

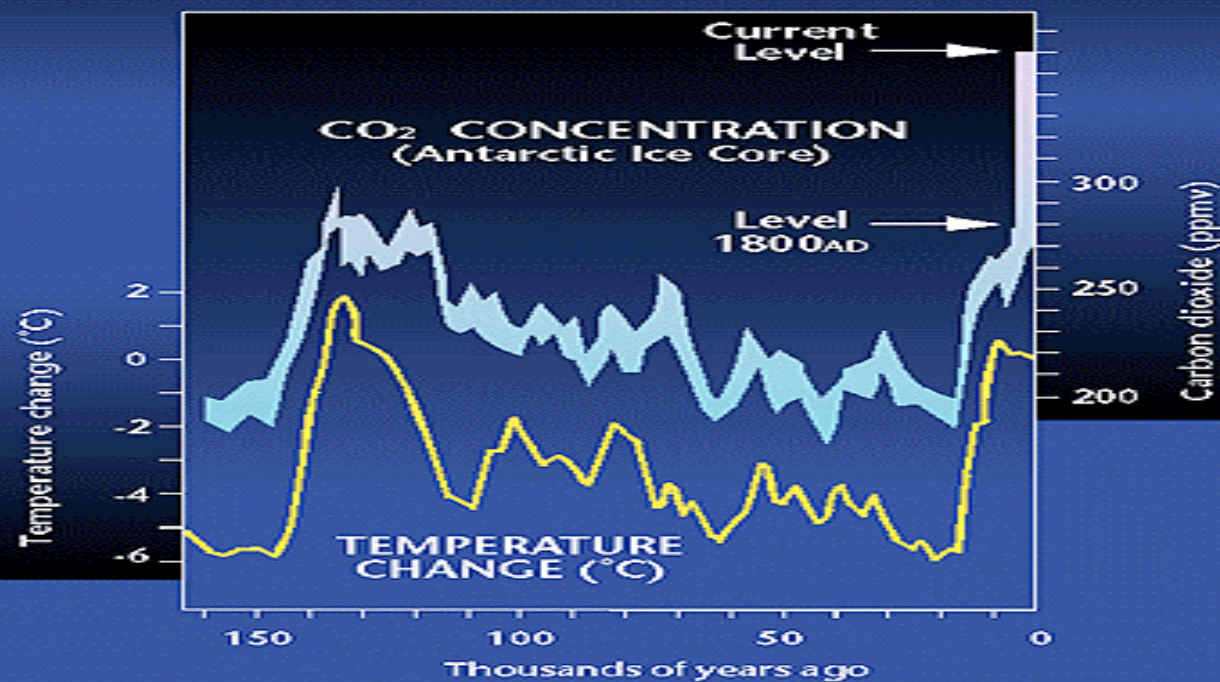
Rice University Environmental and Energy
Systems Institute and
The Shell Center for Sustainability Seminar on
Climate Change:

**“US CO₂/Greenhouse Gas:
Market Drivers, Issues and
Trends”**

Michael E. Moore
Managing Partner
Falcon ES/CO₂ Norway
September 14, 2004

Temperature and CO₂ Correlate: CO₂ Changes...Man or Nature?? White House now says Man! New York Times Aug 26th, 2004

