

Working Together Toward a Sound Energy Future: Long Term Energy & Sustainability Planning on Nantucket

September 22, 2014

Presented By:

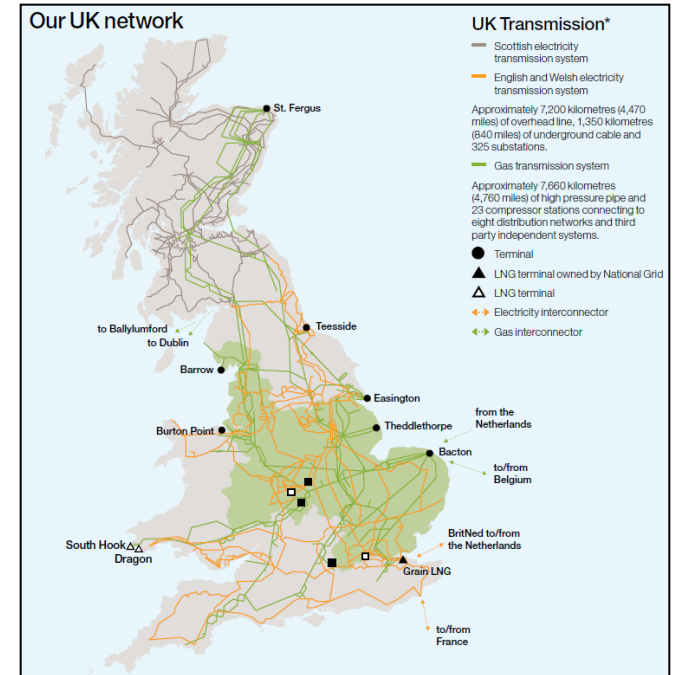
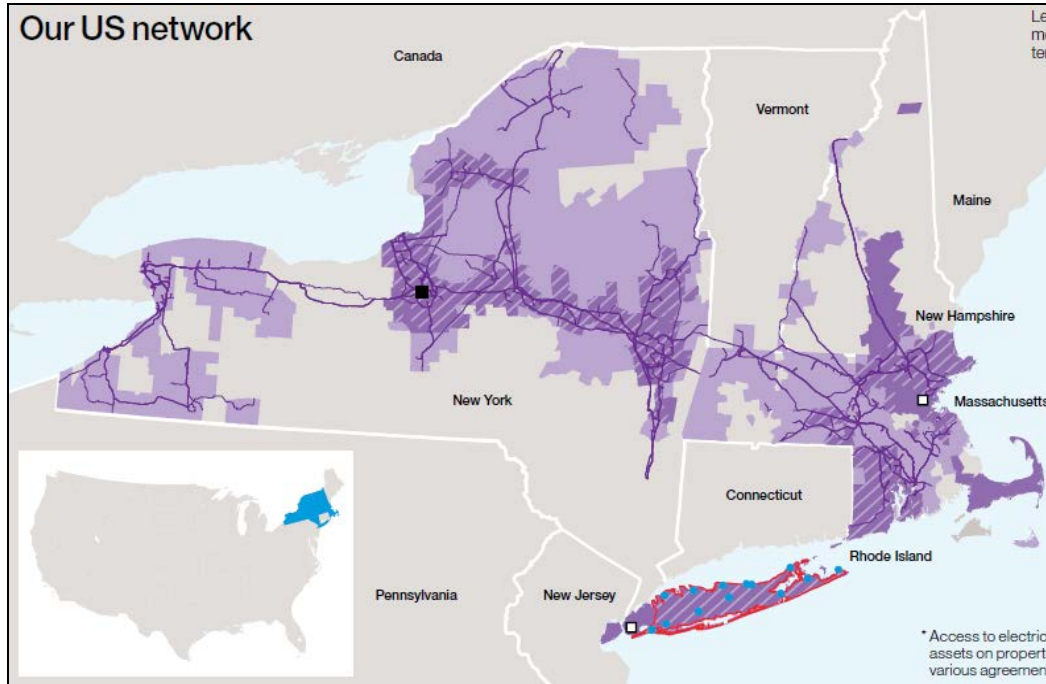
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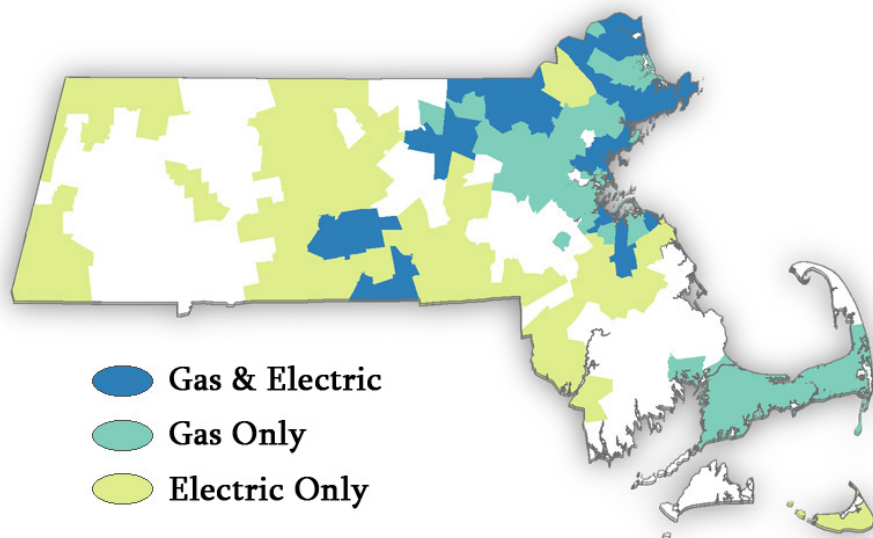
Promoting a sound energy future on Nantucket

