

*Applied Solutions Conference
Accelerating Geothermal Heat Pump
installations to provide energy savings,
economic growth and greenhouse gas
reductions*

October 7, 2008

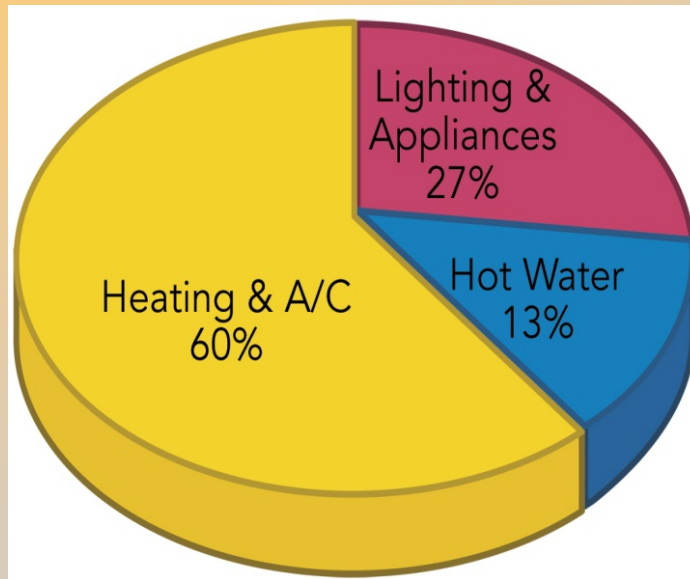
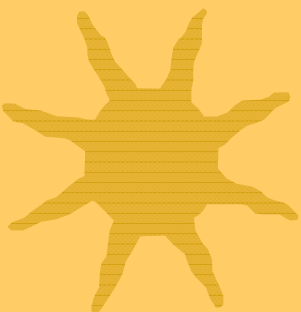
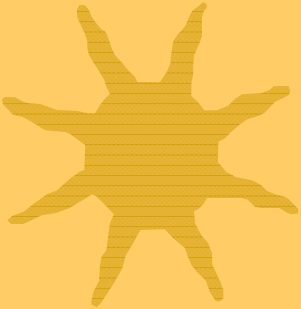
Paul Bony

