

# Educating Perception Towards Reality – On Both Sides

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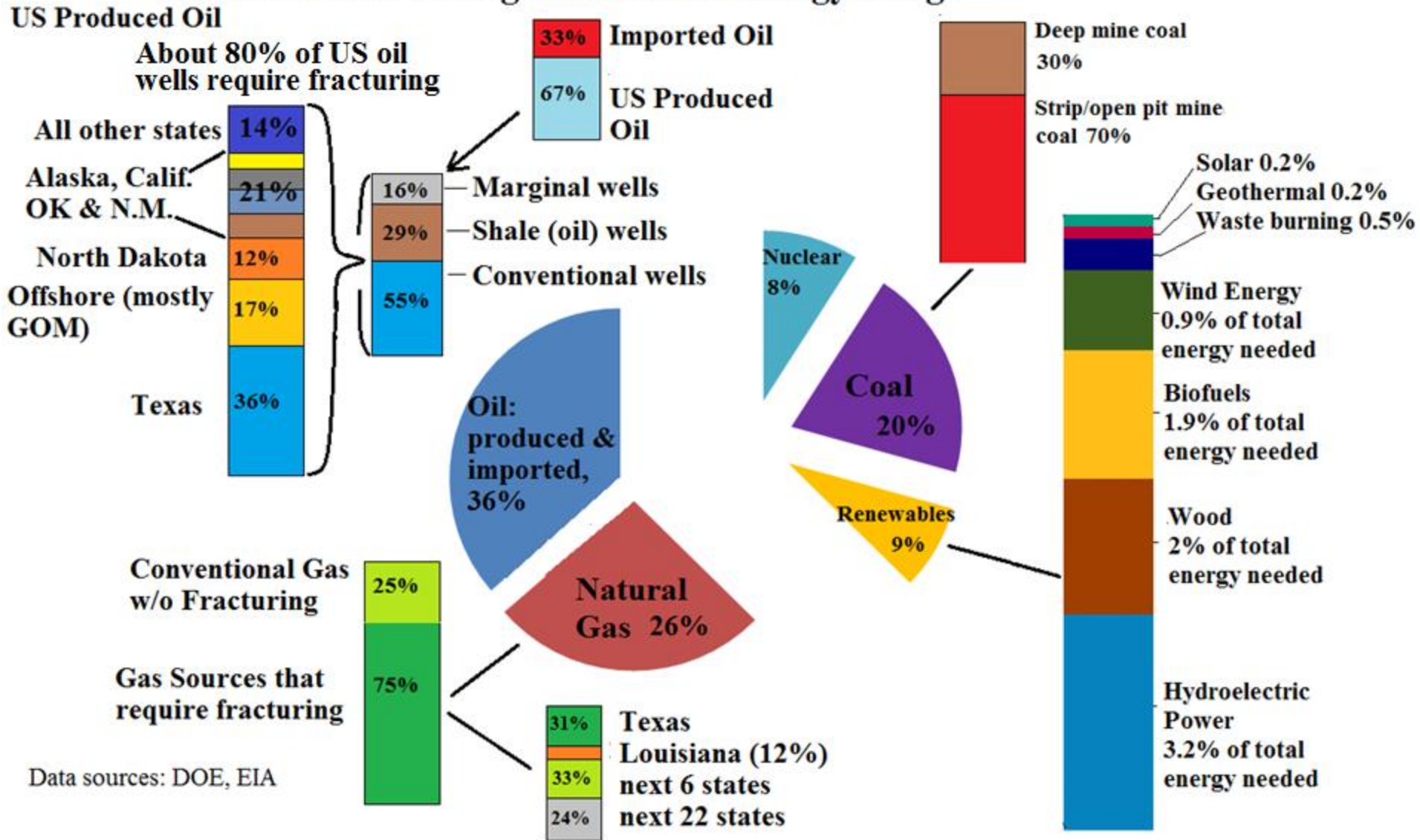
SPE Environmental Stewardship ATW, Austin Tx,