Atmospheric Carbon Dioxide Concentration
and Temperature Change



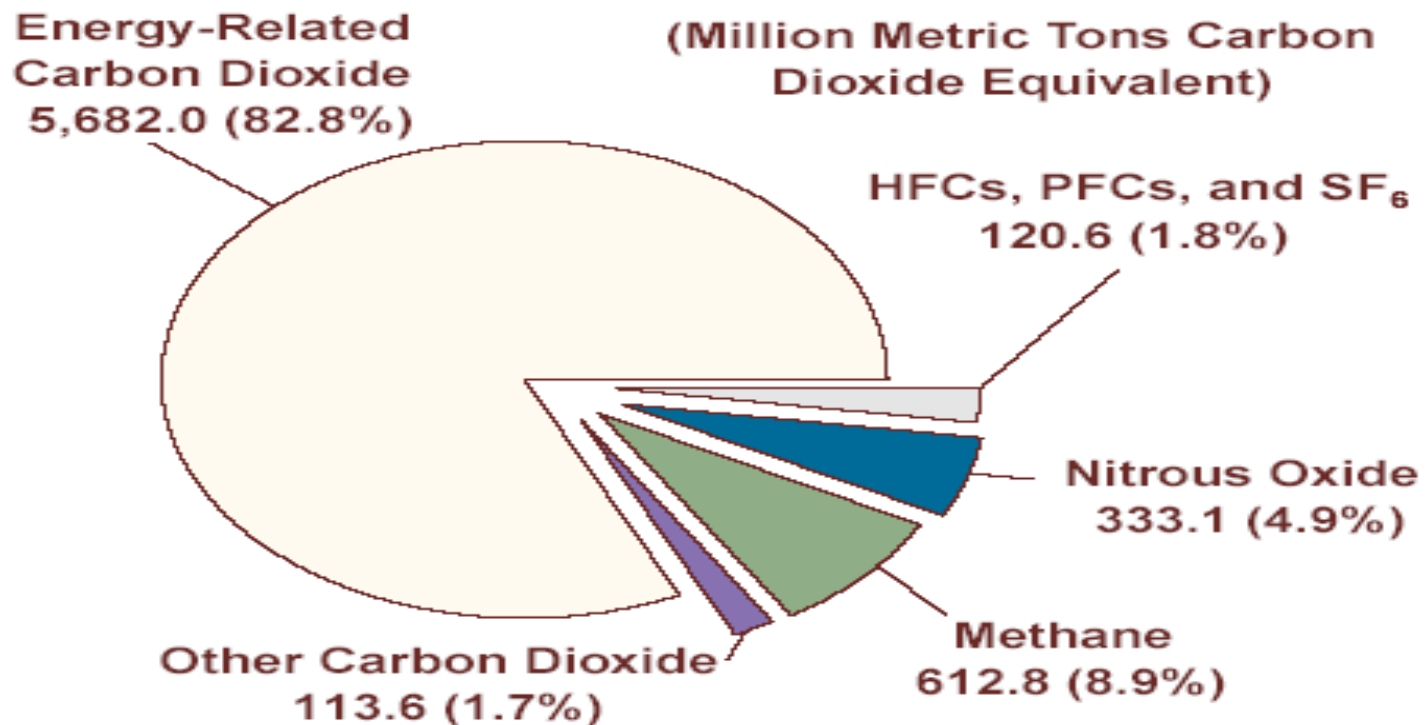
White House Shifts Its Focus on Climate

■ By **ANDREW C. REVKIN** August 26, 2004 New York Times

- “In a striking shift in the way the Bush administration has portrayed the science of climate change, a new report to Congress focuses on federal research indicating that emissions of carbon dioxide and other heat-trapping gases are the only likely explanation for global warming over the last three decades.
- In delivering the report to Congress yesterday, an administration official, Dr. James R Mahoney, said it reflected “the best possible scientific information” on climate change. Previously, President Bush and other officials had emphasized uncertainties in understanding the causes and consequences of warming as a reason for rejecting binding restrictions on heat-trapping gases.”

