

DEPARTMENT OF ENERGY

ANNUAL PROGRAM AND PEER REVIEW
ELECTRIC DISTRIBUTION TRANSFORMATION
PROGRAM

NXEGEN, INC.

October 28-30, 2003

AGENDA

- Relevant Problem – Connecticut & Northeast Electric Markets
- Current Market Activity in Connecticut – Challenges & Solutions
- Project Objectives
- NXEGEN's Project Scope & Timeline
- Technical Overview of NXEGEN's Project
- Accomplishments & Progress To Date
- Collaboration & Leveraging Plan
- FY'04 Planned Activities & Beyond



RELEVANT PROBLEM – CONNECTICUT & NORTHEAST ELECTRIC MARKETS

- Connecticut electricity load growth – 4 to 6% annually
 - Southwest Connecticut zones: 8 to 10% annual growth
- New Generating plants have been constructed – replacing decommissioned nuclear plants
 - New plants are not located near load pockets
- No significant investment in transmission and distribution infrastructure for the past 15 years
 - Most investment went into nuclear plants
- A significant percentage of new load growth are inductive loads
 - Motors, compressors – low power factor loads
 - What does this mean? Greater T&D capacity needed to serve inductive loads



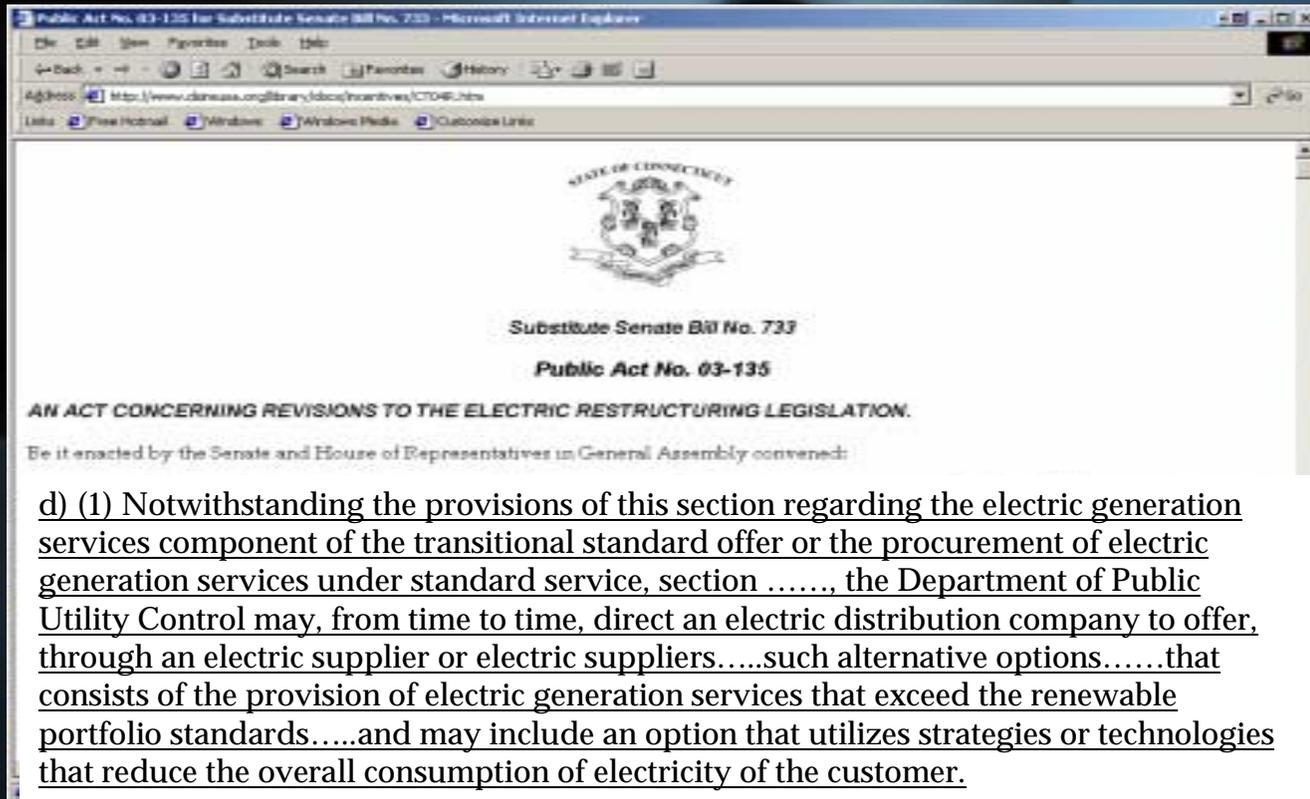
WHAT IS HAPPENSING IN CONNECTICUT TO ADDRESS ELECTRIC INFRASTRUCTURE & MARKET NEEDS

