Geothermal Development in Texas: Update on Projects & Lessons Learned

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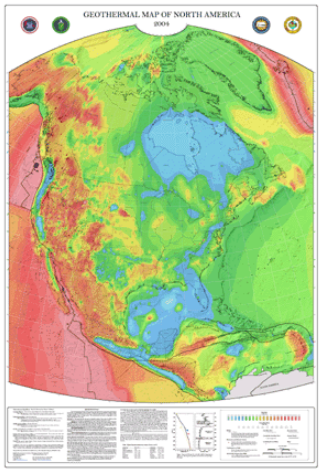
SMU | GEOTHERMAL LABORATORY

Timeline of Ideas, Technology, Oil & Gas



2004 Geothermal Map of North America
2005 UTC builds prototype of PureCycle®
2005 Steve Bergman “discovers” RMOTC’s high fluid flow
- Blackwell and Mink meet with RMOTC to review site
2006 Chena Hot Springs develops geothermal power
2006 1st SMU Conference on utilizing oil & gas fields
2008 ORMAT Technology installs binary unit at RMOTC
2008 Raser Tech. develops power in Utah with PureCycle®
2008 ElectraTherm demonstrates Green Machine on SMU Campus
2009 UTC moves to PWPS
2009 RPSEA.org project awarded to Gulf Coast Green Energy in MS
2009 DOE funds projects in ND, TX, LA
2010 Oregon Institute of Tech. powers-up with PWPS PureCycle®
2010 Chena Power mobile plant in S. UT
2010 Project completed in LA using Green Machine, privately funded

