Northwest Power and Conservation Council

November 20, 2007

MEMORANDUM

TO: Power Committee

FROM: Terry Morlan

SUBJECT: Smart Grid Presentation by Dr. Michael McCoy

The potential choices of resources for meeting regional electricity growth have been narrowed significantly by climate change policies. As a result, one focus of the Sixth Power Plan will be to identify potential approaches to help the region meet both its electricity demands and its greenhouse gas emissions targets. As illustrated in the Council's CO_2 footprint paper, this will be a huge challenge. New technologies and commercialization of existing immature technologies will need to play a role.

Many of the most hopeful approaches to meeting this challenge in the short run appear to be on the demand side of the market. The Northwest has had great success achieving improved efficiency, but new technologies and applications are needed to expand the conservation alternatives and potential. In addition, new approaches to motivating and facilitating efficiency need to be explored.

Dr. Michael McCoy, a member of the U.S. Department of Energy's GridWise Architecture Council, will discuss some less conventional approaches that, among other things, involve the consumer more actively in reducing the need for new resources. At the heart of these approaches, is a philosophy and set of technologies that are collectively referred to as "smart grid". These technologies have the potential of transmitting pricing information to consumers and their energy using equipment and appliances on a real time basis. This provides consumers with the information they need to integrate energy price information into their business and home energy decisions. The growing importance of reducing CO_2 emissions combined with global business competition makes it important to find ways that consumers can respond in creative ways to price signals about energy costs and related environmental costs. Smart grid technologies have the potential to allow the consumer to make more economic and greener choices in a very personal manner. Other aspects of smart grid will be outlined as time allows.

851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204-1348
www.nwcouncil.org

Steve Crow
Executive Director

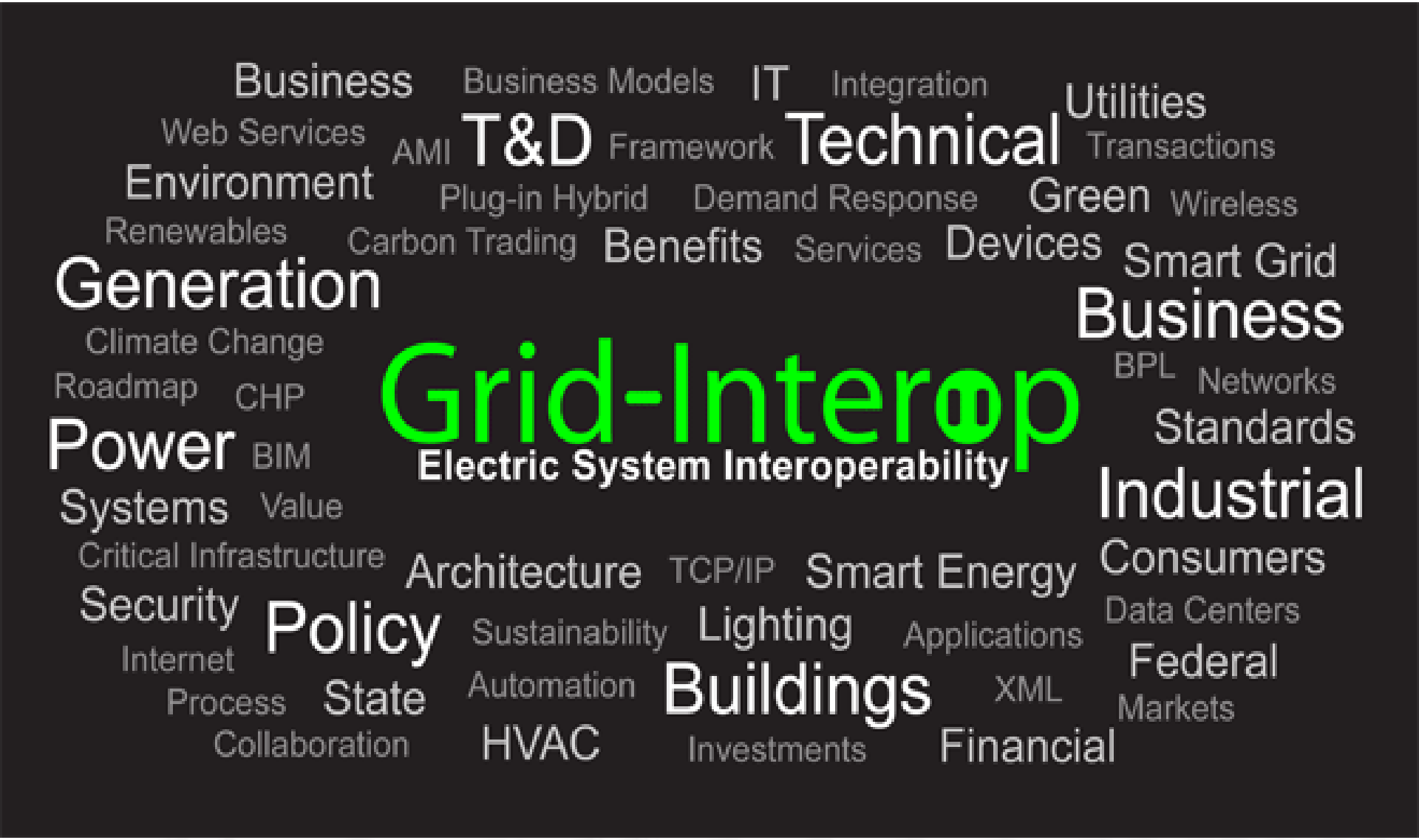
503-222-5161
800-452-5161
Fax: 503-820-2370

