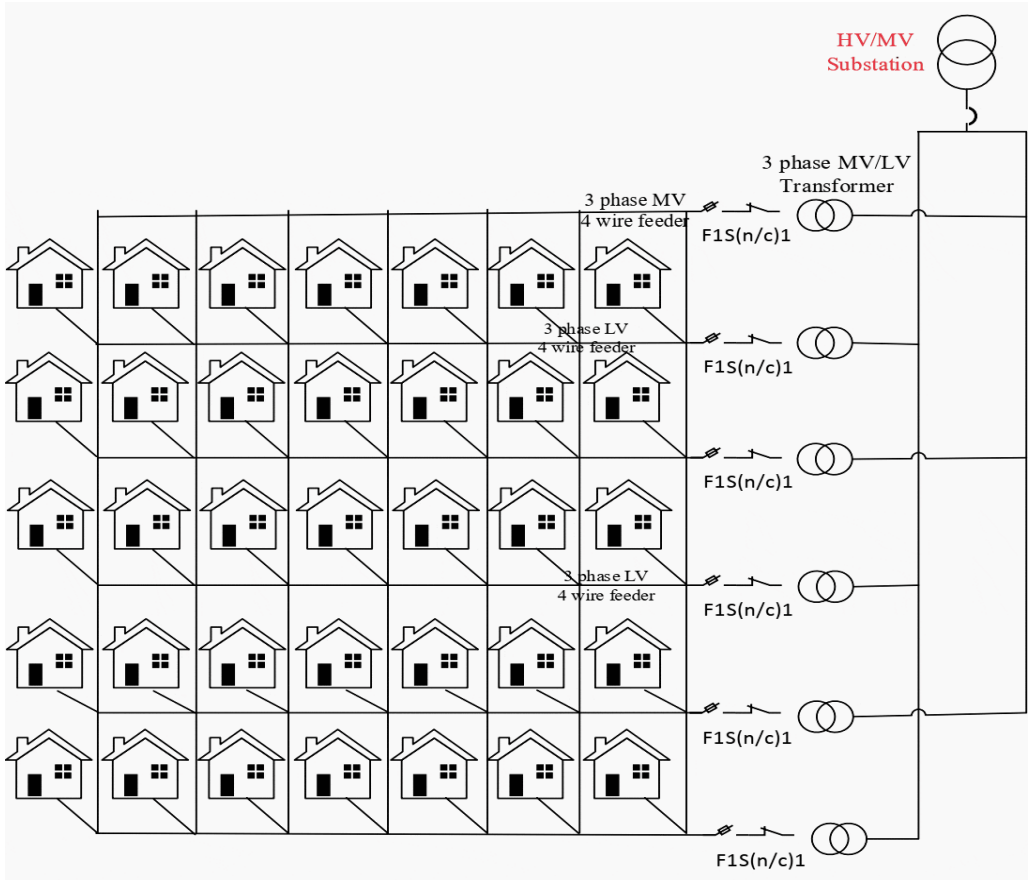
- From the Local Transmission System to the customers/DER.
- Includes substations, power transformers, and circuits (feeders)
- In New York, the distribution is primarily a radial system, often with normally open tie-points.
- Is designed to operate within thermal (load) limits and voltage limits.
- Radial system designed to an N-0 reliability – outages
  - Some utilities design to N-1 standards

