COMPARING ENERGY EFFICIENCY, RENEWABLE ENERGY, AND GENERATION

ACEEE Energy Efficiency as a Resource, September 26, 2011

David Juri Freeman
Lisa A. Skumatz, Ph.D.
762 Eldorado Drive, Superior, CO 80027
303/494-1178  email: skumatz@serainc.com
©SERA2010, Internally funded
TOPICS

- What we know already
- GHG emissions
- Programs analysis
  - Normalized results
- Other considerations
- Implications
WHAT WE KNOW…

... if cost per kWh were the only consideration.
RELATIVE COST PER kWh

Source: ACEEE, NRDC, SERA, and others

Normalized coal=1
IF GOAL IS MTCE ...

...... at least partly...
Electricity, building energy use responsible for about 1/3 of GHG emissions

Source: USEPA, 2005
US GREENHOUSE GAS EMISSIONS SOURCES - REVISED

Source: USEPA 2009

- Building Energy Use: 31%
- Local Passenger Transport: 12%
- Inter-city Passenger Transport: 7%
- Food: 12%
- Provision of Goods & Materials: 38%
GOAL – REDUCE MTCE

- Historic takeaways –
  - Prioritized actions in energy efficiency (EE), transportation

- But are all kWh equal? On what terms?
  - cost hierarchy?
  - other factors?
  - ...Move beyond B/C ratio
ENERGY PROGRAMS ANALYZED

Residential Weatherization (Res EE)

Commercial Lighting (Coml EE)

Wind

Solar
ANALYSIS STEPS

- Data on costs, energy savings, peak & base generation fuels, other
- Modeled
  - associated MTCE, MTCO2e) emissions reductions (base case “generation”)
  - job creation, output impacts (same base case)
- Computed costs / MTCE, jobs / MTCE
- Results “normalized” for policy focus
- Purpose NOT to highlight / criticize specific programs...
MTCE RESULTS
RELATIVE COST PER MTCE

Source: Phase 1 draft figures, Skumatz Economic Research Associates, Inc. (SERA) Superior, CO. All rights reserved. May be used with permission of author.
COST / MTCE RESULTS

- EE programs are relatively cheaper per MTCE
- Variations from:
  - Program costs
  - Local generation mix
- Does anyone care about GHG- What matters now?
RELATIVE JOB IMPACTS
JOB CREATION ALSO DIFFERENTIATES PROGRAMS

- Direct install, broad programs create more jobs
- Fewer jobs from appliance programs
  - No installation
  - Equipment not all made in US or the relevant state
- Recession...

![Bar chart showing job creation by state and program type]
RELATIVE JOBS PER MTCE

Source: Phase 1 draft figures, Skumatz Economic Research Associates, Inc. (SERA) Superior, CO. All rights reserved. May be used with permission of author.
RELATIVE COST & JOBS PER MTCE

Source: Phase 1 draft figures, Skumatz Economic Research Associates, Inc. (SERA) Superior, CO. All rights reserved. May be used with permission of author.
RELATIVE COST JOBS / $1M

Source: Phase 1 draft figures, Skumatz Economic Research Associates, Inc. (SERA) Superior, CO. All rights reserved. May be used with permission of author.
OTHER PERSPECTIVE /
CONSIDERATIONS

City / County point of view...
MULTIPLE WAYS TO ACHIEVE GHG REDUCTIONS

- Cities / counties may also consider recycling, transportation, other strategies
- Conducted similar analysis of recycling programs
PROGRAMS MODELED

- Solid waste:
  1. Pay-as-you-throw (PAYT)
  2. Residential curbside recycling (CS Recy.)
  3. Yard waste (composting not AD)
CALCULATION APPROACH

- Collected data on impacts and costs
  - Tons
  - kWh
- GHG
  - Modeling approaches
  - Base (landfilling)
- Results “normalized” for policy focus
RELATIVE COST MTCE

Source: Phase 1 draft figures, Skumatz Economic Research Associates, Inc. (SERA) Superior, CO. All rights reserved. May be used with permission of author.
RELATIVE COST, JOBS PER MTCE FOR RECYCLING & ENERGY

Source: Phase 1 draft figures, Skumatz Economic Research Associates, Inc. (SERA) Superior, CO. All rights reserved. May be used with permission of author.
RELATIVE COST, JOBS PER MTCE FOR RECYCLING & ENERGY

Source: Phase 1 draft figures, Skumatz Economic Research Associates, Inc. (SERA) Superior, CO. All rights reserved. May be used with permission of author.
US GREENHOUSE GAS EMISSIONS (REVISED)

Local Passenger Transport 12%

Building Energy Use 31%

Inter-city Passenger Transport 7%

Food 12%

Provision of Goods & Materials 38%

Source: USEPA, from Allaway (ORDEQ)
OTHER PROGRAM CONSIDERATIONS

- How do behavior based programs stack-up

Do you really think we’ll save any money with those new Efficient lightbulbs?

I dunno. Did we turn off the lights?
CONCLUSIONS / IMPLICATIONS
CONCLUSIONS / IMPLICATIONS

☐ Other considerations
  ■ Generation mix, region, ramp-up, behavior, EUL

☐ GHG objectives
  ■ Move beyond B/C and consider optimization

☐ Measurable, variable results for different programs –
  ■ GHG,
  ■ Job performance
CONTACT INFORMATION

David Juri Freeman
Lisa A. Skumatz, Ph.D.
Skumatz Economic Research Associates (SERA)
762 Eldorado Drive, Superior, CO 80027
Phone: 303/494-1178
Email: skumatz@serainc.com
Web www.serainc.com