THE IMPERATIVE:
WIDER AND DEEPER

ACEEE/CEE
National Symposium on Market Transformation
March 2007

Blair Hamilton
THE GLOBAL IMPERATIVE

An 80% reduction in CO₂ by 2050 will require that we take action now to:

• Maximize energy efficiency
• Massively reduce use
• Maximize renewable energy supply
THE ECONOMIC IMPERATIVE

Because efficiency is our cleanest and cheapest energy resource –

• It *should* and *will* be called upon to provide 30 – 50% of our future energy requirements
THE STRATEGIC IMPERATIVE
We must acquire wider and deeper energy efficiency resources

Wider: More participants

Deeper: More savings per participant
THE STRATEGIC IMPERATIVE
We must acquire wider and deeper energy efficiency resources

Wider: More buildings

Deeper: More savings per building
THE STRATEGIC IMPERATIVE

We must acquire wider and deeper energy efficiency resources

**Wider:** More decisions affected

**Deeper:** More savings per decision
ACCELERATION IS UNDER WAY

• More states
• More utilities
• More programs
• Higher funding
Estimated Per Capita Budgets for Electric Energy-Efficiency Programs
for All 34 States with Energy-Efficiency Programs
(Excludes Load Management Programs)

CEE Values for 2006

Mean Budget per Capita: $8.50
VERMONT’S RISING INVESTMENT IN ELECTRICITY EFFICIENCY

<table>
<thead>
<tr>
<th>Year</th>
<th>Investment per capita</th>
<th>% of rate revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>$28.16</td>
<td>2.8%</td>
</tr>
<tr>
<td>2006</td>
<td>$31.25</td>
<td>3.0%</td>
</tr>
<tr>
<td>2007</td>
<td>$38.31</td>
<td>3.6%</td>
</tr>
<tr>
<td>2008</td>
<td>$48.89 (circled)</td>
<td>4.5% (circled)</td>
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</table>
# RISING RATES OF SAVINGS

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual GWh load met by efficiency</th>
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</thead>
<tbody>
<tr>
<td>2005</td>
<td>1.0%</td>
</tr>
<tr>
<td>2006</td>
<td>1.2%</td>
</tr>
<tr>
<td>2007</td>
<td>1.4%</td>
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<tr>
<td>2008</td>
<td>1.7% (highlighted)</td>
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</table>
RAISING OUR EXPECTATIONS
A scenario for ramping up annual efficiency savings as a portion of load
GOING WIDER: NEW MARKETS

- Solid-state lighting and beyond
- Consumer electronics
- Data centers and servers
- Advanced water heaters
- Niche industrial process markets
- Micro - C H P
MICRO-CHP

Can MicroCHP become a successor of the HE-boiler?
GOING DEEPER in New Construction

Time for **higher** targets

50% + commercial buildings

Net-zero buildings

LEED

Getting to Fifty
GOING DEEPER in Retrofit

“One size fits all” goes only so deep

• More custom approaches for sub-markets and niche markets
• More comprehensive approaches – bundles of measures
• More customer focus – account management
MORE INTEGRATION

Integration with all fuels

Integration with renewables
THE RETURN OF DIRECT INSTALL

Santa Monica Energy Fitness (1985)

United Illuminating Homeworks (1989)

PEPCO Apartments Plus (1994)

WEC Direct Install Program (1992)

CA small business Direct Install Programs (2005–)

NGRID Small Business Program (1989–)
MOVING UPSTREAM

- More buy-down procurements (e.g., CFLs)
- Supplier-focused strategies (HPT8s, refrigeration)
- More work with / through chain partners
- Franchise approach (building and equipment specs)
- Earlier and more aggressive Codes and Standards
COMMUNITY-BASED ENERGY PROJECTS

- Efficiency Vermont: Multiple Community-Based Energy Projects
- California Community Projects
- Davis Energy Project
- Community Energy Coop
- Ontario Green Communities
- Neighborhood Power Project
- Hood River Conservation Project
- New London Resource Project
- Jasper, Alberta
- Osage, IA
CAMBRIDGE ENERGY EFFICIENCY INITIATIVE

• Massive efficiency, plus distributed generation and demand response to reduce energy use by 14% in 4 to 5 years

• New non-profit corporation to act as agent

• Using private debt, equity capital, and ISO FCP payment stream to finance $100 million of energy efficiency
GOING DEEPER

Vermont’s experiment in targeted, deep efficiency to defer new T&D system capital investment
GOING DEEPER

• Approximately 1/4 of Vermont’s statewide public benefits investment in 2007–2008 is dedicated to four narrowly targeted geographic areas

• Will require a ten-fold increase in demand savings depth

• Maximum ramp-up of statewide strategies, plus “breakthrough” concepts for targeting
WHAT DO WE NEED TO DO?

• Absolute use matters

  • Time to focus on appropriately sized buildings, equipment, and appliances
  • Find ways to make downsizing an attribute, amenity, and benefit, rather than a sacrifice
  • Make “using less” a value, rather than a sacrifice
WHAT DO WE NEED TO DO?

• Increased energy labeling – both voluntary *and* mandatory
  • Shelf labeling of products
  • Building labeling
WHAT DO WE NEED TO DO?