# Distribution System Illustrations

## Radial Distribution

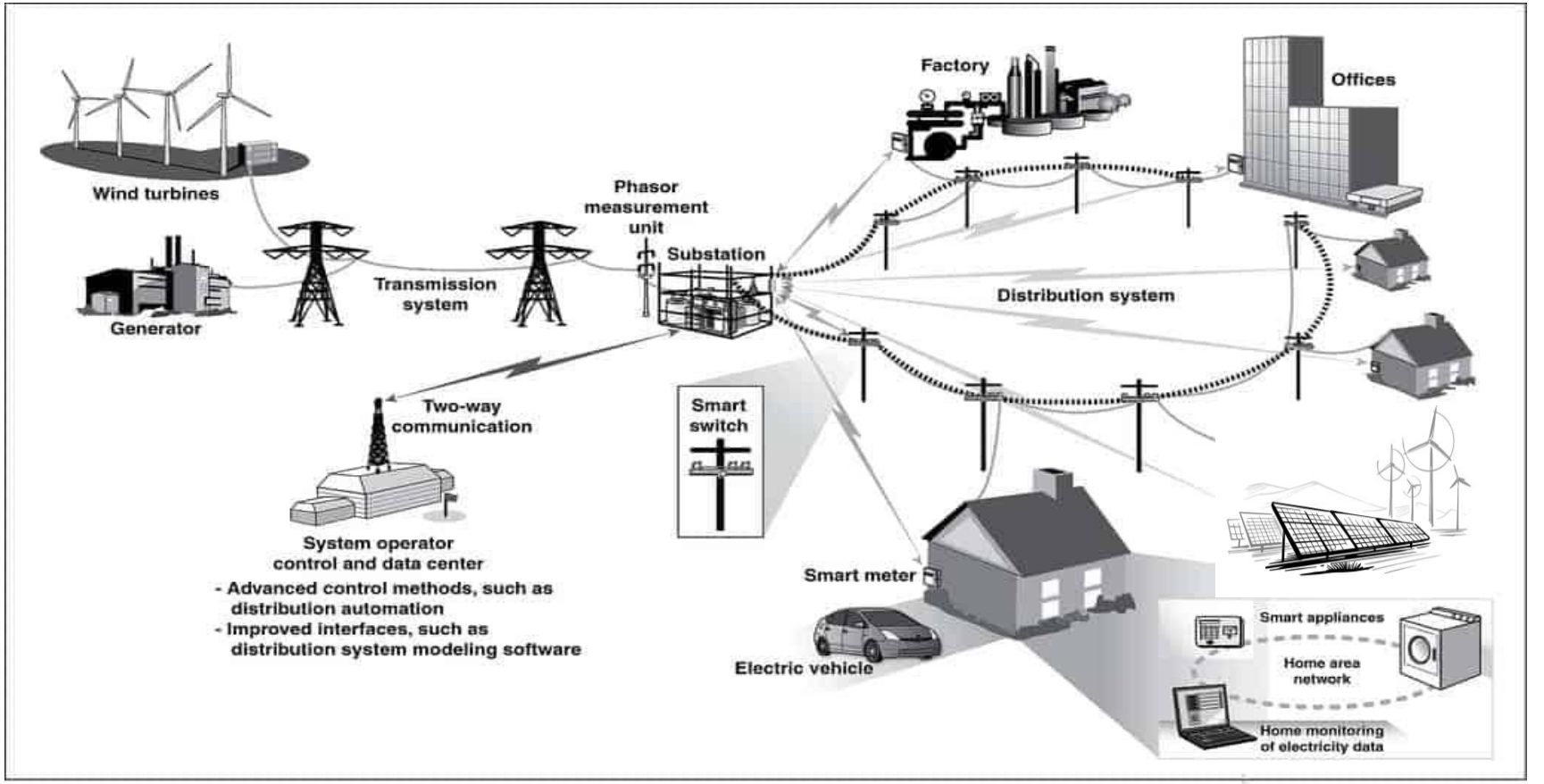



## Networked Distribution



# Goals of Distribution Planning

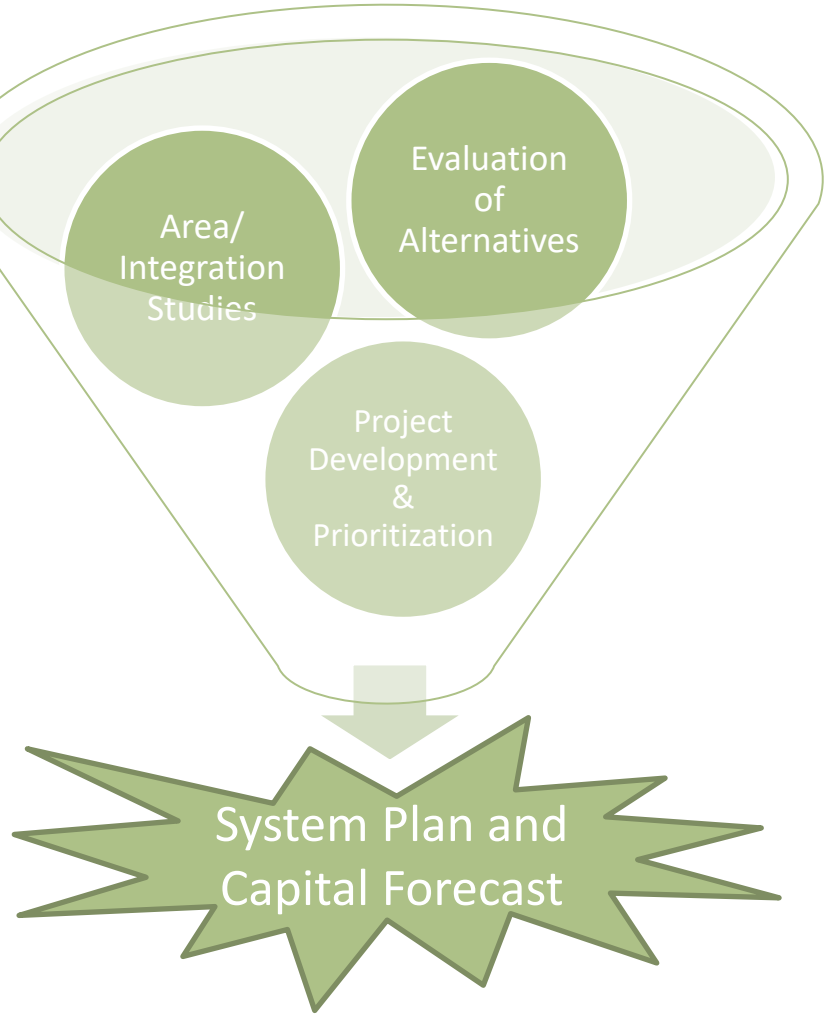
**Ensure the long-term adequacy, stability, and strength of the distribution system in order to deliver electricity in a safe, reliable, and affordable manner.**



# Overview of the Distribution Planning Process

## Inputs

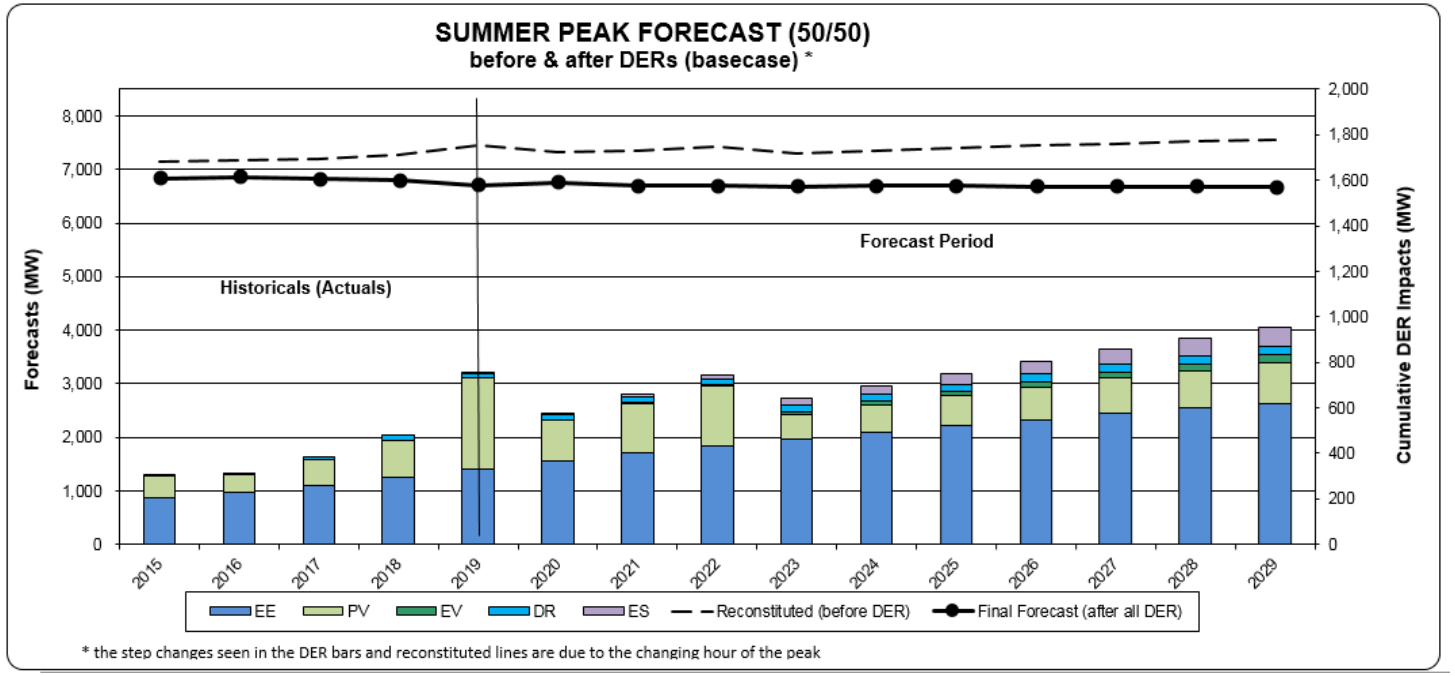
- Forecast Scenarios
- Infrastructure Condition Assessments
- Reliability Analysis
- DERs & Hosting Capacity