23-25 September 2014

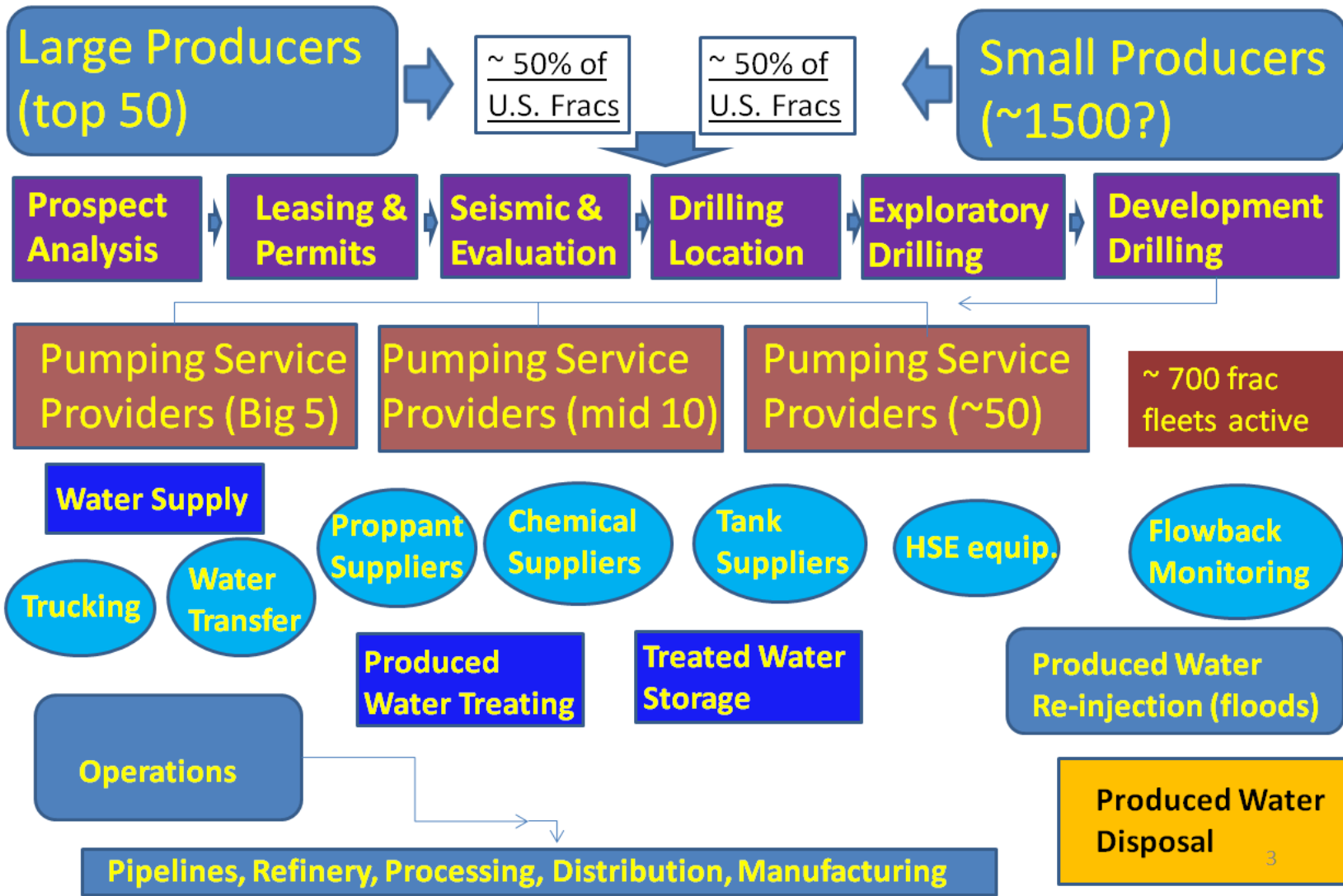
# What the Driver of Our Fears?

