



# **Using Transmission to Effect a Green Power Paradigm Change**

**How We Can Get 2,500MW of Green Power into  
Massachusetts and Southern New England by 2013**

*New England Independent Transmission Company*

*June 2007*



# The Problem

**If the need and desire for much more renewable and low/zero carbon electricity in New England is to be realized... transmission needs to play a very big part.**

**But there is a complex array of overlapping and sometimes contradictory objectives, constraints, incentives and regulatory procedures that need to be managed if transmission is to help resolve the problem.**

# Environmental/Electric Policies Affecting Transmission

- **Regional System Plan of ISO-NE**
  - Transmission construction program of ISO-NE using ratepayer funds
- **Forward Capacity Market of ISO-NE**
  - Payment scheme to finance construction of power plants using ratepayer funds
- **Renewable Portfolio Standards**
  - Purchase a minimum amount of energy from renewable sources
- **Regional Greenhouse Gas Initiative (RGGI)**
  - Reduce carbon emissions of power plants by state to levels 10% less than the [2000] baseline
- **Others**
  - Hundreds of federal, state and local regulations and permits

# Environmental Constraints

- **We assume:**

- No nuclear, no new baseload coal in New England
- Extreme difficulty siting large-scale wind farms in scenic areas anywhere in New England
- No major new hydro potential within New England

- **Therefore...**

- Demand management/reduction and Smart Grid programs will have to work...
- It will help if energy remains relatively expensive!
- We will have to import lots of low carbon resources from Canada and
- We will have to build wind where we can within New England.

# Regional Greenhouse Gas Initiative

- Will require power plants to reduce carbon emissions to 10% less than the 1990 baseline by 2018
  - Mass has 26.7 million ton/year allowance starting in 2009 ... Remains constant until 2014...
  - 2018 target is reached in 4 annual increments starting in 2015
  - Obligation to buy allowances is on power plants > 25MW
  - Other members: all NE states, NY (by far the largest emitter), and selected PJM states (MD, NJ, DE,DC)

# Renewable Portfolio Standards

- State requirements on load to purchase a minimum amount of energy from renewable sources is increasing in New England
  - Load serving entities must buy “Renewable Energy Credits” (RECs) up to target level
  - MA target level in 2006 is 2.5%; rising to 5% in 2010
  - CT Class I target in 2006 in 2%; rising to 7% in 2010
  - ME is expanding its program; RI started program in 2007
  - VT: utilities must meet all net demand growth with renewables
  - NH: by 2025, 25% of electricity must come from renewables
  - In MA to the extent the target level is not achieved, LSE must pay “Alternative Compliance Payment” of ~\$56/MWh
    - LSEs can pass this on to ratepayers
    - Large scale hydro does not qualify

# Forward Capacity Market of ISO-NE

- Payment scheme to finance construction of power plants
  - The FCM is an auction for the purchase of new capacity. First auction is Feb 08 for the period June 1, 2010 to May 31, 2011.
  - Results of auction set poolwide capacity price
    - Auction dollar values will not be sufficient to finance renewables

# Regional System Plan of ISO-NE

- Transmission construction program of ISO-NE
  - Current cost allocation system is not acceptable to Maine.
  - Past projects have been selected on the basis of “reliability” though that term can cover a multitude of sins.
  - In principle, ISO-NE tariff allows transmission projects to be selected for RSP as “economic” or “market efficiency transmission upgrades.”
    - In practice, no such project has ever been approved.
  - In 2007, ISO-NE completed a “Scenario Analysis:”
    - “exploring the economic, reliability and environmental impacts of various resource options.”
  - This may ultimately broaden the basis for ratebasing transmission projects to include “environmental benefit upgrades.”
  - Meanwhile....