Director of Residential Market Development

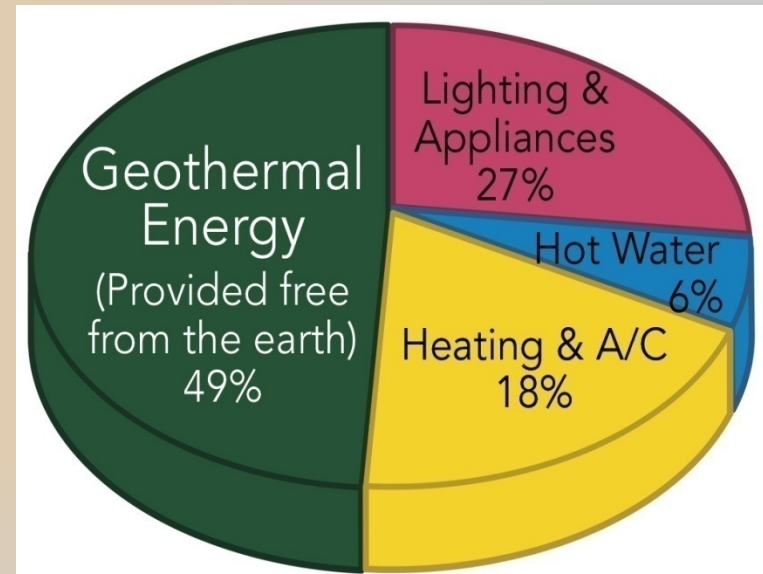




Geothermal Heat Pumps



Conventional HVAC



Geothermal HVAC



Geothermal Heat Pumps



**1 kW Electrically generated
Energy to power the
system**



**4-6 kW Heat
Delivered**



**3-5 kW of Geothermal
Energy moved from the
Earth**

400-600% Efficient

Geothermal Heat Pumps



1300 Sq. Ft. Low Energy Habitat for Humanity Homes

Geothermal Heat Pumps



Statue of Liberty Gift Shop



ASHRAE Headquarters - Atlanta, GA



Galt House Hotel - Louisville, KY



Black Point Inn - Prouts Neck, ME



Alta Condos, Washington DC



Harvard Library - Cambridge, MA



French Laundry Rest. - Napa, CA