National Grid Owns and Operates Large-scale International Energy Transport Networks



- We aim to build on core US and UK electricity and gas regulated businesses to deliver superior customer services.

National Grid in Massachusetts



- 4,700 employees
- 231 cities & towns served
- ≈\$4.0 billion net plant
- ≈\$3.5 billion operating revenues

Electric Distribution – Mass Electric & Nantucket Electric

13,200 miles of electric distribution network
4,600 sq. mile service territory
1.2 million customers
172 cities & towns served

Gas Distribution – Boston Gas & Colonial Gas

11,000 miles of gas distribution pipeline
2,000 sq. mile service area
850,000 customers
118 cities & towns served

The Fundamentals of National Grid's Business

- Provide safe, reliable service for customers 24 hours a day for 365 days per year
- To do so, National Grid invests in equipment and operational procedures to minimize the impact of outages
- These actions and investments are forms of insurance to assure recovery in the event of an outage
- National Grid is regulated by the Department of Public Utilities
 - ◆ Regulation approves pricing for services, levels of service quality for reliability and customer service

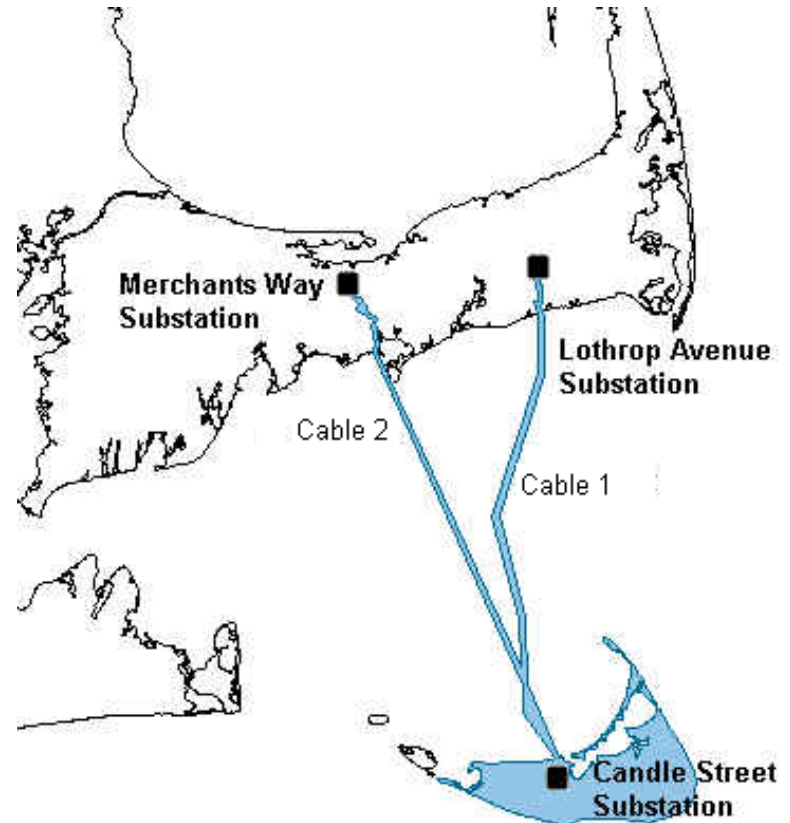


Our Presentation Tonight Aims To

- Describe how the island is served electrically
 - ◆ Under normal conditions
 - ◆ During a contingency situation
- Discuss Nantucket's peak load characteristics and projected growth
- Present and discuss National Grid's proposal for an alternative approach to meeting Nantucket's energy needs