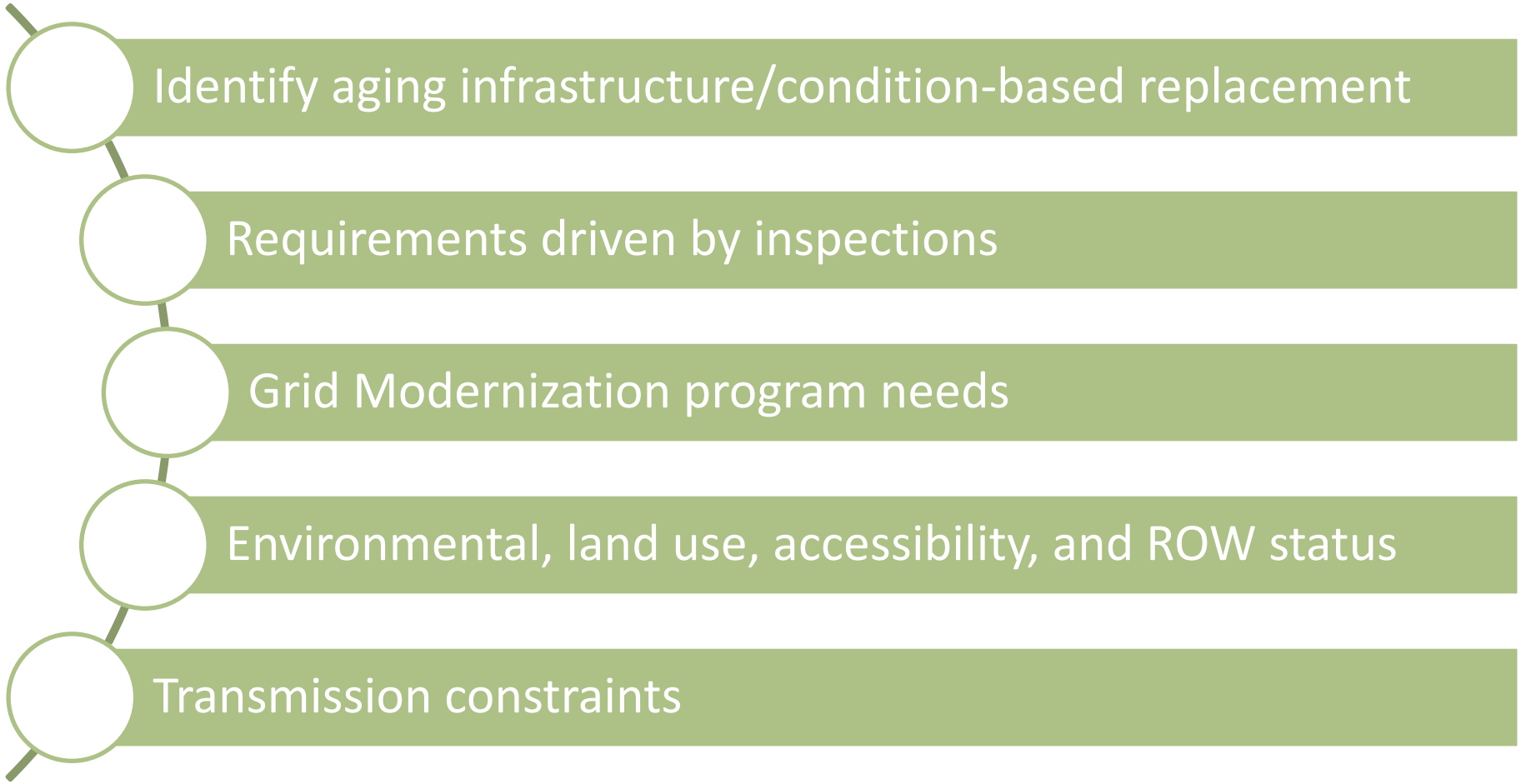
# Inputs: Forecast Scenarios

- Typically, the forecast will be done on a 5 to10 year horizon
- Performed for transmission areas and distribution substations, may even be performed at circuit level
- Considers weather normalization
- Incorporates traditional load and DERs (including separately forecasted EE, EV, storage, solar)
- Forecasts use varying methods to reflect weather variability, DER, or load growth scenarios
- Considers large lumped loads (i.e. industrial customers) along with steady load growth

Forecast ultimately provides load growth/rates to identify substation and circuit load serving capability and potential needs

