Johns Manville

A Berkshire Hathaway Company

Use of Energy Efficiency as a Tool to Offset Air Emissions

September 26, 2011

Johns Manville – part of Berkshire Hathaway

- **Three Business Divisions in North America**
  - **Insulation Systems**
    - *Residential*: JM Formaldehyde-free™ fiber glass building insulation
    - *Commercial*: office; multi-family; high rise
    - *Mechanical/Industrial*: aerospace; HVAC; OEM
  - **Roofing Systems**
    - Commercial roofing systems, including insulation and cool roofs
    - New integrated solar PV roofing systems
  - **Engineered Products – North America**
    - Glass fiber-based mats and reinforcements, wind energy
    - High efficiency air and liquid filtration, glass textiles

ACEEE – EER: EE to Offset Emissions

Policy problems?

- 65% of homes are under-insulated – adverse impact on
  - health and comfort of occupants
  - cost of home ownership
  - home value
- Poor air quality has an adverse public health and environment
- Air permits for many new sources can take years
- Some non-attainment areas will experience electricity shortages

ACEEE – EER: EE to Offset Emissions

Policy problems?

- Substantial emissions reductions will be required at power plants
  - Cross State Air Pollution Rule (2008 ozone standard)
  - Utility New Source Performance Standard for GHG
- Federal and state subsidy money steadily declining
- Private sector capital sitting on sidelines

ACEEE – EER: EE to Offset Emissions

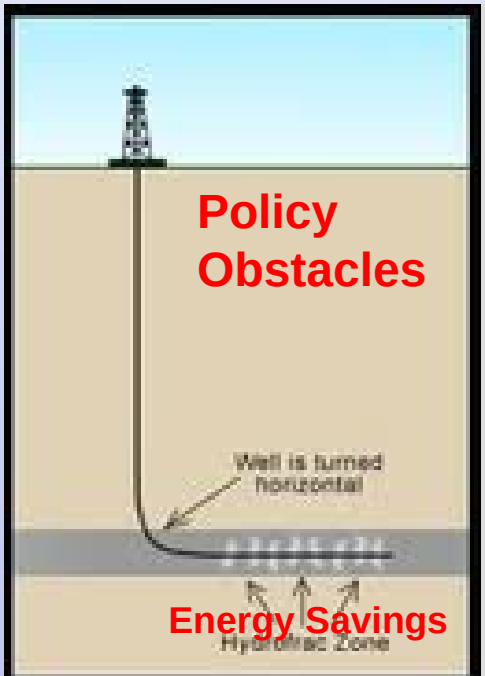
Overlapping – inconsistent problems?

- No, really this is a description of a great opportunity
- End-use EE hits on all these policy issues
  - Emissions reduction
  - Air quality
  - Air permitting
  - Health
  - Investment
  - Under-insulated homes (70 million)

ACEEE – EER: EE to Offset Emissions

Efficiency is America's last great clean energy resource

- 70+ million homes under-insulated
- We know the resource is there and we know the rough size of savings
- We need a reliable way to get to it
- EE is like shale gas ten years ago
- What we need for EE is "policy fracking" to promote the use of EE to achieve indirect emissions reductions and related benefits



ACEEE – EER: EE to Offset Emissions

What has EPA done to promote EE for emissions reductions?

- 2004 guidance on SIP credits for EE
- 2011 draft roadmap for EE in SIPs/TIPs
- Future – identify polices that should be changed repealed to allow more flexibility
  - Not just for states
  - For private sector interested in investing in EE projects

ACEEE – EER: EE to Offset Emissions

EE to achieve indirect emissions reductions - EPA regulations

- Cross State Air Pollution Rule (August 2011)
  - Preamble Section VIII.D.2.; 76 Fed. Reg 48208, at 48319 (Aug. 8, 2011)
  - achievement of energy efficiency (EE) improvements in homes, buildings, and industry is an important component of achieving emission reductions from the power sector while minimizing associated compliance costs.
  - energy efficiency avoids emissions of all pollutants associated with electricity generation, including emissions of NOX and SO2 targeted by CSAPR, and reduces the need for investments in EGU emission control technologies in order to meet emission reduction requirements.
  - ***energy efficiency can often be implemented at a lower cost than traditional control technologies***

