



Geoexchange: An Opportunity For A Renewable State Program That Is "DIRT CHEAP"

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September 2004

U.S. Department of Energy on Geoexchange:

→ “No active technology for heating and cooling is more efficient than the geothermal heat pump.”

EIA, *Annual Energy Outlook 1994*, (Washington, DC, January, 1994), Table 21



U.S. Environmental Protection Agency on Geoexchange:

→ **“The most energy efficient, environmentally clean, and cost-effective space conditioning systems available today”**

"Space Conditioning: The Next Frontier," EPA 430-R-93-004, April 1993



Geoexchange Is:

- A heating, ventilation and air-conditioning (HVAC) technology that uses the earth's thermal properties, in conjunction with electricity, to provide space conditioning and water heating to homes, schools, buildings, and other kinds of facilities
- Also known as geothermal or ground source heat pumps



The US DOE States:

- ➔ **Building, light, appliances, space conditioning and water heating account for 36% of primary energy use in the United States**
 - *This is far greater than the total energy use in the transportation sector and nearly equals that of the industrial sector*
 - *Two-thirds of that is supplied by electricity*
- ➔ **Residential and commercial buildings use 65% of all electricity generated**
 - *40% of the total used in buildings is for space conditioning (heating and cooling) and water heating*



Geoexchange Is:

→ A Power Reduction Technology

➤ *This Accounts for:*

- More than 7 Billion kWh saved each year
- More than 2.3 Million kW demand reduced annually
- Annual savings of more than 36 trillion Btus of fossil fuels

➤ *This Is Equivalent To:*

- Reducing U.S. reliance on imported fuels by 19.3 million barrels of crude oil per year



Geoexchange:

→ Reduces Greenhouse Gas Emissions by 40 Percent

➤ *This Accounts For:*

- More than 1.4 Million metric tons of carbon equivalent eliminated every year
- More than 5.2 Million metric tons CO₂ eliminated annually

➤ *This Is Equivalent To:*

- Taking more than 1,165,000 cars off the road
- Planting more than 346 million trees



Geoexchange:

→ Saves Water

- *Assuming one half of installation would use a cooling tower, chilled water system (9,286 tons), the water saving potential, given a 10-hour cycle, would be 185,720 gallons of water per day*



Geoexchange is:

→ A Renewable Technology that Optimizes the Power Grid

re*new*able

adjective

1 : capable of being renewed <renewable contracts>

2 : capable of being replaced by natural ecological cycles or sound management practices <renewable resources>

- Source: Merriam-Webster Online Dictionary

→ A technology that is either inside the building or underground, therefore not apt to be disrupted by Mother Nature



Successful State Initiatives: A Two-Pronged Approach

→ **Accelerated Deployment**

→ **Sustainable Development**



Accelerated Deployment:

- Accelerated deployment is comprised of:
 - Strategic Outreach, *and*
 - Design Assistance.
- Strategic outreach catalyzes both consumer and industry through personal involvement, and is used to identify candidates for design assistance.
- The outreach also promotes the programs within the targeted market segments.



Sustainable Development

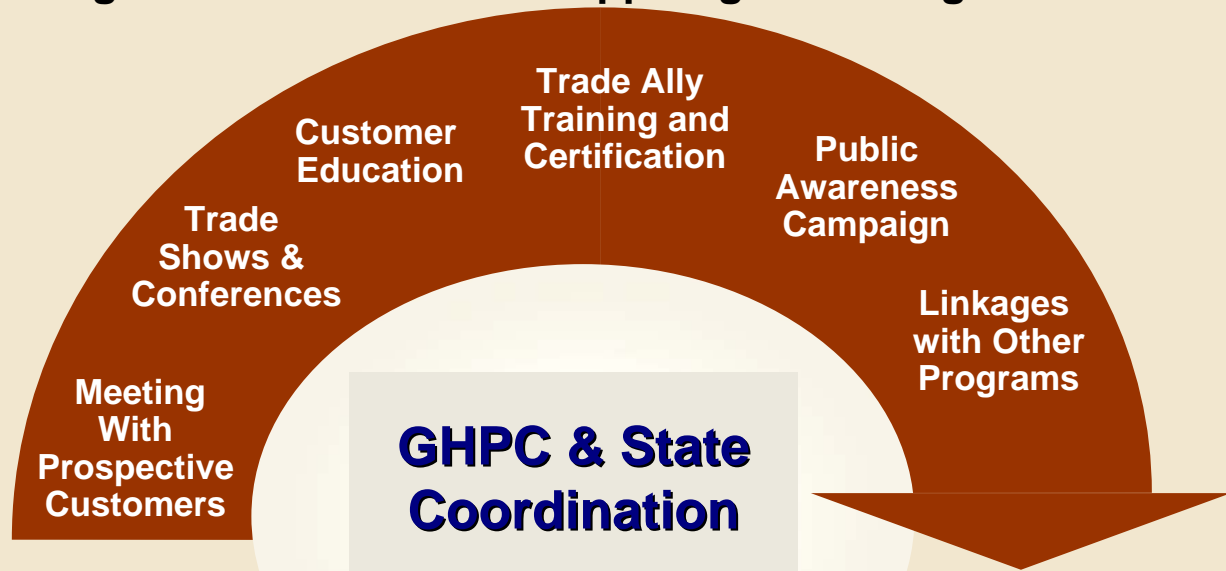
→ Sustainable development consists of:

- Education and Training,
- Marketing Communications, and
- Information Dissemination.