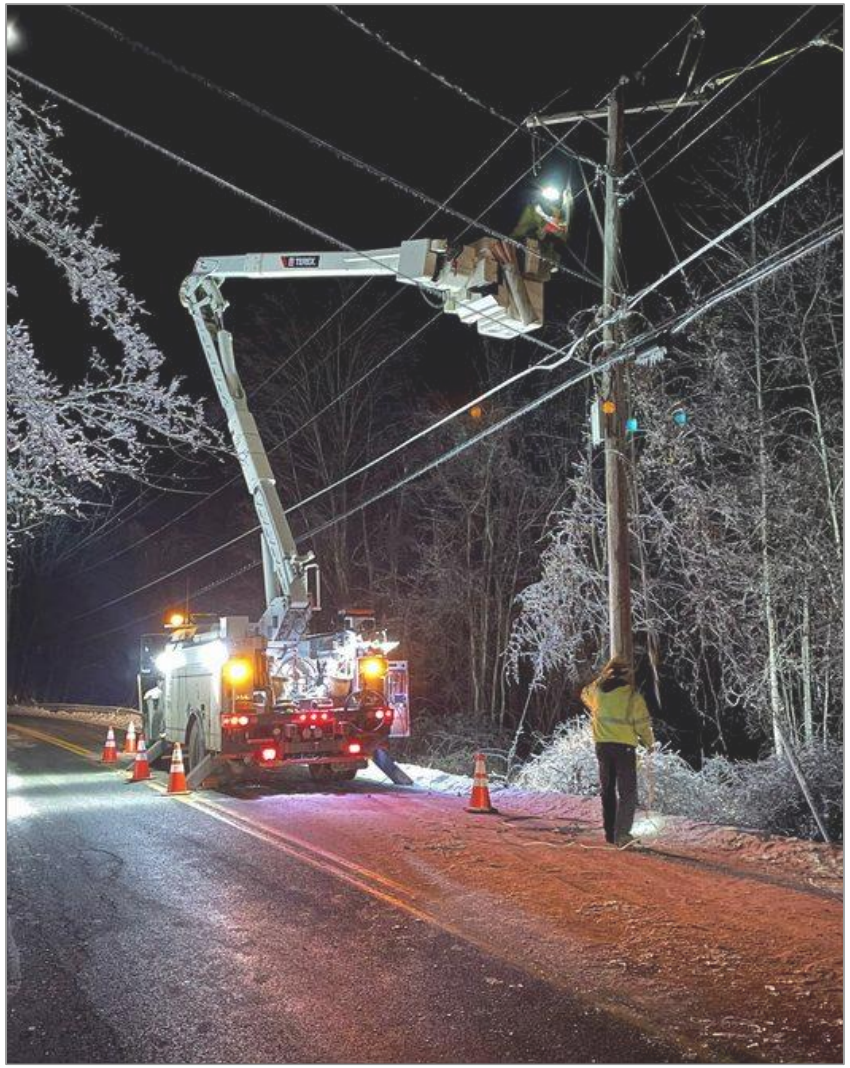


# Inputs: Infrastructure Condition Assessment



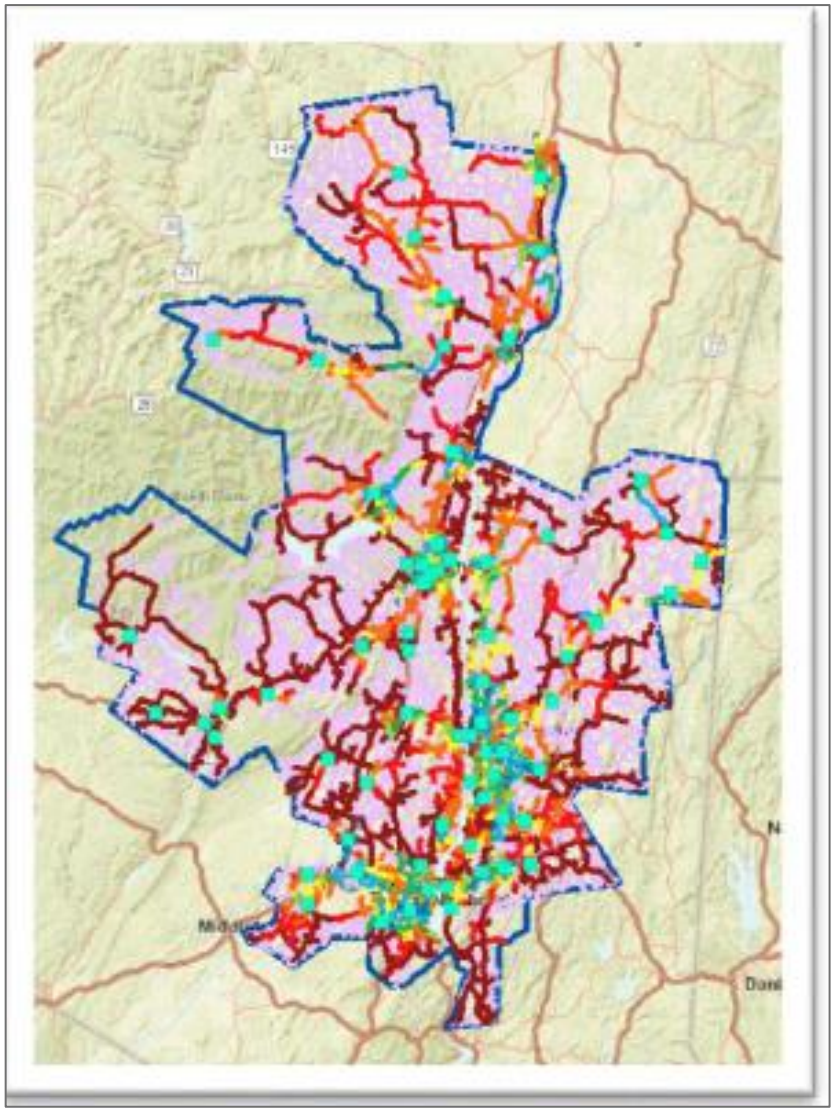
# Inputs: Reliability Performance Review

- Address circuit/customer reliability (SAIFI)
- Increase operational flexibility (CAIDI)
- Consider storm hardening and resiliency needs



# Inputs: DERs & Hosting Capacity

- Consider DER forecasts
  - Differentiate between small residential/roof-top systems and/or large scale community DER
- Consider existing queue/location of DERs as part of infrastructure upgrades
- Will identify system upgrades needed to meet projected DER