Whistler Village - BC, Canada



Yale Art Bld. - New Haven, CT



Gaillardia Offices - Okla. City



California University of PA



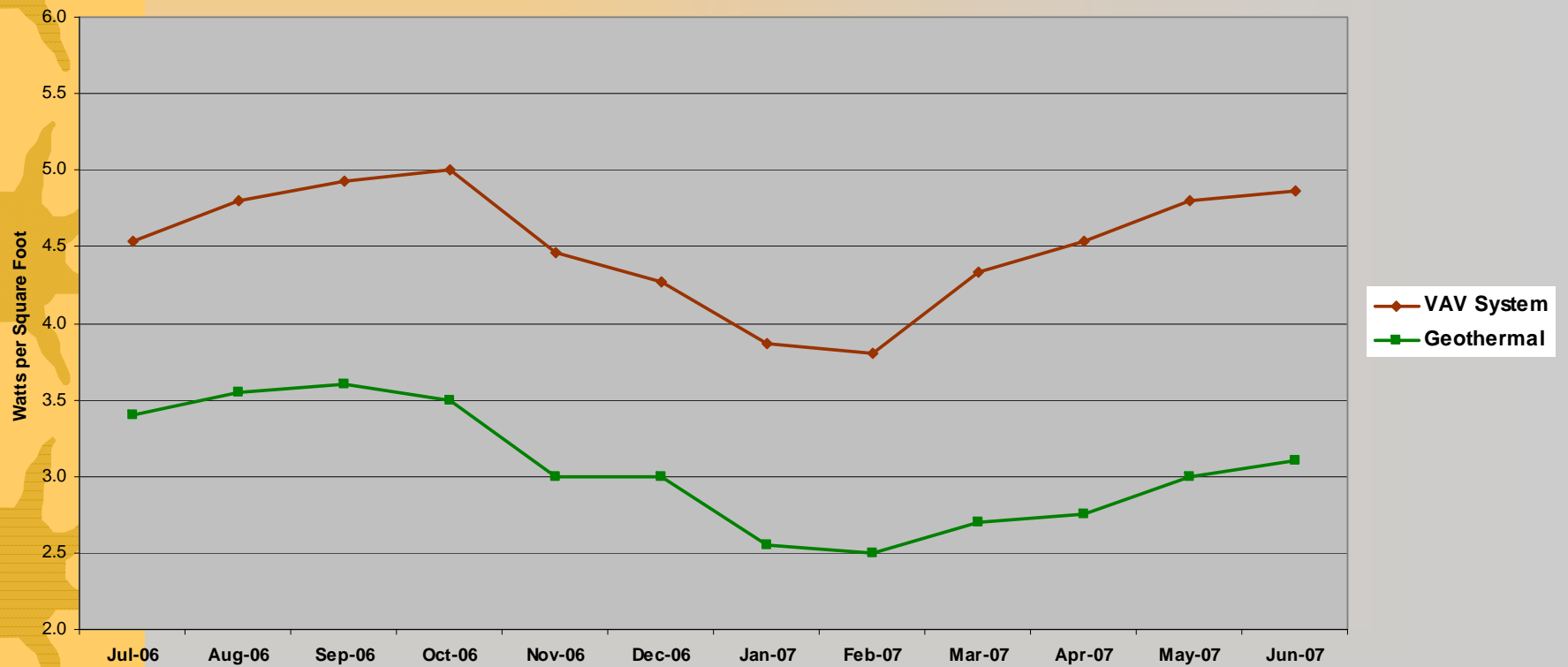
Hirschfeld Towers - Denver, CO

Commercial Buildings



Garrett Office Buildings Monthly Peak Demand 2006-2007

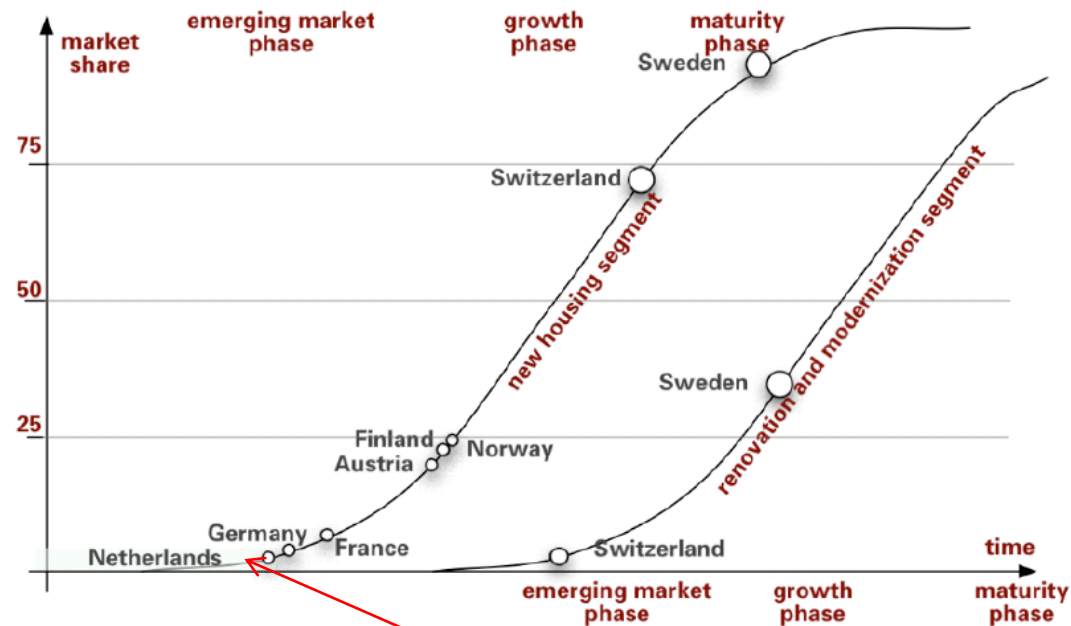
35% Peak Demand Reduction





Geothermal Heat Pumps

Stages of market development



**GHPs were installed in 1 out of 38 new US homes in 2008
(2.6% share)**

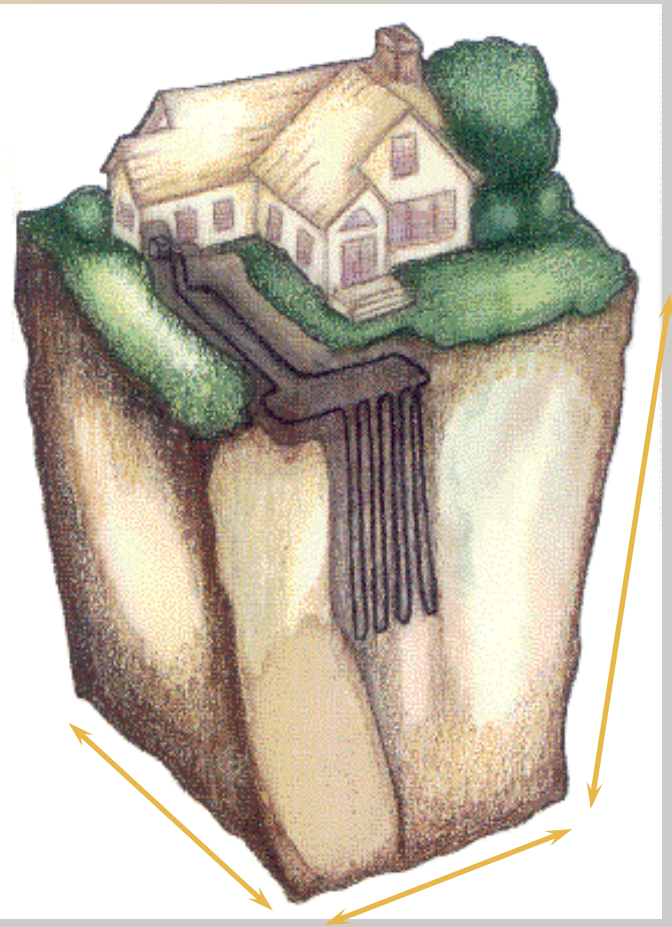


Market Barriers

Mass market approach for geothermal heat pumps

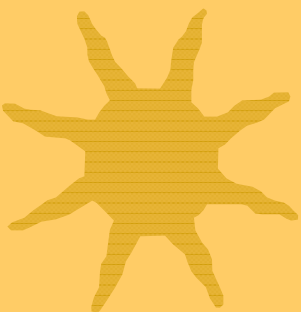
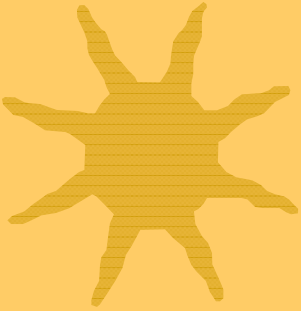
GreenHeat