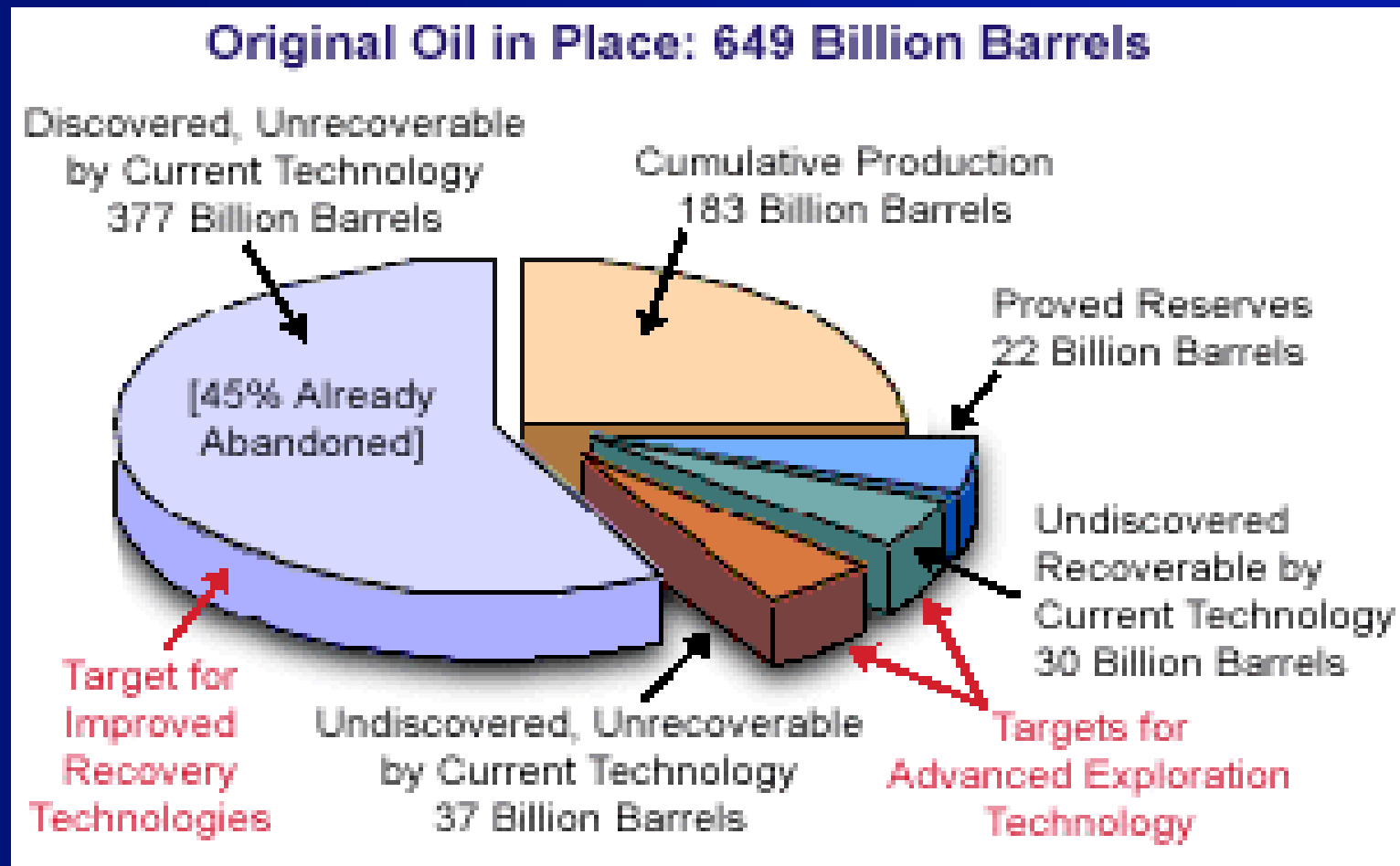
IEA US 2002 GHG Statistics

U.S. Greenhouse Gas Emissions by Gas, 2002