Sedimentary Basins Offer

RMOTC - Wyoming

Coproduction
0.1 - 0.5 EJ

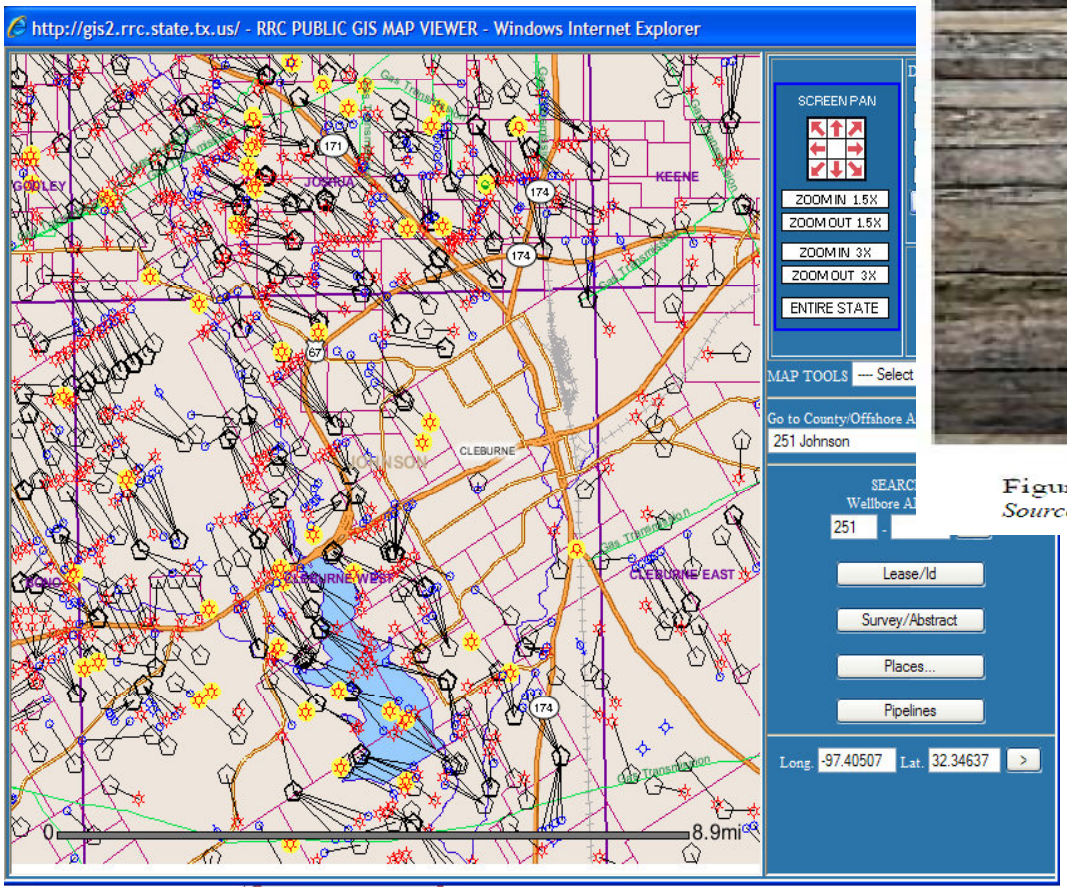
Geopressure
>71,000 EJ

Enhanced Geothermal Systems in Sed. Basins
> 100,000 EJ

(Reference: Future of Geothermal Energy, Tester et al., 2006)