# Maine Transmission Development and The Green Line

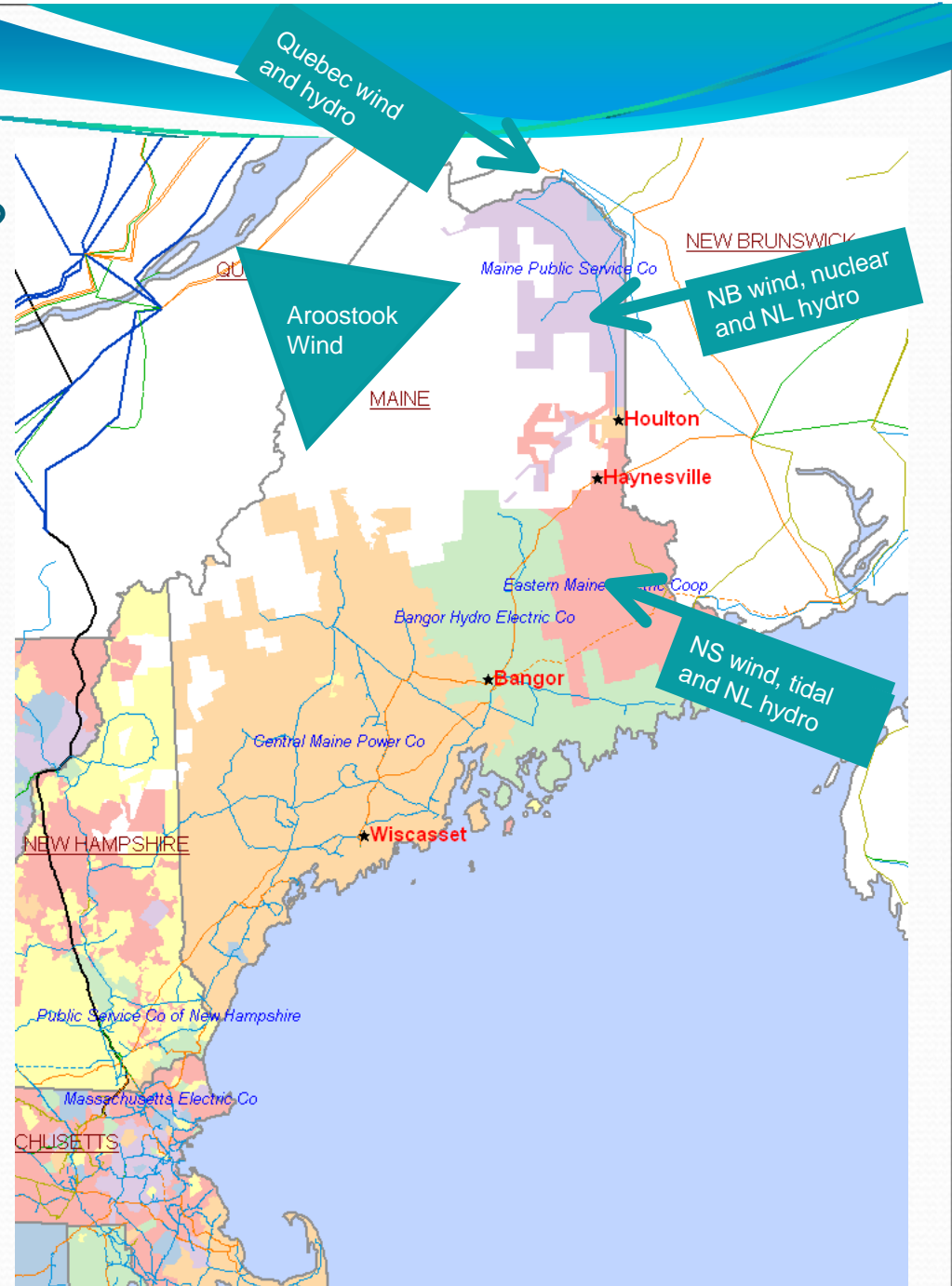
A Specific Program for Developing Transmission for  
2500MW of Renewable and Low-Carbon Electricity  
for New England

## Where are the Renewables?

- Maine and the neighboring Canadian provinces could provide 2000MW and more of renewables to Southern New England

- ✓ Maine – more than 1000MW of wind and other renewables can be developed...
- ✓ Quebec – thousands of MWs of hydro and wind available for export to New England ...
- ✓ New Brunswick – wind and nuclear, as well as the potential to be the transit province for up to 2000MW of Lower Churchill hydro power...
- ✓ Nova Scotia – world's best tidal and wind, as well as the potential to be the transit province for up to 2000MW of Lower Churchill hydro power...