- Collapse Anxiety – “the sky is falling!”
- Pundits and critics take conditions of the “now” and extrapolate – to infinity – with no regard for changes.
  - We’re running out of food!
  - We’re running out of water!
  - We’re running out of oil and gas!
  - We’re changing the climate!
  - The wells are declining too rapidly!
  - There are trucks everywhere!!!!
- The solution is and always has been human innovation
  - “Smaller, Faster, Lighter, Denser, Cheaper” – Robert Bryce

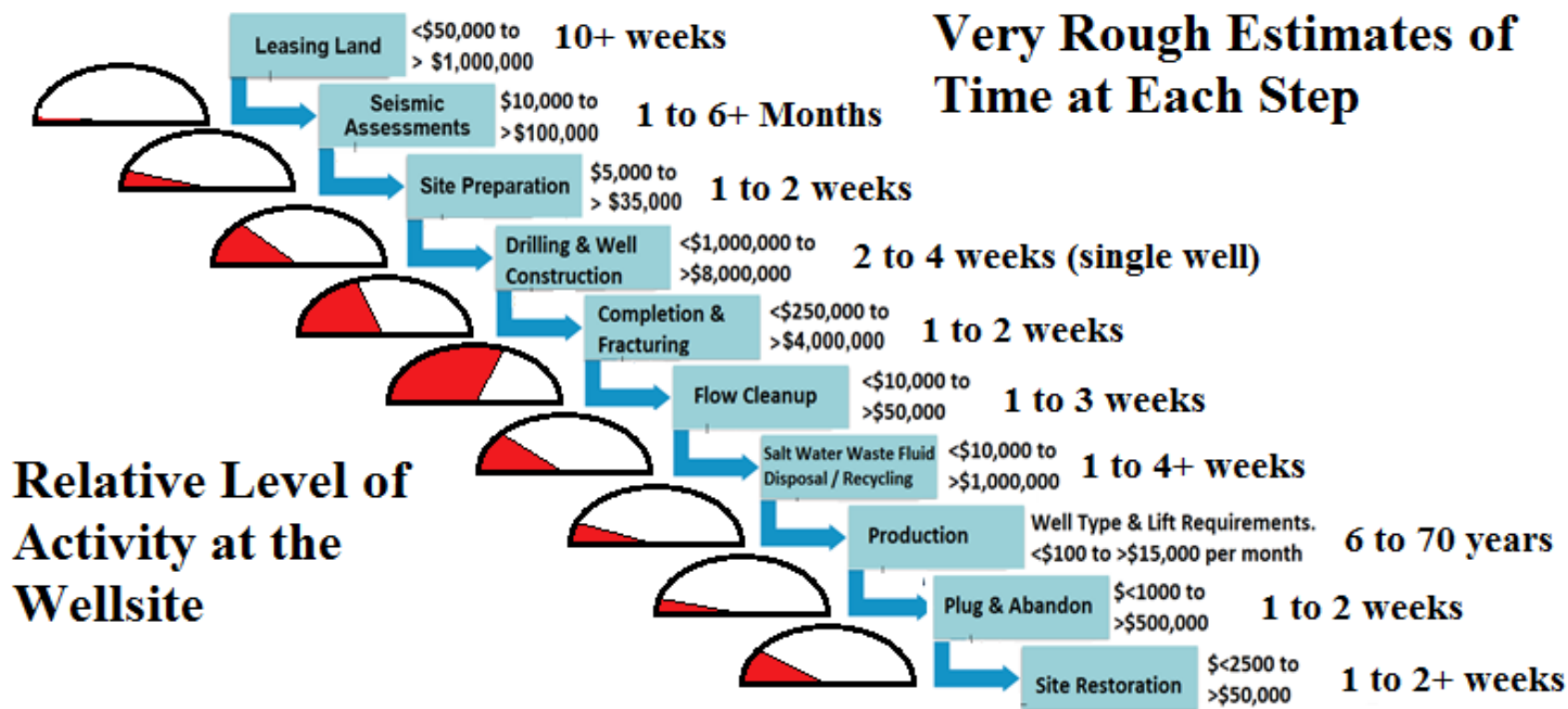
# Sources Contributing to Total US Energy Usage



