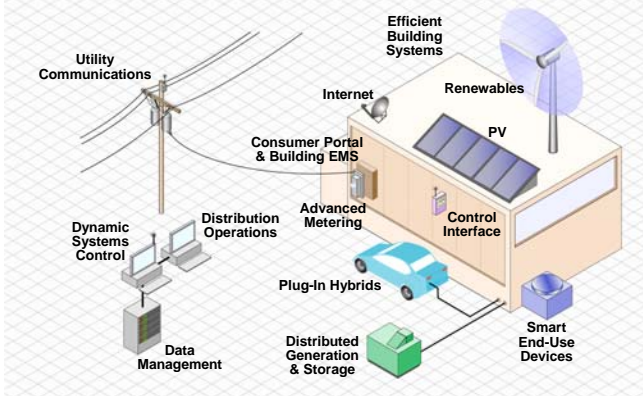
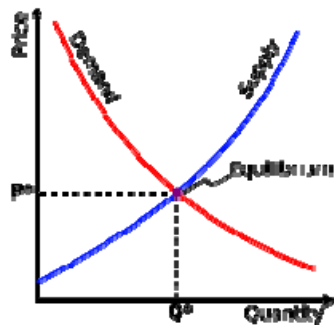




Smart Grid Demo Advisory Team Meeting, San Diego, CA



February 3rd, 2009



Welcome!



Agenda

- 1:00 – 1:15: Welcome & Introductions
- 1:15 – 1:45: Con Edison Host-Site Overview/Update (Frank Doherty)
- 1:45 – 2:15: FirstEnergy Host-Site Overview/Update (Joe Waligorski)
- 2:15 – 2:45: PNM Resources Host-Site Overview/Update (Steve Willard)
- 2:45 – 2:55: Break
- 2:55 – 3:15: Deliverables Update (Matt Wakefield / Brian Green)
- 3:15 – 4:00: Regional Profiles Update (Angela Chuang)
- 4:00 – 4:45: Arch. Ref. Design Update (Steve Thiel / Charles Vincent)
- 4:45 – 5:00: Break
- 5:00 – 5:50: Round Table – Member Smart Grid Projects / Activities
- 5:50 – 6:00: Wrap Up

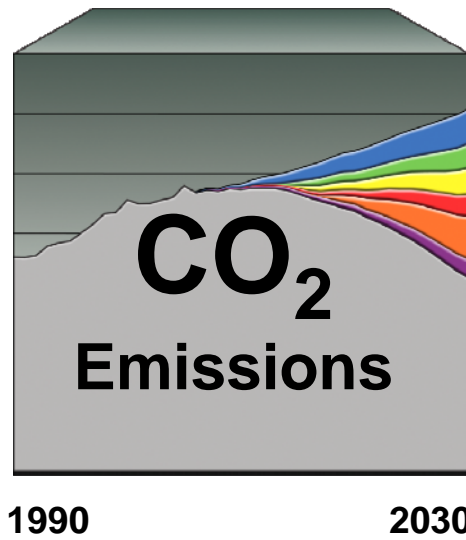
Host Sites Overview

	Consolidated Edison	FirstEnergy	PNM Resources
Resources	Distributed Generation Demand Response Wind Plant	HVAC (Res., C&I) DR Electric Storage Thermal Storage	Solar PV (residential & System) Storage & DR
Integration	End-to-end (Customer owned DG, DR provider, Con Edison, NYISO)	Real Time T&D Ops & Planning PJM	HAN, SCADA, System Ops & Planning
Diversity	Dense Urban Environment Customer Owned Resources	Smart Grid w/Out use of AMI system Master Controller Concept	Large deployment of Residential PV. Optimization Incl. Volt & Freq control
Business Case	Increase Reliability Reduce Peak Demand	Grid efficiency and reliability at local level	15% peak load reduction at feeder
Further Industry	Interoperability of Distributed Energy Resources (DER)	Local delivery system Integration of DER	Technologies & Standards for Renewable Integration

Break (Resume promptly at 2:55 PM)