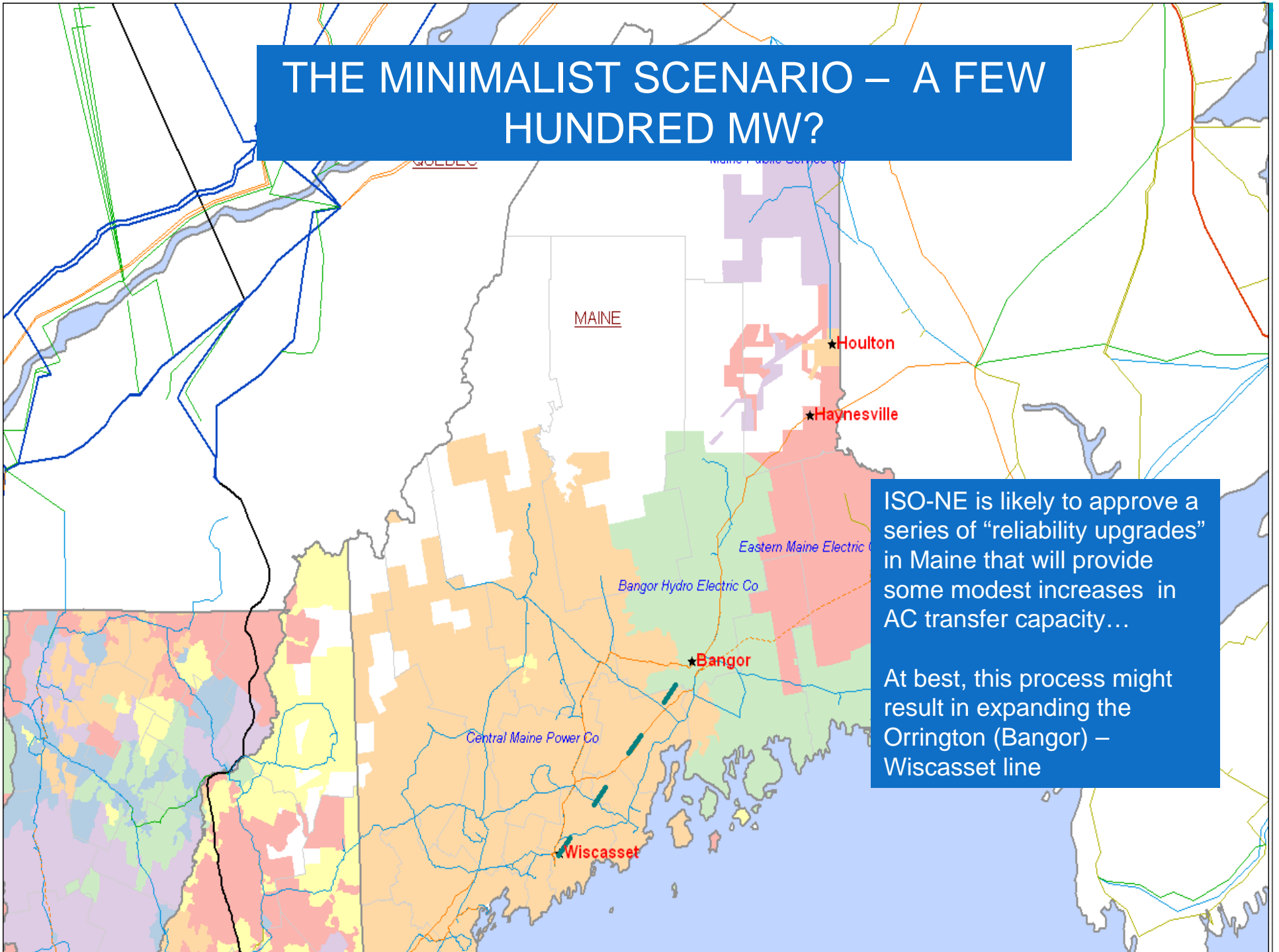
**All this could be available ... if there were enough transmission capacity**



# Where are the Renewables?

- Maine holds the key for the deployment of large amounts of renewables in the rest of New England.
- To achieve New England's Renewable Portfolio Standards and RGGI Objectives, we have to take action.
- Green Line – an environmentally do-able transmission project – is the lynchpin.
  - With Green Line (or two), we can achieve our environmental targets – RPS and RGGI – by 2012.
- Requires going beyond the traditional incremental transmission approach.