Oil and Gas Fields

already being set-up for EGS



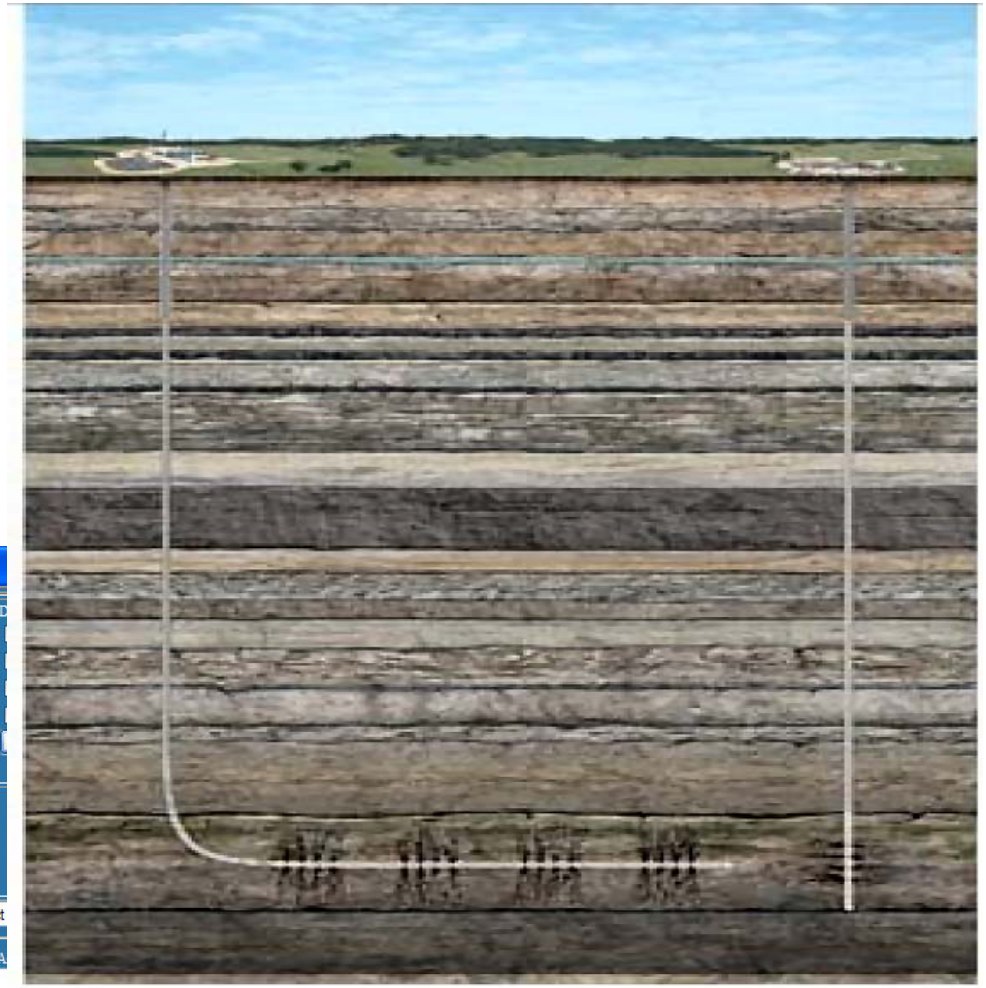
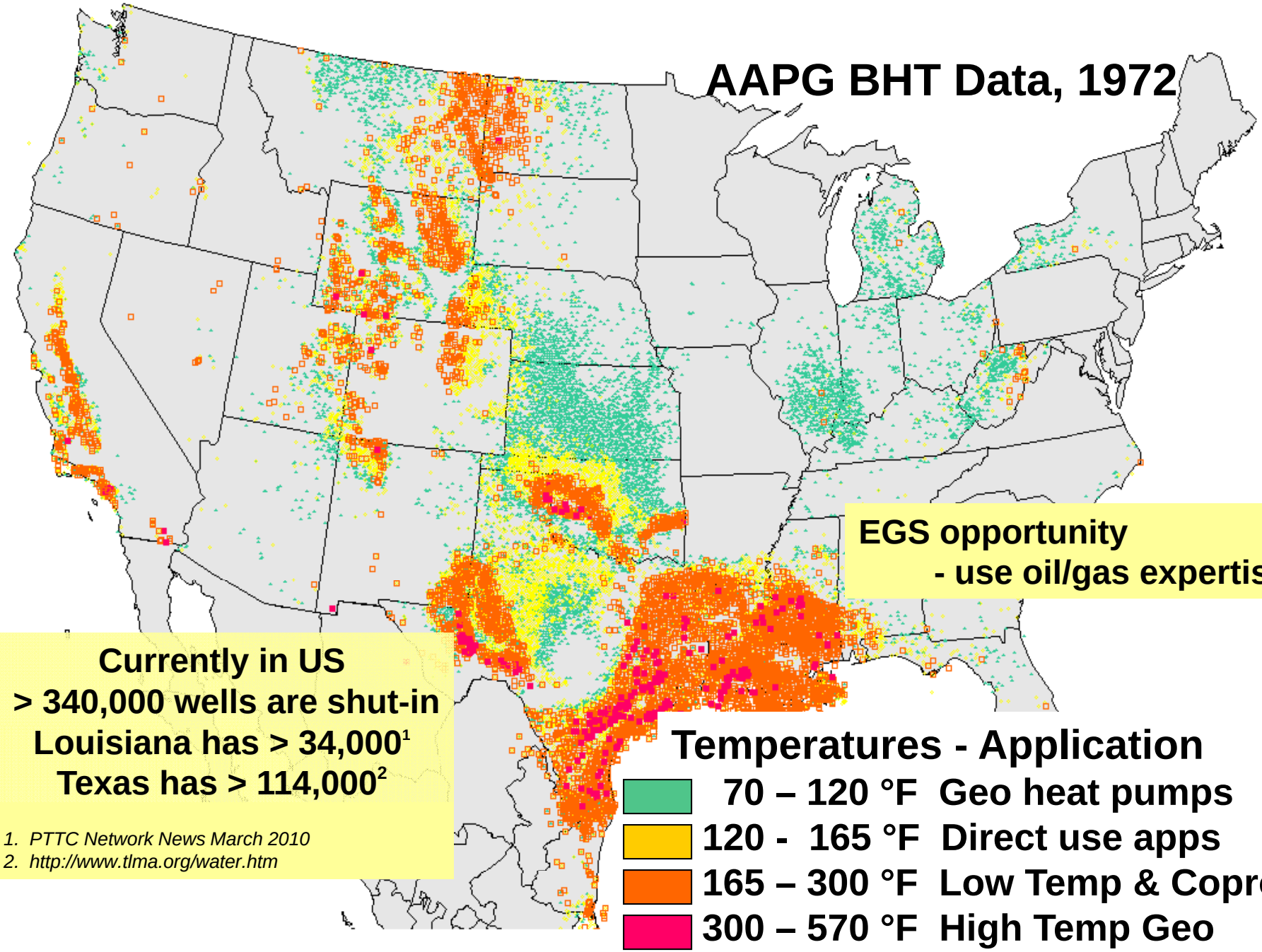


