SWEEP’s 2010 Regional Energy Efficiency Workshop
November 8, 2010
Welcome to Las Vegas

NV Energy
Introduction

- Who
- Portfolio of DSM Programs
- Energy Efficient Lighting
- Commercial Incentive Program
- Energy Efficient New Homes
- NV Energize
- Demand Response
Where are we?
NV Energy’s Three-Part Energy Supply Strategy

Increasing Energy Efficiency and Conservation

Expanding Renewable Energy Initiatives and Investments

Add New Efficient Power Plants and Transmission Lines

Meeting the Energy Needs of Nevada
<table>
<thead>
<tr>
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<th>2009</th>
<th>2010</th>
<th>2011</th>
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<tbody>
<tr>
<td>Expenditures</td>
<td>$57,462,583</td>
<td>$50,661,000</td>
<td>$82,673,000</td>
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<td>kWh</td>
<td>438,622,139</td>
<td>237,075,397</td>
<td>306,028,545</td>
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<td>kW</td>
<td>121,914</td>
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Portfolio of DSM Programs

- Non-Profit Agency Grants
- Energy Education
- Low Income Weatherization
- Market and Technology Trials
- Demand Response
- Residential Lighting
- Second Refrigerator Collection and Recycling
- ES Manufactured Homes
- Mobile and Manufactured Homes
- Commercial New Construction
- Energy Efficient Schools
- Commercial Retrofit Incentives
- Residential High Efficiency Air Conditioning
- High Efficiency Space Heating
- Energy Efficient Pools & Spas
- Advanced Building Techniques
- Consumer Electronics & Plug Loads
- Energy Plus New Homes
- In Home Displays
- HomeFree Nevada
- Solar Thermal Water Heating
Energy Efficient Lighting

2003-2010

12.0 MILLION CFLs
Standard CFL Goes Dim

- **AB178**
  - 25 lumens per watt minimum
    - More Stringent than EISA
  - January 1, 2012
  - All except specialty bulbs

- Gap bulbs (enhanced incandescent)

- Next Generation CFLs

- LED
  - Lighting quality
  - Price Point
  - Incremental costs
Commercial Incentive Program

- Per-unit prescriptive incentives:
  - Lighting, cooling, motors, commercial kitchens, refrigeration, etc.
- Custom incentives
- Direct install component for small commercial customers
- Upstream incentive component for HVAC and motors.
- Added niche market component
  - A/C tune-ups, compressed air, retro commissioning, enhanced automation, data centers, grocery stores, water/waste water, industrial processes, and other technologies
Housing Slump Continues
Advanced Building Techniques (ABT)

- Program goal – Introduce and promote energy efficient building techniques and materials to the production home market to pull the market beyond the Energy Star Home level of savings

- Target – HERS Scores of 50 or better

- Limited funding – TRC < 1.0
ABT Program Status

- Rebate levels
  - $5,500 envelope improvements
  - $7,500 add photovoltaic system
- 42 homes firm to date and 600+ three year potential
- **HERS score range** 50 – 25
- Energy Savings 5,000 – 13,500 kWh per home
ABT Measures

- High efficiency appliances
- MERV – Wall mounted module that controls plug loads
- CID – Charge indicator display for AC units
- Icynene foam insulation – Sprayed
- Energy efficient windows
- Mini split ductless AC units (SEER 20)
- BIBS – Blown in Batts
ABT Quality Control

- Third Party QC
  - Hired by NVEnergy
  - Plan checking
  - 20% Remodled
  - 2%+ Filed Sampling
Energy Plus New Homes

- Goal – Move beyond Energy Star Home Levels of energy savings
- Requirement – HERS 70 or better
- 50% of homes sold in 2010 qualify for this program (1,915 homes)
- Cost Effective – TRC of 1.63 (2009)
Hang on For Change
NV Energize

- Tools and Technology to help customers make more informed choices about their energy use -- potentially saving money and helping the environment.

- View their energy usage data on a daily basis:
  - Customers will know exactly how much energy you are using over the course of the day, week, or month before they receive their bill.

- Smart Meters:
  - New digital meters that allow for a two-way communication between the customer and NV Energy.
  - Every NV Energy customer will receive a new meter.

