





# PART 1: MACRO MARKET TRENDS & ANALYSIS

## Economic Benefits of Oil & Gas Industry U.S. Statistics

- Total Jobs
  - Oil and natural gas industry supports 9.2 million American jobs
  - = 5.2% of the total employment
- Labor Income
  - Oil & gas labor income is estimated to be \$558 billion
  - = 6.3% of the national labor income total.
- Percentage of GDP
  - Oil & gas total value added contribution to the national economy was over \$1 trillion
  - = 7.5% of U.S. GDP in 2007.

Source Colorado Oil & Gas Association

# ENERGY INDUSTRY STATISTICS WORLD DAILY SUPPLY

## Daily Supply World Oil Markets (2011)

Country- Producer	Total Oil Production	
	MMbpd	% of Total
1Saudi Arabia	11.2	12.86%
2Russia	10.2	11.71%
3United States	10.1	11.60%
4China		

# ENERGY INDUSTRY STATISTICS WORLD DAILY DEMAND

## Daily Demand World Oil Markets (2011)

Country- Consumer	Total Oil Consumption	
	MMbpd	% of Total
1United States	18.9	21.43%
2China	9.8	11.11%
3Japan	4.5	5.10%
4India	3.4	3.85%
5Russia	3.1	3.51%
6Brazil	2.6	2.95%
7Saudi Arabia	2.6	2.95%
8Germany	2.4	2.72%
9Canada	2.3	2.61%
10South Korea	2.2	2.49%
Total	88.2	

Source: U.S. Energy Information Administration

# 2011 U.S. PRIMARY ENERGY USE BY SOURCE

# 2011 U.S. ENERGY CONSUMPTION BY SOURCE & SEC





# HUGE MARKET OF PRODUCED OILFIELD WATER

In 2007, Total Volume in U.S.  
of Produced Oilfield Water was 21 Billion Barrels

- Equates to 57.4 million barrels per day
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# HYDRAULIC FRACTURING REQUIRES MILLIONS GALLONS WATER

Hydraulic fracturing is a proven technological advancement, allowing natural gas and oil producers to safely recover natural gas and oil from deep shale formations

- Stimulation to unlock the oil & gas that is in the rock itself
- Been used safely for more than 60 years (since 1947) in more than a million wells.
- Involves using water pressure to create fissures, or fractures, in deep underground shale formations to allow natural gas and oil to flow.
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# TREATMENT & SALE OF FRAC WATER

# MAP OF U.S. SHALE PLAYS WHERE FRACKING IS REQUIRED

# FRACKING IN SHALE FORMATIONS

# ADVANTAGES OF REUSING PRODUCED OILFIELD WATER

## The Problem?

E&P companies currently face management problems in not only getting rid of their produced oilfield water but also meeting their heavy demand for suitable water for fracking operations.

## The Solution?

Oil and gas companies, by offloading their produced oilfield water to a water treatment company, gain four self-explanatory benefits:

- Reduces the E&P Company's out-of-pocket cash cost of getting rid of their brine (upwards of \$3.50/Barrel)

- Avoids management problems (and time delays) in seeking permits for and costly drilling of saltwater disposal wells

- Provides a new source of water suitable for frac fluids

- Political benefits of reusing produced oilfield water



# GEOHERMAL ADVANTAGES AS RENEWABLE ENERGY SOURCE

As an alternative energy source,  
geothermal energy has many advantages and benefits

- Virtually emissionfree
  - Binary cycle plants are completely closed systems and produce virtually no pollution
- Baseload Power
  - Produces continuously deliverable base load power with a capacity factor greater than 95%. Unlike wind and solar, which are intermittent with a capacity factor of only around 20-35%, a geothermal plant can run continuously, generating baseload power, making it direct competition for coal
- Small Environmental Footprint

# GEOHERMAL LIMITS OF MARKET LOCATIONS

# PLEASANT BAYOU #2 WEDDLE'S PILOT OPERATION



GEOHERMAL RESOURCES IN TEXAS GULF COAST  
SOURCE: STATE ENERGY CONSERVATION OFFICE (SECO)

# PART II- GROWTH INDUSTRY & FINANCIAL ANALYSIS

Water is becoming ever more valuable in the oil & gas industry, marked by explosive demand from horizontal drilling and hydraulic fracturing to increase oil & gas production

- Fracking in shale fields, a process requiring millions of gallons of water per well, per frack-job, is revolutionizing the landscape of the American domestic energy sector
- Used in over one million wells in the United States for more than 60 years, fracking has been successfully used to retrieve more than 7 billion barrels of oil and over 600 trillion cubic feet of natural gas
- In 2010 alone, the consumer surplus from shale gas production was worth over \$100 billion, in addition to creating a remarkable energy boom and hundreds of thousands of jobs in the U.S.

# MONTHLY REVENUE \$FRAC WATER SALES

Summary Financial Model: Monthly Gross Revenues from Treatment & Sale of Frack  
 (Does NOT Deduct Costs or Expenses)

## Financial Inputs

Daily production of Water (Barrels)	10,000
Injection Percentage	40.0%
Water Sale Percentage	60.0%
Production Days in Month	25
Barrels Treated per month	250,000
Oil-Cut Percentage (% per Barrel of Water)	1.0%
Price of Oil (per barrel)	\$85
Revenue per barrel of Brine <del>Off</del> taken	\$0.25
Sale Price per barrel of Treated Frack Water	\$1.50

## Monthly Gross Revenues

Inbound Brine Revenue	(Total Barrels X off-take price)	\$75,000
Oil-Cut Sales	(Barrels treated X oil-cut % X oil price)	\$212,500
Treated Frac Water Sales	(Barrels treated X sales % X frac price)	\$225,000
Total Monthly <u>Gross</u> Revenues		<u>\$512,500</u>