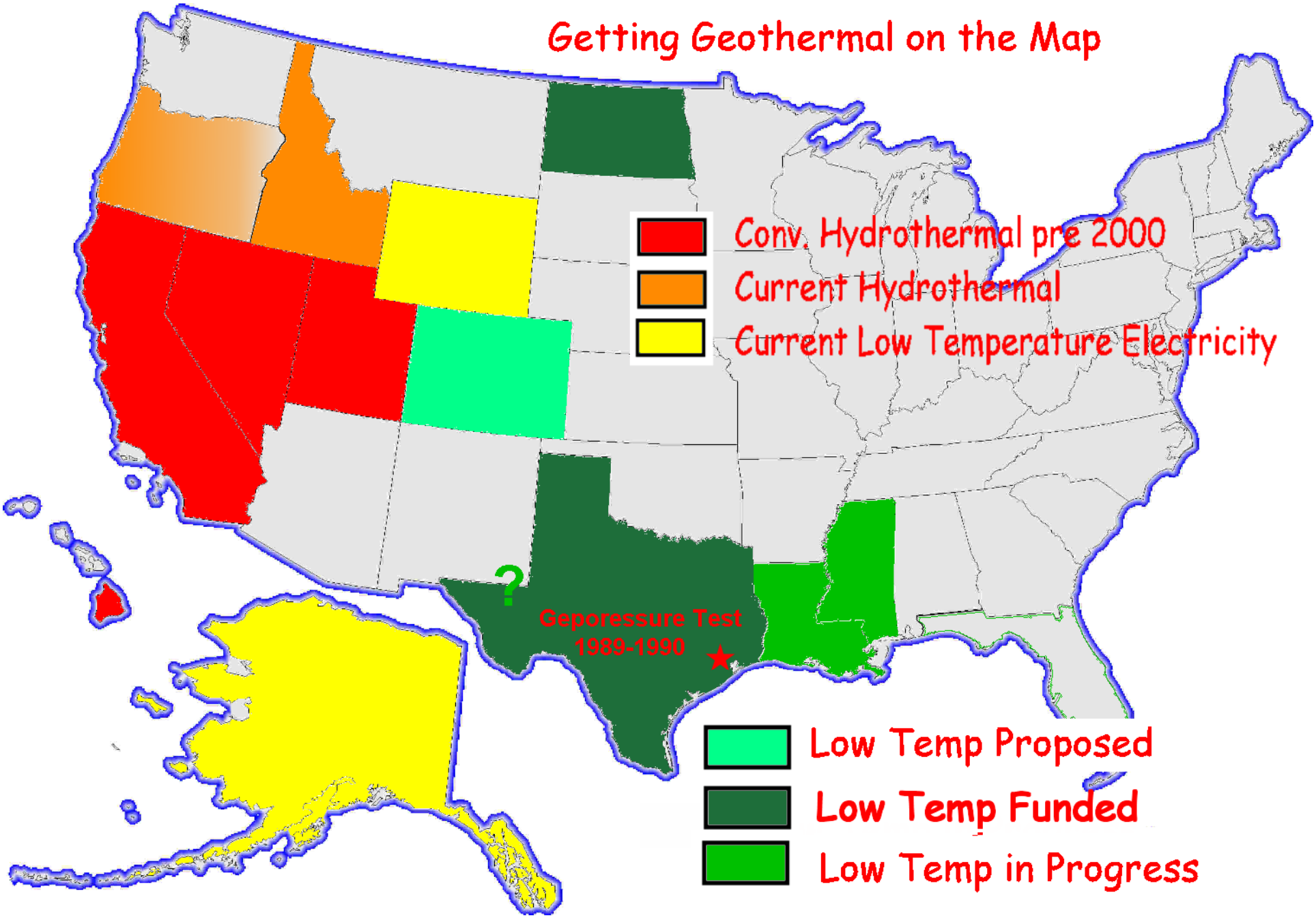
Figure 4: Horizontal and Vertical Well Completions
Source: John Perez, Copyright ©, 2008

South of Fort Worth



Currently in US
> 340,000 wells are shut-in
Louisiana has > 34,000[1]
Texas has > 114,000[2]