ACEEE – EER: EE to Offset Emissions

EE: emissions reductions new/modified sources under Clean Air Act

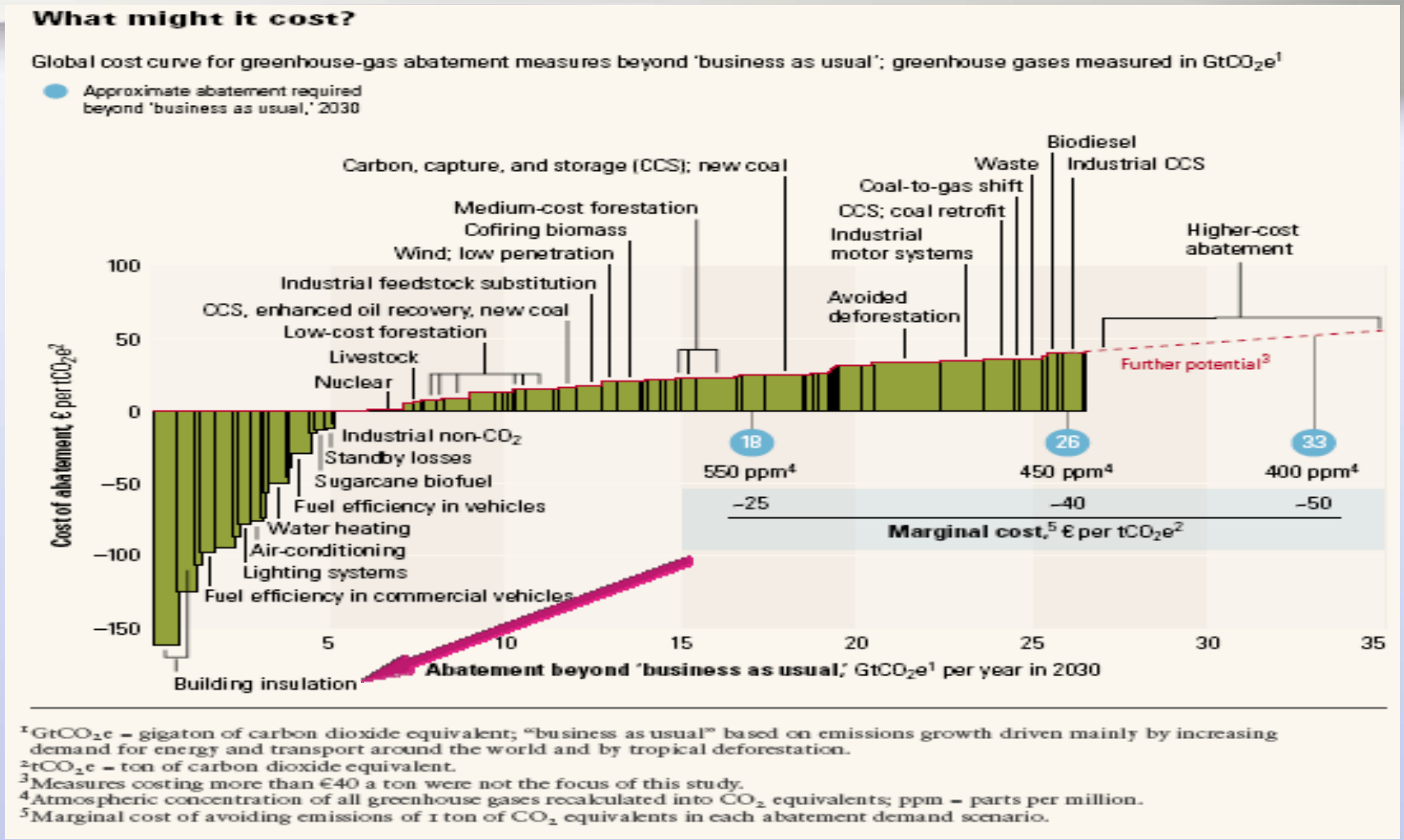
- Air permits: lengthy, expensive process
  - Attainment areas: PSD for significant **net** emissions increases
  - Nonattainment areas: no net emissions incr.
- Use EE-based indirect emissions reductions to hasten permits
  - net out of PSD
  - offset emissions of new/mod source