From Analysis to Action



Technology Challenges

1. Smart Grids and Communication Infrastructure
2. Transmission Grids and Associated Energy Storage Infrastructures
3. Advanced Light Water Reactors
4. Coal-Based Generation Units with CO₂ Capture and Storage

~80% of Smart Grid Emissions Reductions from Integrating DER

Avoided CO₂ Emissions, 2030 (Tg CO₂)*

	Low	High
Direct Feedback PHEV Integration Renewable Integration EE & Demand Response Peak Load Mgmt Reduced Line Losses Cont. Comm. Large Commercial Buildings	60	211
% of Total U.S. CO ₂ Emissions	~3%	~10%

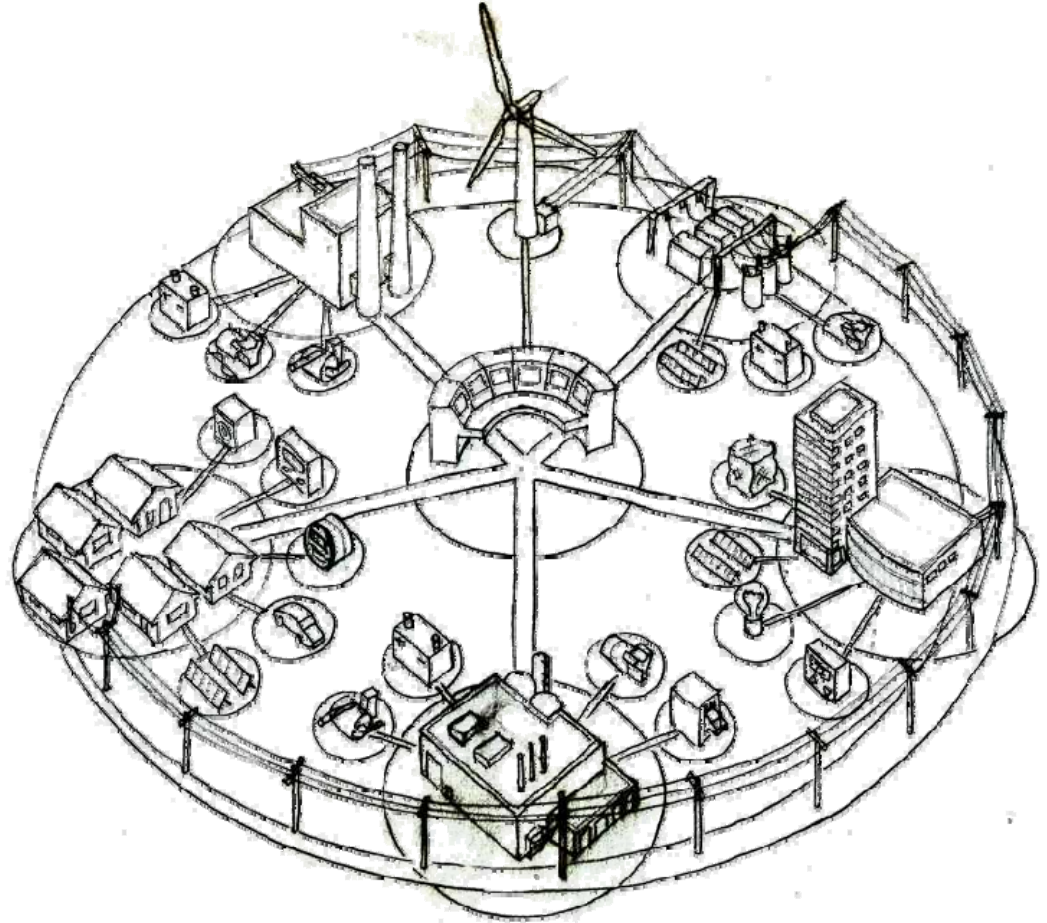
A Key Business Driver

Over the next 25-30 years, significant CO₂ reductions could be achieved through the aggressive development and deployment of a full portfolio of technologies

* Source: EPRI Publication 1016905, The Green Grid Savings and GHG reduction Enabled by a Smart Grid

