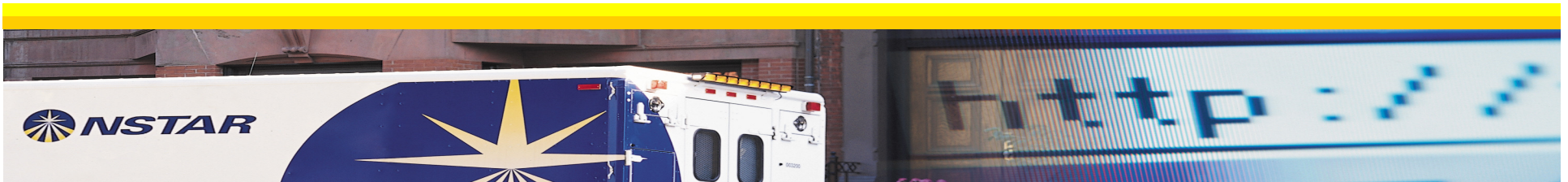


# What Drives Drives?

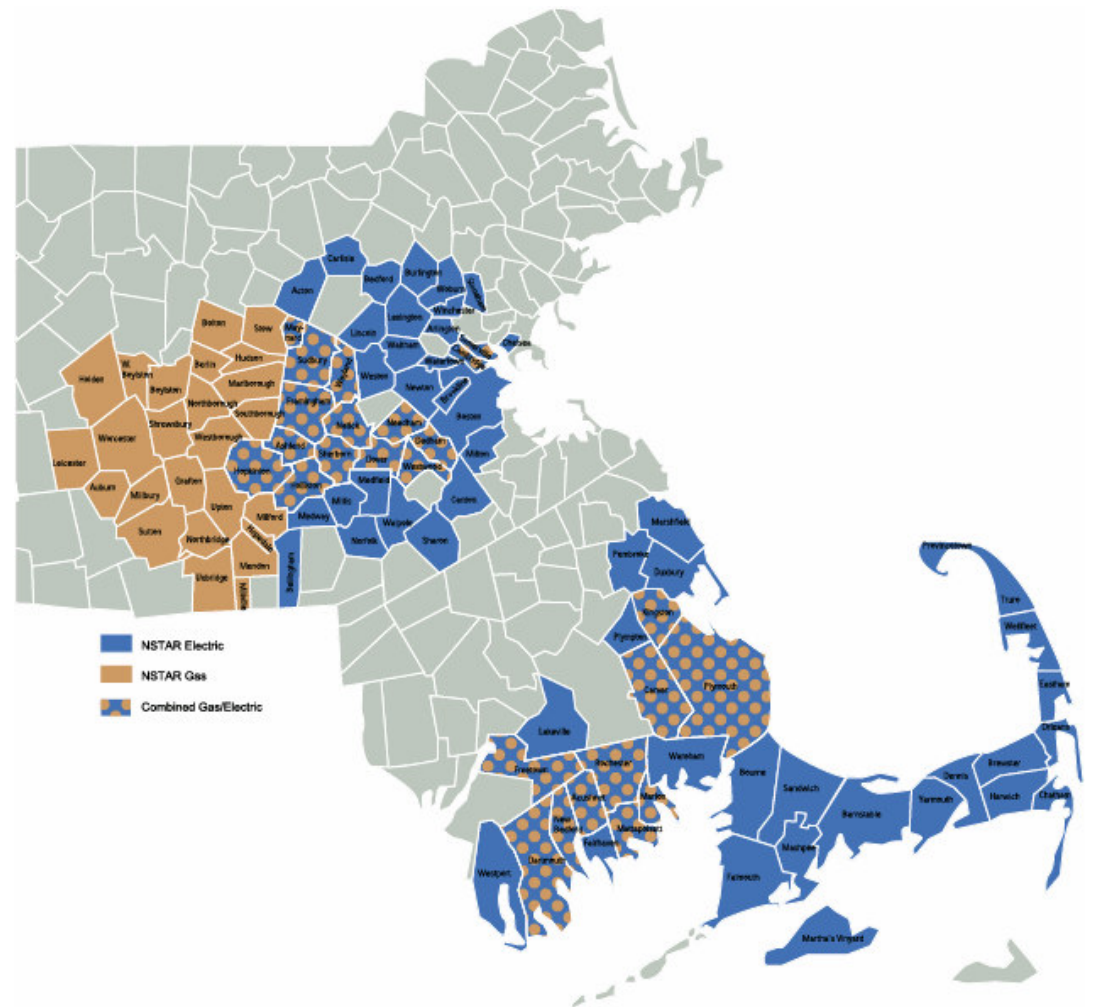
**The components of NSTAR's adjustable speed drive programs and their role in achieving overall efficiency goals.**

