



# 2010 Connecticut Integrated Resource Plan: Policy and Technology Options for Repowering Connecticut's Generation Fleet

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# Integrated Resource Planning ...

- IRP Should establish a vision for Connecticut's energy future
  - Maximize efficiency of energy usage *and* of energy production
  - Minimize environmental impacts of power generation
  - Maximize reliability
  - All consistent with reasonable cost
  - Use competitive mechanisms to ensure greatest efficiency and lowest possible cost

# The Repowering Opportunity

- “Repowering” RFP
  - Seek proposals for new, efficient and low-emission energy sources linked to the retirement of existing fossil steam capacity
  - Could be open to any type of new resource, but each proposal must include retirement of existing capacity
  - Contracts would be executed for new capacity that demonstrates net ratepayer economic and environmental benefits
  - Long-term, cost-based contracts stabilize consumer costs

# RFP Details

- Open to in-state generation and demand resources
- Verifiable plan to retire capacity at existing fossil stations of at least 75% of proposed new MW
- Proposals must demonstrate lower air emission rates than capacity to be retired
- Proposals must demonstrate lower water usage and impacts – thermal discharge and fish impacts
- Production cost modeling to evaluate economic and emission impacts over contract life
- Decision based on net cost savings and net environmental impact reductions

# Basis for Repowering RFP Proposal

- Statute requires 'optimization' of existing sites
- Statute provides DPUC with authority to seek new capacity that will produce net ratepayer benefits
- ISO-NE studies for NE Governors show benefits of replacing older fossil capacity with new gas combined cycle
- Current capacity surplus provides opportunity to transition with low reliability risk
- Begin an orderly transition from the existing fleet to a more efficient, lower-emission fleet, with stable contracted prices
- Pro-active compliance with environmental objectives
- Reusing existing sites and infrastructure is economically and environmentally efficient
- Failing to plan for the fleet transition risks reliability problems and uneconomic choices forced by the sudden loss of 30% of the state's fleet

# IRP and 'Need'

- To date, the IRP has considered 'need' only in the context of a shortage of MW to meet demand
- To fulfill its purpose, IRP must consider 'need' to include the statute's directive to update and optimize existing sites and deliver net ratepayer benefits
- PA 27-242 does not require a resource need or resource 'gap' in order to trigger a DPUC procurement – the statute only requires a demonstration that an alternative provides 'benefit' (cost, environmental, reliability, security)
- The general case for the benefits of repowering has been made many times; an RFP will enable the DPUC to evaluate specific opportunities, costs and benefits

# The IRP Statute...

Conn. Gen. Stat. § 16a-3a(d)(3) requires energy resource procurement plans to:

- *"...develop a comprehensive plan for the procurement of energy resources... in a manner that minimizes the cost of such resources to customers over time and maximizes consumer benefits consistent with the state's environmental goals and standards."*
- *"consider . . . the optimization of the use of generation sites and generation portfolio existing within the state . . ."*
- *"assess... the impact of current and projected environmental standards, including, but not limited to, those related to greenhouse gas emissions and the federal Clean Air Act goals... energy security and economic risks associated with potential energy resources, and the estimated lifetime cost and availability of potential energy resources."*

# Repowering in Regional Policy

- New England Governors' Energy Blueprint
  - ISO's study in support of the Blueprint included consideration of replacement and repowering of older fossil steam generation
  - In addition to findings with regard to renewables, the study found that repowering or replacing older units with new, efficient, local generation is the most effective strategy for reducing air emissions and among the most effective for reducing costs
- 2009 Regional System Plan also shows that gas combined cycles in southern New England will lower energy costs and produce air emissions benefits

Sources: New England Governors' Energy Blueprint, September 15, 2009.

[http://www.nescoe.com/uploads/September\\_Blueprint\\_9.14.09\\_for\\_release.pdf](http://www.nescoe.com/uploads/September_Blueprint_9.14.09_for_release.pdf)

ISO New England Draft New England 2030 Power System Study, September 8, 2009 ("ISO")

[http://www.iso-ne.com/committees/comm\\_wkgrps/prtcpnts\\_comm/pac/reports/2009/eco\\_study\\_report\\_draft.pdf](http://www.iso-ne.com/committees/comm_wkgrps/prtcpnts_comm/pac/reports/2009/eco_study_report_draft.pdf)