# THE MINIMALIST SCENARIO – A FEW HUNDRED MW?



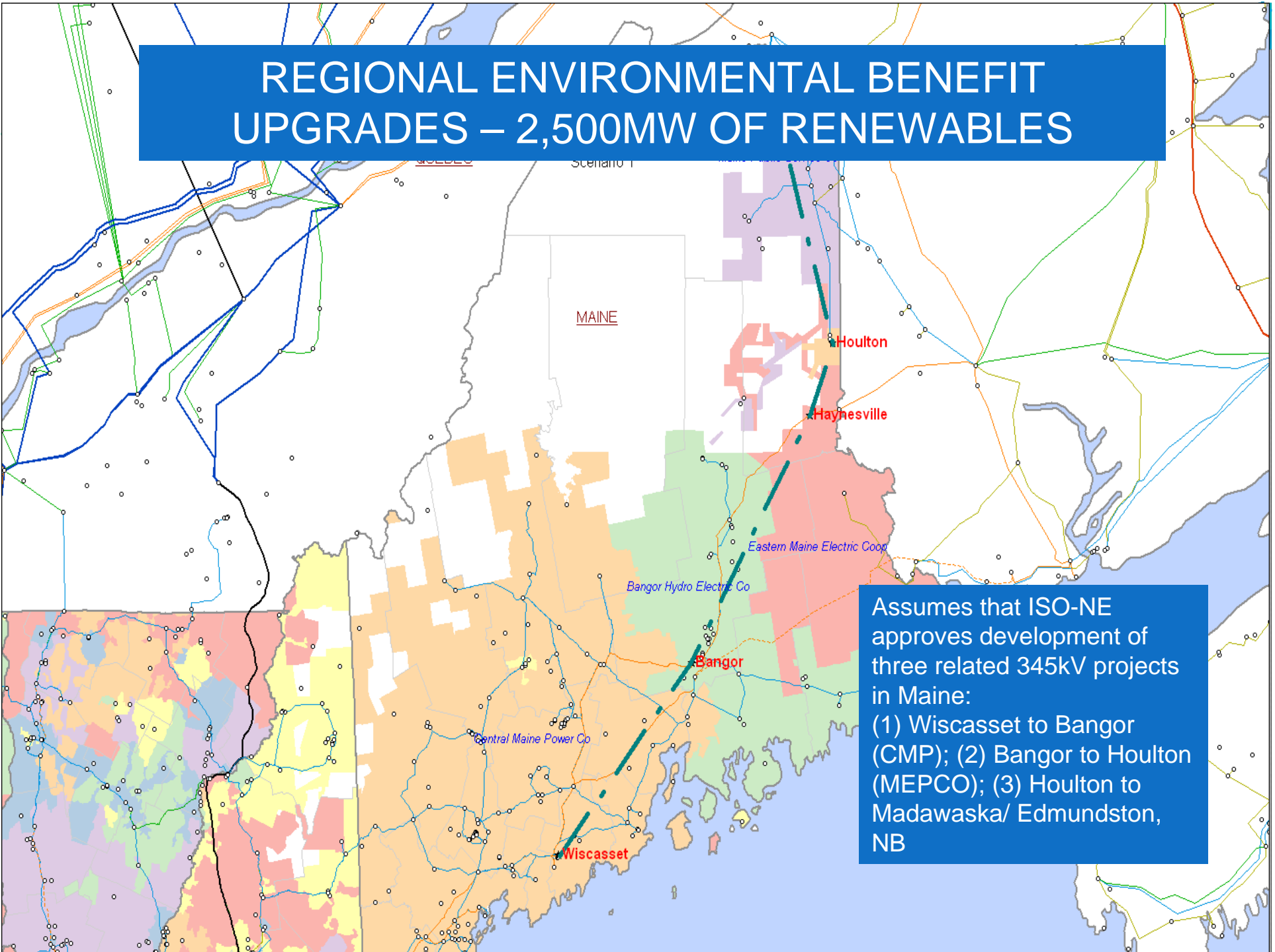
ISO-NE is likely to approve a series of “reliability upgrades” in Maine that will provide some modest increases in AC transfer capacity...

