

MAINE POWER RELIABILITY PROGRAM

A CENTRAL MAINE POWER COMPANY PROGRAM

Non-Transmission Alternatives (NTA) Study

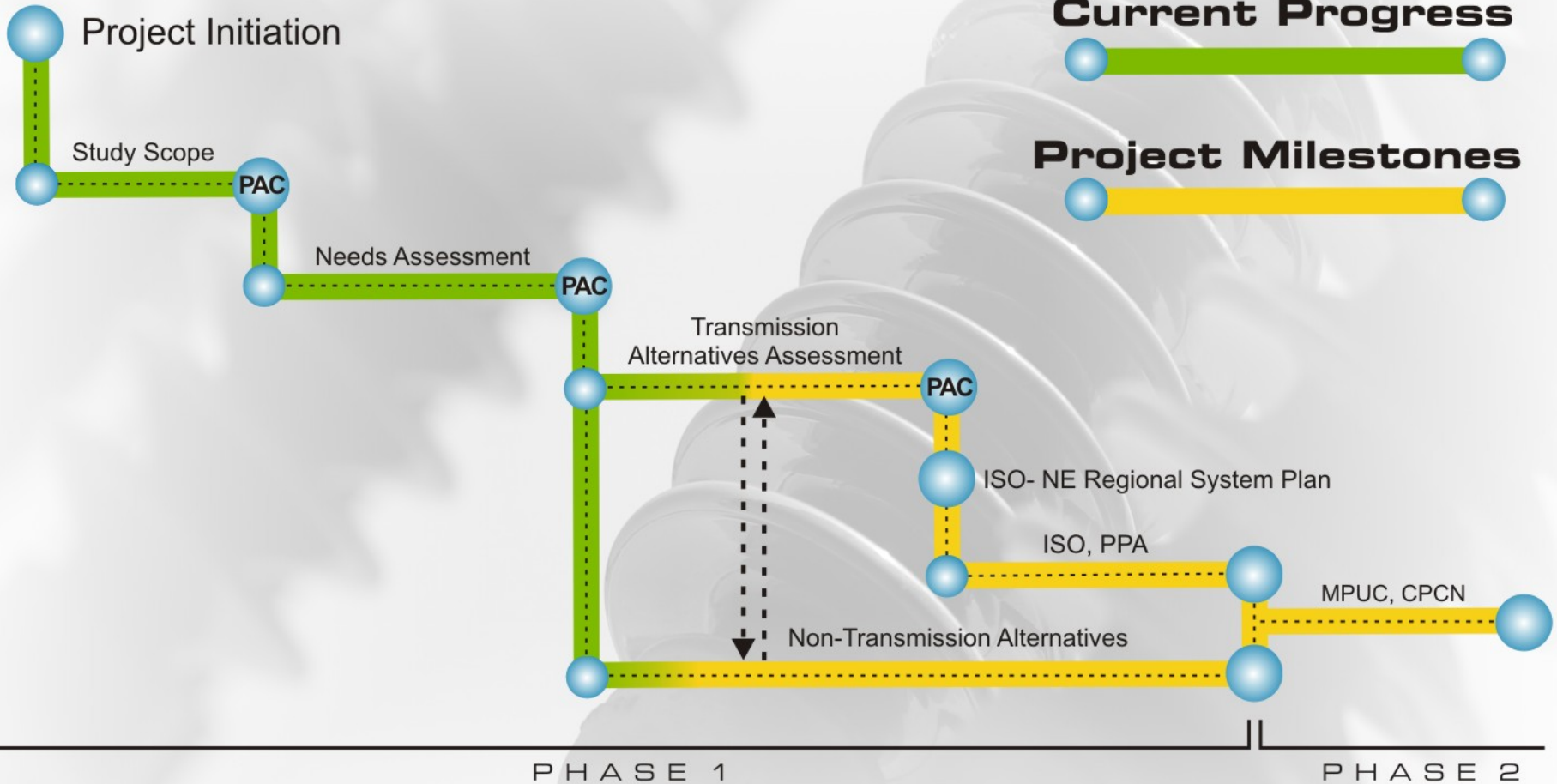


NTA Study Objectives

- **MPRP Objective:**
 - Reliable Electric Service to Maine Consumers
- **NTA Study Objectives:**
 - Identify Viable Alternatives to Transmission
 - Consider CMP and Market Options
 - Long Term Benefits to Maine Consumers
- **MPRP Transmission Proposal(s)**
 - Proposals may depend on NTA development by others



