

Utah Energy

Women's State Legislative Council Energy Development in Utah

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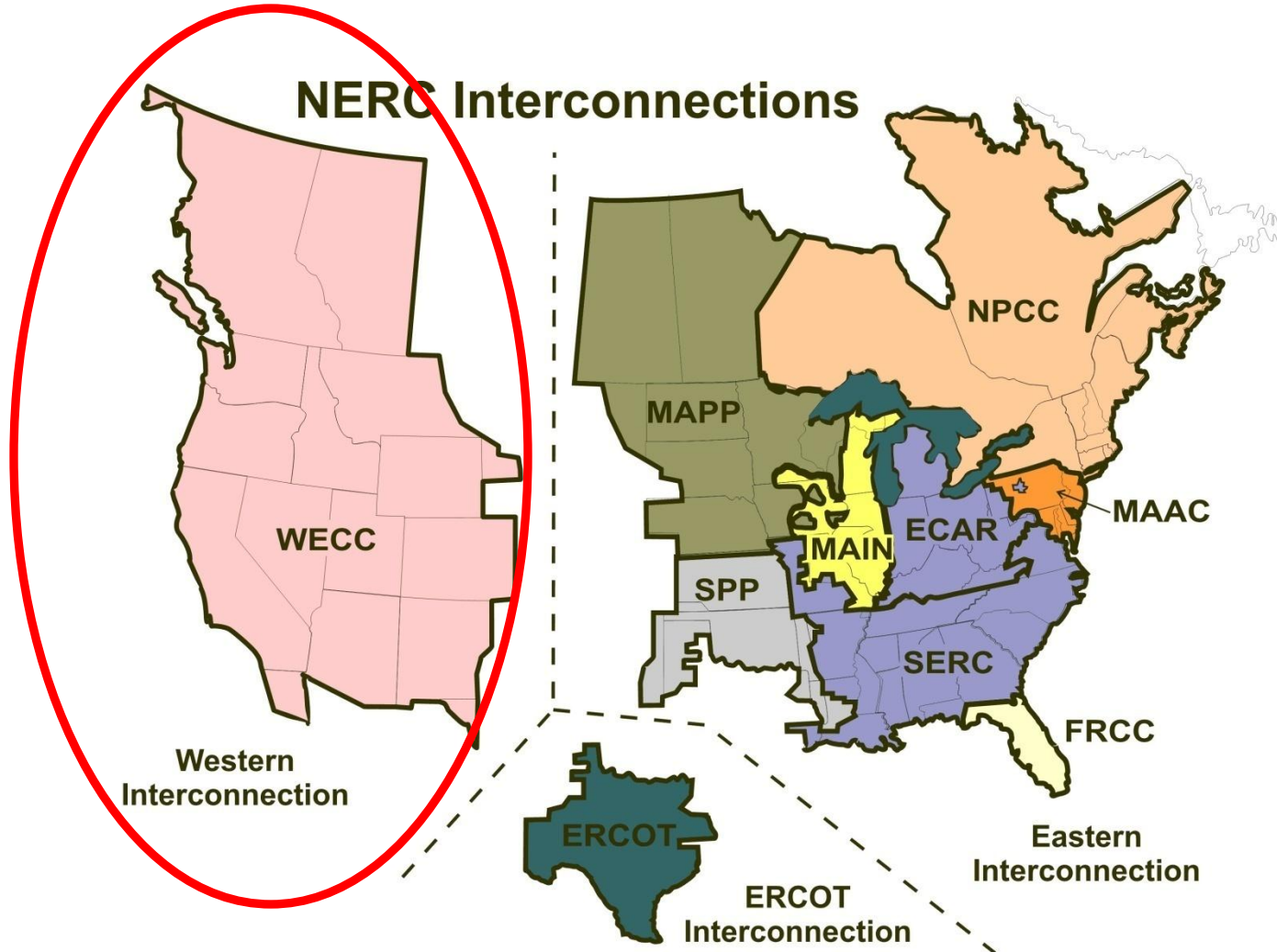
UTAH ENERGY GOALS