ACEEE – EER: EE to Offset Emissions

EE for emissions reductions - EPA regulations

- Utility New Source Performance Standards for Greenhouse Gas Emissions
- 2010 settlement required proposed NSPS 7/2011
- Effort under criticism, proposal delayed –
- EE good fit for Section 111(d) standard for new sources

EE for GHG Emissions Reductions



[1] $GtCO_2e$ – gigaton of carbon dioxide equivalent; "business as usual" based on emissions growth driven mainly by increasing demand for energy and transport around the world and by tropical deforestation.
[2] tCO_2e – ton of carbon dioxide equivalent.
[3] Measures costing more than €40 a ton were not the focus of this study.
[4] Atmospheric concentration of all greenhouse gases recalculated into CO_2 equivalents; ppm – parts per million.
[5] Marginal cost of avoiding emissions of 1 ton of CO_2 equivalents in each abatement demand scenario.

ACEEE – EER: EE to Offset Emissions

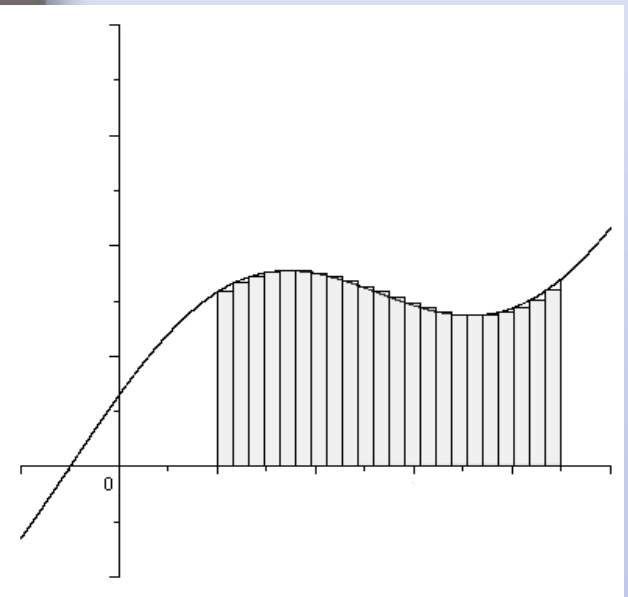
What's holding back large-scale EE projects for indirect emissions reduction?

- Requirements for indirect emissions reductions
  - Real/quantifiable - attribution
  - Surplus
  - Enforceable
  - Permanent
- What is real?
- How best to quantify indirect emissions reductions

ACEEE – EER: EE to Offset Emissions

EM&V – essential requirement or unnecessary obstacle?

- Precision vs. accuracy
  - Energy savings in one retrofit is measured to 3 decimals
  - This takes time and money
  - Is it worth it?