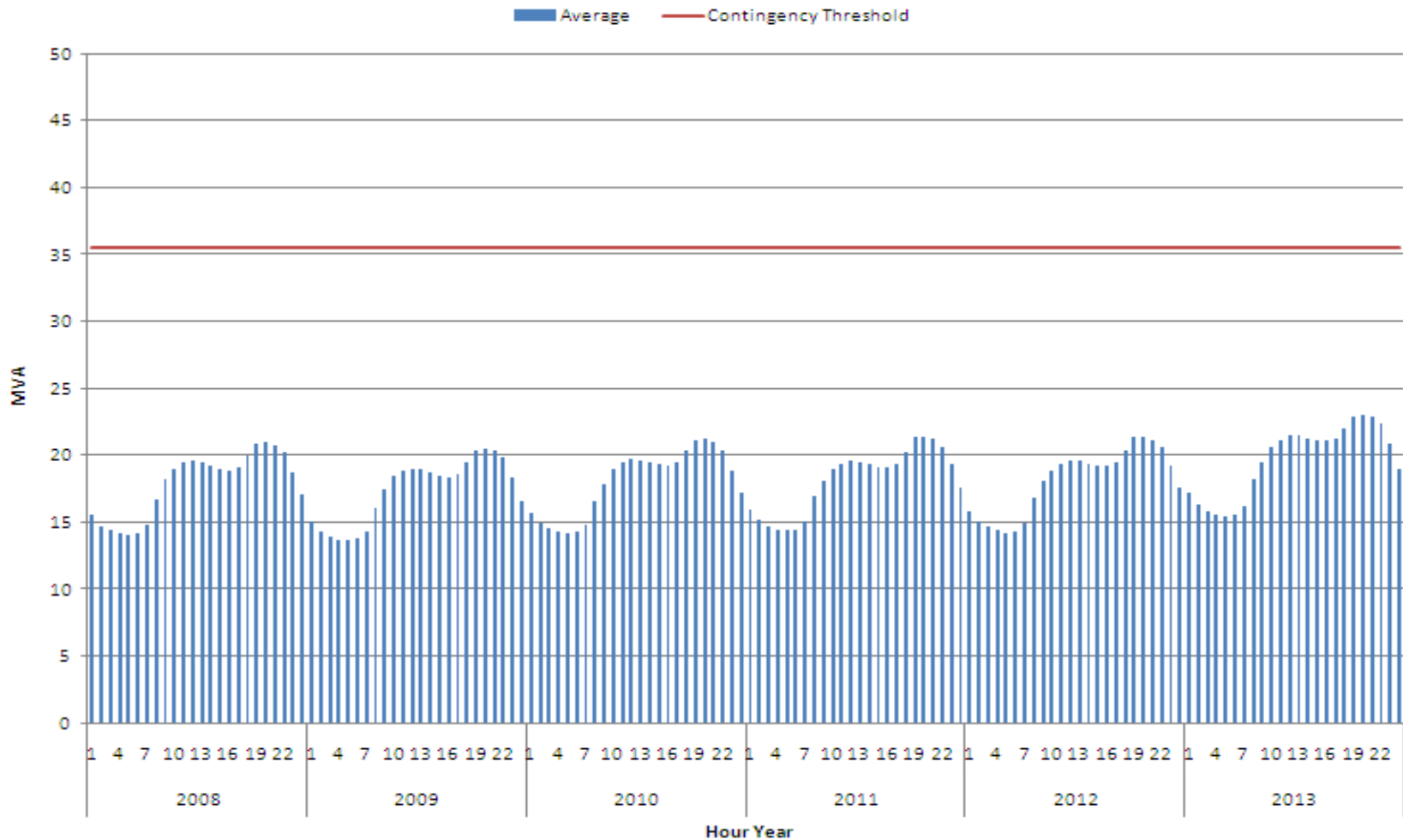
How Electricity is Delivered to Nantucket