(NOTE: Blue inputs are sensitive)

# MONTHLY REVENUE \$ GEOTHERMAL ENERGY

Summary Financial Model: Monthly Gross Revenues from Geothermal Energy  
(Does NOT Deduct Costs or Expenses)

## Financial Inputs

Daily production of Water (Barrels)		25,000
Production Days in Month		28
Production Hours in Month		672
Power Generated (in MWh)	(Based on Pleasant Bayou #2)	1.25
Power Sale Price (per MWh)		\$50

## Monthly Gross Revenues

Geothermal Energy Sales	(Production Hours x MWh x price)	\$42,000
Total Monthly <u>Gross</u> Revenues		<u>\$42,000</u>

(NOTE: Blue inputs are sensitive)



# COST STRUCTURE FRAC WATER & GEOTHERMAL

## Main Categories of Costs

- **Frac Water Operation**
  - Saltwater Disposal Well Permitting, Drilling, Tanks & Land (\$3.5M)
  - Trucking/Transportation of Water (depends on proximity and location)
  - Water treatment costs (per barrel)
  - Injection costs per barrel (for non-treatable brine)
- **Geothermal Energy Operation**
  - Project Cost per Installed MW (\$3M)
  - Royalty costs (2-5%)

# SUMMARY: MAXIMIZE ENERGY OUTPUT FROM WATER

## Financial Metrics

- Sales of Dry Natural Gas & Oil Production Natural gas & oil production sales from existing reserves & production from acquired fields and wells.
- Geothermal Gas- Each barrel of water produced contains roughly 400 scf of natural gas, from which electricity will be generated.
- Geothermal Energy Baseload Electricity generated from hot water produced in wells (upwards of 2 MWs per well).
- Sales of Frac Water Singlewell hydraulic fracturing jobs in Eagle Ford field require about 10 million gallons of water, creating heavy demand, amounting to market prices of - \$1.00 \$2.00 per barrel of frac water. Each well can produce material barrels of water per day.
- Off-Take Inbound Brine Revenues E&P Operators pay to get rid of their unwanted brine
- Oil-Cut Revenues Separation & sale of oil from Brine
- Federal Production Tax Credits \$22 per MWh of power generated.
- Exemption from 7.5% Texas Severance Tax for gas incidentally produced in association with geothermal.
- Reduction of Operating Costs Reduce its operating costs by utilizing existing oil and gas wells and infrastructure. Rather than drilling new wells, use existing wells via less expensive workover rigs (rather than more expensive full drilling rigs).
- Higher IRRs

The following slides focus on  
selected metrics analyzed in oil & gas industry

# TEXAS LEGAL DEFINITION OF “MINERALS”

[Texas Geothermal Resources Act of 1975 Section 141.002](#)

# TEXAS LEGAL DEFINITION OF “GEOHERMAL ENERGY”

# INDUSTRY DEFINITION OF “RESERVES”

Since cash flow source is subject to depletion,  
analysis must include review of applicable Reserves

- Example

# GOVERNMENT SEC DEFINITION OF “RESERVES”

To prevent overbooking of Proven Reserves,  
SEC regulates disclosures. New rules effective January 1, 2010.

## Pricing

- Old Rules: Yearend price
- New Rules: First day of month for each of last 12 months, simple mathematic average

## Definition of Proved

- Old Rules: Direct contact with a reservoir via flowing well test
- New Rules: May use new technology if such technology has been demonstrated empirically to result in reliable conclusions

## Full-Cost Ceiling Test

- Old Rules: Compare ceiling to carrying value using yeard price, or subsequent price if needed to avoid impairment
- New Rules: Compare ceiling to carrying value using 12 month historic average price. No revision for

# PETROLEUM ENGINEERING RESERVE REPORTS

**Petroleum Engineering Reserve Reports** (often referred to as “Summary of Reserves & Revenue”) provide :

- Production quantities and volumes from wells
  - Considers depletion curves
  - Considers technical & engineering analyses of properties
  - Considers Reserve Production Ratios (Proved Reserve Additions ÷ BOE Produced)
- Reserves; and



# SEC VALUATION FORMULA OF RESERVES

## SEC P-10 Value of Reserves

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# OIL & GAS INDUSTRY VALUATION MODEL

## Two Main Valuation Approaches

- Income Method
  - Discounted cash flows
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# U.S. GAAP ACCOUNTING OF F&D COSTS

Under GAAP, oil companies can choose from two methods to account for Finding & Development Costs (F&D)

- **Successful Efforts**
  - Permits writeoff of F&D expenses against profits until Reserves become Proven. Dry Hole costs are expensed. Once Reserves are Proven, associated F&D Costs can be capitalized.
- **Full Cost**
  - Capitalize all exploration spending, whether dry hole or successful
  - Is less conservative method (because can defer some costs)

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Diverse Experience - Accounting, Tax, Law & Finance: Steven Erdahl is GreenTech's Founder and CEO, responsible for implementing and giving direction and leadership toward achieving the Company's strategic goals and objectives. He is an attorney (Texas), CPA (Texas), CVA (National Association of Certified Valuation Analysts) and entrepreneur with over 20 years of experience in accounting, tax, law and finance. He is also Board Certified in Tax Law by the Texas Board of Legal Specialization. Mr. Erdahl's experience includes public accounting and private law practice, as well as legal and corporate finance executive positions in Dallas with Oryx Energy Company (now Anadarko Petroleum). He has a heavy international background.