EPRI Smart Grid Demonstrations

- Several regional demonstrations
 - Multiple Levels of Integration
 - Multiple Types of Distributed Energy Resources
- Leverages Information & Communication Technologies



SG Demo Update

Current Smart Grid Demo Collaborators

AEP**

Ameren

Central Hudson G&E

Con Edison*

Duke

Entergy

FirstEnergy*

Great Plains Energy (KCPL)

PNM Resources*

PSEG

Southern

Southwest Power Pool

SRP

TVA

*** Current Host-Site**

**** Actively working on development of Host-Site proposal**

Still a fair amount of activity / Interest from Additional utilities to join collaborative

Host Site Selections (1-2 Selections Per Cycle)

ID	Host Site Selection Dates	Q1 09		Q2 09			Q3 09			Q4 09			Q1 10			Q2 10			Q3 10
		Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
1	April 15, 2009																		
2	August 4, 2009																		
3	November 18, 2009																		
4	April 6, 2010																		
5	August 3, 2010																		

Typical Host-Site Selection Cycle			
	Month 1	Month 2	Month 3
Utility Drafts Proposal			
EPRI Technical Review			
Peer Review			
Present to BOD			

Start all Field Deployments no later than Mid-2011 to have at least 1 year of Deployment with sufficient time for field assessment

Task 1 – Analytics

ID	Task 1: Analytics on Integrations Approaches & Impact of DR	2008	2009				2010				2011				2012				2013	
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
1	1.1 Develop Regional Profiles													?						
2	1.2 Develop Integration Framework													?						
3	1.3 Identify & Evaluate Analytical Tools													?						
4	1.4 Develop and Evaluate Approaches for CO2 impact													?						
5	1.5 Develop Framework for Economic Assessments													?						
6	1.6 Develop Scope and Mapping of SG Projects													?						

- Task 1.1 & 1.2 Regional Profiles
- Task 1.5 Framework For Economic Assessment
 - Coordinating with DOE & a number of world class economists
 - Team Established, working meetings begin in February
 - Managed by Bernie Neenan
- Task 1.6 Scope & Mapping of SG Projects
 - Smart Grid Project Mapping Draft

Task 2 – Critical Integration Technologies

ID	Task 2: Critical Integration Technologies & Systems	2008	2009				2010				2011				2012				2013	
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
1	2.1 Architecture Reference Design for distributed Resource Integration																			
2	2.2 Develop Information Exchange Model to support System Operations																			
3	2.3 Develop Comm Interfaces & Control Algorithms for DER																			
4	2.4 Develop Aggregation Methods & Tools																			
5	2.5 Develop DER Controller Requirements																			
6	2.6 Lab Trials of Critical Integration Technologies																			

- Task 2.1 – Architecture Reference Design
 - Foundation for future work
- Task 2.6 – Lab Trials of Critical Integration Technologies
 - “Mini Projects” - Opportunities for utilities with smaller projects that don’t meet all the requirements of a Host-Site
 - Leverage \$11 Billion / \$32 Billion Stimulus

Task 4 – Technology Transfer

- EPRI Smart Grid Resource Center
 - www.smartgrid.epri.com
 - Or smartgrid.epri.com
 - Or www.epri.com/smartgrid
- Use Case Repository



Smart Grid Resource Center

This site serves as a home for information about EPRI Smart Grid research, demonstration projects, and the Smart Grid Use Case Repository.

Smart Grid

A Smart Grid is one that incorporates information and communications technology into every aspect of electricity generation, delivery and consumption in order to:

- minimize environmental impact;
- enhance markets,
- improve reliability and service,
- reduce costs and improve efficiency.