heating & cooling a different world
with renewable energies



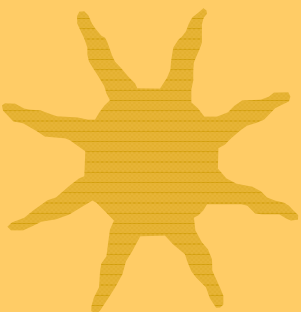
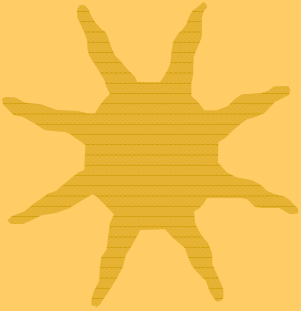


This space can heat/cool a 6,000 sq. foot home

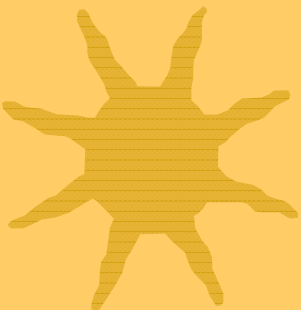
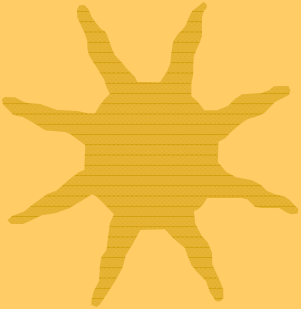




Geothermal Heat Pump Jobs



Activity	# man days / home	
Home Audit & system design	1	
Home Repair/weatherization	2	
Utility and loop Locates	0.25	
Loop Construction	2.5	
loop tie-in/landscape	0.5	
Geo system installation	4	
Back Office - supervision	0.75	
Other trades	0.25	
Manufacturing -transport - dist	0.5	
Total	11.75	
Assumptions	1880	man-days per year
	94	hours/home
	20.0	homes/job
	5.00	jobs/100 homes