→ These tasks are conducted concurrently with the accelerated deployment tasks.



GOAL: Increasing number of geexchange installations and expanding the infrastructure to support geexchange



TACTICS: Training, certification, outreach and persuasion

**YEAR
2004**

- Existing State Program
- A few high profile installations
- Emerging market interest
- Some (not many) qualified trade allies
- Political support for geexchange

**2004 and
beyond**

- More competent & committed trade allies
- Informed customer decision makers
- Informed building owners and managers
- Increasing number of installations

New York State Energy Research
and Development Authority
(NYSERDA)
New York Energy \$mart Program



- 116 projects, 18,572 tons, 7.1 million square feet
- Reduced demand by more than 15MW
- Eliminated 34,030 metric tons of CO₂
- Ratio of external spending for the geoexchange program was 117.4 to 1

Southern California Edison / California Public Utilities Initiative

- **Conducted 40 educational geexchange seminars for school officials and administrators, architects and engineering design firms**
 - *Hundreds of individuals with current or future building projects have geexchange knowledge*
- **Marketing and outreach to 96 organizations in SCE service territory and conducted 123 meetings with them**
 - *These organizations include schools & school districts, and a variety of building industry firms and associations*
- **GHPC met with large developers to discuss the use of geexchange systems in forthcoming building projects**
- **We marketed the program with 18 press releases to major news outlets**



Oklahoma Department of Commerce Initiative

**Program To Increase Consumer Awareness of Geexchange Technology
In the State of Oklahoma With an Emphasis on the Educational Market**



- At least one high profile building and one school district committed to use geexchange as their primary HVAC system**
- Three workshops trained more than 300 architects and industry professionals**
- Information was disseminated to more than 1,500 Oklahomans**

Illinois Small Business \$mart Energy Program

- Sponsored and led by the Illinois Department of Commerce and Economic Opportunity
- Joint effort between GHPC and the Building Research Council of the University of Illinois at Urbana-Champaign School of Architecture
- 20 design assistance projects for small businesses being completed through the state as part of pilot
- Designed to make Illinois businesses more competitive through reduced operational costs with the use of energy efficient technologies, including geexchange
- Proposed three-year program to begin January 2005, which will include more detailed design assistance, training, and outreach



Pending Geoexchange Initiatives

→ **Pennsylvania Energy Harvest Grant**

- Pennsylvania Geothermal Heat Pump Market Transformation Deployment Program

→ **Texas**

- Geoexchange Market Transformation Aimed at Public Buildings in Texas

→ **New Mexico**

- New Mexico Geothermal Strategic Development Plan

→ **NYSERDA**

- Demonstration of the Use of Geoexchange in an Innovative Hybrid Application

→ **Oklahoma**

- Geoexchange Market Transformation For Native American Oklahomans
- Proposal To Launch Geoexchange Market Transformation Activities In The State Of Oklahoma

→ **Southern California Edison IDEEA Program**

- Achieving Energy and Demand Savings from Geoexchange



Geoexchange Is Needed NOW

→ **“DOE Predicts Energy Needs Will Double By 2005”**

➤ *USA Today, 9/20/2004*

→ **“Strategic Petroleum Reserves (SPR) Holds 700 Million Barrels of Oil. The Current Inventory Is 670 Million Barrels, Or 67 Days of Imports”**

➤ *Wall Street Journal, 9/24/2004*

→ **“Attorney Generals in Eight States Have Sued The Nation’s Largest Utilities Over Global Warming, Stating That, ‘Global Warming Threatens Our Health, Our Economy, Our Natural Resources And Our Children’s Health.’”**

➤ *USA Today, 9/18/2004*



Current Problems

- **Fluctuations in natural gas pricing**
- **Oil at \$50+ per barrel**
- **To modernize transmission infrastructure, which is at least 30 years old in some areas, would cost \$10 billion each year for 10 years, EPRI estimates**
- **The cost of the blackout in 2003 was \$60 billion. Blackouts cost the US economy \$100 billion annually**
- **A transmission line costs \$100 million for each and every mile**



Once Georexchange has 10% of market, the U.S. will have:

- More than 1.5 million units
- Fossil fuel savings of almost 61 million MMBtu each year, and more than 12 billion kWh
- An electricity demand reduction of 4 million kW
- Annual reduction of nearly 2.5 million metric tons of carbon and almost 9 million metric tons of CO₂
- A savings of almost 32.5 million barrels of crude oil saved annually, or 89,000 saved daily
- Creation of more than 5 million jobs
- The environmental equivalent of almost 2 million cars removed from the road, 581 million trees planted, or 1.2 million acres of trees in the ground





Geoexchange is a
SOLUTION TECHNOLOGY
that is
"DIRT CHEAP"

*It's a backyard technology that saves
energy, water, the environment, and
creates jobs.*



“We cannot solve our problems with the same thinking we used when we created them.”

-Albert Einstein



Any questions?



Thank You