



SCHOOL OF PUBLIC AND
ENVIRONMENTAL AFFAIRS
INDIANA UNIVERSITY

The Search for Wise Energy Policy

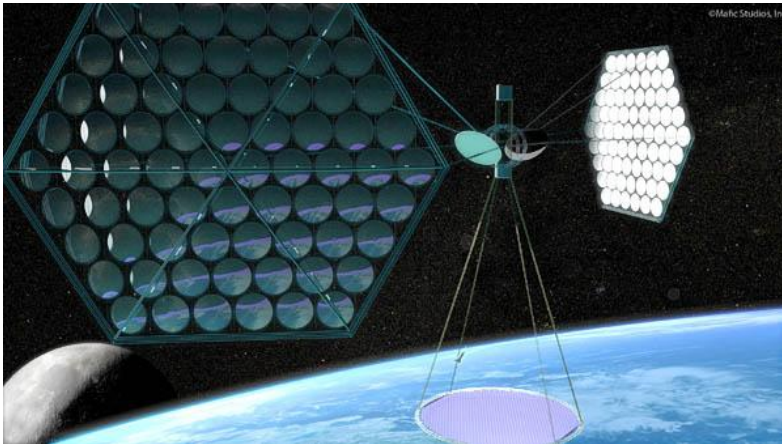
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Energy Efficiency: Evaluating Outcomes

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Two Main Ways to Meet Future Energy Demands

Increase supply



Source: <http://www.nss.org/settlement/ssp/SSP03-600.jpg>

Decrease demand



Source: www.alleganyhrdc.org

Demand side management

- Not sexy, but...
- It's "good" and "right"; not subject to much scrutiny

(Fairly) Big Federal Money in EE

Out of a \$26.4 billion FY '10 budget request for DOE (*...in addition to a \$38.7 billion DOE portion of the American Recovery and Reinvestment Act*):

- Building Technology Program (\$238 million)
(70% increase over FY '09).
- State Energy Program grants (\$75 million)
(+ stimulus: \$3.1 billion)
- Weatherization assistance (\$220 million);
(+ stimulus: \$5 billion – see NY Times, 6/8/09)

Categories of Energy Efficiency (EE) Interventions

- Appliance standards
- Financial incentive programs (for EE investments)
- Utility-based demand side management (DSM)
 - stimulus(> \$18 billion) for EE
- Information & voluntary programs
- Building codes
- Transportation policies (including CAFE)

EE: What to Evaluate?

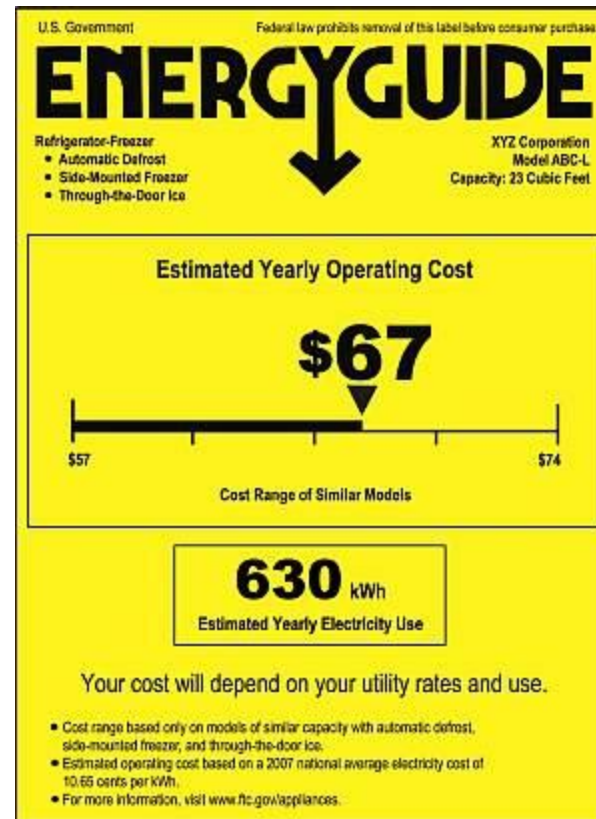
- Promised energy savings?
- Promised emissions reduction?
- Promised cost savings?
- Enhanced national security?