- **AFFORDABLE ENERGY**
- **SUSTAINABLE ECONOMY**
- **STRENGTHEN ENERGY SECURITY AND INDEPENDENCE**
- **REDUCE EMISSIONS**

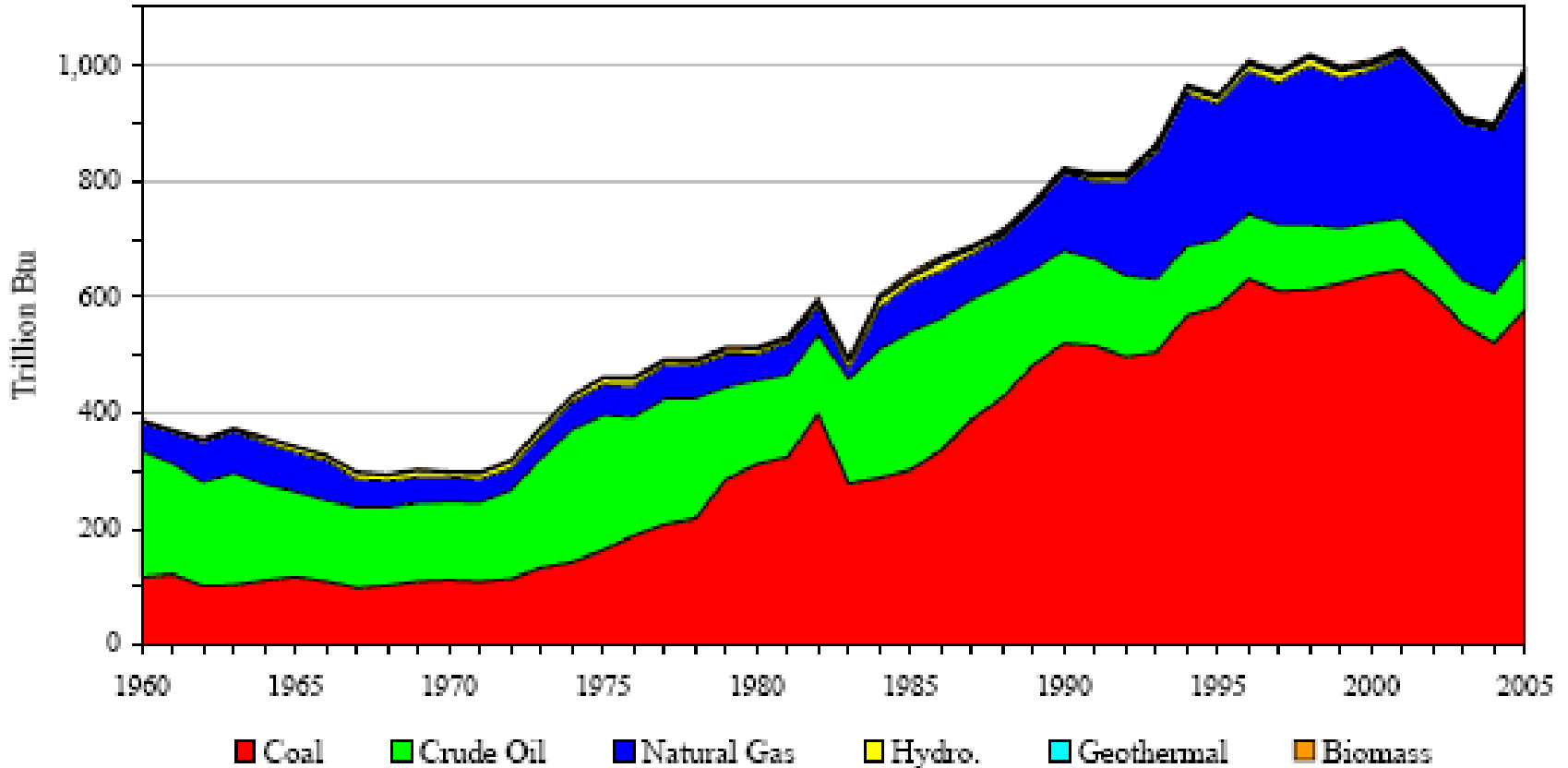
UTAH ENERGY STRATEGY

- **Diversify Energy Portfolio of Renewables and Non-Renewables**
- **Promote Economic Development**
- **Improve Energy Efficiency and Conservation**
- **Improve Environmental Quality and Reduce Greenhouse Gases**
- **Develop Transmission and Transportation**
- **Maintain Quality of Life**