- Connecticut Regulatory & Legislative Action
 - CT Legislature passed a new Electricity Deregulation Bill
 - Generation contracts expire on 12/31/03
 - New commodity contracts are being bid and will be effective 1/1/04
 - Rates are expected to rise 15 to 25%
 - Commodity 5 – 10%
 - T&D 8 – 10%
 - Congestion 6 – 12%
- Connecticut Light & Power Company (CL&P) Rate Case
 - Proposed \$1 billion upgrade to the transmission and distribution system
 - Focus is on Southwest Connecticut – major transmission upgrades
 - Implementation faces many challenges
 - “Not in my backyard”
 - Who pays versus who gets the benefit



WHAT IS HAPPENING IN CONNECTICUT TO ADDRESS ELECTRIC INFRASTRUCTURE & MARKET NEEDS

- Department of Public Utility Control (DPUC)
 - Supports the needed upgrade in T&D infrastructure but wants more...
 - Demand Response – viewed as an integral part of the solution to load growth and more importantly to enhance competition
 - DPUC has crafted enhancements to the new Electric Deregulation Bill to enhance customer choice and participation



PROJECT OBJECTIVES

- Demonstrate that non-intrusive load management can work in the commercial markets
 - Small, dispersed loads, controlled centrally, aggregated together to....
 - Reduce customer peak demand
 - Demand charges represent 35 to 50% of commercial customer's total bill
 - Most commercial tariffs contain peak demand "ratchets"
 - Reduce system coincident peak demand
 - Quantify available system capacity that can be derived from demand response infrastructure
- Develop market models that quantify...
 - Participating customer benefits
 - Demand (KW) savings
 - Kilo-watt Hour (KWh) savings
 - System benefits
 - Lower wholesale locational pricing (LMP)
 - Avoided congestion costs
- Develop a scalable market model with key stakeholders
 - DPUC, Office of Consumer Counsel, Electric Distribution Companies



SAMPLE MODELING EFFORTS

Sample Correlation Analysis of Congestion Price Data and System Load Data for June, 2003

LMP prices for Day-ahead and Real-time		Correlation Analysis:			
Time period: 06/01/2003-06/30/2003		Day Ahead Congestion Prices vs. Day Ahead MWs			
Location/Node: .Z.CONNNECTICUT(4004)					
Report generated: Tue Aug 19 8:38:55 EDT 2003					
Day Ahead Congestion	Day Ahead MWH				
-15.47	5559.1				
-14.25	5542				
-5.88	5306				
-5.72	5135.4				
-3.29	4475.2				
-2.98	4186.9				
-2.89	4243.3				
-2.65	3739.2				
-2.59	3962.8				
-2.58	3634.6				
-2.52	3929.9				
-2.35	4734.6				
-2.15	3794.4				
-2.13	3810.4				
-2	4112.5				
-1.94	4536.3				
-1.65	4020.7				
-1.62	3757.1				
-1.59	3988.9				
-1.57	4145.6				
-1.54	4137.2				
-1.48	4141.7				
-1.44	4083.4				
-1.36	3982.2			<u>Linear Regression Analysis:</u>	
-1.25	3963			<i>Day Ahead Price/MWh</i>	<i>SLOPE</i>
-1.2	3249.1	\$0.00 to \$9.99	0.00007567		
-1.1	5173.8	\$10.00 to \$49.99	0.00531148		
-1	3927.8	> \$50.00	-0.02971663		
-0.95	5228.5				