Case: Appliance Standards

- Energy Star



- EnergyGuide



Evaluating Appliance Standards

- Most studies are ex ante (Oak Ridge; Lawrence Berkeley; ACEEE; Gillingham, et al. 2006 offers a good review);
- Meyers, et al. (2005) for appliance standards programs that came into effect in 1988-2001 and 2007.
 - Methods: actual product shipments; forecasts of product shipments; forecasts of energy prices; marginal energy prices; base case assumes some EE improvement over time; NPV of 7%.
 - Projected outcomes for residential end-users:
 - Energy savings of 34 quads by 2020; 54 quads by 2030 compared to having no standards.
 - Reduction of CO₂ emissions in 2020 by 8%.
 - Cumulative NPV of consumer benefits: \$93 billion by 2020; \$125 billion by 2030.
 - Benefit-cost ratio of cumulative consumer impacts: 2.45 to 1.

Critiquing Benefits from Appliance Standards

- Energy efficiency leads to lower cost of energy services for consumer, thereby increasing demand, nullifying some gains in efficiency. (*rebound effect*).
- EE leads to improved productivity, new capital investment, economic growth, & associated increased energy demand.

Not much empirical evidence to back-up these critiques.

Critique (continued)

- Uniform national standards are insensitive to regions with different climate conditions & energy prices.
 - Should a customer in Fargo, ND be forced to purchase an energy efficient room air conditioner?
- If net benefits are so large, why isn't everyone taking advantage of them?
- EE appliances are regressive; negative impacts on low income households.

Again: little empirical evidence from critics.

Countering the Critiques

- Rebound effect not significant in a metastudy (Nadel, 1993);
- Appliance standards may help correct for information problems & other market failures;
- Critics overestimate the cost of EE appliances (economies of scale should be taken into account)
 - *E.g., The cheapest room AC I could find from 5 major retailers, whether Energy Star-complaint or not, was <\$200 and was Energy Star-compliant. Also, there are 812 Energy Star room air conditioner models.*

Key Problem: Gaps in Policy Evaluation by Responsible Agencies

- For example, the FTC does not regularly measure the overall effectiveness of the EnergyGuide program.
 - FTC does not measure energy savings from the program (though it's mandated by law) (GAO, 2007). (Nor does DOE or EPA).
 - FTC claims there is no baseline, there are confounding variables, etc.
 - FTC *has* asked consumers & manufacturers whether they think the labels are effective.

FTC could...

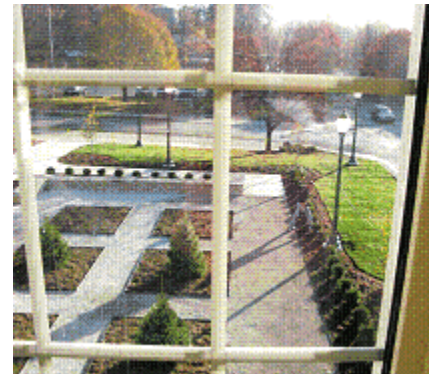
- Sample consumer behavior from showroom to the home;
- Conduct ex post experiments (consumers who purchased EE appliances vs. those who did not);
- Analyze data from smart meters that capture appliance energy demand.
- Deploy impact evaluation framework recently developed for DOE (Reed, et al. 2007).

Advice from the Secretary of Energy

- Interviewer: “...do you think Americans are doing enough to make their homes energy-efficient?”
- Steven Chu: “Most Americans could do more. The most important thing is making sure that your home is properly insulated, that your leaky doors and windows are fixed.”
– (NY Times, 4/19/09)

Case: New Hutton Honors College Building, Indiana University

- 15,000 sq. ft.
- Two floors
- Classrooms, administrative offices, library, Great Hall, etc.
- CFL's & electronic ballasts & motion sensor-activated lights.
- Inoperable windows
 - Energy efficiency
 - Humidity control



Biggest Occupant Complaints

- Can't open windows
- Off-gassing

That's a bad combination

Occupant Case: Jody



- She processes student fellowships & grants.
- Began having severe headaches, regularly, shortly after moving into new bldg.
- Eventually, she visited a doctor. Diagnosis: sick building syndrome.

Costs

- Private
 - Impaired health (acute or possibly long-term)
 - Out-of-pocket co-pay to doctor
- Institutional
 - Lost work day
 - Lower performance on other work days
 - Collateral concerns among staff may affect their productivity, too
 - Delay in issuing fellowships may have consequences for admissions of excellent students
- Social
 - Medicare reimbursement

Lessons Learned & Future Plans

- Piecemeal green buildings (“yellow buildings”) may cost more in the end.
- 11 new LEED projects at IU (Biology Research & Teaching Lab; Multidisciplinary Science Building; new dorm; etc.)



IUB Multidisciplinary Science Building II

Source: newsinfo.iu.edu