

**2012 Smart Grid Program
Peer Review Meeting**

AMR Based Dynamic Pricing
Doug Horton
NSTAR Electric & Gas Co.

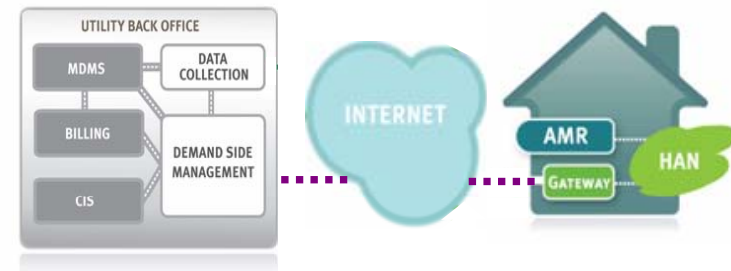
6/8/2012

AMR Based Dynamic Pricing

Objective

Provide two-way communication of electricity cost & consumption data utilizing the customers existing meter & Internet.

Goal to achieve 5% reduction in peak and average load.



Life-cycle Funding (\$K)

Total Budget	Total DOE Funding	Funding to Date
\$4,900k	\$2,362k	\$1,623k

Technical Scope

Use customer's *existing* AMR meter and broadband Internet to achieve two way communication and "AMI" functionality

Cutting-edge solution to integrate:

- Existing meters
 - Existing Internet
 - Existing billing & CIS systems

Needs and Project Targets

- Many AMI solutions require:
 - Meter replacement
 - Build-out of communications network
 - Billing & CIS system upgrade
- NSTAR's does not
- Pilot Requirements:
 - Cover at least 2,750 residential customers (0.25 % of NSTAR Electric customers)
 - Integrate two-way communications of near real time cost & consumption data
 - Automated Load Management (Smart Thermostat)
 - Time of Use Pricing
 - Minimum 5 % load reduction (Peak and Average)