NXEGEN PROJECT SCOPE & TIMELINE

PROGRAM TIMELINE – Total Project Budget \$644,877

JUN 2003 JUL 2003 AUG 2003 SEP 2003 OCT 2003 NOV 2003 DEC 2003 → APR 2003

Project Start

1

- Customer Segmentation Data
- Market Data (ISO-NE)

WE ARE HERE

2

- Customer Acquisition
- Installation & Operation of NXEGEN's Real-Time Monitoring & Load Management Systems

3

- Quantify Customer Benefits
- Develop Market Models
- Quantify System Benefits

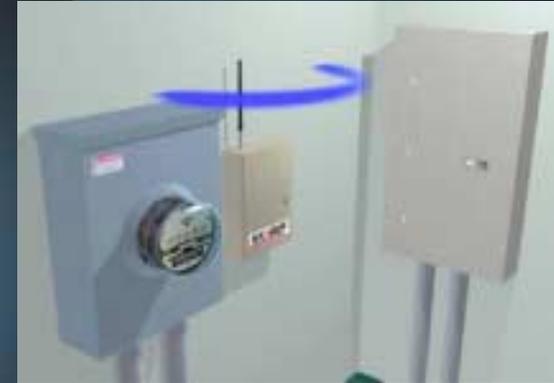
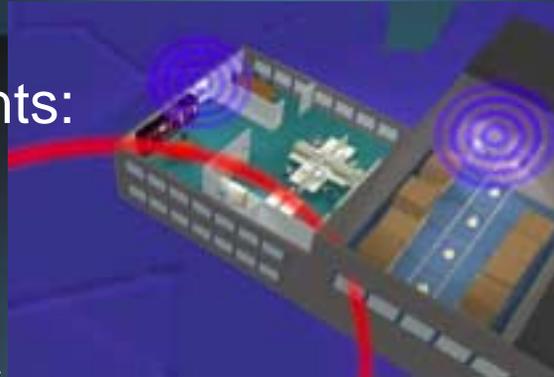
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- Prepare Implementation Plan
- Stakeholder Leveraging Efforts

Technical Overview

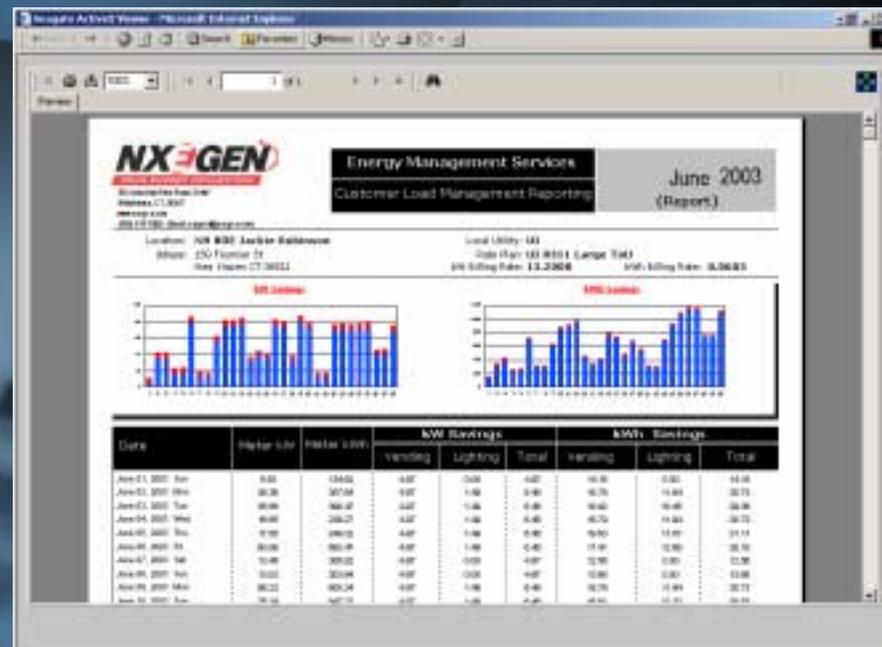
Nxegen System Components:

- Wireless end devices
- Private wireless network
- Network operations center



Technical Overview

- Load Management Infrastructure
 - NxeGen installs non-intrusive load control devices
 - Lighting, vending, power factor correction, refrigeration controls
 - Manage Facility Peak Demand (KW) and reduce KWh consumption



- Load Management Capabilities
 - Stand-alone facility infrastructure
 - Manage facility peak demand
 - Reduce KWh consumption
 - System over-ride capability
 - Central over-ride controls
 - LMP & Congestion mitigation



Technical Overview

- Customer targets
 - (60) customer installations
 - Commercial, industrial, and municipal facilities
 - Major customers represented
 - City of New Haven (70 facilities)
 - City of Norwalk (30+ facilities)
 - Webster Bank (120 locations)
 - 500 KW of controllable/dispatchable load
 - Lighting dimming
 - Compressor controls
 - 1.5 million KWhs saved annually (normal control scripts)
- On-line access via Nxegen website
 - Robust reporting platform
 - All load management savings are verifiable – data packets



Accomplishments & Progress to Date

- All (60) customers are committed
 - (30) are installed, remaining (30) to be installed by 12/15/03
- Data Modeling is Ahead of Schedule
 - ISO-NE LMP, Congestion, and Load data for the Connecticut zone has been provided for the months – June, July, August 2003
 - Correlation models have been developed
 - Single variable models are completed for 3 months
 - Customer segmentation and load profile database in place
 - Relationships between facility peak demand and system peak
- NxeGen is working directly with...
 - CT Dept of Public Utility Control (DPUC)
 - Office of Consumer Counsel (OCC)
 - State Energy Office



Collaboration & Leveraging

- Significant Regulatory Opportunity exists today
 - DPUC has opened several new dockets
 - Alternative Transitional Standard Offer Docket (03-07-16)
 - Bundled service offers with Default Commodity Service
 - A load management option is being requested by the DPUC – bundled with commodity
 - Scalable programs are encouraged
 - Proposals to be submitted 11/03
- Electric Distribution Company Support
 - Conservation programs currently provide incentives for customers implementing real-time information and load management infrastructure
 - \$300 to \$500 per KW
 - \$2 million in C&LM funds – FY 03



FY 2004 Plans & Beyond

- Expand customer acquisition
 - (1000) customer acquisition goal
 - Minimum of (10) MWs of non-intrusive dispatchable load
 - 25 million KWhs saved per year – normal script controls
 - Demonstrate scalable deployment of technology
 - Demonstrate real-time non-intrusive load control – no direct customer involvement
- Implementation of a bundled customer offer approved and supported by the regulatory bod(ies)
 - Standard Offer Commodity service bundled with load management
 - Simplified customer choice
 - Proposed (8000) customer acquisition
 - 4 year acquisition timeline
 - (80) MWs of controlled load – peak demand reductions
 - 120 million KWhs saved annually



NX GEN
Your Energy Connection

The logo features the text 'NX GEN' in a bold, white, sans-serif font with a 3D effect. The letter 'E' is replaced by a red stylized symbol consisting of three horizontal bars of decreasing length, resembling a stylized 'E' or a power symbol. A red swoosh underline is positioned beneath the text. Below the swoosh, the tagline 'Your Energy Connection' is written in a smaller, italicized white font.