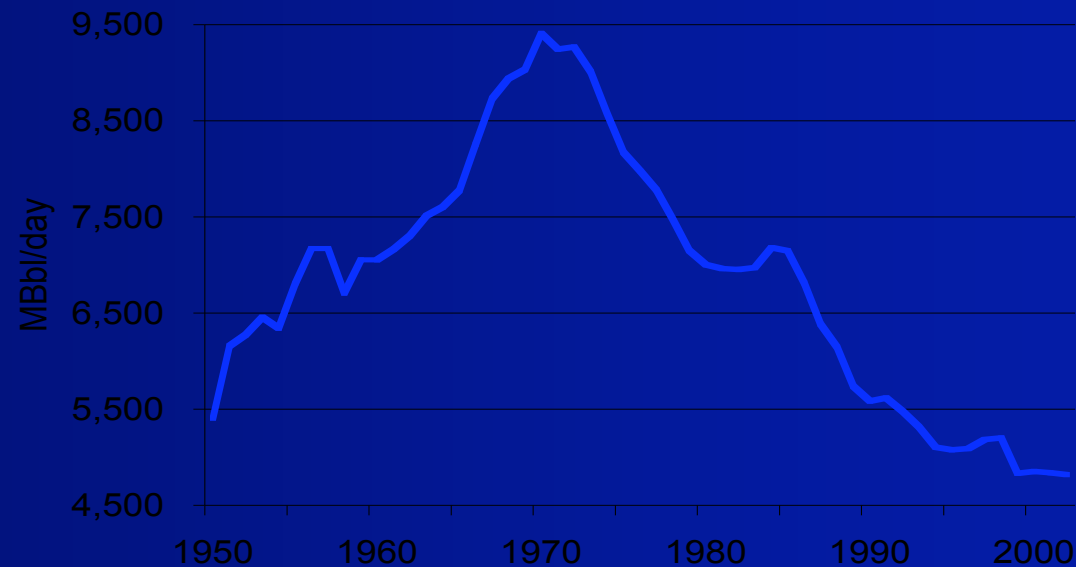
US Potential Crude Oil Resources

31 billion bbls have been identified in Texas that CO2 flooding could