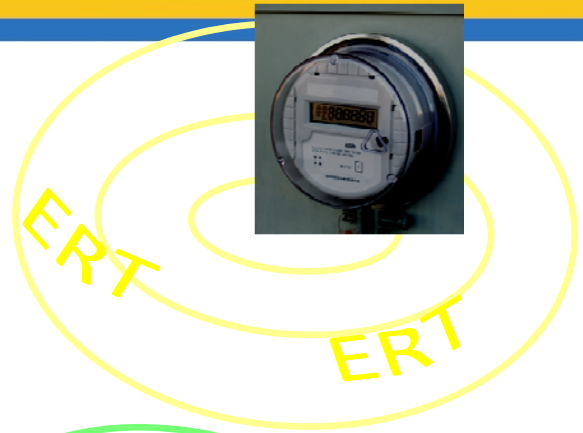
Tendril/NSTAR AMR-Based Dynamic Pricing

All participants

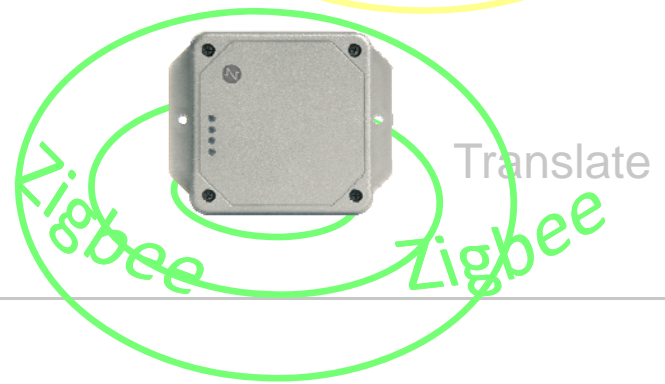
Portal



Display



Gateway

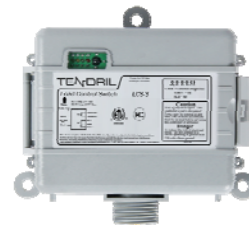


Half of the participants

Thermostat



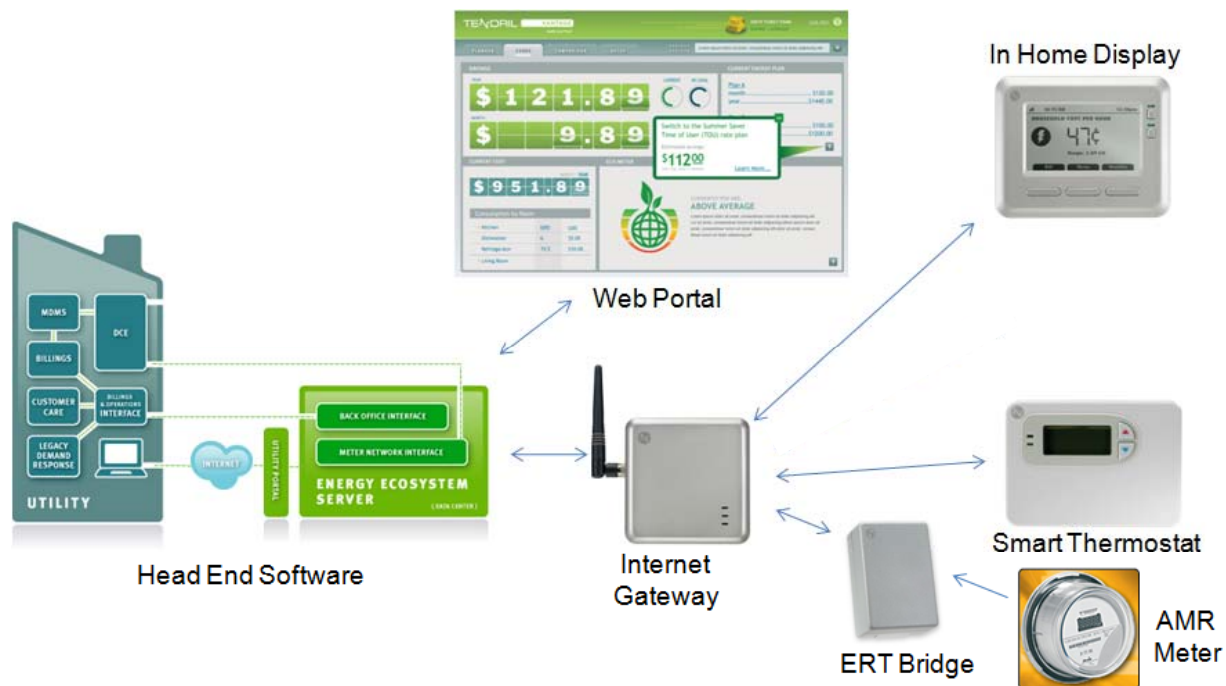
Load Control Switch



Technical Approach

Designed, developed, and implemented customized process and interfaces utilizing secure file transfer structure:

- Data is communicated via the Internet to Tendril's NOC
- Communicated to NSTAR via secure encrypted exchange to integrate with NSTAR back-office.



Technical Accomplishments

Completed customized back-office integration:

- Utilize interval data from the AMR meter to produce time differentiated bills and peak time rebates.
- Utilize existing Internet connection for two way communications and Critical Event notifications.
- Feeds data into existing CIS & billing systems.

Technical Accomplishments

All major marketing efforts and installations are complete.

- Marketing response on high end of expectations of 2%-4%.