**Kevin Morley – NSTAR Electric & Gas  
CEE Motor & Motor Systems Committee Breakout Session  
June 11, 2008**



# NSTAR

- Massachusetts' largest investor-owned electric and gas utility
- NSTAR serves 1.4 million customer in MA
  - 1.1 million electric customers in 81 communities
  - 300,000 natural gas customers in 51 communities



**We're committed to delivering great service!**



# NSTAR Energy Efficiency Services

- For over 20 years, NSTAR has offered both commercial and residential energy efficiency programs to its customers
- In the past five years alone, NSTAR's energy efficiency programs have helped customers save 800,000 megawatt-hours of electricity and 6.5 million therms of natural gas



# Objectives of Energy Efficiency Programs

- **Transform the Market toward Energy Efficiency Design and Practice**
- **Provide a simplified means for customers and market actors to participate**
- **Educate customers on how to use energy more efficiently**
- **Provide incentives to cost-effective, energy saving projects**



# NSTAR's C&I Energy Efficiency Programs

## Construction Solutions Program

- Lost Opportunity or New Construction Market
- Focus on Time-Dependent Projects where the installation of energy efficient equipment and systems are for new construction, major renovations and replacement of failed equipment

## Business Solutions Program

- Retrofit Market
- Targets energy efficient opportunities for existing buildings and equipment
- Replaces inefficient equipment or systems
- Reduces owners current operating costs



# C&I Energy Efficiency Application Types

- **Prescriptive Application** for common EE measures.
  - Applications include: Lighting, Lighting Controls, HVAC, Energy Management Systems, Compressed Air, Electric Motors, & **Variable Speed Drives**
  - Easy to use applications with pre-determined incentives
  - Energy savings calculated by installation type, facility type, and load shape data
- **Custom Application** for any other EE measure submitted for program incentive consideration.



# Adjustable Speed Drives (ASD)

- Also known as Variable Speed Drives (VSD) and Variable Frequency Drives (VFD)
- Types: Mechanical, Hydraulic, Eddy Current, Magnetic (Magna-Drive), & Electrical (Solid State AC)
- Adjustable speed drives are a control measure that when added to a motor system will control the speed of the motor
- Lower Speeds = Lower Electric Demand



# ASD/VSD Benefits

- Reduced energy usage: Motor and equipment are speed controlled to provide the optimum flow
- Improved power factor: Phase power factor can be improved to closer to 1.0
- Limited over-speed capability (depending on VFD sizing)
- Slower speed and built in soft start reduces mechanical stresses
- Motor usually runs cooler



# What Drives Drives?

- Lower Motor Speeds = Electrical Energy Savings
- Cost Savings
- Equipment Savings – Longer Equipment Life
- Optimal Control Processes
- Increased Flexibility
- **Utility Energy Efficiency Incentives**



# Case Study: Prescriptive VSD Project

- **PROJECT: Medical Campus, BOSTON  
(Prescriptive Retrofit)**
- **Air handlers 24/7 operation**
- **Total of 24 VFD, 1300 HP and 400,000 CFM**
- **Converted to VFD controls**
- **Annual savings of 2,998,432 kWh or  
approximately \$400,000**
- **Prescriptive Incentive of \$82,500**







# VSD and Motor Prescriptive Applications

- Set incentives
- Energy savings calculated using load shapes
- 9 Prescriptive HVAC Installation Types
- Eligible Sizes from 5hp to 100hp
- Prescriptive applications provide a means of a “door opener” for other energy efficiency opportunities (Premium Efficiency Motors, Lighting, HVAC, etc.)



## Future Program Modifications

- Expand prescriptive installation types in order to increase Program participation
- Increase Customer/Vendor Outreach and Education
- Statewide Energy Efficiency Providers anticipate the adoption of New Motor Efficiency Standards on both Motor and Motor/VSD applications
- Inform and educate customers regarding the new standards prior to implementation



**Questions?**

**Open Discussion**

**Thank You !**



**To serve our customers and our trade allies**

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