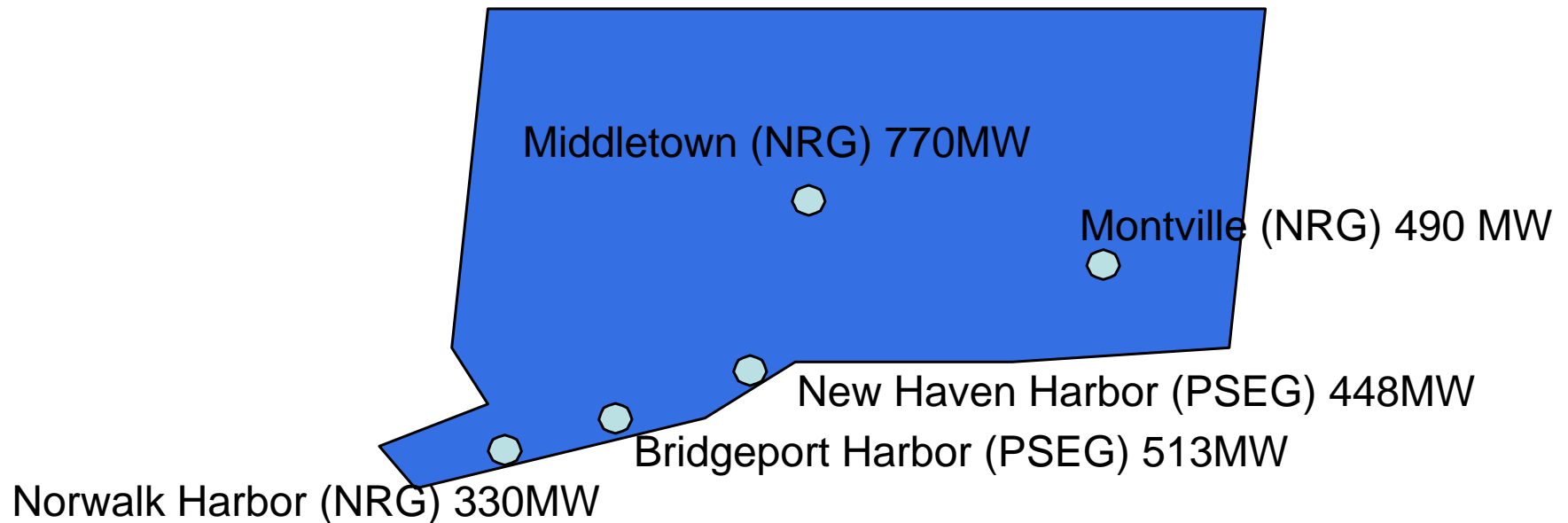
ISO New England, Inc., 2009 Regional System Plan, October 15, 2009, [http://www.iso-ne.com/trans/rsp/2009/rsp09\\_final.pdf](http://www.iso-ne.com/trans/rsp/2009/rsp09_final.pdf), Section 9

# Adopting a Repowering Strategy

- Provide smooth capacity resource transition
- Moderate market clearing prices for energy and reserves, reducing overall consumer costs
- Maintain jobs and renew local tax base
- Maximize use of existing generation sites and transmission infrastructure
- Minimize need for new greenfield generation sites and transmission rights-of-way
- Improve generation efficiency (heat rate) at these stations by 30-40%
- Minimize congestion and transmission losses by siting efficient and economical base-load generation in close proximity to load pockets
- Reduce emission rates relative to the existing plants
- Retain the use of highly-assimilated generation sites
- Increase the operational flexibility of the plants and the system overall, resulting in lower costs and a greater ability to integrate intermittent and other renewable resources

# Repowering Potential

Connecticut's fossil steam units more than 30 years old



## NRG's Candidate Sites for Repowering

# Montville Station

- Montville 5 – Repower existing boiler and turbine/generator with greenwood biomass
  - All permits received or in process
  - Certified for Class 1 RECs
  - Repowering creates substantial cost savings
  - Significant cost advantage vs. greenfield sites
  - Repowering substantially reduces emission rates
  - Long-term contract will enable financing and construction
- Montville 6 – Potential to repower existing turbine/generation in dual-fueled combined cycle



- Active rail and deep water access.
- 46 Acres on the Thames River
- 345kV and 115kV interconnections
- Natural gas on-site

# Norwalk Harbor Station

- Units 1 and 2 steam turbines are candidates for gas combined cycle repowering
- Oil storage for dual-fuel operation
- Expand gas and transmission infrastructure to the site. Opportunity for joint generation/gas transmission plan.
- Located in southwest Connecticut load pocket



- Former coal ash fill area is a renewable energy opportunity
  - 40-60 acres for PV - 10-12 MW of solar
  - Demonstration or educational resource: PV, wind, fuel cell, etc, with supporting test and educational facility
- Combined cycle 'anchors' the site for renewables

# Middletown Station

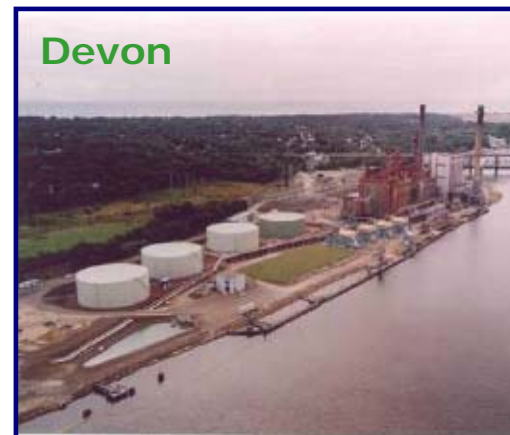
- Site of new GenConn Energy peaking units (anticipated in-service date 2011)
- Repower/replace steam units with dual-fueled combined cycle
- 345kV and 115kV interconnections
- Natural gas on-site
- Oil storage on-site
- Central location in Connecticut



- 67 Acres
- Connecticut River access
- Potential clean energy
  - Biomass
  - Biofuels
  - Fuel cell
  - PV
  - Hydrokinetic

# Devon Station

- Site of new GenConn Energy peaking units (anticipated in-service date 2010)
- 220MW existing peaking units plus two retired steam units
- Housatonic River access
- Potential clean energy
  - Biomass
  - Biofuels
  - Fuel cells
  - PV
  - Hydrokinetic



- River access
- On-site gas
- On-site oil storage
- 62 acres