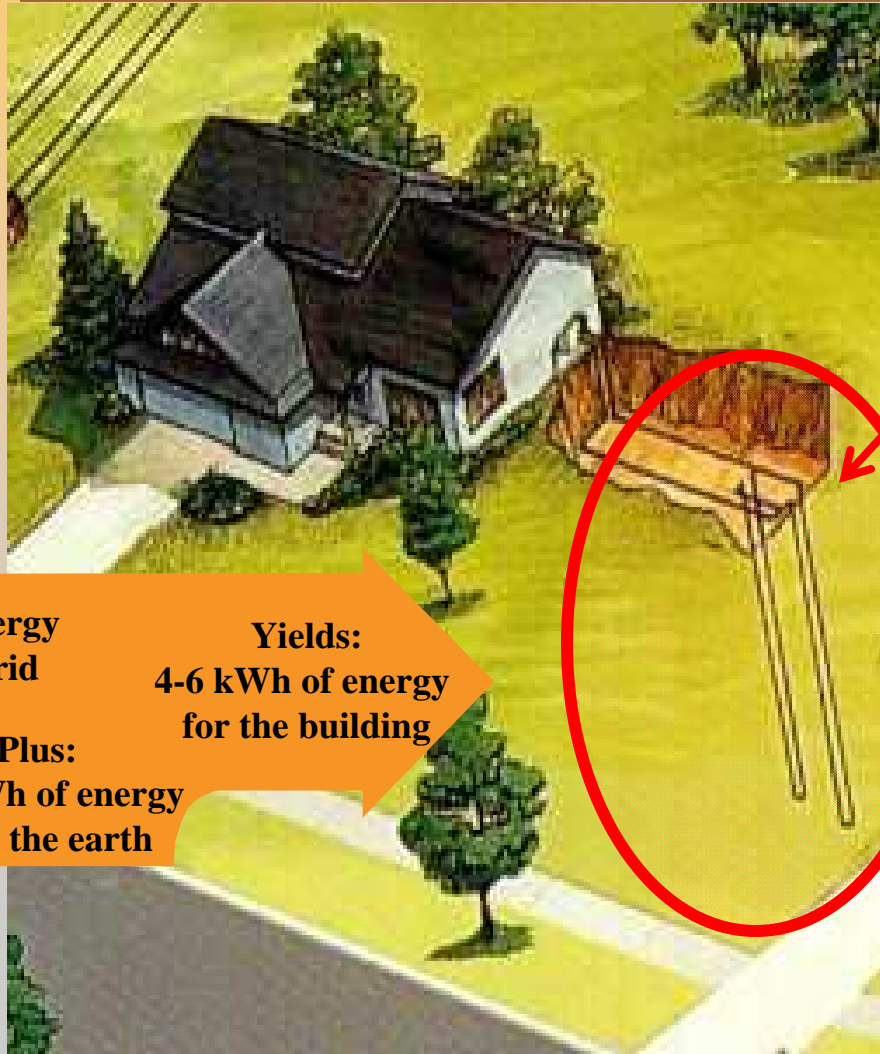


Market Barriers

- ★ High(er) Cost of Installation
- ★ Lack of HVAC Dealer Interest
- ★ Lack of HVAC Dealer Expertise
- ★ Limited Consumer Education
- ★ No Viable Long Term Financing



The Geothermal “Utility”



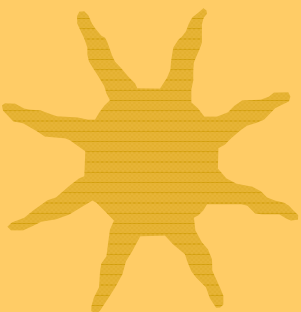
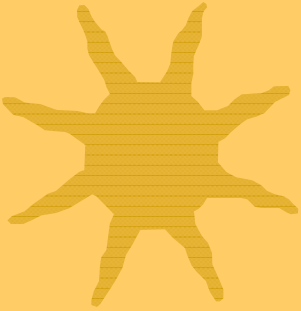
Another form of utility plant
for delivering renewable
energy supplies to the load

