Energy Policy: The Demand Side

ASEE Engineering Deans PPC
February 9, 2016

Lowell Ungar
Senior Policy Advisor
Outline

• Energy demand is as important as energy supply
• Energy efficiency policies are key to national energy strategy
• Current federal actions may help
American Council for an Energy-Efficient Economy (ACEEE)

Nonprofit 501(c)(3) that acts as a catalyst to advance energy efficiency policies, programs, technologies, investments & behaviors

• **Research**: buildings, industry, utilities, transportation, economic analysis & behavior

• **Policy**: national, state, & local

• **Outreach**: conferences and publications

• Nearly 50 staff based in D.C.
Celebrating 20 Years of Achieving Energy Efficiency through Market Transformation

National Symposium on Market Transformation

Baltimore, MD • March 20-22, 2016

Hot Topics:
• Zero Net Energy Buildings
• Combined Heat and Power
• Evaluation, Measurement, & Verification
• Data Analytics
• Connected Lighting & Controls
• Plug Load Management
• Demand Response & Distribution System Grid
• Affordable Housing
• Community Strategies

aceee.org/conferences

For: Policymakers • Contractors • Agencies • Utilities • Researchers • Advocates
Energy Efficiency Savings

If grew with GDP...

Energy efficiency

Structural change

Actual energy use
Energy News: Oil Prices

![Graph showing the price of oil over time](chart.png)

*Source: U.S. Energy Information Administration*
Vehicle Standards
Oil Savings from Standards

- 2011 fuel economy
- Light-duty standards
- Light- and heavy-duty standards
Energy News: Utility Angst

Will Solar Cause A 'Death Spiral' For Utilities?

Rate Design & Distributed PV: A Complex Debate That Must Evolve

The Utility Business Model: Evolution or Revolution?

The End of the Electric Utilities? The Industry Thinks So Too
Real Change is in Demand

Source: EIA
Energy News: Climate Change
Energy Efficiency Potential 40%

Efficiency Key to CO₂ Reductions

U.S. MID-RANGE ABATEMENT CURVE – 2030

Adapted from McKinsey Analysis

Source: McKinsey analysis

Cost Real 2005 dollars per ton CO₂e

Potential Gigatons/year

-90 -60 -30 0 30 60 90

Residential electronics
Residential buildings – Lighting
Residential buildings – New shell improvements
Cellulosic biofuels
Commercial buildings – CFL lighting
Fuel economy
Commercial buildings – Combined heat and power
Industrial process improvements
Coal mining – Methane mgmt
Residential buildings – Shell retrofits
Active forest management
Distributed solar PV
Solar CSP
Solar
Coal power plants – CCS new builds
Coal power plants – CCS new builds with EOR
Industry – CCS new builds on carbon-intensive processes
Biomass power – Cofiring
Onshore wind – High penetration
Onshore wind – Medium penetration
Winter cover crops
Reforestation
Afforestation of pastureland
Natural gas and petroleum systems management
Conservation tillage
Existing power plant conversion efficiency improvements
Residential water heaters
Commercial buildings – Control systems
Commercial buildings – Combined heat and power
Industrial – Combined heat and power
Coal mining
Coal power plants
Commercial buildings – HVAC equipment efficiency
Commercial buildings – HVAC equipment efficiency
Residential buildings – CCS rebuilds with EOR
Consumption
Residential cost <$50/ton

Adapted from McKinsey Analysis
Policies and Programs

Source: Northwest EE Alliance
Research and Development
**People-Centered Efficiency**
Providing real-time information and management tools that enable users to lower energy consumption in response to changing information.

**Technology-Centered Efficiency**
Using sensors, controls, and software to automate and optimize energy use.

**Service-Oriented Efficiency**
Shifting behavior and organizational structures to reduce energy-intensive activities.
Utility Energy Efficiency Programs

Source: ACEEE, 2015 State EE Scorecard
Building Energy Benchmarking

U.S. Building Benchmarking and Transparency Policies

- Commercial policy adopted
- Commercial & multifamily policy adopted
- Public buildings benchmarked
- Single-family transparency adopted
Appliance and Equipment Efficiency Standards

Source: ACEEE, EE in US, 2015
Building Energy Codes

Source: ACEEE based on PNNL analysis
Federal Landscape
RDD&D Funding – EE at DOE

![Graph showing RDD&D Funding for EE at DOE from 2002 to 2016.](image)
House and Senate Energy Bills

![Graph showing total savings (in billions NPV) for various energy bills and proposals, including SAVE Act, EERS, Smart manufacturing, Smart buildings, Building energy codes, Federal building standards, and furnace standard.]

ACEEE: American Council for an Energy-Efficient Economy
Agency Actions

- Clean Power Plan
- Appliance and equipment standards
- Heavy-duty vehicle standards
- Housing finance
Thank you!

Lowell Ungar
American Council for an Energy-Efficient Economy
Phone: (202) 507-4759
Email: LUngar@aceee.org
Website: www.aceee.org
## Electric Program Savings Potential

<table>
<thead>
<tr>
<th>Category</th>
<th>Savings Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miscellaneous plug loads</td>
<td>3.4%</td>
</tr>
<tr>
<td>Conservation voltage reduction</td>
<td>2.1%</td>
</tr>
<tr>
<td>New construction programs</td>
<td>1.9%</td>
</tr>
<tr>
<td>Comprehensive commercial retrofits</td>
<td>1.7%</td>
</tr>
<tr>
<td>Smart manufacturing</td>
<td>1.6%</td>
</tr>
<tr>
<td>Residential air conditioners and heat pumps</td>
<td>1.5%</td>
</tr>
<tr>
<td>Combined heat and power systems</td>
<td>1.3%</td>
</tr>
<tr>
<td>Commercial lighting design and controls</td>
<td>1.3%</td>
</tr>
<tr>
<td>Heat pumps replace electric resistance furnaces</td>
<td>1.2%</td>
</tr>
<tr>
<td>Smart commercial buildings</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

*Savings are percentage of total electricity demand in 2030*  
*(ACEEE New Horizons study)*