# Who Does Fracturing?



# How Much Time does a well or a Development take?



# How Much Water Does Fracturing Use?

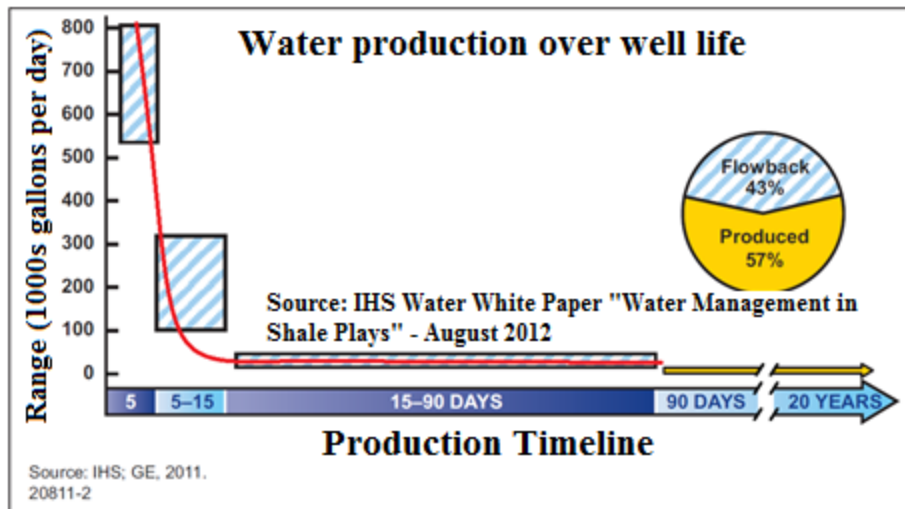
Depending on the well and the formation, the operations in one well might use 5 million gallons.

10,000 such wells in a year in Texas would use 50 billion gallons.

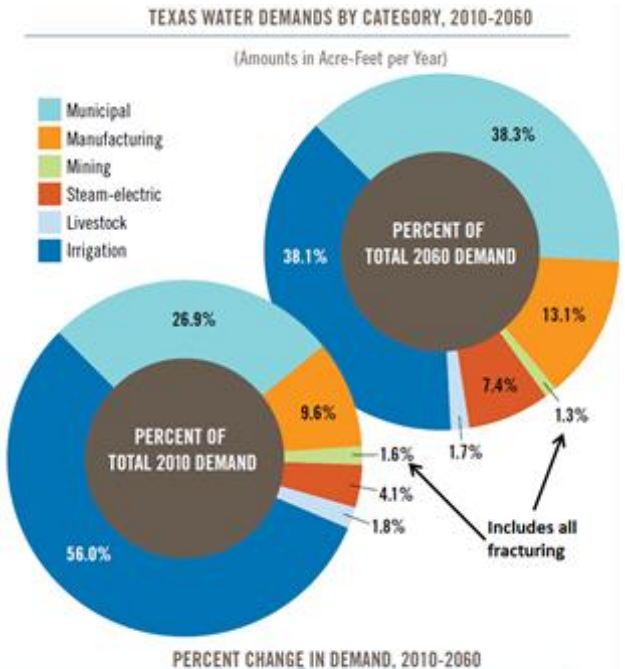
1000 wells in this area might use 5 billion gallons

To put this in context:

- Houston leaks 20 billion gallons of water per year
- Irrigation in Texas uses 2.8 trillion gallons per year
- Average yearly flow of the Brazos is 2 trillion gallons.