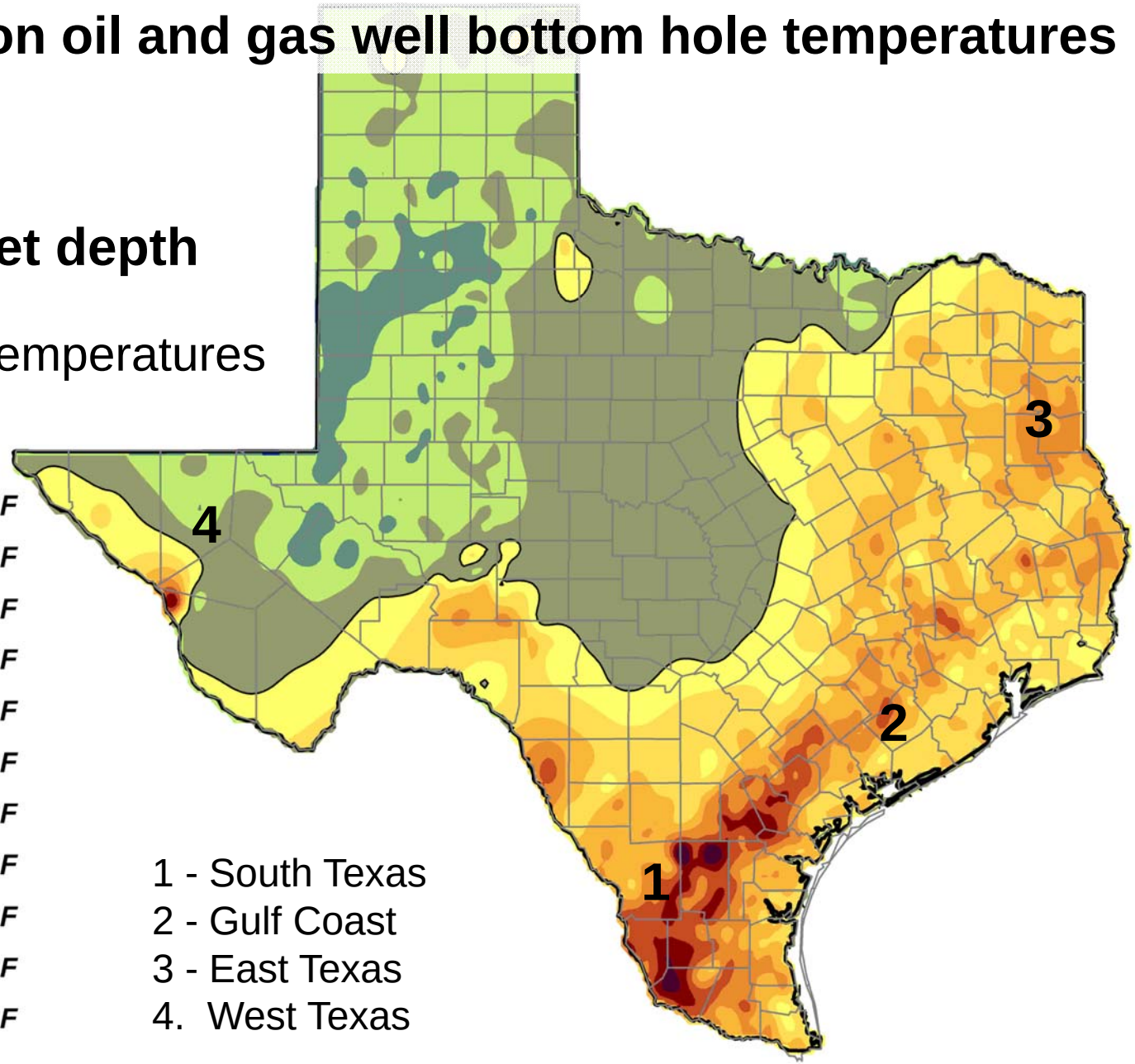
1. *PTTC Network News March 2010*
2. *http://www.tlma.org/water.htm*


Getting Geothermal on the Map
Conv. Hydrothermal pre 2000
Current Hydrothermal
Current Low Temperature Electricity
?
Geporessure Test
1989-1990
Low Temp Proposed
Low Temp Funded
Low Temp in Progress