produce, 2 billion in East Texas.



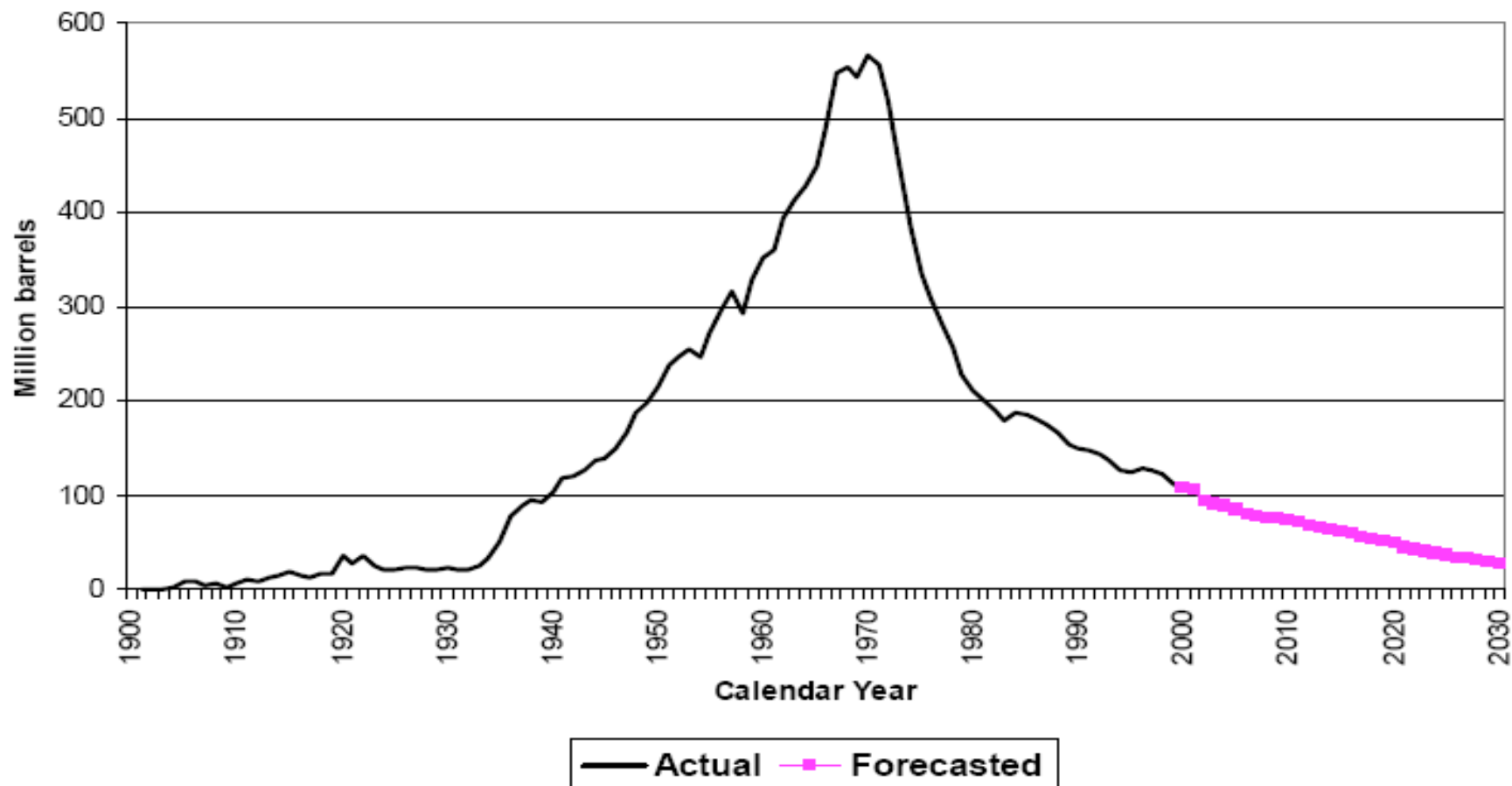
U.S. Basins very Mature, Production Peaked in 1970