1 kWh of energy
from the grid

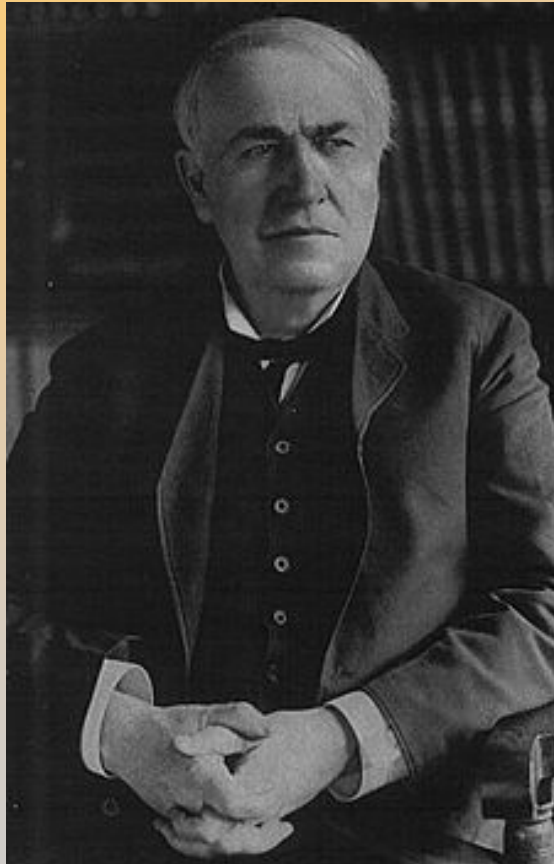
Yields:
4-6 kWh of energy
for the building

Plus:
3-5 kWh of energy
from the earth





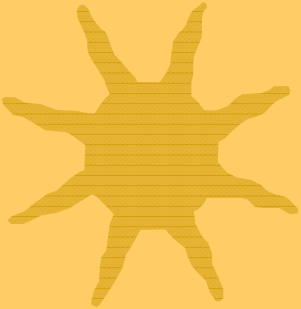
The Geothermal “Utility”



- 1- Water/Sewer
- 2- Electricity
- 3- Natural gas
- 4- Telephone
- 5- Cable TV
- 6- Energy efficiency



The Ground Loop “Utility”

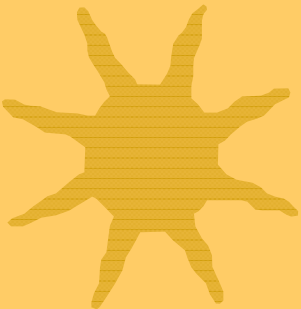


The Utility Loop Concept



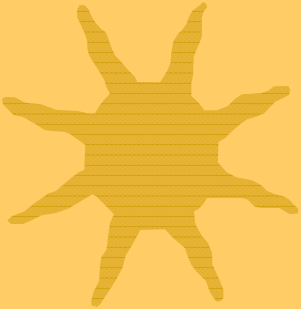
- ★ Utility owns and recovers the cost of the loop, interest expense, program costs, and profit or operating margin.
 - Utility installs or contracts out loop construction.
 - Controls system design and installation quality
 - Electric utilities get improved load factor & incremental kWh revenue.
 - System load factor is even better with load control.
 - Future carbon credits may stay with the utility

- ★ Consumers Get:
 - Lower total energy bills.
 - Utility grade service and reliability





The Ground Loop “Utility”

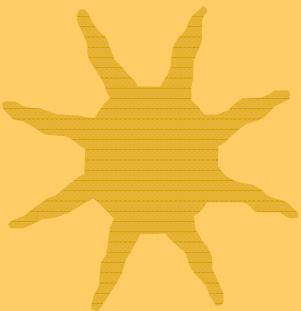


★ H.R. 2419

★ Food and Energy Security Act of 2007
(Engrossed Amendment as Agreed to by
Senate)

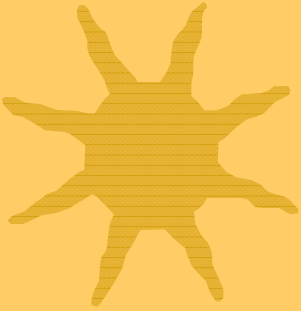
– SEC. 6108. ELECTRIC LOANS TO RURAL
ELECTRIC COOPERATIVES.