Context – Western Interconnection



Energy Production in Utah by Primary Source



Net Generation of Electricity in Utah by Source

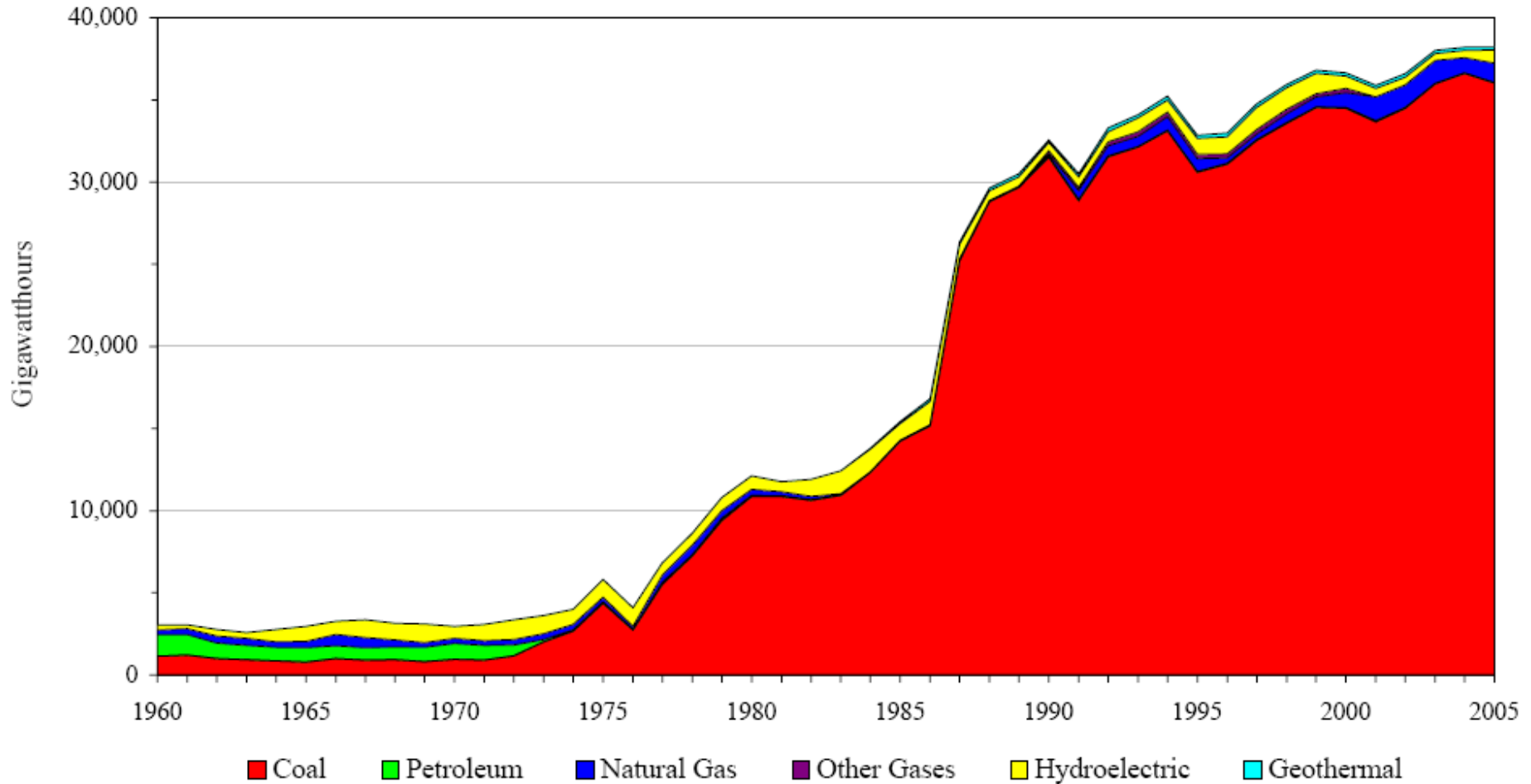
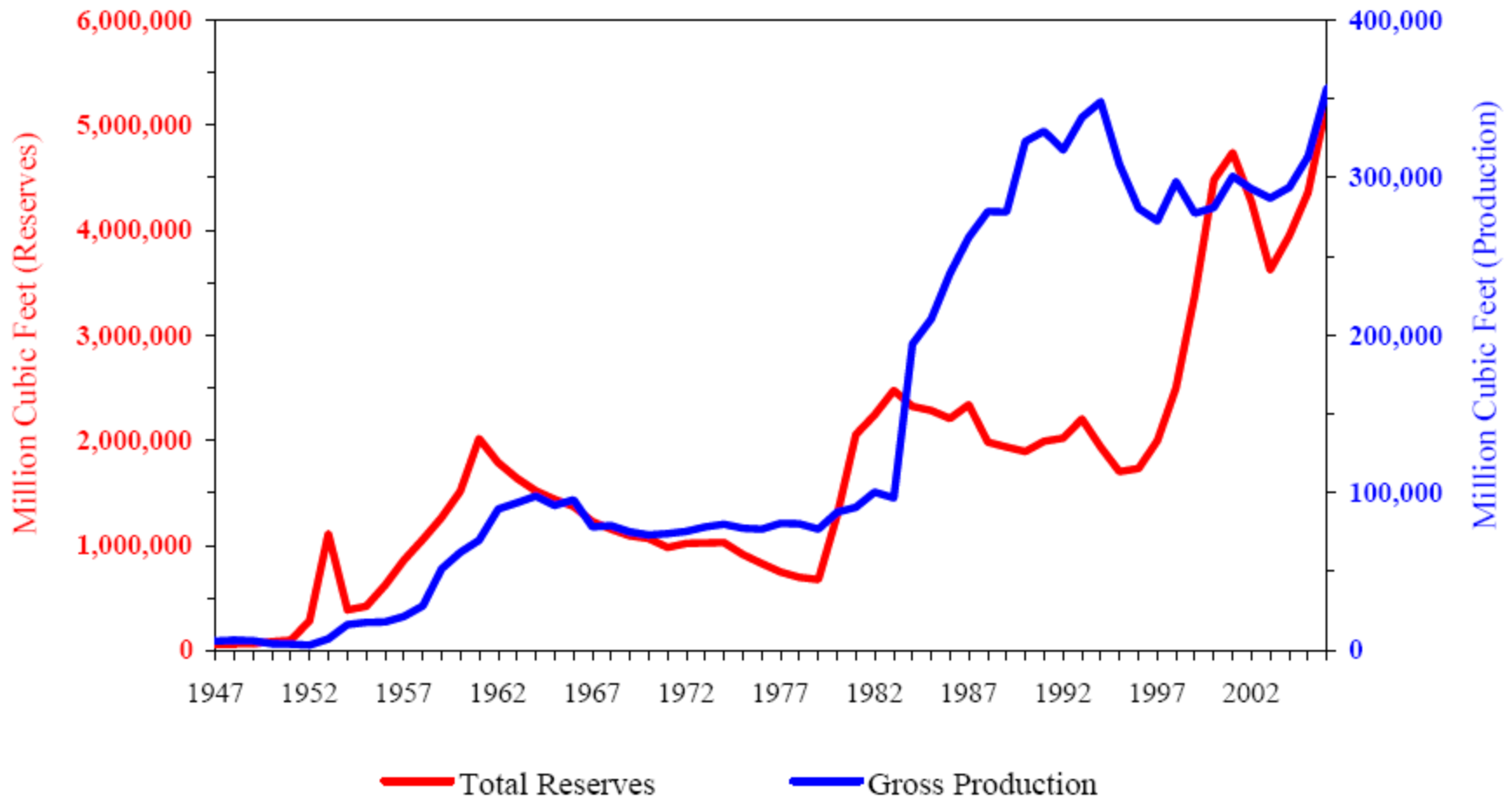