At best, this process might result in expanding the Orrington (Bangor) – Wiscasset line

# Incremental Development

- Typical transmission development is incremental – study reliability needs and propose a “reliability solution.”
- “Reliability upgrades” to Maine, New Hampshire, and Massachusetts transmission systems may squeeze some hundreds of incremental renewables into southern New England.
- Without Green Line, that is all that can be expected.

# REGIONAL ENVIRONMENTAL BENEFIT UPGRADES – 2,500MW OF RENEWABLES



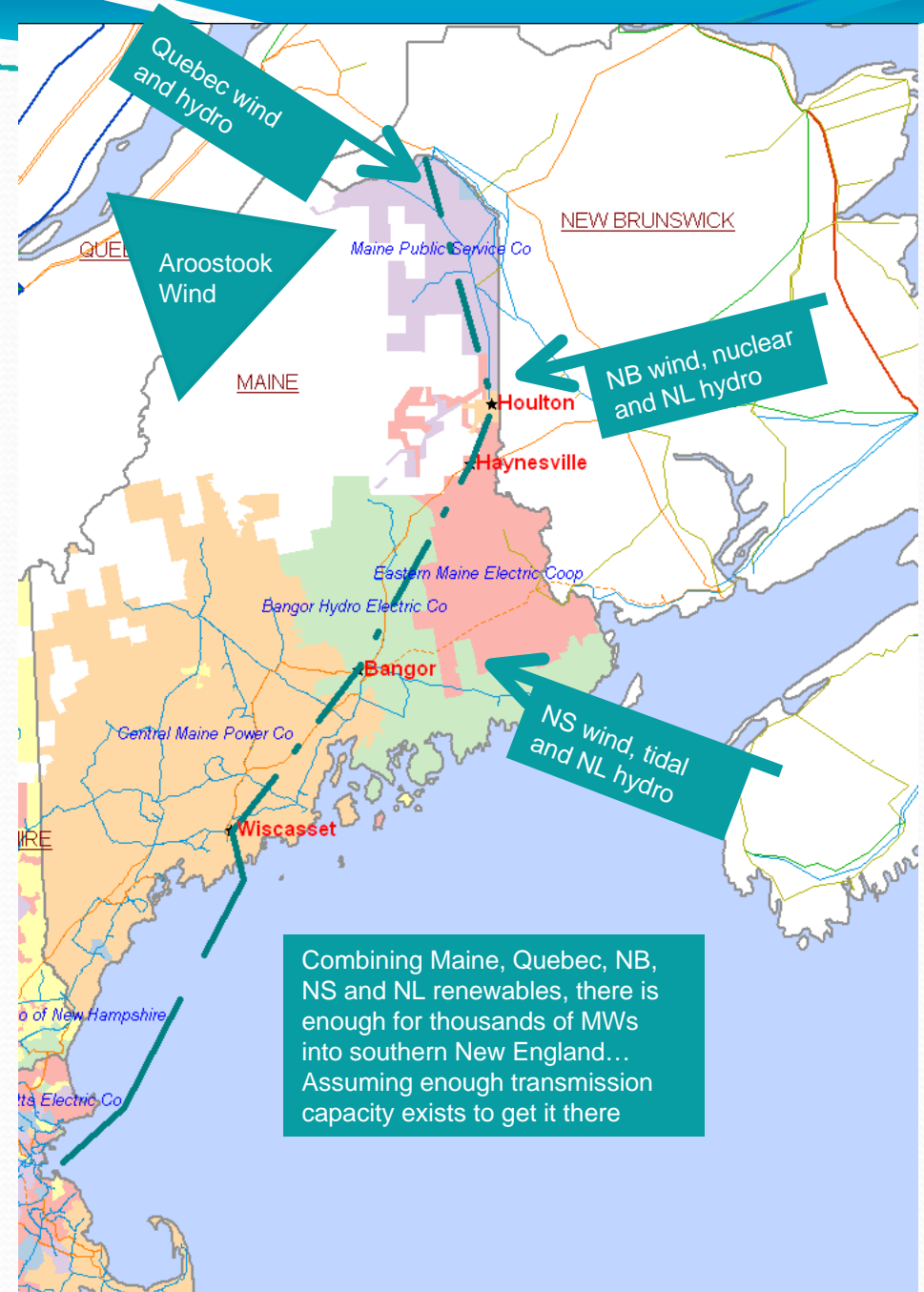
Assumes that ISO-NE approves development of three related 345kV projects in Maine:  
(1) Wiscasset to Bangor (CMP); (2) Bangor to Houlton (MEPCO); (3) Houlton to Madawaska/ Edmundston, NB