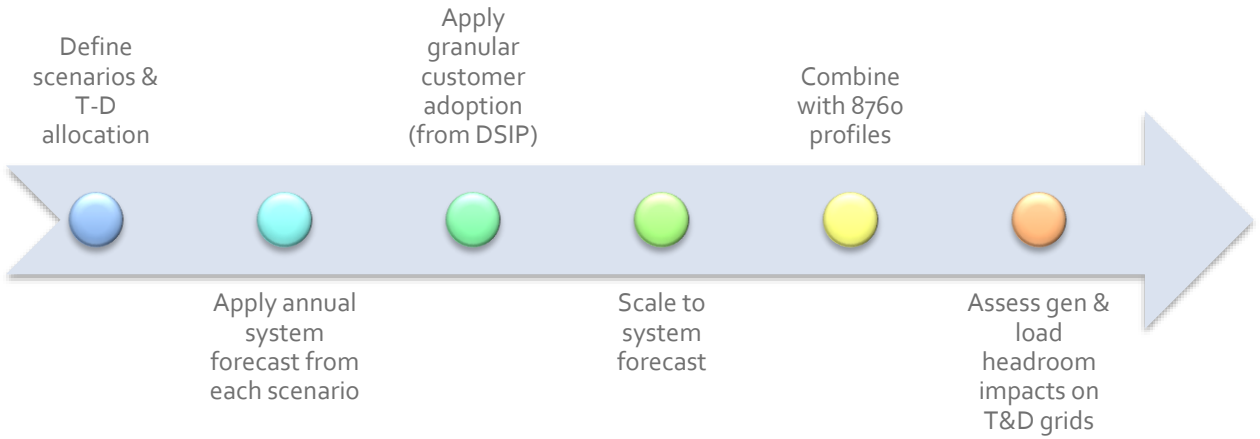
# Distribution Planning Process

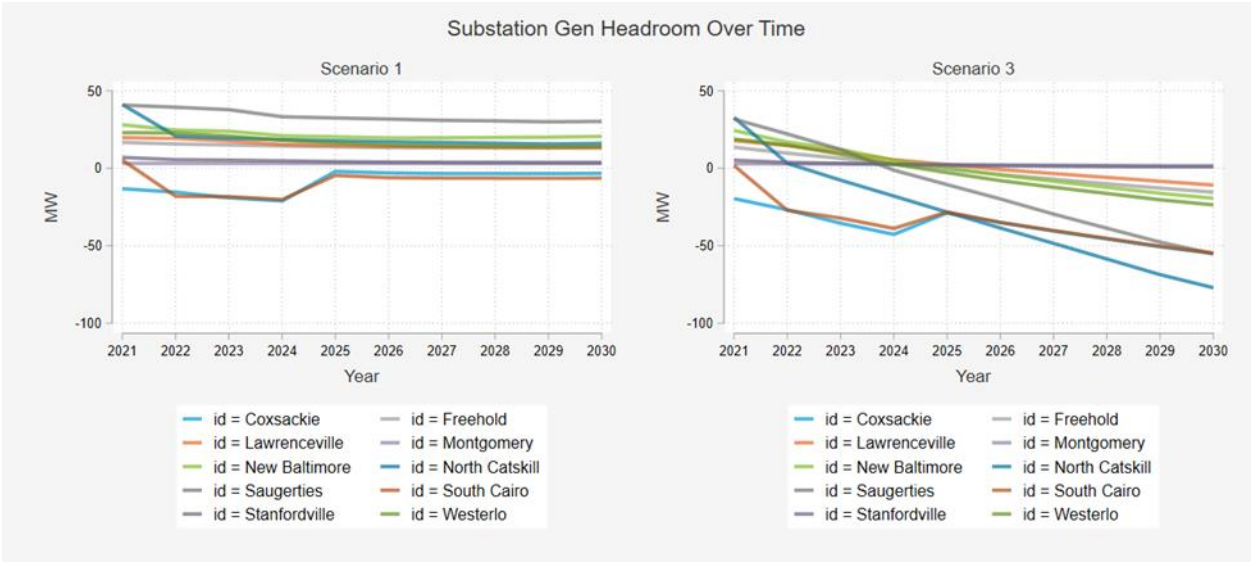
- Inputs utilized to perform system studies
- Studies used to identify area needs and timing
- Identify solution(s) to address needs, including evaluation of alternates
  - Identify short term vs. long-term solutions
  - Low-cost solutions (i.e. load transfers)
  - Need for traditional T&D infrastructure upgrades (i.e. reconductoring, new circuits, new substation)
  - Non-wires alternatives screening
  - Align with local transmission plans
  - BCA may be completed, if applicable

# Distribution Planning Process

- Once final solution(s) determined, projects are identified and prioritized
  - Multi-value projects/solutions typically prioritized (projects that provide a combination of load, reliability, operational flexibility, and/or hosting capacity benefits)
- Solutions/recommendations incorporated into annual capital forecast and documented in long-range system plans

# CLCPA and Distribution Planning Example

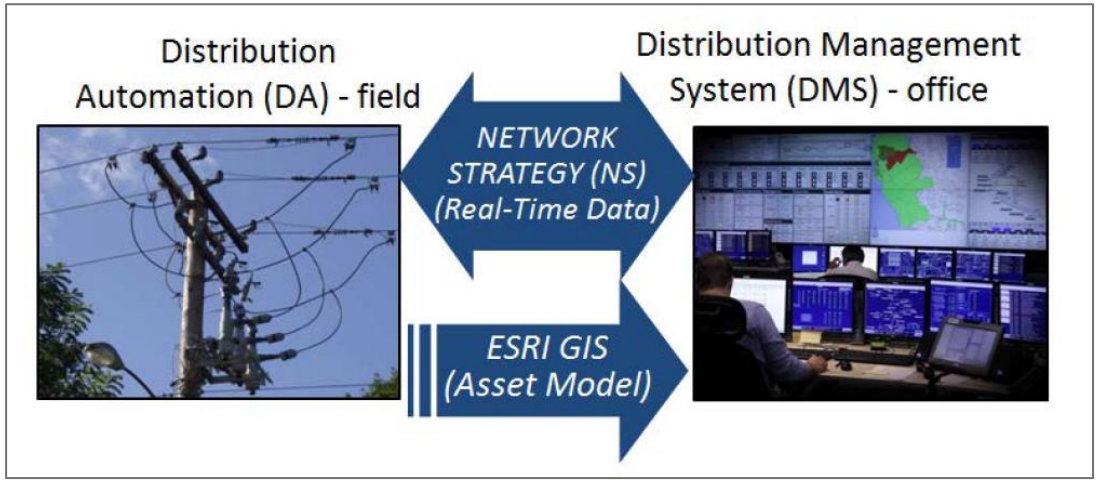



- Coxsackie Substation Identified as Load constrained and due to age/condition was identified for replacement.
- Transformer size based on loading would be sized to 13.4 MVA
- Based on DER in queue, the recommendation was changed to 22 MVA paid by DER.