MPRP - System Planning Study



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NTA Study Team

- **La Capra Associates – NTA Study Lead**
 - Supply Options Assessment
 - Economic Benefits Analysis of All Solutions
- **GDS Associates**
 - Demand-Side Alternatives Potential Study
- **RLC Engineering**
 - Reliability Assessments and Transmission Options



What Are NTAs?

- **Alternatives that Mitigate Peak Load Growth**
 - Reduction of Maximum Loads (“90/10” Summer Peak)
 - Reduction of High (near peak) Loads
 - Load Responsiveness at times of Stress
- **“Reliable” Supply Sources**
 - High Availability at time of System Stress
 - Locations that mitigate stress on Transmission
 - Sources that provide voltage/reactive power support



Elements of Our NTA Analysis

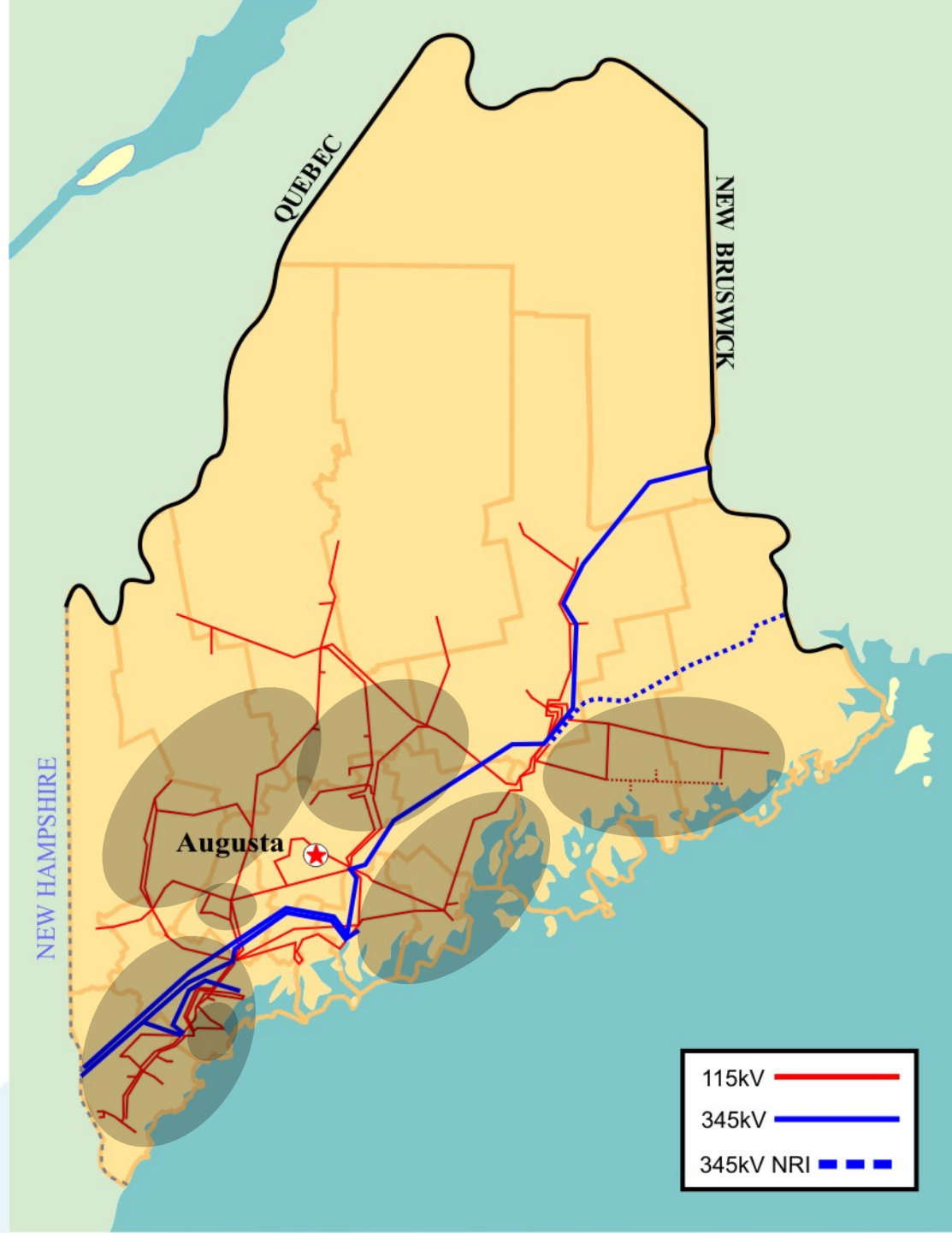
Based on the areas identified and framed by the Needs Assessment (see next slide), the NTA will:

- Identify Options for Alternative Solutions including Demand and Supply
- Consider Combinations of DSM, Generation and Transmission
- Verify Solutions to the Reliability Problem
- Evaluate Cost/Benefit and Overall Economic Benefit to Customers



Needs Assessment Findings

Refer to Executive Summary posted elsewhere on this website; or to the full report, "Needs Assessment of Maine Transmission System," June 19, 2007 on ISO-New England's website.



Identifying Demand Side Management (DSM) Options

- Energy Efficiency (see list of preliminary options)
- Demand Response (see list of preliminary options)
- Price Response



MPRP Technical Potential Study: Preliminary List Energy Efficiency

Commercial Measures

- **Space Heating**
 - High Efficiency Heat Pump
 - Hydronic Heating Pump
 - Ground Source Heat Pump
- **Heating Water Heating End Use**
 - Heat Pump Water Heater
 - Booster Water Heater
 - Point of Use Water Heater
 - Solar Water Heating System
 - Solar Pool Heating
- **Envelope**
 - Integrated Building Design
 - Double Pane Low Emissivity Windows
- **Space Cooling – Chillers**
 - Centrifugal Chiller, 0.51 kW/ton, 300 tons
 - Centrifugal Chiller, 0.51 kW/ton, 500 tons
 - Centrifugal Chiller, Optimal Design, 0.4 kW/ton, 500 tons
- **Space Cooling - Packaged AC**
 - Electric HVAC
 - DX Packaged system EER = 10.9, 10 tons
 - DX Packaged System, CEE Tier 2, <20 Tons
 - DX Packaged System, CEE Tier 2, >20 Tons
 - Packaged AC - 3 tons, Tier 2
 - Packaged AC - 7.5 tons, Tier 2
 - Packaged AC - 3 tons, Tier 2
 - Packaged AC - 7.5 tons, Tier 2
 - Packaged AC - 15 tons, Tier 2
 - Ground Source Heat Pump - Cooling
- **Space Cooling - Maintenance**
 - Chiller Tune Up/Diagnostics - 300 ton
 - Chiller Tune Up/Diagnostics - 500 ton
 - DX Tune Up/ Advanced Diagnostics
- **HVAC Controls**
 - Retrocommissioning
 - Programmable Thermostats
 - EMS install
 - EMS Optimization
- **Ventilation**
 - Dual Enthalpy Economizer - from Fixed Damper
 - Dual Enthalpy Economizer - from Dry Bulb
 - Comprehensive Track Proper HVAC Sizing
 - Demand-Controlled Ventilation
 - Heat Recovery
 - Fan Motor, 40hp, 1800rpm, 94.1%
 - Fan Motor, 15hp, 1800rpm, 92.4%
 - Fan Motor, 5hp, 1800rpm, 89.5%
 - Variable Speed Drive Control, 15 HP
 - Variable Speed Drive Control, 5 HP
 - Variable Speed Drive Control, 40 HP

Commercial Measures (continued)

- **Motors**

- Efficient Motors
- Variable Frequency Drives (VFD)
- Variable Frequency Drives (VFD) for Environmental Remediation Projects
- Efficient Environmental Remediation Motors
- Variable Frequency Drives (VFD) for Dairy Farms

