

Session 4 Breakout Group on Energy Management

Decision Support for Energy Management and Planning: Application of Climate Science

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U.S. Department of Energy*

November 15, 2005

Session 4 breakout groups: Applications of climate science

Objectives of the breakout groups:

1. Discuss how well research is meeting the needs of decision makers;
2. Describe development and application of resources to support adaptive management and climate policy development;
3. Identify program needs and gaps that should be addressed to support decision making.

Focus in energy breakout group is on climate science applications and needs for energy-related decision making.

Overview of energy breakout group

- **Climate-energy connection – why decision support information and tools from climate science are needed for both near- and long-term energy management and planning**
- **Presentation on decision support needs and applications for the Climate Change Technology Program - David Conover, DOE**
- **Series of presentations on science informing decision making both in the near- and the long-term**
- **Panel discussion: Panel and audience to address questions dealing with:**
 - 1) barriers to using decision support resources in energy-related decision making,*
 - 2) high priority information needs that aren't being met,*
 - 3) observations, and research needed to develop resources for meeting those needs, and*
 - 4) characteristics of effective communication of science to decision maker.*

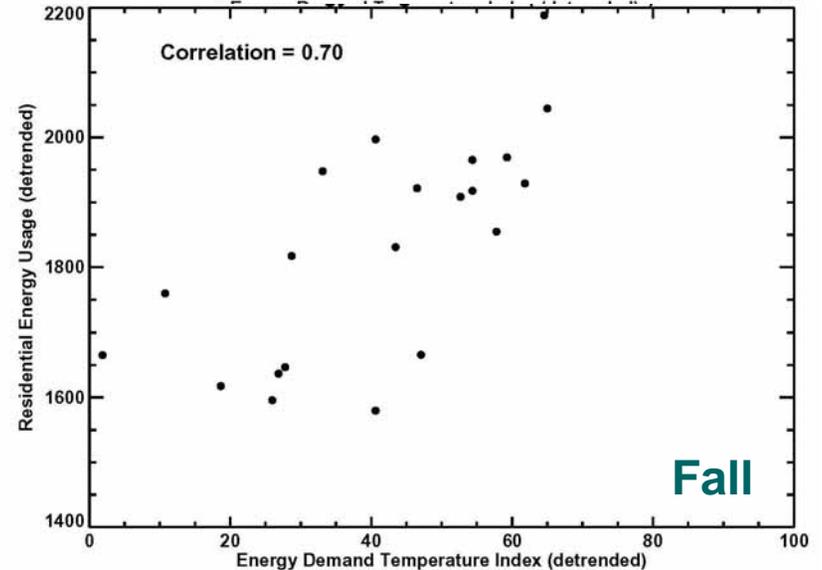
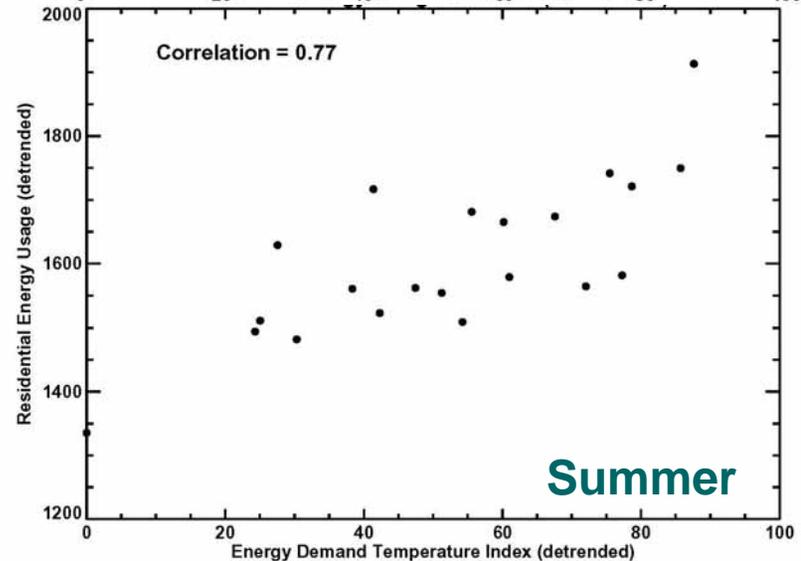
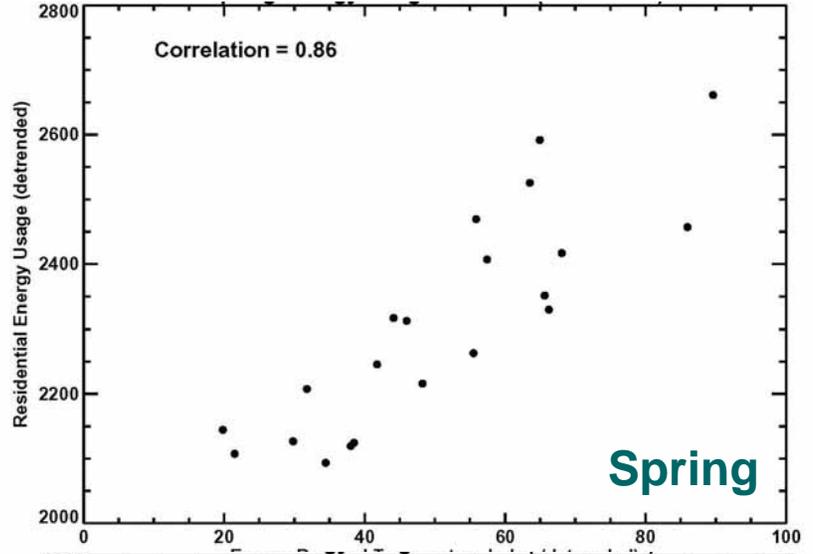
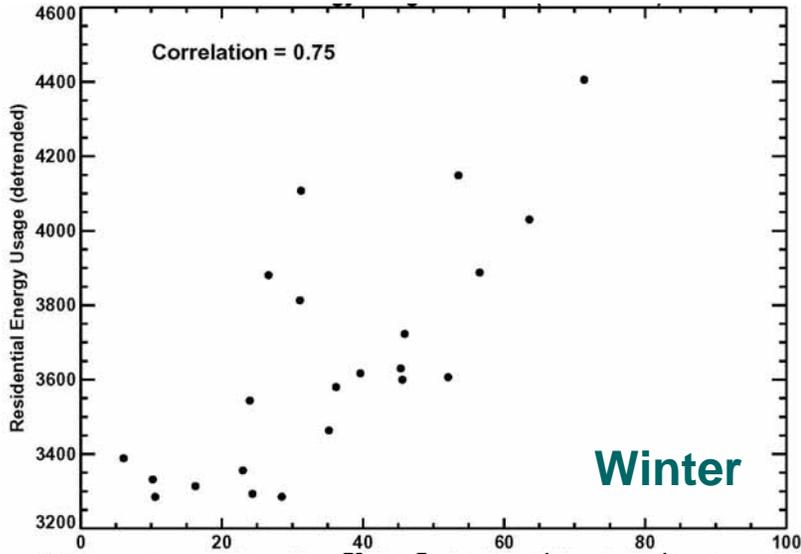
Panel discussions to address four questions to report back to plenary:

1. **Effectiveness:** What are the barriers to using decision support resources in decision making, and how can these barriers be overcome? How can we evolve our approach to decision support as we evaluate experiences and learn more?
2. **Information Needs:** Across the applications covered in the energy breakout group, are there unmet high-priority information needs shared by user groups?
3. **Research Priorities:** What observations and research are most needed to develop resources for meeting the needs identified in question 2?
4. **Communication:** What are the characteristics of effective communication of science to decision makers, and what is needed to better sustain a continuing dialogue? What are examples of successful decision support collaborations that should inform program design?

CCSP Energy Breakout Group

- **Climate-Energy Connections: Why decision support information and tools from climate science are needed for both near- and long-term energy management and planning**
- **Many energy decisions are and will continue to be closely tied to climate**
- **Climate variation and change affects energy demand, supply, and distribution:**
 - energy demands for heating and cooling,
 - supplies of renewable energy (hydro, solar, biomass, wind)
 - potential impacts of extreme climatic events (droughts, floods, hurricanes, ice storms) on energy supplies, distribution, and transport
- **Energy-related activities contribute to human-induced climate forcing and thereby can affect climate**
- **Need to quantifying climate sensitivity to energy-related emissions and activities, e.g., climate forcing from greenhouse gas and aerosol emissions, potential alterations of albedo from land use changes associated with potential large-scale biomass energy production**

Residential energy demand versus Residential Energy Demand Temperature Index for the period 1980-2000 for each of the four seasons. Figures show that residential energy consumption is highly correlated with heating and cooling degree days. Results from NOAA/NCDC REDTI website.



Why climate science information is needed for both near- and long-term energy management and planning

Examples include information and tools to inform decisions dealing with:

- Effects of climate variation and extremes on energy demand and supply, enable planning for and management of potential mismatches between demand and supply associated with climate variability
- Potential for disruptions in energy supplies and distribution resulting from extreme climatic events, enable preparation of adaptive plans for dealing with such events, if needed
- Effect of energy-related activities on climate and the environmental and economic costs and benefits of energy technology options for mitigating enhanced greenhouse forcing of climate

Worldwide large CO₂ emission sources of more than 0.1 million metric tonnes CO₂ per year. 88% of stationary-source emissions of CO₂ are related to energy in some way.

Process	Emissions (Mt CO₂/yr)
Fossil Fuels (stationary sources)	
Power (coal, oil, gas)	10,539
Cement production	932
Refineries	798
Iron & Steel industry	646
Petrochemical industry	379
Oil & gas processing	50
Other sources	33
Transportation (mobile sources)	5,656*
Biomass (stationary sources)	
Bioethanol & bioenergy	91
TOTAL	19,124

*Road transportation (cars, trucks, buses) accounts for most of these emissions (~4200 Mt CO₂/yr).

Why climate science information is needed for both near- and long-term energy management and planning

Examples include information and tools to inform decisions dealing with:

- risks to/vulnerabilities of energy systems of long-term climate change, climate variation, and climate extremes, enable planning to mitigate or adapt to the risks;
- availability, reliability, and sustainability of environmental resources sensitive to climate that could constrain current and future energy technologies and renewable energy resources, e.g., water, solar, wind, biomass, etc