## REGIONAL ENVIRONMENTAL BENEFIT UPGRADES

- New Maine Terrestrial Transmission Projects that provide a path for renewables from all of Maine (including Aroostook County), Quebec, and the Maritimes.
  1. Build a new 345kV line through Aroostook Country from the Maine/NB border to Orrington (Bangor): ~\$250 million
  2. Build a new 345kV from Orrington(Bangor) to Maine Yankee: ~\$150 million
- These projects would provide capacity for incremental 2500MW renewables down to Maine Yankee...
- Now, how does that renewable energy get to the markets of Southern New England?

# Regional Environmental Benefit Upgrades: Southern New England

- New terrestrial high-voltage transmission corridors through coastal Maine, NH, and Massachusetts are impossible.
  - ✓ Although upgrades to existing AC system may increase transfer capacity by a few hundred MW
- One or more DC, subsea Green Lines are possible
  - ✓ Connecting Maine Yankee (Wiscasset) and key coastal locations in Massachusetts (e.g., Boston Harbor, Salem, Lynn)
- With Green Lines, the amount of renewable energy from Canada and Maine to Southern New England Increases to 2500MW



# How We Get There – The ISO Route

- ISO-NE is constrained in how it could include the Maine projects + Green Line in its “Regional Plan:”
  - ✓ They should be deemed “Regional Environmental Benefit Upgrades” but no such classification exists
  - ✓ They could be deemed necessary for “reliability”
    - With rare exceptions, this process favors smaller, incremental projects (like upgrades to Maine’s existing grid)
  - ✓ They could be deemed “economic benefit upgrades”
    - NE ITC will hire a consultant to conduct such a study, but we are breaking new ground here – what is the economic benefit of portfolio diversity, of renewables, of carbon-free energy?
    - Regulatory and case law is just beginning to be developed

# How We Get There – Independent Project

- Green Line’s “Sister Projects,” – Neptune and Hudson – are being built for New York’s Public Authorities
  - ✓ Authorities launched RFPs, selected Neptune and Hudson
    - In New England, there are no such Authorities.
  - ✓ Alternative 1-- A Consumer Coalition: The State could be the anchor tenant (with other prominent consumers) in an association that would own the Green Line transmission rights.
    - Conduct an RFP for renewables/low-carbon at Wiscasset?
  - ✓ Alternative 2 -- Suppliers (Canadian provincial energy companies, Maine wind developers) could buy the Green Line transmission rights.
    - Would the owners’ resources fit the desired environmental profile of the buyers (e.g., is large scale hydro or nuclear acceptable for firming up wind?)

# When You Have Lemons, Make Lemonade

- Until 2007, the current ISO-NE tariff would not allow anyone other than an incumbent transmission owner to propose a transmission line that would be part of the “pool transmission facility”
  - NE ITC applied for and got FERC approval as “capable” and “independent” ITC under the ISO-NE tariff’s “attachment M” language
- Now, NE ITC must convince ISO-NE and the NEPOOL stakeholders that the Green Line(s) are needed... even though the Tariff does not allow anyone to develop a transmission line as an “environmental benefit upgrade.” Therefore, NE ITC has to:
  - propose Green Line(s) as “Reliability” and “Market Efficiency Transmission” upgrades and/or
  - Explore ways to develop Green Line(s) as an independent project (organize a coalition of buyers of sellers to contract for the line).



# Green Line(s)

Either way, if it's Time to Change the Paradigm,

It's Time to Build Green Line.

*Using Transmission to Promote a Greener and More Sustainable Electric System*