# Grid Modernization Efforts to Support Planning Process

- Implementation of ADMS/DERMS
  - Will provide more real-time, up-to-date system model/data
  - Supports customer reliability by providing more operational flexibility (SAIFI & CAIDI)
  - Supports increase in hosting capacity by providing more visibility and awareness
  - Enable market related functionality



# Integration with Local Transmission

- Use of Common Forecasts
  - Load Forecasts
  - DER and other forecasts
- Alignment of Solutions
  - Area studies/solutions require T&D facilities
  - Transmission solutions considered

# Distribution Planning Takeaways

- Is aligned with Transmission planning process in many ways
- Driven by local infrastructure or load needs
- Shorter solution timeframes than Bulk and Local transmission
- Solutions can vary widely
- Will need to evolve to proactively address CLCPA

# Questions?

# New York Joint Utilities Transmission Planning

*Existing Practices*

4/28/2022

# Existing Transmission Planning Processes

## Transmission planners must balance numerous study types in a parallel and cyclical fashion

- Multiple different types of studies are performed, each with different objectives
  - Reliability
  - Economic
  - Public Policy
  - Interconnection
  - Operating
  - Etc.
- Studies must respect processes and criteria from various organizations
  - NERC
  - NPCC
  - NYSRC
  - NYISO
  - Utilities
  - Neighboring Entities
  - Etc.
- Each of these studies require different Scenarios
  - Years of Study
  - Load Forecasts
  - Project Inclusion
  - Generation Dispatch

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

NPCC, Inc.

NEW YORK STATE
NYSRC
RELIABILITY COUNCIL

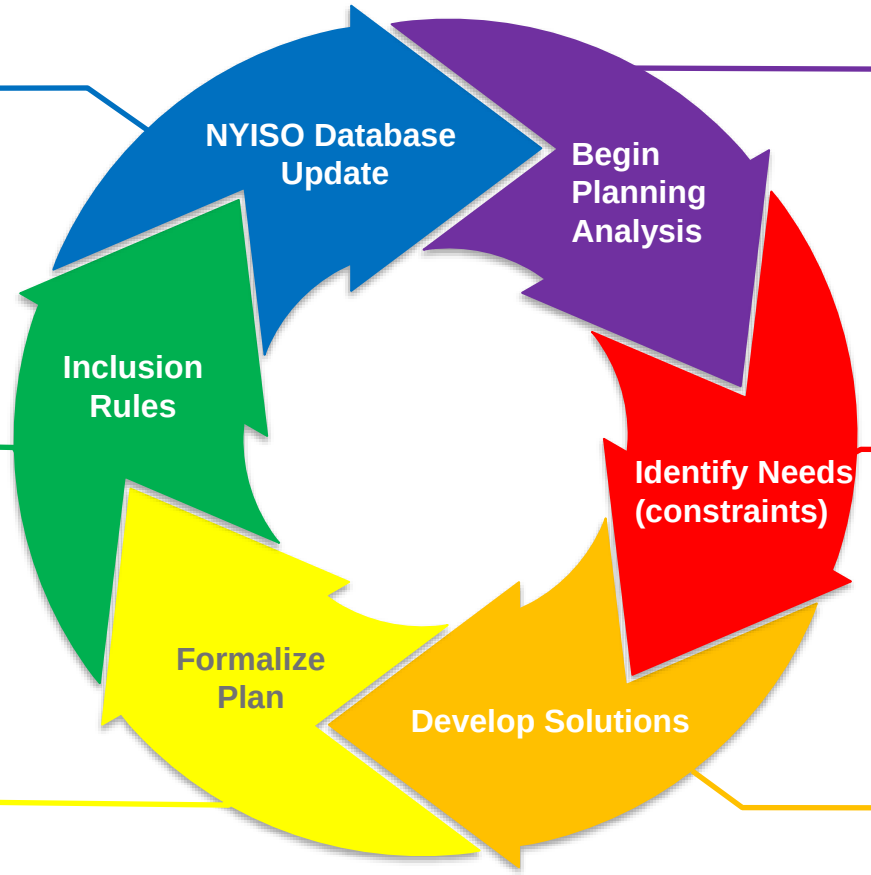
# Existing Transmission Planning Processes

## NYISO Database Update
- Steady State/Dynamic Base cases
- Steady State/Dynamic Contingency Decks
- Short Circuit Base cases
- Demand and Capacity Forecast
- DER projection
- System configuration

## Inclusion Rules*
- Projects
  - ❑ NYISO Gold Book 'Firm' criteria
  - ❑ Local 'Firm' project
- Resource addition/deactivation
  - ❑ Accepted NYISO class year cost allocation
  - ❑ Completed NYISO STAR process

*Rules may differ from one planning process to another

## Formalize Plans
- Project Selection (*e.g.,* PPTN, Reliability)
- Finalized Facility Study
- Completed NYISO Class Year Study
- LTP
- T&D Development Plan




## Planning Analysis
- NYISO Comprehensive System Planning Process
- NYISO Interconnection
- Regulatory Compliance
- Local Transmission Planning
- Operating Study

## Identify Need
- Reliability
- Economic
- Public Policy
- Interconnection
- Compliance
- Local Criteria

## Develop Solutions
- CRP/RBS (if necessary)
- PPTN Solicitation
- Preliminary CTOAF/SUF/SDU/Optional SUF identified (if applicable)
- Capital project developed
- NWA evaluated
- RFP as needed

# Existing Transmission Reliability Planning Process - Overview

1) Bulk Transmission planning: is most consistent between utilities (regional criteria - NPCC, NERC, etc.)
   - Comprehensive analysis (N-0, N-1, N-1-1) – shared NYISO models

2) Sub-transmission planning: may have more variability between utilities (local criteria)
   - Less stringent contingency analysis (N-0, N-1)

3) Base cases: created to consider credible, but sufficiently conservative system conditions (load, dispatch, topology)

4) Software Tools: various packages to comprehensively evaluate system reliability