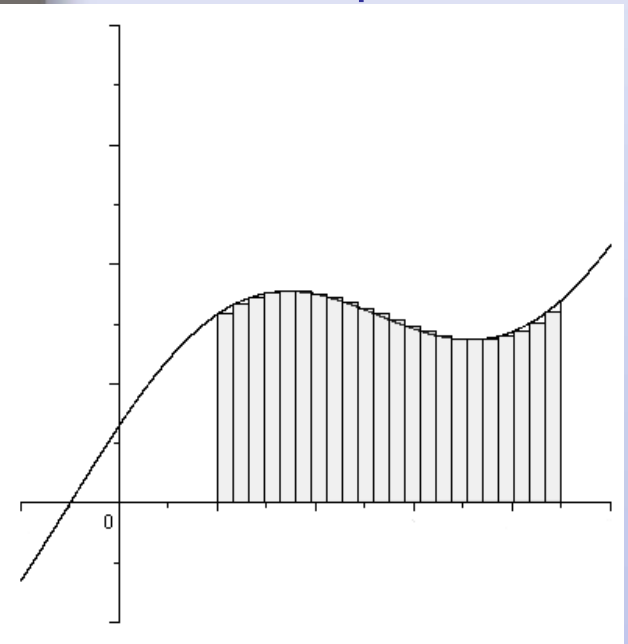
- Depends on size of project

- Precise measurement of energy savings may be appropriate for single home

ACEEE – EER: EE to Offset Emissions

EM&V – essential requirement or unnecessary obstacle?

- Precision vs. accuracy
  - Need rough accuracy in aggregate energy savings NOT precision needed when doing many projects



The benefit of large numbers

$$\int_a^b f(t)\,dt = \lim_{n\to+\infty} \sum_{i=1}^{n} f(t_i)h$$

ACEEE – EER: EE to Offset Emissions

What's needed . . .

- More flexibility from EPA, states
- Prescriptive path for EE emissions offsets, esp. large projects
- Convergence of utility regulation and environmental regulation
- Include health/env. benefits in C/B review
- Clearer financial incentives for EE:
  - New policies would support new business models that monetize all EE benefits
  - Emissions reductions and other benefits owned by the funder
- Less political posturing by all parties

ACEEE – EER: EE to Offset Emissions

What we could achieve: better environment and wealth creation

- No (fewer) new power plants, rates low
- Better air quality faster, cheaper, smaller increments
- Improvements in public health
- Homes
  - Decrease in home ownership cost
  - Increase in home values
  - Increase in health and comfort
- Help integration of renewables and DG

Johns Manville

Backup Slides

Johns Manville and Green Building

- **Formaldehyde-free™** fiber glass insulation
  - Only complete line of home insulation certified to be formaldehyde-free, meet EPA EPI spec
  - US EPA granted exemption to HAP regulations
- **Recycled content**: certified > 30% post-consumer
- **Clean manufacturing** process
  - JM's HERM is low-emitting, more energy efficient fiber glass insulation mfg'ing process
  - Meets US EPA NSPS w/o pollution control
- **JM a Climate Action Leader in California, member TCR**