Based on oil and gas well bottom hole temperatures

12,000 feet depth

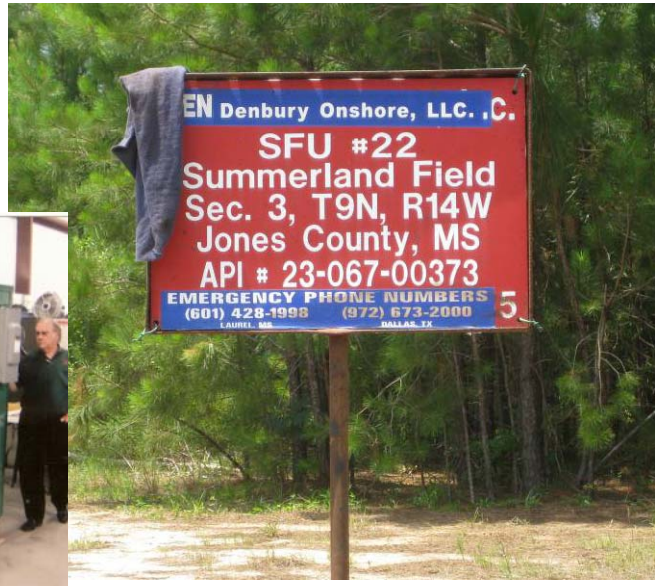
Uncorrected temperatures



Projects in the Ground

- Gulf Coast Green Energy- Denbury Resources

  Jones County, Mississippi (30kW)
  - ElectraTherm Green Machine - 190°F hot fluids
  - RPSEA Demonstration - Power up September 2010



Projects in the Ground

- CLECO - Hilcorp Energy - Gulf Coast Green Energy Western, Louisiana (60 kW)

800 psi, 4000 BPWD (120 GPM) at 250°F

  - ElectraTherm Green Machine
  - Private funding
  - Completion: September 2010

Why is a Utility developing geothermal?

- Distributed Generation
  - Enables the electrification of remote regions
- High Reliability
  - 365 day/year, 24 hours/day baseload
- Renewable Requirements

2009 DOE Geothermal Stimulus Funding: $338,000,000

2) Coproduced, Geopressured, and Low Temperature Projects				
Universal GeoPower LLC	$1,499,288	Liberty County	TX	Universal GeoPower LLC will utilize a modular low temperature binary unit to produce power from oil and gas wells in Liberty County, Texas.
University of North Dakota	$1,733,864	Williston Basin, (Bowman County)	ND	The University of North Dakota will utilize a low temperature binary unit to produce power from oil and gas wells in Bowman County, North Dakota.
Louisiana Tank, Inc.	$5,000,000	Cameron Parish	LA	Louisiana Tank, Inc. will demonstrate the feasibility of a geopressured power plant in Cameron Parish, Louisiana.