- Cable #1
 - ◆ Harwich to Candle Street
 - ◆ 38 MW capacity
- Cable #2
 - ◆ Hyannis to Candle Street
 - ◆ 36 MW capacity
- Each cable serves ~half of the electric demand under normal conditions
- If one cable goes down, all electric demand is served by the other cable, and, if needed, diesel generators are used to supply some of the load
- Peak electric demand in 2013 was 45MW



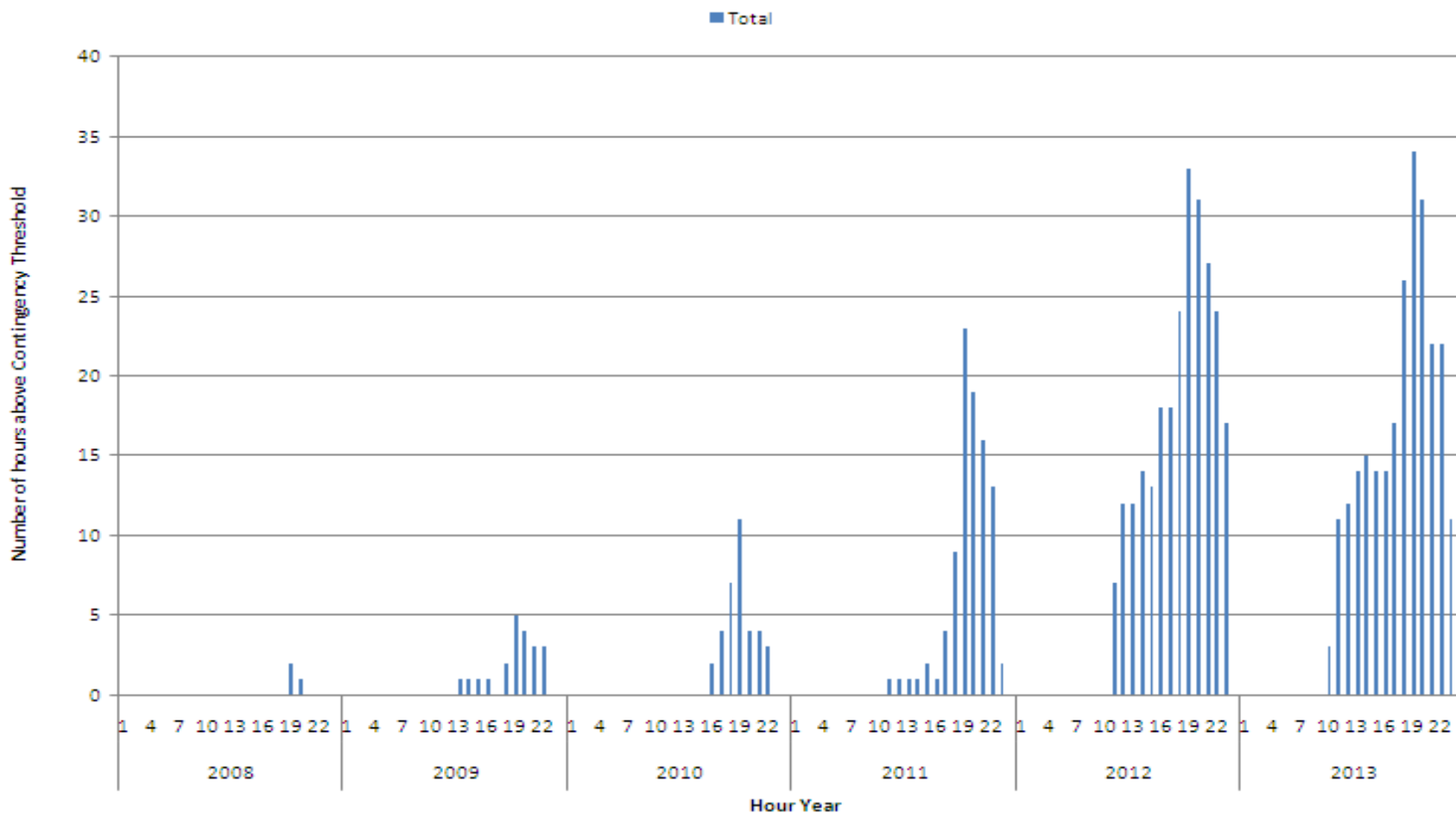
Most of the Time, the Nantucket Electric Demand is Less Than the Capacity of a Single Cable