– “The committee notes that assistance is
authorized for renewable energy including
geothermal ground loops”





The Geothermal “Utility”



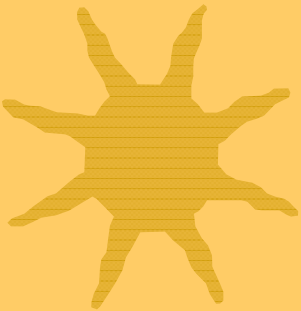
★ Business Offering:

REnU Bringing Solar to Your Home.

Citizenrē launches the pilot phase of its REnU Offering for the residential sector.



- ★ Packaged Approach
- Utility Price Parity
- Fixed-Rate
- Performance Guarantee
- No Investment Risk

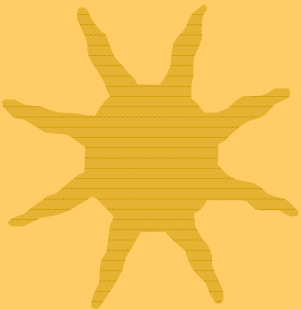




The Geothermal “Utility”



- ★ SunEdison (commercial & government)
 - “real savings – no up front costs”





State of Colorado - PUC Law

LexisNexis(TM) CD

<http://198.187.128.12/mbDownload/Colorado2GeothermalHeatSupp...>

Document 1 of 7

Source:
Colorado Statutes/TITLE 40 UTILITIES/GEOTHERMAL HEAT/ARTICLE 40 GEOTHERMAL HEAT SUPPLIERS

ARTICLE 40 GEOTHERMAL HEAT SUPPLIERS

Cross references: For the "Colorado Geothermal Resources Act", see article [90.5](#) of title [37](#).

Section

[40-40-101. Short title.](#)

[40-40-102. Legislative declaration.](#)

[40-40-103. Definitions.](#)

[40-40-104. Public utility status - exceptions.](#)

[40-40-105. Operating permits.](#)

[40-40-106. Continuing review.](#)

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Document 2 of 7

Source:
Colorado Statutes/TITLE 40 UTILITIES/GEOTHERMAL HEAT/ARTICLE 40 GEOTHERMAL HEAT SUPPLIERS/40-40-101. Short title.

[40-40-101. Short title.](#)

This article shall be known and may be cited as the "Geothermal Heat Suppliers Act".

Source: L. 83: Entire article added, p. 1422, § 2, effective June 10.

ANNOTATION

Am. Jur.2d. See 27A Am. Jur.2d, Energy and Power Sources, §§ 52, 56.

C.J.S. See 39A C.J.S., Health and Environment, § 109.

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A mechanism to supporting GSHP technology would allow third-party developers to own and operate GSHP systems for consumers who would pay for the thermal energy.

The Colorado Geothermal Heat Suppliers Act, passed in 1984, is a little known statute that gives suppliers of geothermal heat an exclusion from the certificated utility's exclusive territory rights.



The Geothermal “Utility”



★ Berkley FIRST/CityFIRST

★ Financing Initiative for Renewable and Solar Technology

- 3d party program administration
- “OPT-IN” special tax district to secure financing
- 40 solar PV pilot, designed to include other major energy efficiency retrofits in the future
- Property owner retains eligibility for other rebates and tax credits

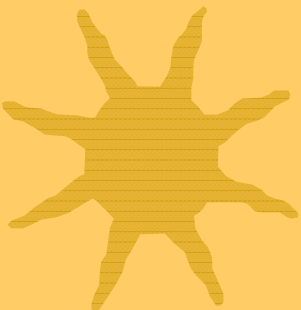
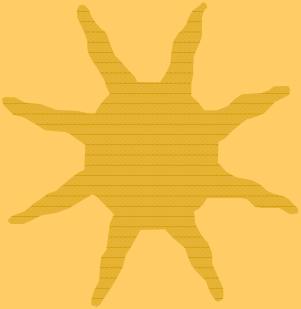


★ Model works for efficiency efforts too.





The Geothermal “Utility”



★ Qualified Energy Conservation Bonds

- The Colorado Governor's Energy Office (GEO) has posted a Request for Applications for QECB's.
- Local governments and qualifying quasi-governmental organizations are now invited to apply.