• More and better energy indicators and controls
  • Simple, user–friendly systems
  • Business and home display of energy use
  • Dashboards and other simple indicator/control systems
WHAT DO WE NEED TO DO?

• Confront fuel choice and fuel substitution in buildings from a future–oriented, societal perspective

Consider:

• Carbon
• Other emissions
• Sustainability

• Current cost
• Probable future cost
• Risk and flexibility
WHAT DO WE NEED TO DO?

• Seriously address the energy & carbon impacts of building location

COURTESY, Center for Neighborhood Technology
• In the green areas, households own 1 less car than regional average

• Saves $400 per household per month

• Boosts disposable income 10–12% for lowest 2 income quintiles
WHAT DO WE NEED TO DO?

• Getting serious about impacts of building location –

  • Build broader awareness
  
  • Explicitly account for impacts of location on energy, carbon, cost of living, housing affordability, economic development
WHAT DO WE NEED TO DO?

• Enact policies that address the costs of building location
  • Score location efficiency in allocating tax credits
  • Account for location–associated costs in mortgages and project financing
  • Require accounting for location–specific impacts in siting all public buildings (e.g., government, schools)
WHAT DO WE NEED TO DO?

Address our biggest barrier to wider and deeper –

Barrier is not *technical* or *economic* –

It’s **INFRASTRUCTURE**
INFRASTRUCTURE NEEDS

• A wide range of high-efficiency products and equipment, competitively priced, needs to be EASY to get

• A deep, competitive infrastructure of efficiency-related service providers needs to be ready and able to provide services
  • Energy design and analysis professionals
  • Sales engineers
  • Building performance contractors
  • Efficiency specialty contractors
  • Building trades technicians and laborers
WHAT DO WE NEED TO DO?

• Will need BIG ramp-up
  • We’ll need tens of thousands of people to implement the work
  • For this not to be the barrier, we need training at all levels to ready a new workforce (vocational programs, unions, community colleges, universities)

• Big transformations like this usually require a lot of time
  • We need to get going now
A CHANGING ROLE FOR “UTILITIES” IN SECURING ENERGY EFFICIENCY?

• What will it look like when demand resources are as big as many traditional supply resources?

• What happens as demand resources become increasingly treated as competitive supply resources?

• Role of transmission utilities and RTOs as efficiency resource buyers? providers?
A CHANGING ROLE FOR “UTILITIES” IN SECURING ENERGY EFFICIENCY?

• What happens when utilities start to compete with each other – and with private and public entities – for efficiency resources?

• Some distribution utilities are attracted to the security of just poles and wires operation – complements the “Efficiency Utility” model
AN EXPANDED VISION OF THE EFFICIENCY UTILITY MODEL

Energy efficiency utility

Generation, transmission, distribution, and retail utilities
AN EXPANDED VISION
OF THE EFFICIENCY UTILITY MODEL

• Regulators (and the market) balance the mix of demand resources and supply resources

• Energy efficiency utility has a revocable franchise, similar to supply utilities
AN EXPANDED VISION
OF THE EFFICIENCY UTILITY MODEL

• EEU provides reduction in central system requirements (generation, T & D) by deploying multiple, customer-sited demand resources, including:
  • All-fuels efficiency – load & usage reduction
  • Combined heat & power
  • Customer-sited renewables (PV, solar hot water, etc.)
AN EXPANDED VISION
OF THE EFFICIENCY UTILITY MODEL

• EEU responsible for long-term planning and forecasting of demand resources
• EEU aggregates customer reductions as a resource in regional capacity markets
• Customers can pay for services and measures over time on a “bill” from the EEU
What will wider and deeper look like, 10 years from now?
“There’s a gentle man here who says he’s come to caulk where others have been too afraid to caulk.”

Courtesy E J Pettinger
ENVISION....

• Providers of efficiency services and products vigorously compete for customers, who respectively have a range of attractive offers to choose from
ENVISION....

• Empowered consumers
  • Have access to information, and the ability to act on it
  • Enjoy the benefits of ubiquitous rating, labeling, and disclosure
  • Take charge of their own energy use: customer–sited generation, smart meters

• Communities taking responsibility for their energy futures
ENVISION….

• Much greater integration between efficiency and customer-sited generation (renewables, CHP, etc.)

• Much greater use of directly measured energy efficiency results (instead of proxies)
ENVISION....

A transformation in product and equipment choices

Efficient vs. inefficient

Off-the-shelf, multiple choices of very-efficient and super-efficient products
ENVISION….

• Efficient products, equipment, and buildings would be *less* expensive than inefficient ones, using pricing mechanisms that reflect energy costs

For example:

• Embedded first month’s bill in price
• 1% of energy cost multiplier in price
• Up-front carbon charges
EFFICIENCY SHOULD BE AS EASY TO BUY AS ENERGY SUPPLY

- One stop, no hassle, one phone call away
- As easy to buy as the tank of oil it displaces over time
- As easy as pulling into the gas station and pumping gas
- Efficiency products and services as ubiquitous as convenience stores
“Laugh if you will, but my kind once ruled the earth.”

- Jack Ziegler, 1991