Average Hourly Demand versus Contingency Threshold

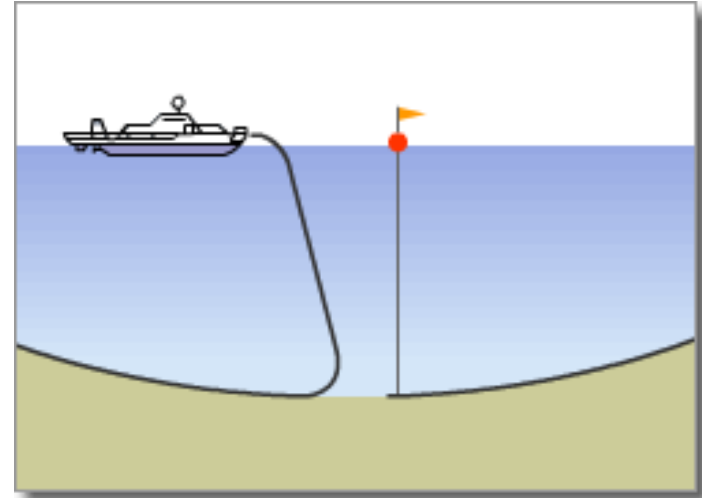


Peak Electric Demand is Greater Than the Capacity of a Single Cable For Some Hours in July and August

Number of Hours above Contingency Threshold
by hour by year



National Grid's "Insurance" for Reliable Service



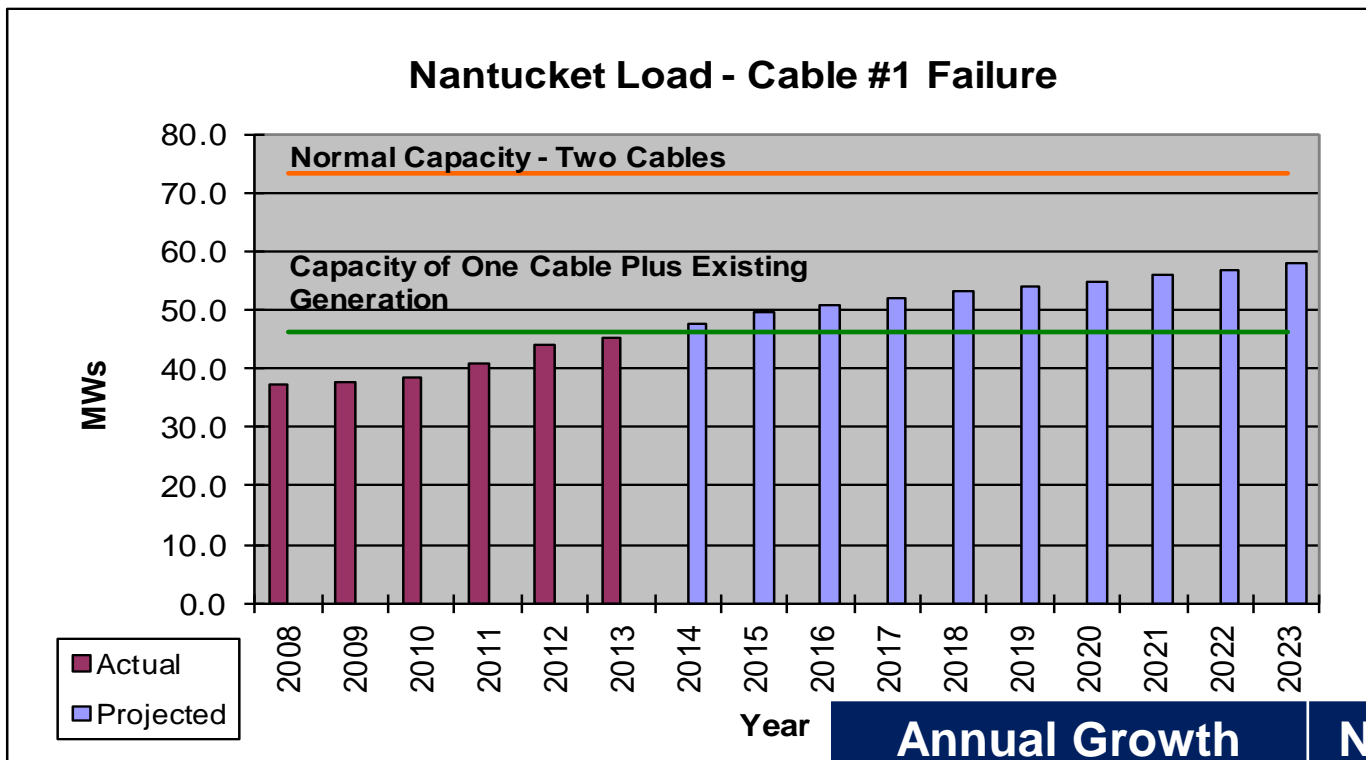
- National Grid has a plan to serve customers in the event of a loss of one cable (very low probability)
- At most times, all electric demand could be supplied by remaining cable
- If demand is greater than the capacity of one cable, on-island and roll-on diesel generation will be utilized