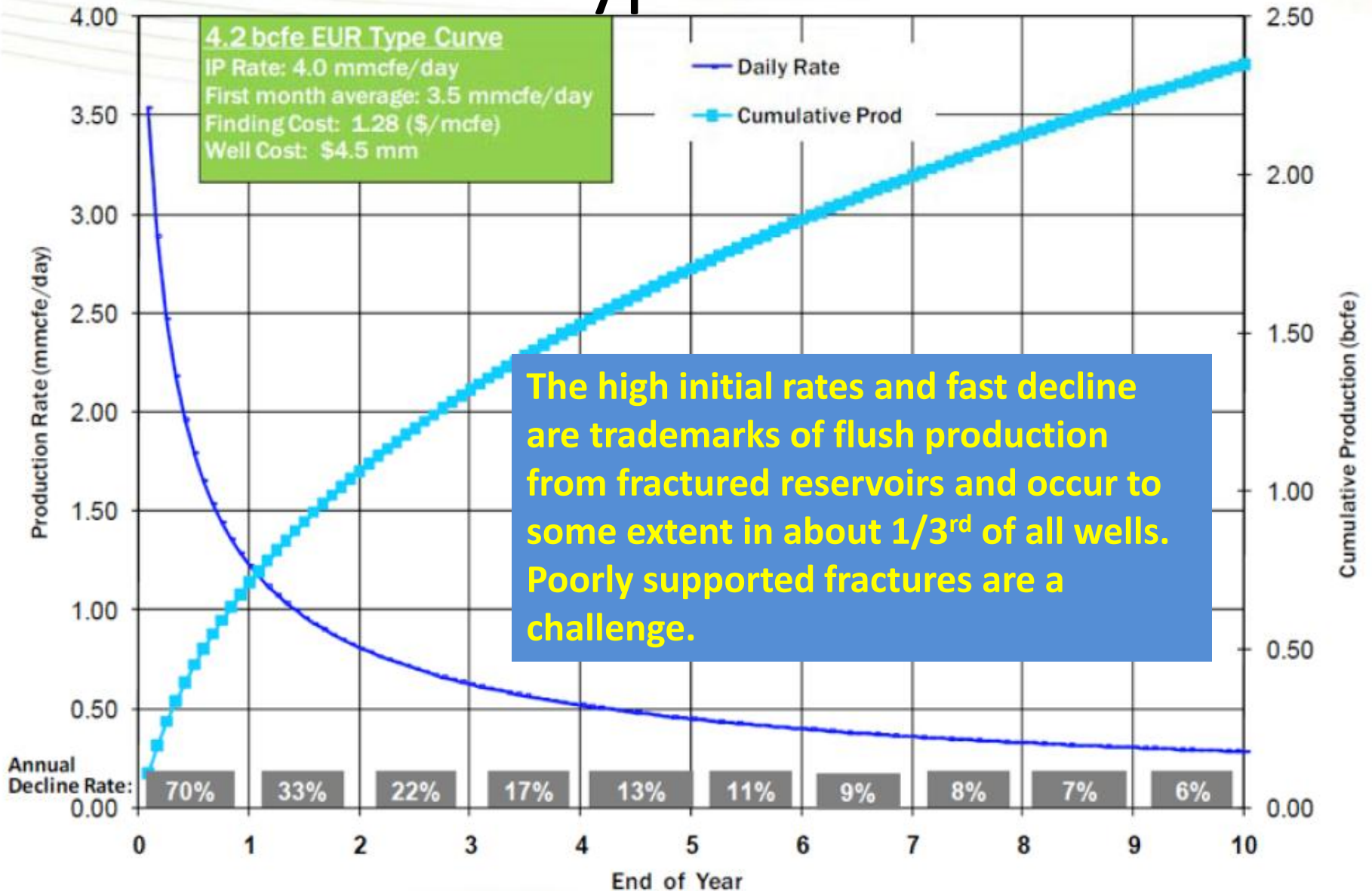


**About 40% of water after fracturing returns in first 2 weeks**

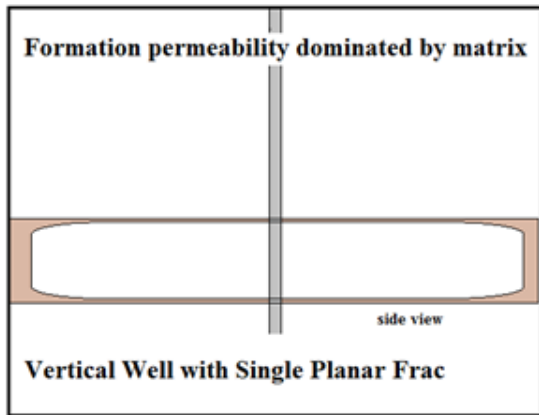


Source: Susan Combs, Texas Comptroller of Public Accounts: "The Impact of the 2011 Drought and Beyond", February 6, 2012.