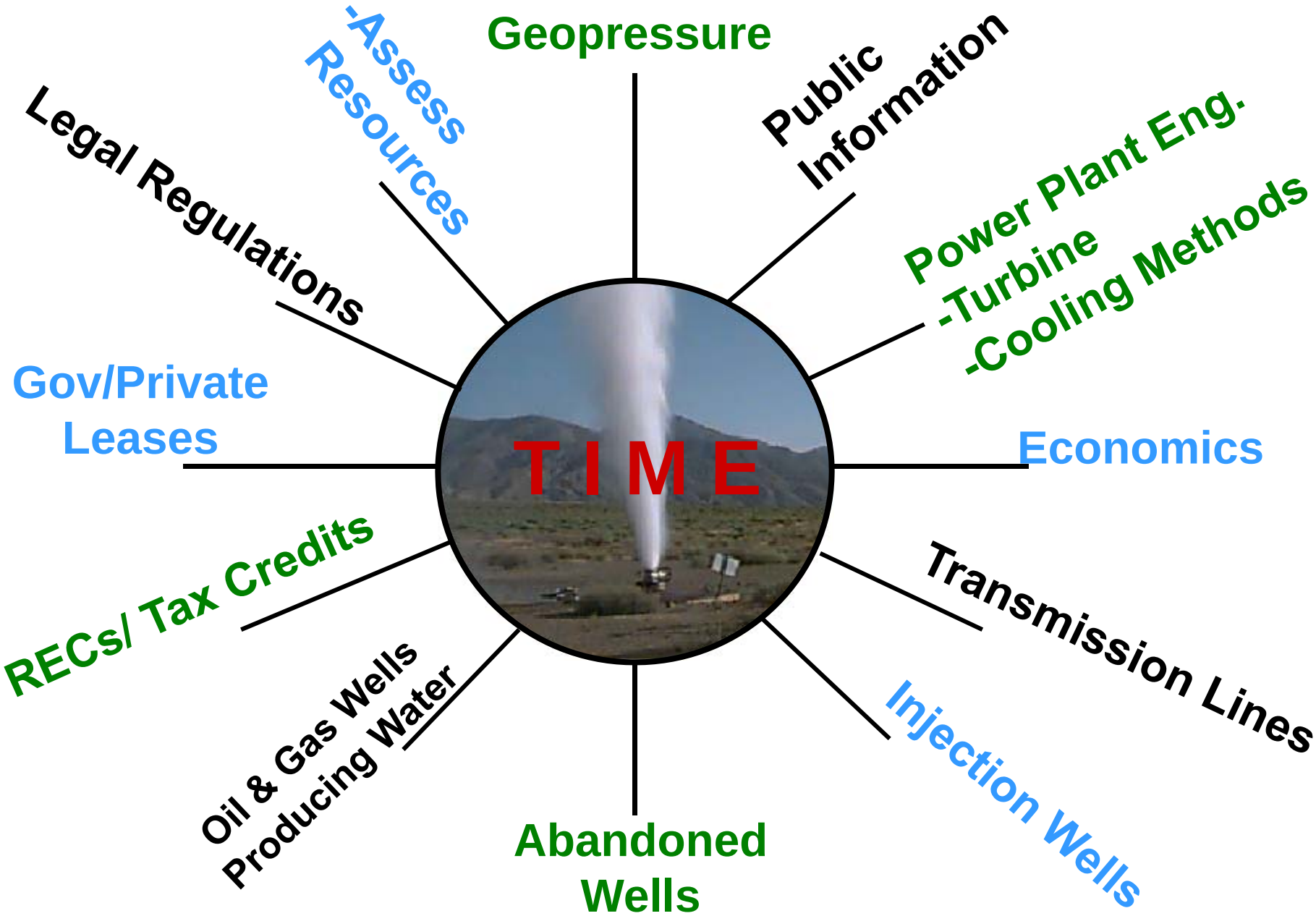
RPSEA.org $$ now

Research Partnership to Secure Energy for America (RPSEA), recently announced the **2010 Request for Proposals for their Small Producers Program**. Up to $3.2 million is available for a variety of projects to reduce operating costs or improve recovery.

Proposals are due September 28, 2010

The full RFP can be found at: http://www.rpsea.org/req_proposals/

ITEMS TO CONSIDER FOR DEVELOPMENT



Lessons Learned

1. Finding the resource - where's the water, how hot?
2. Leasing/royalties different from oil & gas
3. Show me the $$ for small projects
4. Abandoned wells - mysterious "gifts"
5. Equipment - still growing and developing
6. Texas Legislation tries, but not succeeds

   H.B. 4433 Hydrocarbon Tax Exemption from Geothermal Wells

7. Public concern - today: earthquakes
   tomorrow: ?

Companies selling Low Temperature Technology for Geothermal Power

Pratt & Whitney Power Systems
Michael Ronzello
michael.ronzello@pw.utc.com

ORMAT Technologies, Inc.
Josh Nordquist
jnordquist@ormat.com

Cryostar USA (TX)
Tim Ryan
Tim.Ryan@cryostar.com

Turbine Air Systems
Halley Dickey
HDickey@TAS.com

ElectraTherm Inc.
Kit Jennings
RoughRider Power
Distributor for Wyoming Region
kit1@roughriderpower.com

Loy Sneary
Gulf Coast Green Energy
Distributor for Texas Region
loys@sbcglobal.net