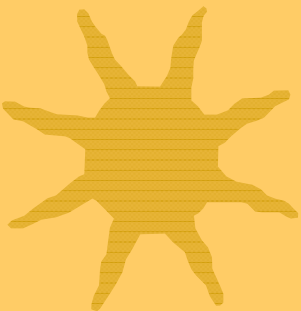
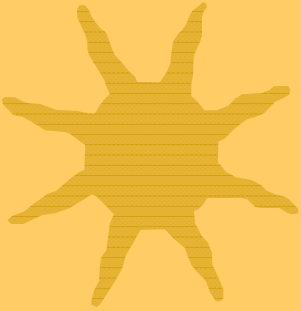
★ Two categories of project applications;

- ★ Expenditures to reduce energy consumption in publicly-owned buildings by at least 20 percent.
- ★ Green community financing programs.



Geothermal Heat Pump Initiative

- ★ DOE Competitive Block Grant Program
 - \$390 million for innovative programs
 - 5:1 leverage
 - Innovative “game changing” ideas for building retrofits including financing, delivery, and monitoring.
 - Addressing upfront cost, lack of consumer confidence, and other barriers
 - With lots of “partnering”



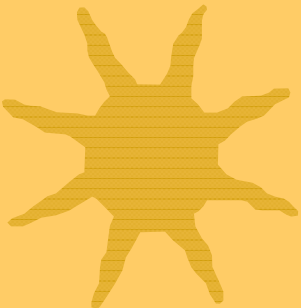


The renewable energy utility



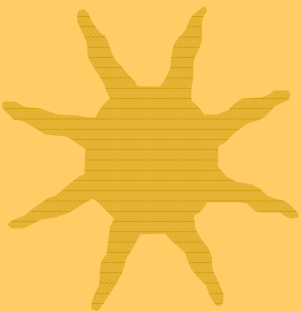
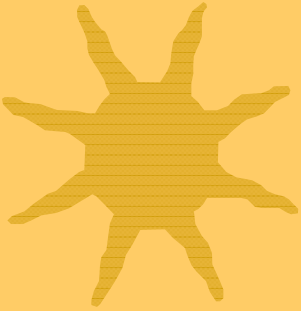
★ The renewable energy utility

- Local Governments
- Existing utilities (electric, gas, water)
- Builders/Developers
- Loop installers
- New opportunity companies
- Anyone in this room?





Geothermal Heat Pump Initiative

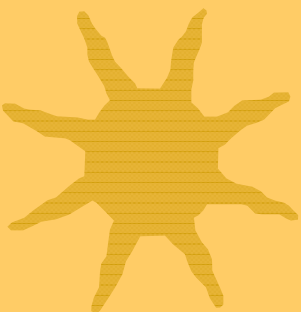
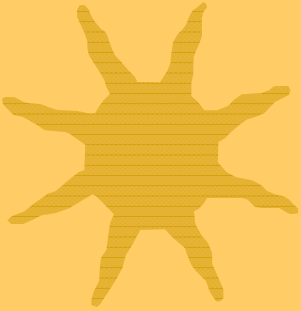


- ★ **Immediate Green-Tech Jobs Creation – “Shovel-ready” projects**
- ★ **Creation of New “Green-Tech” Industry**
- ★ **National Leadership Position in GHP Installations**
- ★ **Create Gvt. Income Without Increasing Taxes**
- ★ **Significantly Reduce Carbon Footprint**
- ★ **Reduce Peak Loads on Electricity Generators**
- ★ **Conserve Natural Gas Reserves**
- ★ **Reduce Homeowner’s Net Utility Costs – Stimulate The Economy**

The Leading Manufacturer of Geothermal Heat Pumps



ClimateMaster Plant
Oklahoma City, OK
425,000 Sq. Ft. – 700 Employees



Thank You For Your Attention! Questions?



**If you ever need a hand
you can reach me at:**

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