- **Lighting End Use**

- HP T8 Relamp and Reballast (replacing EST12 w/ESM)
- HP T8 Fixture (replacing standard T8)
- T5 Fluorescent High-Bay Fixtures (replacing HID)
- HP T8 Troffer/Wrap (replacing T12)
- T5 or HPT8 Industrial Strip - 8' w/reflectors (replacing T12)
- Low Glare Recessed T5/HP T8 (replacing T12)
- CFL Fixture
- Exterior HID
- LED Exit Sign
- Controls for H.I.F.
- LED Traffic / Pedestrian Signals
- Electronic HID Fixture Upgrade
- Halogen Infra-Red Bulb
- Integrated Ballast MH 25W
- Induction Fluorescent 23W
- CFL Screw-in
- Metal Halide Track

- **Lighting Controls**

- Bi-Level Switching
- Occupancy Sensors
- Daylight Dimming
- Daylight Dimming - New Construction
- 5% More Efficient Design

10% More Efficient Design

15% More Efficient Design - New Construction

30% More Efficient Design - New Construction

- **Refrigeration End Use**

- Vending Miser for Soft Drink Vending Machines
- Refrigerated Case Covers
- Refrigeration Economizer
- Commercial Reach-In Refrigerators
- Commercial Reach-In Freezer
- Commercial Ice-makers
- Evaporator Fan Motor Controls
- Permanent Split Capacitor Motor
- Zero-Energy Doors
- Door Heater Controls
- Discus and Scroll Compressors
- Floating Head Pressure Control
- Anti-sweat (humidistat) controls (refrigerator)
- Anti-sweat (humidistat) controls (freezer)
- High Efficiency Ice Maker

- **Compressed Air End Use**

- Compressed Air - Non-Controls
- Compressed Air - Controls

- **Snow Making End Use**

- Snow Making

- **Monitor Power Management**

- EZ Save Monitor Power Management Software

- **Water/Wastewater Treatment**

- Improved equipment and controls

Industrial Measures

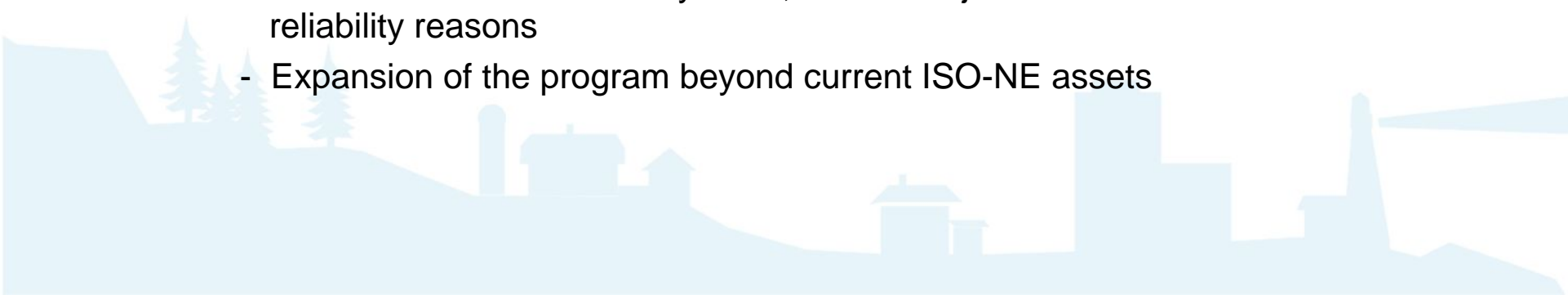
- **Ag/Dairy**
 - Pumps
 - Fans
 - Compressed air/vacuum pumps
 - Refrigeration Lighting
- **General Industry**
 - Sensor and Controls
 - Advanced lubricants
 - Electric supply system improvements
 - Pump system efficiency improvements
 - Advanced Air compressor Controls
 - Industrial motor management
 - Air compressor system management
 - Fan system improvements
 - Advanced motor designs
 - Motor system optimization (including ASD)
 - Transformers (NEMA Tier II)
 - Efficient industrial lamps and fixtures
 - Efficient lighting design
- **Energy Star Clothes Washer (w/ Electric DWH)**
- **Energy Star Clothes Washer (W/ Non-Electric DWH)**
- **Energy Star Dehumidifier**
- **Standby Power**
- **Pool Pump and Motor**
- **CFL Bulbs (Homes w/ partial CFL installation)**
- **CFL Bulbs (Homes w/ no CFL bulbs installed)**
- **Programmable Thermostats**
- **ES Windows**
- **Insulation & Weatherization Package**
- **Energy Star Room A/C**
- **High Efficiency Central AC**
- **Efficient Furnace Fan (Fuel Oil)**
- **Efficient Furnace Fan (Natural Gas)**
- **Efficient Furnace Fan (Propane)**
- **Water Heater Blanket**
- **Pipe Wrap**
- **Low Flow Showerhead/Faucets**
- **Efficient Water Heater**
- **Solar Water Heating**
- **New Construction – Electric**
- **New Construction - Non Electric**
- **Low Income Insulation & Weatherization**
- **Seasonal Homes Package**