Available Back Up Generation

- Bunker Rd: 6MW of on-site generation
- Additional roll-on generators: ~1.7MW apiece up to 12
 - ◆ 6 generators at Bunker Rd
 - ◆ 6 generators at Candle St
- 3 of the 12 roll-on generators in addition to the Bunker Rd generation would have been needed for a 2014 projected contingency situation.
 - ◆ Actual peak demand in 2014 was only 39MW and would have required less back-up generation.

Future Projections of Peak Demand Indicate More Insurance Will Be Necessary



Annual Growth	Nantucket	State
Historical 5 Year Avg	3.6%	0.6%
5 Year Forecast	3.2%	1.1%
15 Year Forecast	2.2%	0.8%

Estimates of Long Term Peak Load Forecast

- To maintain load levels forecasted for 2014:
 - ◆ 2016 – 2032: Target ~18MW of load relief
 - ◆ ~ 3MW by 2016, increments of ± 1 MW per year after that

- Costs avoided by achieving load reductions include:
 - ◆ 2016 – 2027: minimizing back-up diesel generation
 - ◆ 2028 – 2032: deferring 3rd cable construction

Ongoing Research

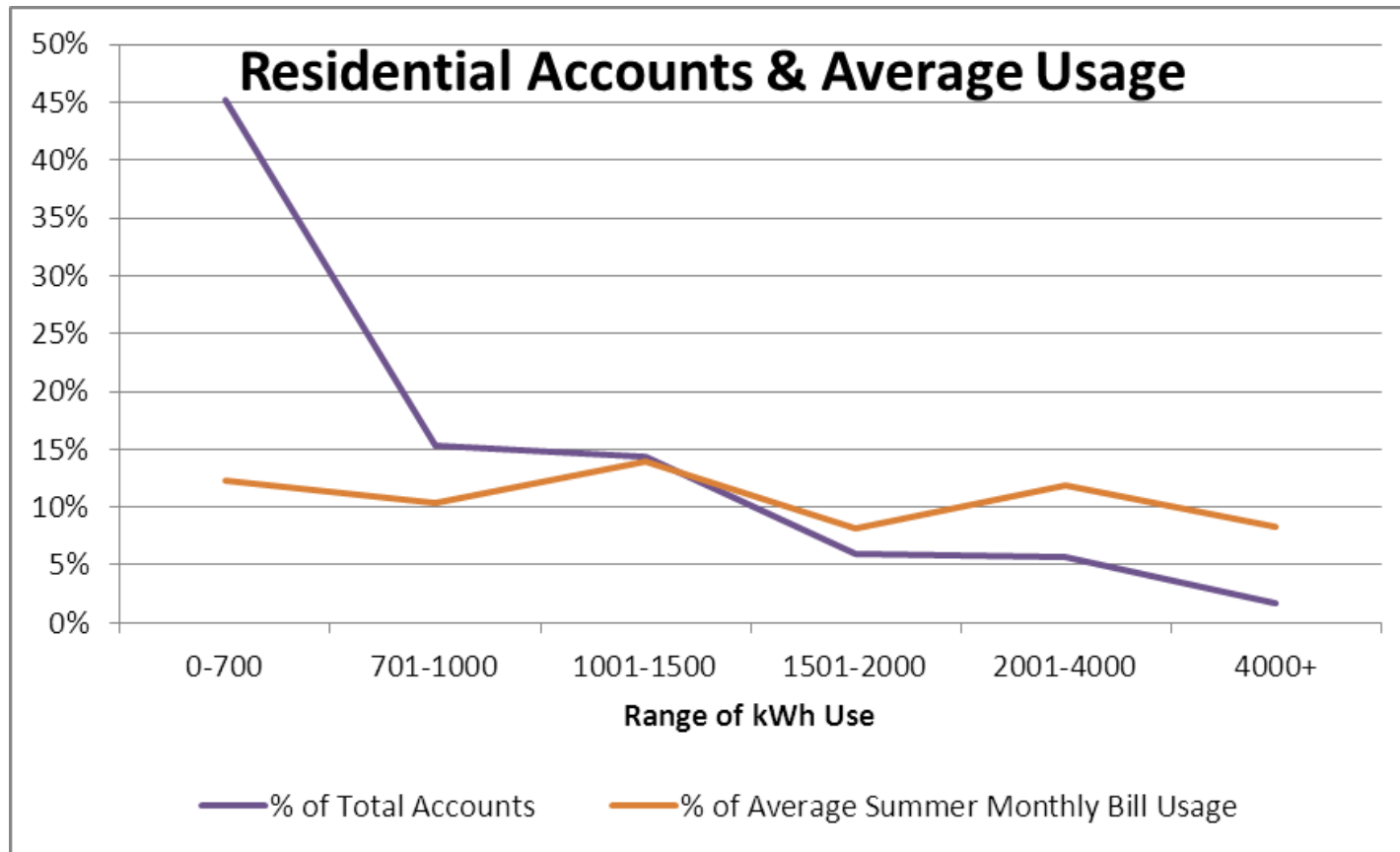
➤ Needs Assessment Study

- ◆ Determines the scope and timeline of any infrastructure investments under consideration over the next 20 years
- ◆ Will confirm the approximate year a 3rd cable is needed

➤ EE Technical Potential Study

- ◆ Gathering data from a cross section of residents to determine load relief potential from different end uses
- ◆ Preliminary results included in this proposal final results including analysis of metered data will be available later this fall

Estimated Contributions to Peak Load



Alternative Approach to Meet Energy Needs

- Reduce the demand for electricity during peak hours
- Creating sustained, peak load relief on Nantucket could:
 - ◆ Potentially reduce costs for customers (e.g. reduced need for backup diesel generation, potential deferral of a third cable)
 - ◆ Increase penetration of energy efficiency and other “green” technologies
 - ◆ Increase community awareness of energy use and knowledge about conservation

National Grid Proposal to MA DPU

- Proposes a 5-year R&D project to test alternative methods of meeting peak demand needs
 - ◆ Targeted for 2015 – 2019, pending DPU approval
 - ◆ Report on progress to the DPU annually

- If methods prove successful, the Company will file an updated proposal with additional initiatives incorporating:
 - ◆ Lessons from first five years
 - ◆ New technology advancements
 - ◆ Additional coordination with Grid Modernization
 - ◆ Long term projections for potential deferral of 3rd cable

- If the project is not successful, the Company will move forward with its traditional “insurance” for reliable service.

Project Initiatives

Energy Efficiency Initiatives

- Increase participation in Residential EE programs
 - Frequency of service
 - Direct, frequent marketing
 - Enhanced or new incentives for measures with highest potential for peak load reduction e.g. heat pump water heaters, wi-fi thermostats, dehumidifiers & window AC recycling
- Increase EE Opportunities for Small C&I
 - Re-position marketing to showcase all offers available
 - Enhance incentives for kitchen, HVAC and hot water equipment
 - Weatherization incentives for residential-style buildings
- Building Code Awareness & Education Initiative

Project Initiatives

Demand Response

- Residential central AC through installed wi-fi thermostats
- May also explore plug load devices or wi-fi enabled window AC units