Figure 4.2 - Proved Reserves and Gross Production of Natural Gas in Utah, 1947-2006



UTAH ENERGY TARGETS

- Improve Energy Efficiency by 20% by 2015
- Generate 20% of Electricity from Renewable Energy Sources by 2025
- Reduce Greenhouse Gas Emissions to 2005 Level by 2020

State of Utah
Governor's Blue Ribbon Advisory Council on
Climate Change

www.deq.utah.gov/Issues/Climate_Change/index.htm

Utah Energy Efficiency Strategies: Policy
Options

<http://energy.utah.gov/energy>

Western Climate Initiative

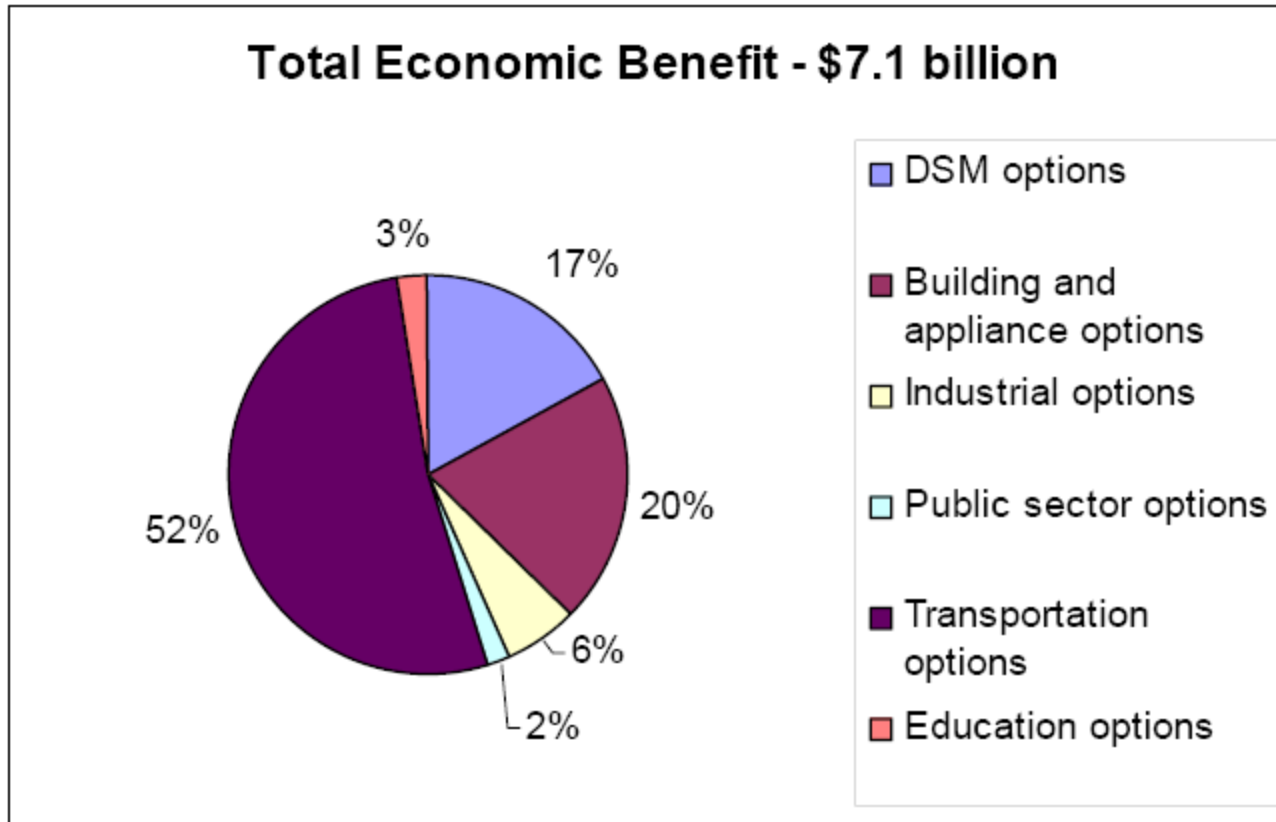
www.westernclimateinitiative.org



THE CLIMATE REGISTRY

www.theclimateregistry.org

Net Economic Benefit of Energy Efficiency Options



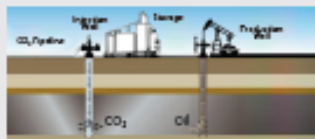
Geller et al, 2007

Burying CO₂ — Utah's new tool to fight global warming

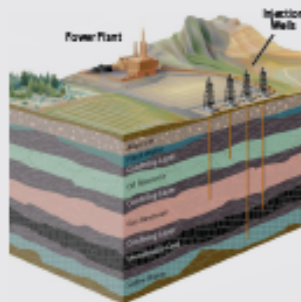
Where can we store CO₂?

Natural gas, which we use to heat our homes, has been trapped by Mother Nature below Utah sandstone for millions. Now, Dr. Brian McPherson, a USTAR professor at the University of Utah, is developing ways to inject CO₂ into those same sandstone formations to prevent it from entering the atmosphere.

It's called carbon capture and storage. And the basic idea is to take CO₂ created by burning fossil fuels at power plants and pump it thousands of feet underground to store it safely away from the atmosphere.



Enhanced oil recovery uses CO₂ to make oil wells more productive.



CO₂ created at power plants is injected thousands of feet below the ground, below a "Sealing Layer," which prevents the CO₂ from escaping.

How does Utah's economy benefit from carbon storage?

Enhanced Oil Recovery: For decades, CO₂ has been injected into oil wells in Texas to enhance oil recovery. Essentially the CO₂ "pushes" oil out of the ground that would otherwise be impossible to pump out. The same CO₂ that assists oil recovery is trapped underground, where it can't contribute to global warming. A Department of Energy analysis estimates that Utah could recover 2.8 billion barrels of oil using CO₂. That's enough oil to supply gasoline to Utah drivers, at current levels, for more than 30 years.