Johns Manville - Insulation Products

Batts & Rolls

Johns Manville - Insulation Products

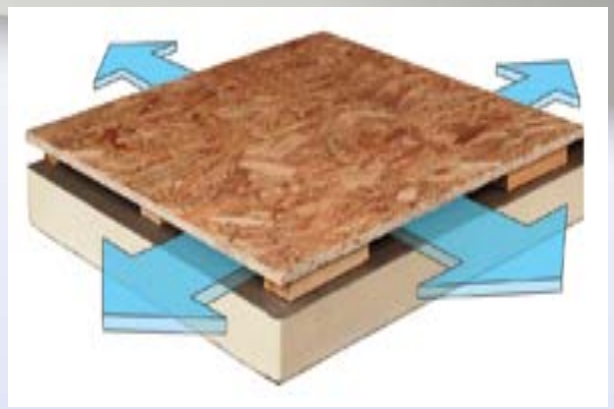
Climate-Pro®
Blowing wool

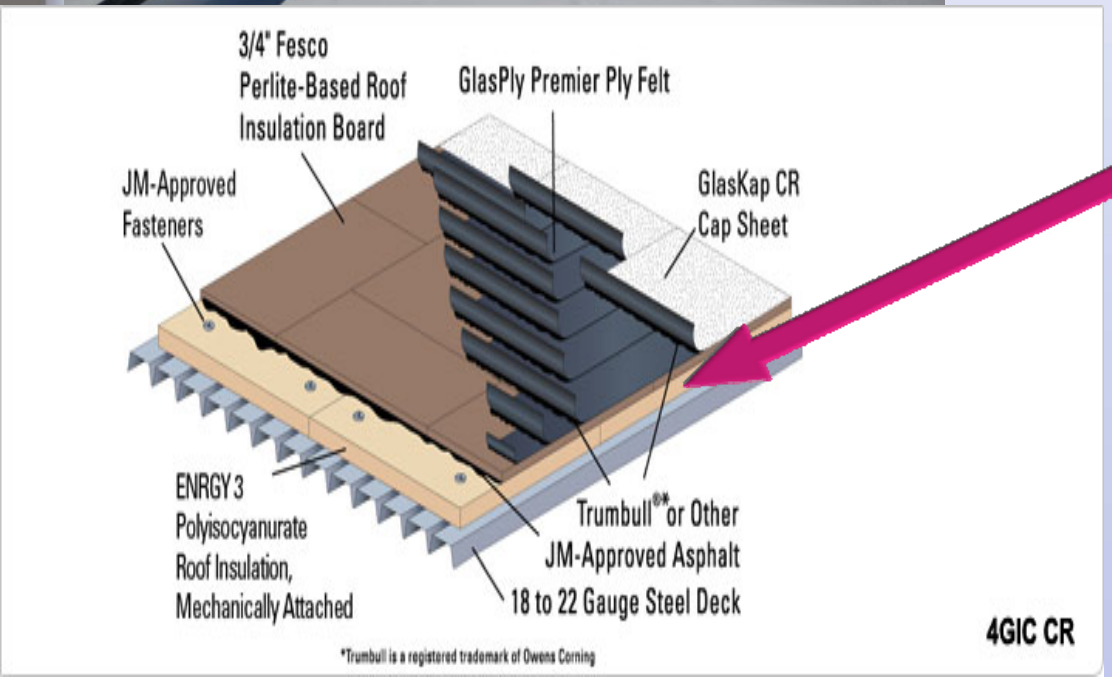
Spider® Blow-in
Batt system

(zero waste)

Johns Manville - Roofing Products

Cool roof membrane





Iso-Foam Roof Insulation

Nailboard

Johns Manville - Roofing Products

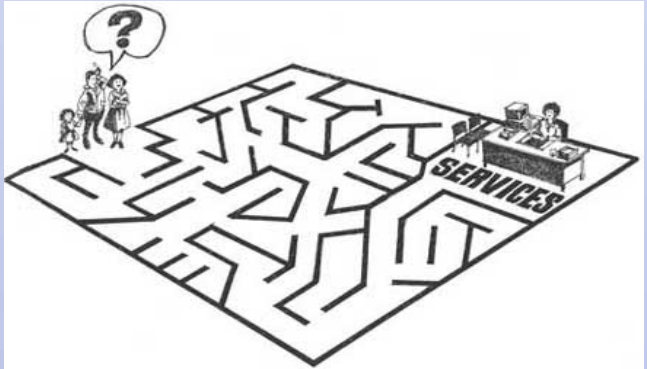
JM E3co.

The JM Eco-leadership™ Company

Integrated Solar PV

Johns Manville – Energy Efficiency Policy Issues

- **There are three major barriers to the maximum deployment of Energy Efficiency.**
- **Insufficient access to:**
  - **information on energy efficiency products and solutions;**
  - **financial resources to fully fund appropriate energy efficiency projects; and,**
  - **a plentiful and fully trained and skilled workforce to implement efficiency solutions quickly and effectively.**



Johns Manville – Energy Efficiency Policy Issues

- **Attributes of Energy Efficiency**
  - **delivers cheap demand reduction/supply increase**
  - **quicker than power plants, renewable projects**
  - **in smaller increments than traditional supply facilities**
  - **Also delivers quick emissions reductions (GHG, NAAQS, toxics)**
  - **side benefits**
    - **increased comfort of home occupants**
    - **decreased heating and cooling costs**
    - **increased affordability of home ownership**
    - **increased public health**
    - **Increased grid reliability; better financials for RE**
    - **increased energy/national security**