What is Smart Grid

Dr. Michael McCoy

December 11, 2007

Portland, OR


Business
Business Models
IT
Integration
Utilities
Web Services
AMI
T&D
Framework
Technical
Transactions
Environment
Plug-in Hybrid
Demand Response
Green
Wireless
Renewables
Carbon Trading
Benefits
Services
Devices
Smart Grid
Generation
Business
Climate Change
Grid-Interop
BPL
Networks
Roadmap
CHP
Standards
Power
BIM
Electric System Interoperability
Industrial
Systems
Value
Critical Infrastructure
Architecture
TCP/IP
Smart Energy
Consumers
Security
Policy
Sustainability
Lighting
Applications
Data Centers
Internet
Federal
Process
State
Automation
Buildings
XML
Markets
Collaboration
HVAC
Investments
Financial

Smart Grid “Overviews”

- GWAC -- 30,000’ to develop principles and framework spanning entire electricity system
- EPRI Intelligrid -- 10,000’ to develop utility-centric, technical projects
- Modern Grid – taxpayer-funded popularization and demonstration (DOE, states)
- GridWise Alliance -- coalition of utilities, technology vendors, and others

The Players from Top to Bottom

- Utilities – Generators
- Large Industrial Consumers
- Air Bases – Universities – Hospitals – etc.
- Small and Medium Enterprises (SMEs)
- Large Buildings
- Private Homes
- (Regulators)

Keys to Following Discussion

- Remember it is MHO i.e. my view
- Smart Grid cry: Prices to Consumers
- * denotes multiple use applications
- * or decisions made by consumer
  - these are the stronger
  - more likely to succeed areas
- ** denotes relevance to resource plans

Utilities - Generators

- Lots of SMI/AMI
  - Billing, Security, Maintenance*
  - Command and Control DR**
- Ambivalent on DG
  - if DG exceeds local load
  - infrastructure not built for back flow
  - makes load forecasting more difficult
- Meeting renewable (legislated) targets**
- Meeting efficiency (programmatic) targets**

Large Industrial Customers

- No Uniform Arrangements
  - special rates
  - special operating arrangements**
  - plant power manager focus is plant efficiency
- SG says: Provide Prices to Inform Decisions*
  - improve use of on-site generation
  - improve scheduling of production process
  - Like pre-heat, pre-cool
  - Can only result in better energy use**

SMEs

- Tell the Site Control Story
  - Aggragator
  - SCE
  - Texas class 4 event
  - Starbucks, Nordstroms, 7-11, Home Depot

Large Buildings

- Very active space
  - Efficiency is priority
  - Green footprint sometimes overrides economics
  - Assumes efficient implies economic
  - DR if rates promote*
- If they had prices they would act
  - They would do more
  - And different things*

Private Homes

- Passive devices?
- Appliances are not so easy
- Direct Control* is not popular
- Electric Vehicles*
- Multiple use ideas are opening new areas
- (Entertainment to Grandma to Security)

Regulators

- Rates encourage or discourage
  - Flat - hide the opportunity to provide capacity
  - Time of Day – good but not sensitive*
  - Real Time – better but still course (ex-post)*
  - Day ahead – great potential* – lots of obstacles
- Green rates should be a goal