Smart Grid Use Case Repository

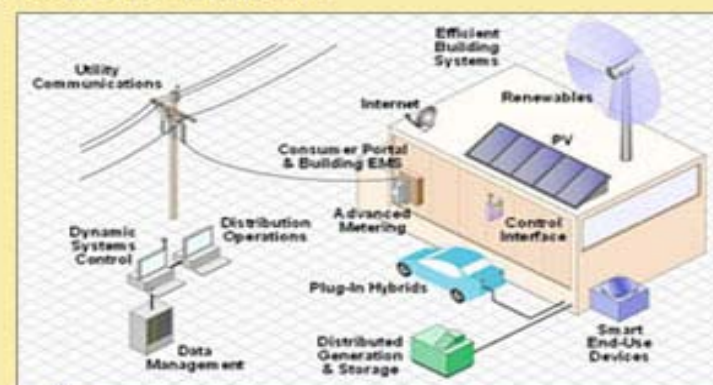
The Use Case Repository is a public resource for the electric power industry to house Smart Grid related use cases as well as provide a forum for the industry to contribute to this effort by submitting their own use cases.

- [Use Case Repository](#)

Smart Grid Advisory Update Newsletter

- [Decemeber](#)
- [November](#)
- [September](#)

Smart Grid Network



Mouseover Image for larger view

Smart Grid Network

Smart Grid News

Current

Archive

[Energy Central features an Intelligrid report by EPRI's Don Von Dollen](#) – Month, Day, 200X

[EPRI's Green Grid report featured on Carbon Offsets Daily](#) – Month, Day, 200X

[M2M Radio discusses Smart Grid with EPRI's Don Von Dollen](#) – Month, Day, 200X

[EPRI Releases Report on Energy Savings and Carbon Emissions Reductions Enabled by a Smart Grid](#) – Month, Day, 200X

Use Case Repository

[→ About the Repository](#)

Smart Grid Use Case Repository

Use Case Categories

- [General](#) (18)
- [Customer Services](#) (22)
- [Distributed Energy Resources](#) (3)
- [Distribution Operations](#) (3)
- [Market Operations](#) (5)
- [Transmission Operations](#) (8)

[View all Smart Grid Use Cases](#) (61)

The Use Case Repository is a collection of Smart Grid use cases and requirements developed within the industry as well as through EPRI's smart grid demonstration initiative. All Use Cases are delivered as PDFs. All Use Cases are under the [Creative Commons license](#). You may use the [NIST Use Case Template](#) to create your own use cases and submit them to mwakefield@epri.com for posting.

Name	Size	Published
Category: General		
Adaptive Transmission Line Protection	254k	1/8/2009
Application Adjusts Load To Meet System	11k	1/8/2009
Capacity Based On Settings From System Operator	11k	1/8/2009
Adaptive Transmission Line Protection	254k	1/8/2009
Application Adjusts Load To Meet System Capacity Based On Settings From System Operator		
Category: Customer Services		
Adaptive Transmission Line Protection	254k	1/8/2009
Application Adjusts Load To Meet System	11k	1/8/2009
Capacity Based On Settings From System Operator	11k	1/8/2009

Task 1.1 Regional Profiles Update

- Angela Chuang, EPRI Senior Project Manager



Task 2.1 Architecture Reference Design

- Steve Thiel & Charles Vincent, IBM



Break (Resume promptly at 5:00 PM)



Round Table Discussion

- Purpose – Identify common projects among team
- Explore opportunities to collaborate
- Identify opportunities for focused research
- Smart Grid Projects – Focused on Integration of DER
 - Discuss your Existing Smart Grid Projects
 - Discuss your Planned Smart Grid Projects
 - What are your biggest needs, issues, concerns?
 - What is the biggest opportunity?

Wrap up

- Future Meetings (Details TBD)
 - Late June, Hosted by FE in Red Bank, NJ
 - Fall, Hosted by PNM, Sandia National Labs in Albuquerque, NM
 - Winter 2010, Hosted by Con Edison, New York, NY
- Workshops?
 - IntelliGrid / Use Case: Train the Trainer
- Future Web Casts
 - Host-Site Peer Review (AEP, March)
 - Deliverables - updates as deliverables become available
- Newsletters (every 6-8 weeks)
 - Next newsletter in February
 - Monitor www.smartgrid.epri.com for more frequent news
- Questions?
- Thank You!