Consideration of Time Varying Rate Structure

- Will be pursued in coordination with Grid Modernization plan

Project Initiatives

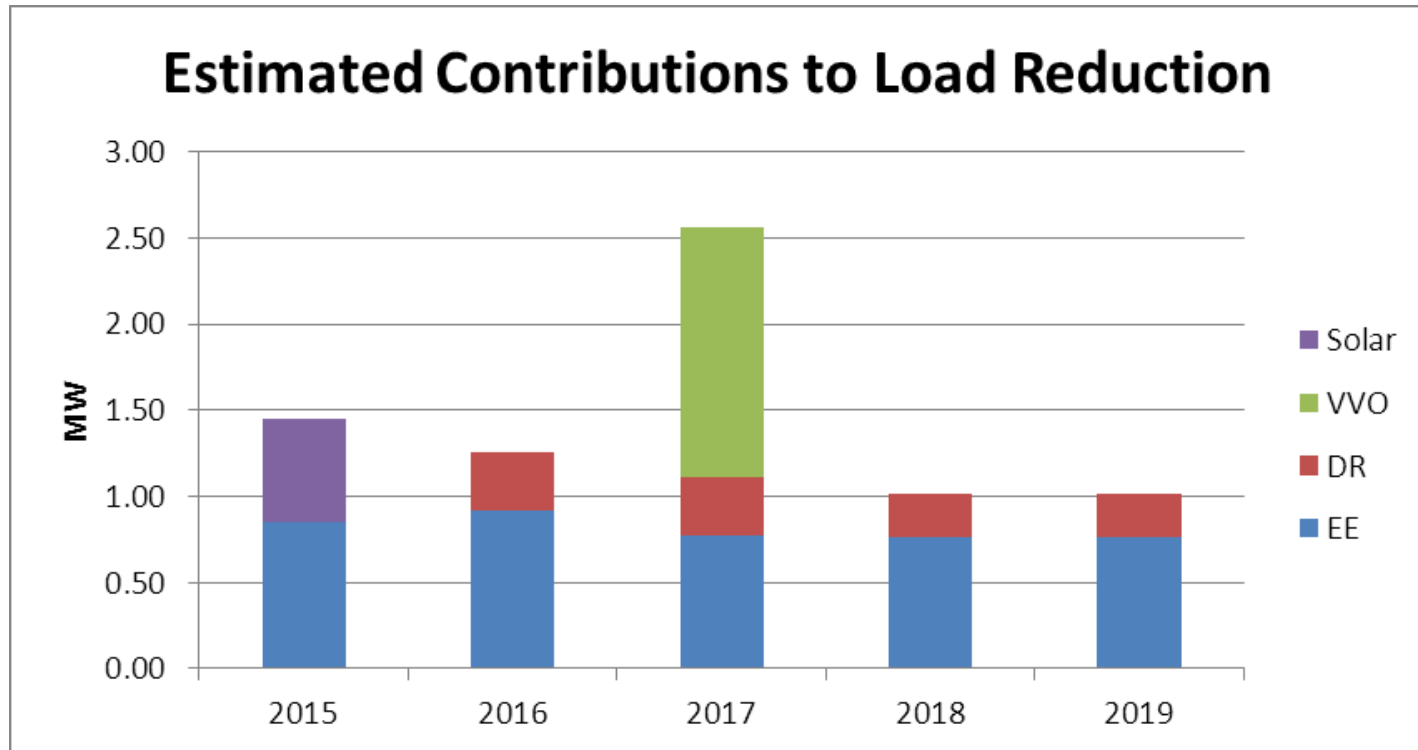
Volt-VAR Optimization

- Intelligent control of reactive/voltage distribution devices to reduce energy demand
- Company managed, independent project targeted for 2017
- Will use lessons learned from the Company's RI VVO pilot currently in construction
- Will coordinate with Grid Modernization plan

Renewables

- Third party project targeting 2MW nameplate near airport
- Solar Phase II project was considered a proposal for pole-mounted solar on Nantucket but not chosen
- NWA marketing campaign will aim to raise awareness of renewable technology options and gauge interest for possible future NWA initiatives

Estimated Incremental Load Reductions By Technology



Comparison of Incremental Generation Needs

- The baseline for the project is the 2014 projected load:
 - ◆ Assumes the 6MW of on-site generation plus 3 roll-on generators at Bunker Road are already committed for a contingency situation
 - ◆ The project will work toward maintaining that load level despite projected growth

Year of Load Reduction	Diesel Roll-On Units Needed With Project		Diesel Roll-On Units Needed W/O Project	
	Bunker Rd	Candle St	Bunker Rd	Candle St
2016	4	0	5	0
2017	4	0	6	0
2018	3	0	6	0
2019	3	0	6	0
2020	3	0	6	1

Next Steps

- National Grid will file proposal with the MA DPU in October 2014
 - ◆ Project initiatives can begin as soon as the proposal is approved and funded
- In the meantime, National Grid and the Town of Nantucket Energy Office are working to expand and promote EE within the existing construct of the statewide programs. In 2014:
 - ◆ An additional MassSave audit week was held during the summer peak season. **Next Audit Week is October 6-10.**
 - ◆ Unlimited no-cost LED bulb replacements began to be offered through the Home Energy Services Program
 - ◆ Weatherization Incentives began to be offered for residential-style buildings currently on a commercial rate

Contact Information

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Small Business Energy Assessment: 800-332-3333

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