**** Linear Power Ltd.,***
Robert Hunt
hunt0972@bellsouth.net

**** Deluge, Inc.***
Brian Hageman
bhageman@delugeinc.com

New Resources Available

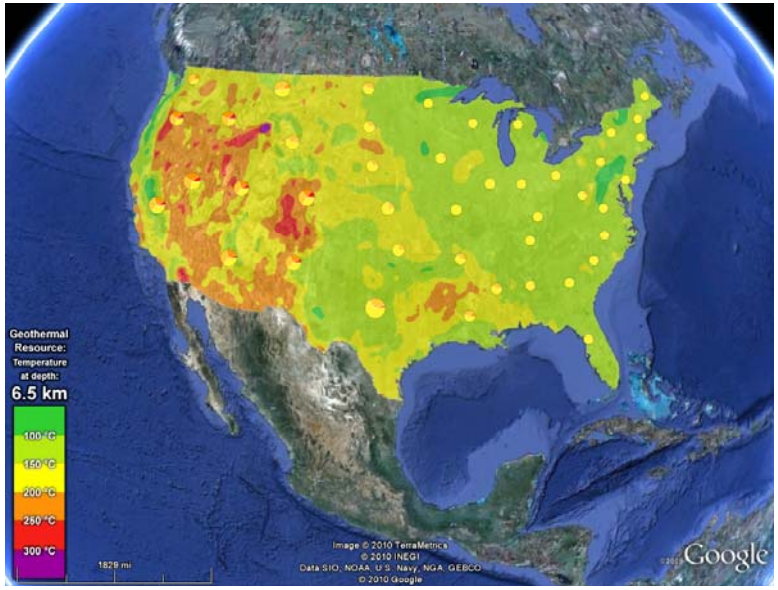
SMU Geothermal Laboratory, Final Report -

Texas Geothermal Assessment for the I35 Corridor East

for Texas State Energy Conservation Office Contract CM709

- Appendix with ~5000 well BHTs

- Questions to Consider before Starting a Geothermal Venture



Google.org Geothermal Map of U.S.

- Eastern US Focus
- google.org/egs
  temperature maps 3 - 10 km

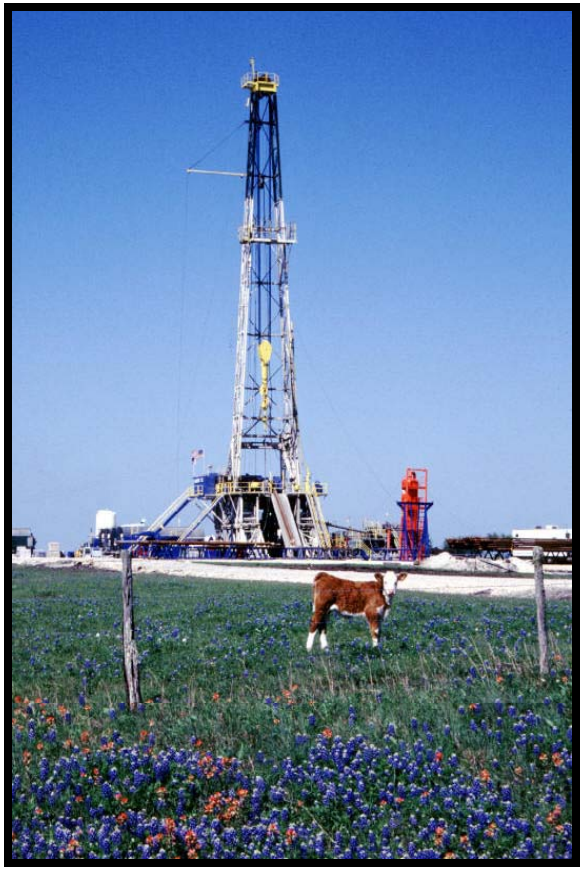
National Geothermal Database

…. now in progress

Data currently available at:

http://smu.edu/geothermal

Now it’s your turn!



Develop and use geothermal energy

- Find temperatures ~180°F or higher
- Develop fluid flows (200°F + 200 gpm = 50 kW)
- Locate a cold source (air, water, tower)
- Select technology to meet resources
- Sell or use your baseload energy
- Don’t forget, ask for assistance along the way
  - DOE Low Temperature - Tim Reinhardt
    Timothy.Reinhardt@ee.doe.gov 202.287.1351
  - Maria Richards - 214.768.1975 mrichard@smu.edu
  - David Blackwell - 214.768.2745 blackwel@smu.edu
    http://smu.edu/geothermal