Jobs in Rural Utah: Carbon capture facilities will be built in rural Utah, requiring construction and maintenance workers. In addition, the ability to generate electricity using Utah's abundant coal and natural gas resources, while still meeting new regulations limiting CO₂ emissions, will mean well-paying jobs in mining and at electric plants could continue in rural Utah.

A CO₂ Storage Industry: It's highly likely that a market for carbon storage will be created in the coming years. Assuming the technology proves environmentally safe, Utah could store CO₂ created in other states for a fee, which again would help the Utah economy.



Results So Far

Recruiting World-Class Talent to Utah

USTAR's first accomplishment was to recruit Dr. McPherson to Utah using state funding. The creator of the Southwest Regional Partnership for Carbon Sequestration at the New Mexico Institute of Mining and Technology, Dr. McPherson is an internationally recognized expert in carbon capture and storage.

\$88 million in funding

Dr. McPherson was recently awarded a \$67 million grant from the US Department of Energy to study carbon capture and storage. Adding in private and partner funding, the project will total \$88 million.

Millions to be spent in rural Utah

To study the feasibility of carbon storage, Dr. McPherson will be injecting up to 1 million tons of CO₂ yearly into the Paradox Dome, a geologic formation southeast of Price. Dr. McPherson's team will closely monitor the site to prove that long-term underground storage is a feasible solution to CO₂ emissions. This part of the project will potentially bring as much as \$30 million to the economy of rural Utah.

