

Presentation Overview

- ¥ Texas Land Situation
 - ¥ Texas Geothermal Overview

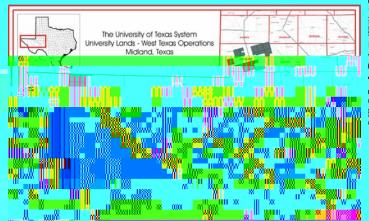
¥ Policy Recommendations

¥ Conclusions



Texas Lands Are State Or Privately Owned

University Lands 2,104,772 acres in West Texas



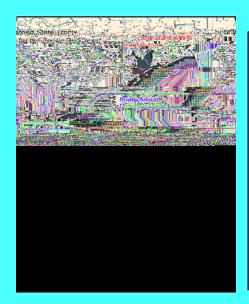
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Texas General Land Office

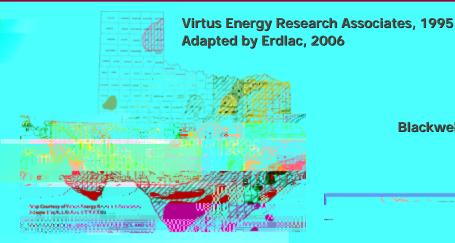
20.3 million acres in West Texas, the Gulf Coast extending 10.3 miles from shoreline, state agency acreage & timber lands in East Texas







Texas Geothermal Energy As: <u>Geoexchange – Direct Use – Electrical</u>



Blackwell & Richards, 2006

Erdlac & others, 2006

Well symbol color intervals every 1000 ft: 18,000 - 30,000 ft

Lower yellow half circle indicates BHT data available.

CI for BHT data every 5°F: 270 - 410°F



Texas State Recommendations On Geothermal Energy Development

Recommendations Are In Four Categories:

- ¥ Technical Assistance
- ¥ Industrial / Economic Development
- ¥ Advocacy
- ¥ Policy / Legal Action



dations: Economic Development

<u>exas</u>

<u>endence</u>

s For Midland & Ector Counties				
Businesses	Number People Employed			
9,923	78,345			
9,784	77,851			
1,795				
228				

Market Place llow Pages



^ From D&B Market Place

Renewable Energy Jobs

Texas Wind Resource

Tech / 10 MW*

Tech / 2898



Recommendations: Industrial / Economic Development

Recommendation 2 – Leasing Definition And Clarification

The typical O&G lease does not directly include geothermal in the agreement with the mineral owner...or do they?

If the word 'geothermal' is not used does this type of wording also include heat?

And if not, does the injection of hot brine constitute a breach of law under the Geothermal Resources Act whereby the heat is being wasted?

OIL AND GAS I EASE



Recommendations: Advocacy

Recommendation 4 – Financial Forums

- ¥ Renewable energy finance forums that include geothermal.
- Separate geothermal finance forum due to uniqueness of resource – long lead time in establishment.
- ¥ Location of forums be in different locations throughout the state.

Recommendation 5 – Nesting

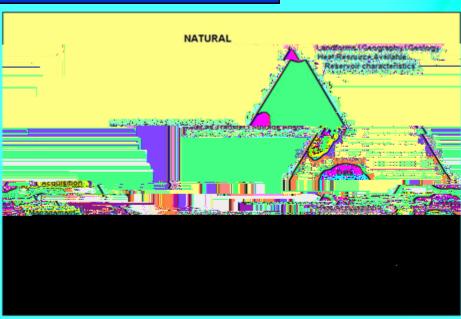
- ¥ The planned development of two or more (renewable) resources in concert with each other in the same geographic area for the purpose of:
 - Offsetting a weakness of one resource by the strength of another.
 - Guaranteeing that a minimum amount of electrical power is available for baseload use at all times.



Recommendations: Policy / Legal Action

Constraints on geothermal development.

CONSTRAINTS TO GEOTHERMAL DEVELOPMENT						
Natural (Geological/C	Geographical)					
Surface	Subsurface	Technical	Human			
		Drilling (techniques-				
Landforms/Geography/	Heat Resource	horizontal, radial	Economics (cost vs.			
Geology	Available	patterns)	profit) (drilling costs)			
	Reservoir	Heat Acquisition				
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Ternary Constraint Diagram Erdlac, 2005

While Natural and Technical constraints may be hard to overcome, the Human constraints can be more directly addressed. Constraints that are 'manmade' can be 'unmade'.



Recommendations: Policy / Legal Action

Recommendation 9 – Shallow Geothermal Use

- Fast Legislation defined geothermal as a mineral and energy resource, managed by the Texas Railroad Commission (Oberbeck, 1977) suggesting ownership by the mineral owner.
- ¥ Texas Oil And Gas Conservation Laws: Title 5: §141.003 Definitions:
 - (4) "Geothermal energy and associated resources" means:
 - (C) heat or other associated energy found in geothermal formations;
- ¥ What legislation, if any, covers the access to shallow heat use with geoexchange systems?
- ¥ What constitutes the legal definition of a "geothermal formation"?
- ¥ May need a revisit of terms by legislation to more clearly define the forms of geothermal, its ownership, and its use.