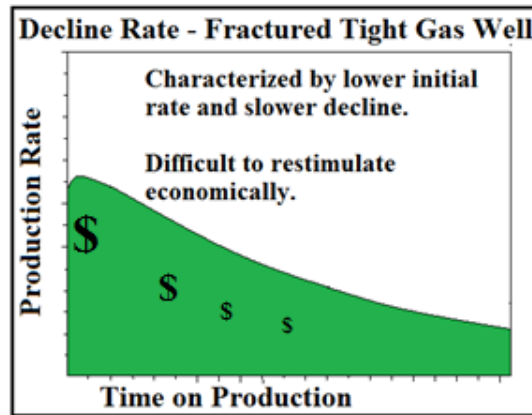
# Shale Gas - Type Decline Curve



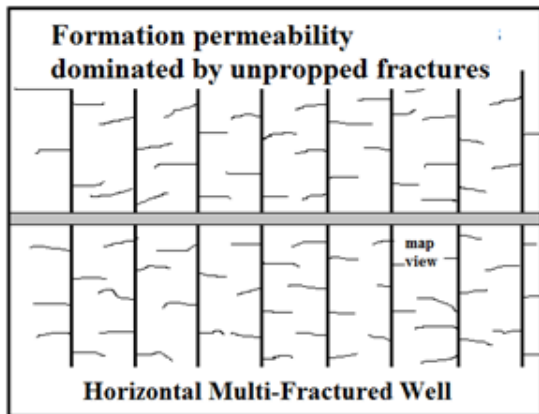
# However – It's not bad, just different.



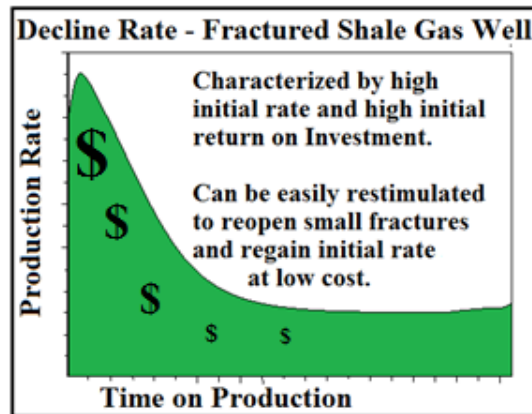
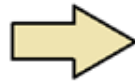
Matrix Flow



- Economics
  - Slow, long term recovery



"Flush" Production



- Economics
  - Quick recovery
  - Higher \$NPV

A higher net present value (NPV) of cash flow is typical from successful shale wells



# Well Failures & Improvements in Development Eras

Time Era	Operation Norms	Era Potential For Pollution
1830 to 1916	Cable Tool drilling, no cement, wells vented	High
1916 to 1970	<u>Cementing isolation</u> steadily improving.	Moderate
1930's →	<u>Rotary drilling</u> replace cable tool, <u>BOPs</u>	Moderate & Lower
1952 →	<u>Frac reduce # wells.</u> Better pipe & cement	Lower from Frac aspects
1960 →	<u>Gas tight couplings and joint make up</u>	Moderate
1970 →	Cement improving, Horizontal Wells introduced	Lower
1988 →	<u>Multi-frac, horizontal wells, pad drilling</u> reducing environmental land footprint 90%	Lower
2005 →	<u>Well integrity assessment, premium couplings,</u> adding barriers & cementing full strings.	Lower after 2008 to 2010 <u>(STRONGER Reg Review)</u>
2008 →	<u>Chemical toxicity &amp; endocrine disruptors</u> <u>sharply reduced.</u> Real time well integrity needs studied - early warning & avoidance.	Lowest yet, most states caught up with design and inspection requirements.

# Regulations

## Effective or Development Preventers?

### Effective & Development Encouragers

- Standards reduce real risks
  - Consistent operations by all operators
  - Encourages produced water reuse instead of disposal.
  - Provides a level field for well development.
  - Requires reporting of all fracs to public available site ([www.fracfocus.com](http://www.fracfocus.com))

### Development Preventers

- Prevents Any Development
  - Every well a target for environmental impact and endless public challenge.
  - Creates unachievable goals or excessive cost to comply.
  - Continues to make companies prove a negative – regardless of a individual performance record.

# Conclusions

1. Innovation solves problems – never underestimate it.
2. We do cause problems! We also make our way of life possible!
3. Find the Hot button issues and address them.
  1. Trucks, Trucks, Trucks, Trucks – damn it!!!!
  2. Fears, Anxiety, Frustration, Lack of contact
4. Transparency is good, but education **MUST** occur.
5. Your best defense is:
  1. Your presence
  2. Your record of behavior
  3. Your knowledge of the subject (be accurate)
  4. Patience – and understanding.
6. Show how things have changed
  1. Water recycling (reduces FW load and reduces seismicity)
  2. Safer chemicals (EPA DFE and N.S. Gold Band)
  3. Pad Operations – 6000 acres produced from a 6 acre pad.
  4. Air emission – sharp declines when best practices applied
7. Explain/Expose the De-Growth agenda. – and innovate.