A new company is formed

Following USTAR's mission of creating new Utah companies to commercialize innovations, Dr. McPherson has already created a new company in Utah, which will help commercialize carbon storage technology for use around the world.



What is USTAR?

The Utah Science Technology and Research Initiative (USTAR) is a state-funded, long-term effort to strengthen Utah's "knowledge economy," creating high-paying jobs and new businesses. This bold initiative invests in world-class innovation teams and facilities at the University of Utah and Utah State University, then commercializes the technologies through new business ventures.



Discover more at ustar.utah.gov



Spanish Fork Wind Power Plant



Photo from Deseret News August 29, 2008,
Stuart Johnson

- August 2008
- 9 Turbines with 18.9 MW Capacity
- 55,000 MW production = 6,100 average homes
- Spanish Fork still uses land for culinary water and mining
- The school district receives \$1.267 Million in the first 20 years of the project.
- 20 MW Turbine = \$4.78 million, 12 long term jobs, plus additional jobs and economic impact during construction
- GHG Offsets 88,000 lbs SO₂; 241,000 lbs NO_x; 115,000 CO₂

UT Thermo Springs Geothermal

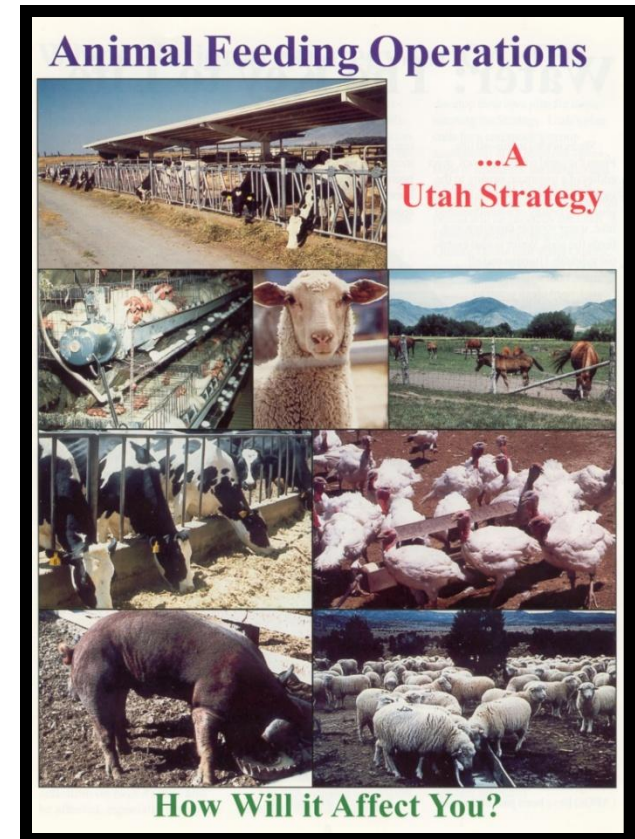


Photo courtesy of Raser Technologies 2008

- Beaver, UT
- Groundbreaking in May 2008
- 10 MW in 2008, up to 235 MW future development
- Raser Heat Transfer Technology = patented liquid that has a lower steam point.
 - Allows more low-temperature geothermal production sites
 - Allows more economical sites using shallower water
- \$35 Million dollars for construction, \$15 million for well development
- 10 MW will replace 60,000 tons CO₂/year

Small Towns Reenergized by Alternative Energy

- **Reynolds, Indiana**
 - “Bio Town, USA”
 - Attempting to go off the grid
 - Uses local resources of cow and hog manure.
 - Anaerobic digester turns methane gas from animal waste into electricity.
- **Benson, Minnesota**
 - Ethanol plant and a biomass power plant (burns turkey manure)
 - Burns 500,000 tons a year
 - Produces 55 megawatts of power
 - Provides 100 new jobs



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