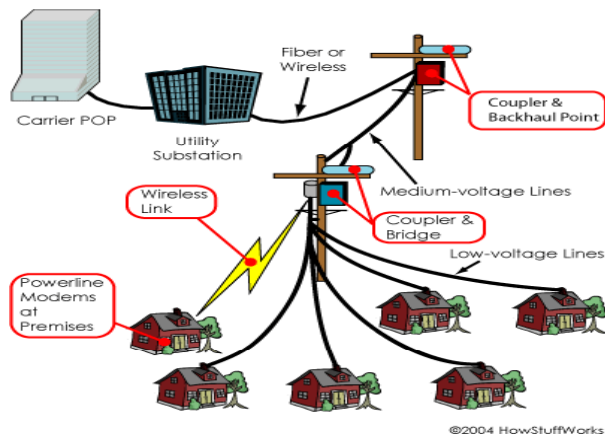
Group		Installed Number of Customers
1	Enhanced Information	954
2	Peak Time Rebate	486
3	TOU Rate plus Critical Peak Pricing (CPP) No Load Control	841
4	TOU Rate plus Critical Peak Pricing (CPP) With Load Control	425
Total		2,706

Significance and Impact

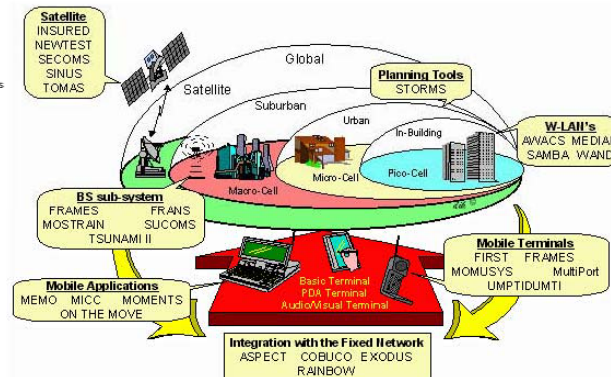
If successful, may allow for “AMI-like” functionality but avoid the need for premature meter replacement for company’s with AMR infrastructure.

Alternatives may include:

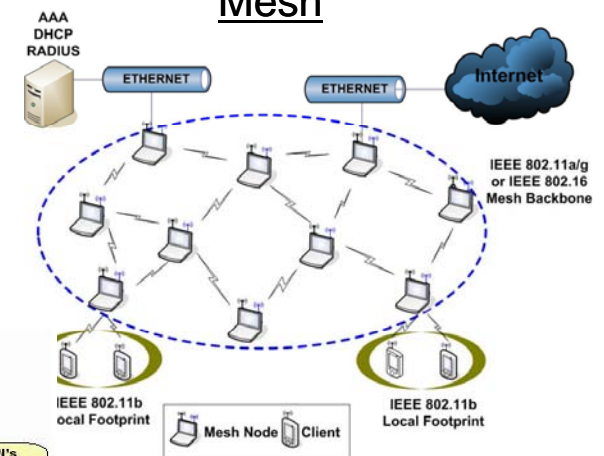
Broadband over Power Line



Cellular



Mesh



Interactions & Collaborations

Organization	Role
NSTAR Engineering	<ul style="list-style-type: none"> • Project Management • Vendor relationship
NSTAR Customer Care	<ul style="list-style-type: none"> • Marketing • Billing support
NSTAR IT	<ul style="list-style-type: none"> • System Architecture • Database support
NSTAR Accounting & Investment Planning	<ul style="list-style-type: none"> • Financial & Compliance support
NSTAR Procurement	<ul style="list-style-type: none"> • Vendor selection / Contract support
Massachusetts Statewide Evaluation Collaborative	<ul style="list-style-type: none"> • Various stakeholders collaborating to identify common evaluation framework.
Tendril Networks Inc.	<ul style="list-style-type: none"> • Primary vendor for technical solution, technical customer support, and installations.
Navigant Consulting	<ul style="list-style-type: none"> • Evaluation

Contact Information

Doug Horton
Project Manager, Smart Grid
NSTAR Electric & Gas Corporation
781-441-8046
Douglas.Horton@NSTAR.com



Back-up Slides

Include any back-up slides you would like to provide to the DOE program managers for additional information. The back-up slides will not be shared with others, unless specifically stated by the presenter.