- ASD will be phased in over the next few years with completion scheduled for December 2012.
**NV Energize Deployment**

- **Nevada Statewide Project 2010-2012**
  - Serves 1.4 million electric and gas customers
  - Benefits 2.4 million Nevadans

- **NV Energize Delivery**
  - Sensus Advanced Meter Infrastructure (AMI)
  - Itron Meter Data Management System (MDMS)
  - Demand Response Management System
  - Home Area Network (HAN)

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1.3MM Electric Meters and 150k Gas Modules
NV Energize Delivery

1. Advanced Rates
2. Distributed Renewables
3. Home Area Network
4. Demand Response
5. Advanced Metering
6. Load Control Devices
7. Automated Gas Reads
8. Plug-In Hybrids
DR and NV Energize

**Commercial & Industrial**
- 100 MW Goal
- Integrated EE&DR
- AutoDR via OpenADR
- Portfolio of Incentive Offerings

**Residential/Small Commercial**
- 140 MW Achieved
- Program Management
- Paging Thermostats
  - Legacy Switches
  - Existing Software
  - Customer Service
  - Marketing
  - M&V
- Installation Services
- Field Maintenance
- Communication & Hosting Fees
- Incentives

**Energy Storage**
- DRMS/DRCIS

**O&M Benefits**

**NV Energize**
- ($300M Budget)
- 147 MW Goal
- AMI-Based Thermostats
- AMI-Based In-Home Displays
- AMI Based Control Software
- 2-way Comm Infrastructure
- Partial
- Price Responsive Pilot/Dynamic Rates

**Meter Data Management System**
- (Sensus)
- (Itron)
- Smart Meters
- Software Integration
- AMI Headend
- 2-way Comm Infrastructure
- Ubiquitous

**Field Services for Meter Installs**
- (Scope Service)

**DR**
- (387 MW Goal)
- ($99M 2010-2012 Budget)

**AM I (Sensus)**
- $32M Overlap

**DSM Benefits**
- 100 MW Goal
- Integrated EE&DR
- AutoDR via OpenADR
- Portfolio of Incentive Offerings

**Energy Storage**
- DRMS/DRCIS

**Drms/Drcis**

**O&M**
- NV Energize
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**Field Services for Meter Installs**
- (Scope Service)
DR Group Functions – NVEnergize
Supporting Technology

DEMAND RESPONSE SYSTEM
ARCHITECTURE

Back Office Systems
- GIS
- Business Intelligence Microstrategy
- MDM
- BANNER (Billing)
- SCADA
- DRAS (Open AutoDR LBNL)
- AMI Headend
- Optimization Tool
- DR Data Warehouse

Communications Systems
- Network Monitoring
- Security

Middle Office
- Risk Management & Standards Compliance Requirements
- Financial Settlement & Incentive Payments
- Accounting
- Customer Event Participation Profiles

Front Office
- Project Management
- Marketing
- Legal and Contracting
- Customer Service

Field Services
- Customized Commercial DR
- Inventory
- Quality Assurance
- Installation, Maintenance & Training

Customer Systems
- In Home Displays
- Digital Programmable PCTs
- Personal Computers
- Smart Phones or PDAs
Demand Response Portfolio

- **Cool Share**
  - Residential/Small Commercial
  - 147 MW and growing
  - Focus on enabling technology
    - Programmable Communicating Thermostats (PCTs)
    - Home Area Networks (HAN)
    - Platform to provide enhanced energy efficiency
  - Peak Time Rebate

- **Price-Response**
  - Nevada Dynamic Pricing Trial (NDPT)
  - Same technology platform as Cool Share
  - Critical Peak Pricing (CPP)

- **Large C&I**
  - Automated Demand Response
  - Integrated with Energy Efficiency Programs

- **Energy Storage Pilot**
  - Peak Shaving Applications
Customer Empowerment

- **Event Override Data**
  - 11-12% in 1\textsuperscript{st} hour
  - 7-8% in 2\textsuperscript{nd} hour
  - 6-7% in 3\textsuperscript{rd} hour

- **Customer Survey Data**
  - 80% unaware of frequency of events (30+ events)
  - 85% unable to recall occurrence of last event
  - 90% agree savings should be based upon participation

- **Future Distributed Intelligent Agents**
  - Customer selection of participation options
  - Devices more responsive to premise conditions
    - Calculate outdoor to indoor heat transfer rate
    - Improved comfort management
    - Pre-cooling
    - Detect specific equipment parameters
    - Energy efficiency optimization
Technology Package
Home Area Network (HAN) Devices

- Thermostat
- Lighting Controller
- Appliance Controllers
- Phone Display
- PC Display
- Premise Display
- Home Gateway

**Home Gateway**
- Processor
- Operating System
- Ample Memory
- Easily Upgraded
- Designed for Software/Multitasking

- **Intelligent Agent**
- **Zigbee Client**
- **OpenADR Client**

From Meter Gateway → Home Gateway → From Broadband Gateway
Avoided Capacity: Simultaneous

- 5120 MW
- 5000 MW
- 20 MW

4pm 6pm
Avoided Capacity: 3-phase

How and When to Dispatch?

Utility DR Logic: Real-time Decision Analysis
Who do I contact?

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Conservation:
The most environmentally friendly kWh
is the one never used.