Residential Measures

- **Energy Star Compliant Top Freezer Refrigerator**
- **Energy Star Compliant Bottom Freezer Refrigerator**
- **Energy Star Compliant Side by Side Refrigerator**
- **Energy Star Compliant Upright Freezer (Manual Def.)**
- **Energy Star Compliant Chest Freezer**
- **Energy Star Dishwasher (Electric)**

Preliminary List of Demand Response Measures

- **Residential**
 - Central Air Conditioning - Direct Load Control
 - Room Air Conditioning - Direct Load Control
 - Water Heating - Direct Load Control
- **Commercial**
 - HVAC Control
 - Energy Management System with Direct Load Control Capabilities
- **Industrial**
 - Allow existing ISO-NE Demand Response customers in Maine to offer their load reductions when needed by CMP, instead of just when ISO-NE needs them for reliability reasons
 - Expansion of the program beyond current ISO-NE assets



DSM Technical Potential Study Methodology Overview

- **Identify DSM measures to be included**
- **Determine characteristics of each measure**
- **Cost-effectiveness screening & sorting**
- **Determine baseline & forecasted electric end use characteristics**
- **Determine technical & achievable potential**
 - Annually through 2017



DSM Technical Potential Study

Defining “Potential”

- **Technical Potential**
 - Immediate penetration of all technically feasible measures
- **Achievable Potential**
 - Penetration of measures that would be adopted given aggressive funding, programs and market interventions
- **Achievable Cost-Effective Potential**
 - Potential for cost-effective measures if given aggressive funding, programs and market interventions



Overview of DSM Benefit-Cost Test MPUC's Modified Societal Test

Benefits	Costs
Avoided generation, transmission, distribution costs	Direct program costs
Avoided fossil fuel costs	Measure costs
Other resource benefits – reduced water & sewer costs	Ongoing customer costs
Non resource benefits including customer & environmental benefits	



Identifying Supply Options

- Solar PV
- Wind
- Combined Heat & Power
- Micro-turbines
- Fuel Cells
- Internal Combustion Engines
- Combustion turbines
- Combined Cycle Units
- Biomass (wood-fired) Plants
- Fuel Cells



Cost/Benefit Analysis Market Model

- **Market Model being developed to measure electric market effects**
 - All alternatives will be selected to address the reliability needs
 - Each may have some impact on energy pricing, as well
- **Key Attributes of the Market Model**
 - Representing the regional market
 - Representing key zones within the Maine system
 - Examining impacts on locational prices



Stakeholder Input

- **Written Comments Are Welcome**
- **Comments By July 20, 2007 will be most helpful**
 - DSM Options Suggestions
 - Supply Options Suggestions
 - Issues or Concerns that the NTA Study might address
- **Also Collecting Input Through MPRP Stakeholder Outreach**



Ways to Provide Comments

General Information and FAQ

www.maine-power.com

For Questions, Comments and Suggestions

info@maine-power.com