5) Needs (Constraints) / Solutions:
   - Identify system criteria violations (constraints)
   - Consider generation re-dispatch (curtailment)
   - Identify mitigating solution alternative(s)
   - Validate solutions - System Impact Study (no adverse impact to system)

# Interconnection Process - Overview

## NYISO-Administered Interconnection Process

1) Large –Scale Interconnection projects must obtain a NYISO Queue position
   - Studies performed per NYISO Tariff and manuals
   - Must maintain compliance with reliability standards

2) Utilities provide input, review results, and provide solution cost estimates

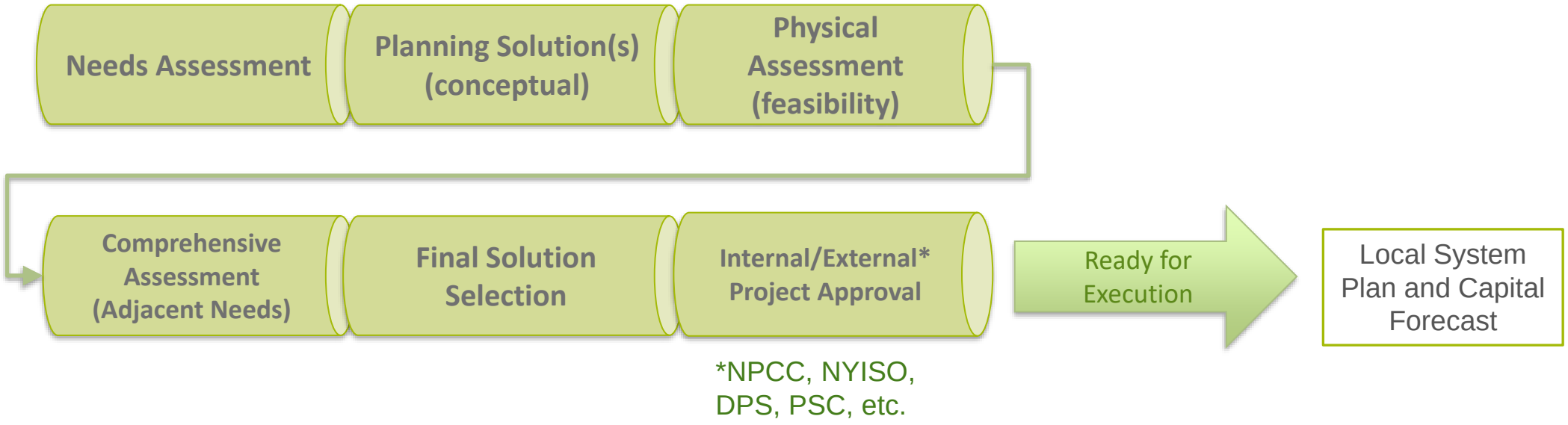
3) Solution may consider generation redispatch (or curtailment)

4) Interconnections studies are typically *reactive:*
   - Responding to specific requests vs.
   - Creating headroom in advance

# Existing Local Transmission Planning Process - Timelines

## Study Timelines

1) Performing studies is typically an ongoing cyclical effort
   - Significant variance to turnaround times experienced for most studies
   - Studies can take many months to complete
   - Re-assessment risk (gen. retirement, load forecast, etc.)
2) Proposed projects require coordinating development efforts
   - Project execution can take many years



# Distribution and Transmission Planning Coordination and Challenges

## How are DERs being Studied?

1) Traditionally treated as a load model. Recently, DER has to be studied discretely as generation due to back feed
2) Emerging concerns of "Clusters" of DERs causing instability risk (e.g. ride-through concerns)

## What Constraints Are Occurring?

1) DER at a single station either reduces the load at that station or pushes power back up into the local transmission system, impacting system loading and voltage
2) The generation at all stations in an area have an aggregate impact on the system
3) If system loading and voltages fall outside of acceptable limits, these violations may have to be addressed with curtailment of large-scale renewables, as DER is not curtailable
4) The DER and large-scale renewables are competing for the same local transmission system headroom and would both benefit from increases in available headroom

# Why is the Coordinated Grid Planning Process Needed?

## What Are The Deliverability Constraints?

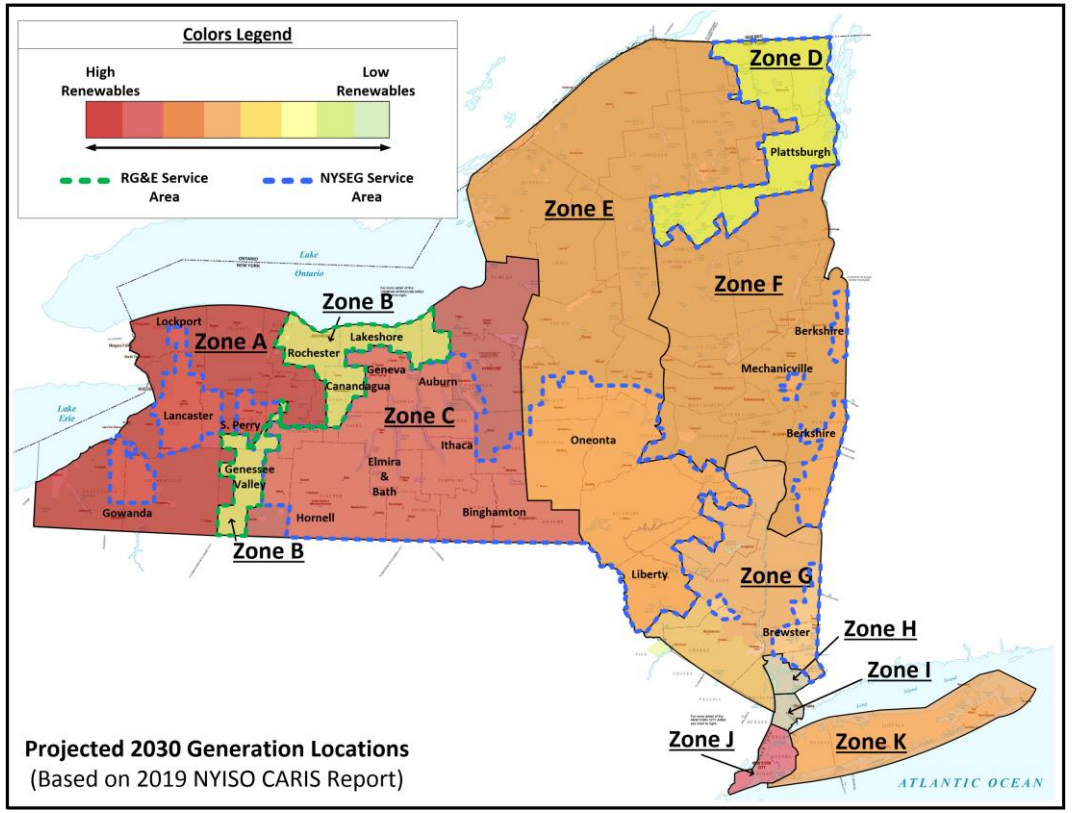
1) High Transmission System Voltage
2) Low Transmission System Voltage
3) Thermal Overloads
4) Voltage Collapse

## Why and When Are Constraints Occurring?

1) High renewable energy generation can cause congestion
2) The most attractive locations for renewables (e.g. wind or solar) are typically the most remote areas of the system where there is less transmission capacity

## What Are The Existing Process Shortfalls?

1) Existing processes allow generation curtailment - there are few studies that identify what upgrades would ensure deliverability
2) Existing processes are typically not focused on unlocking generation interest by increasing available headroom
3) Developers do not have a great indication of which regions of the State are already oversubscribed and which have available headroom



**Projected 2030 Generation Locations**
(Based on 2019 NYISO CARIS Report)

# Proposed Additions by the Coordinated Grid Planning Processes

- Supplemental Coordination Needed (Reliability / Deliverability)

## NYISO Database Update

- Steady State/Dynamic Base cases
- Steady State/Dynamic Contingency Decks
- Short Circuit Base cases
- Demand and Capacity Forecast
- DER projection
- System configuration

## Inclusion Rules*

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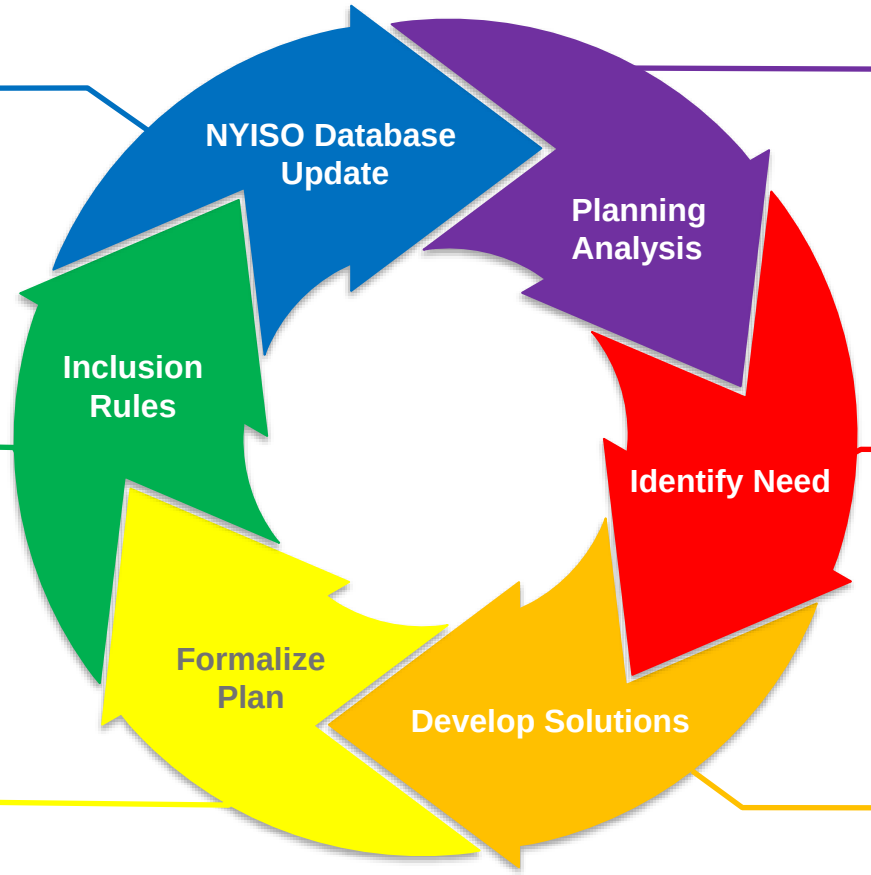


## Planning Analysis

- NYISO Comprehensive System Planning Process
- NYISO Interconnection
- Regulatory Compliance
- Local Transmission Planning
- Operating Study
- CLCPA Build Scenarios
- CLCPA Demand Forecast Sensitivities

## Identify Need

- Reliability
- Economic
- Public Policy
- Interconnection
- Compliance
- Local Criteria
- Local Public Policy

## Develop Solutions

- CRP/RBS (if necessary)
- PPTN Solicitation
- Preliminary CTOAF/SUF/SDU/Optional SUF identified (if applicable)
- Capital project developed
- NWA evaluated
- RFP as needed
- Least Cost CLCPA Project Analysis

# Coordinated Grid Planning Process

## CGPP designed to facilitate the development of Local public policy projects to meet CLCPA Objectives

1) Coordinate existing (reliability) and proposed (deliverability) planning processes

2) Develop consistent assumptions across utilities (for renewable planning)

3) Efficiently and proactively create headroom to accommodate future renewables in areas of high developer interest

4) Ensure DERs are appropriately accounted for (in aggregate and/or discretely as necessary)
   - Consideration of upstream constraints on hosting capacity

5) Communication of available headroom to aid developer decision making prior to entering the interconnection queue

# Incorporation of Advanced Technology Working Group (ATWG) Efforts

## What is ATWG?

1) Joint Utility orking group to share information of advanced technologies
2) Combine research efforts to help integrate renewables onto the grid
3) Work with NYSERDA, NYISO, and EPRI to determine best use cases and best practices with new technologies

## How will this be incorporated?

1) ATWG will communicate with Planners on what technologies are relevant for specific use cases
   - Energy storage;
   - Dynamic line ratings;
   - Power flow control;
   - DERMS;
   - Etc.

# Questions?