Annual Domestic Crude Oil Production



Source: API, DE, Bloomberg, Raymond James Research Report

LOUISIANA STATE LONG TERM CRUDE OIL PRODUCTION FORECAST

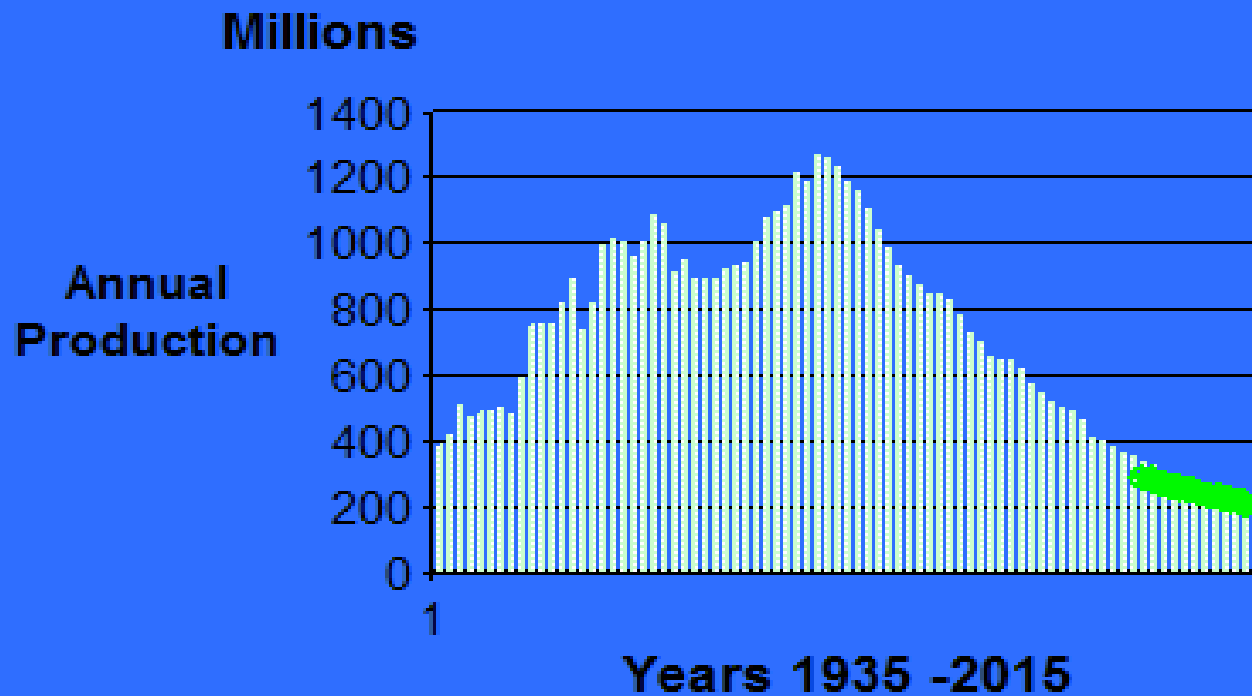


Texas Oil Production Curve

Cumulative production to date appr. 35 billion bbls

The green represents estimated production 2005-2015

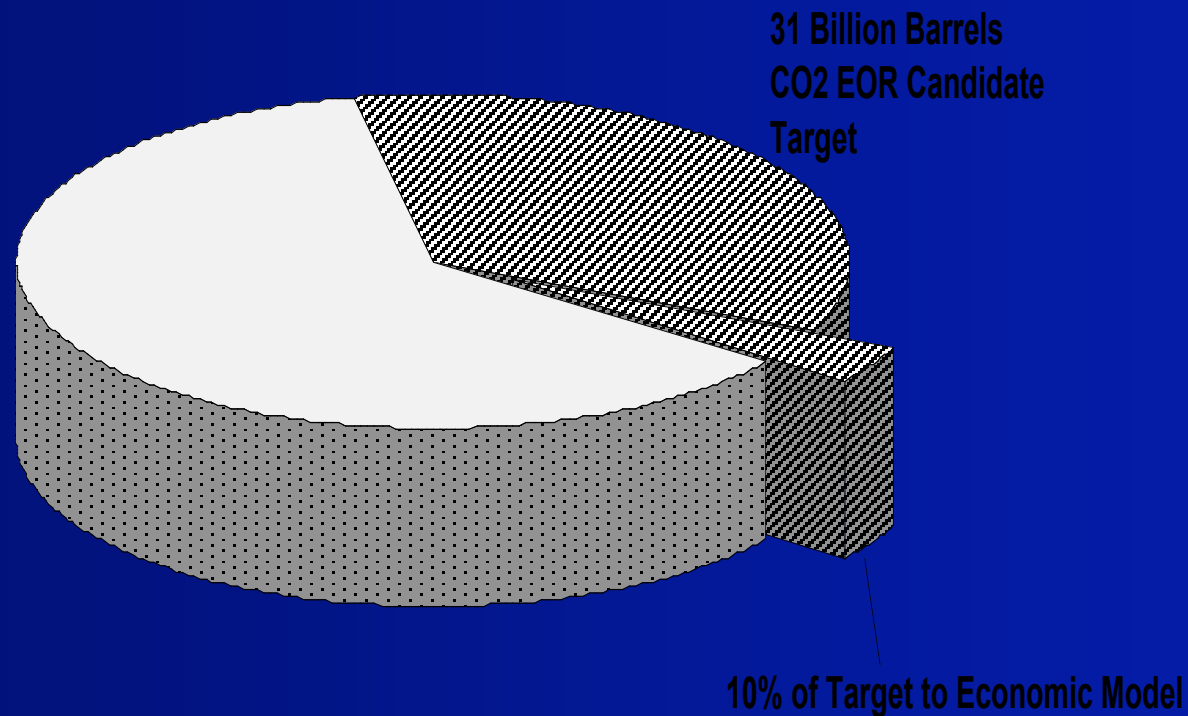
Projected Texas Annual Crude Oil Production



Identified Recoverable Texas Crude Oil—Only with CO2

Source: Texas BEG/GCCC

80 Billion Barrels Residual Oil in Significant TX Reservoirs



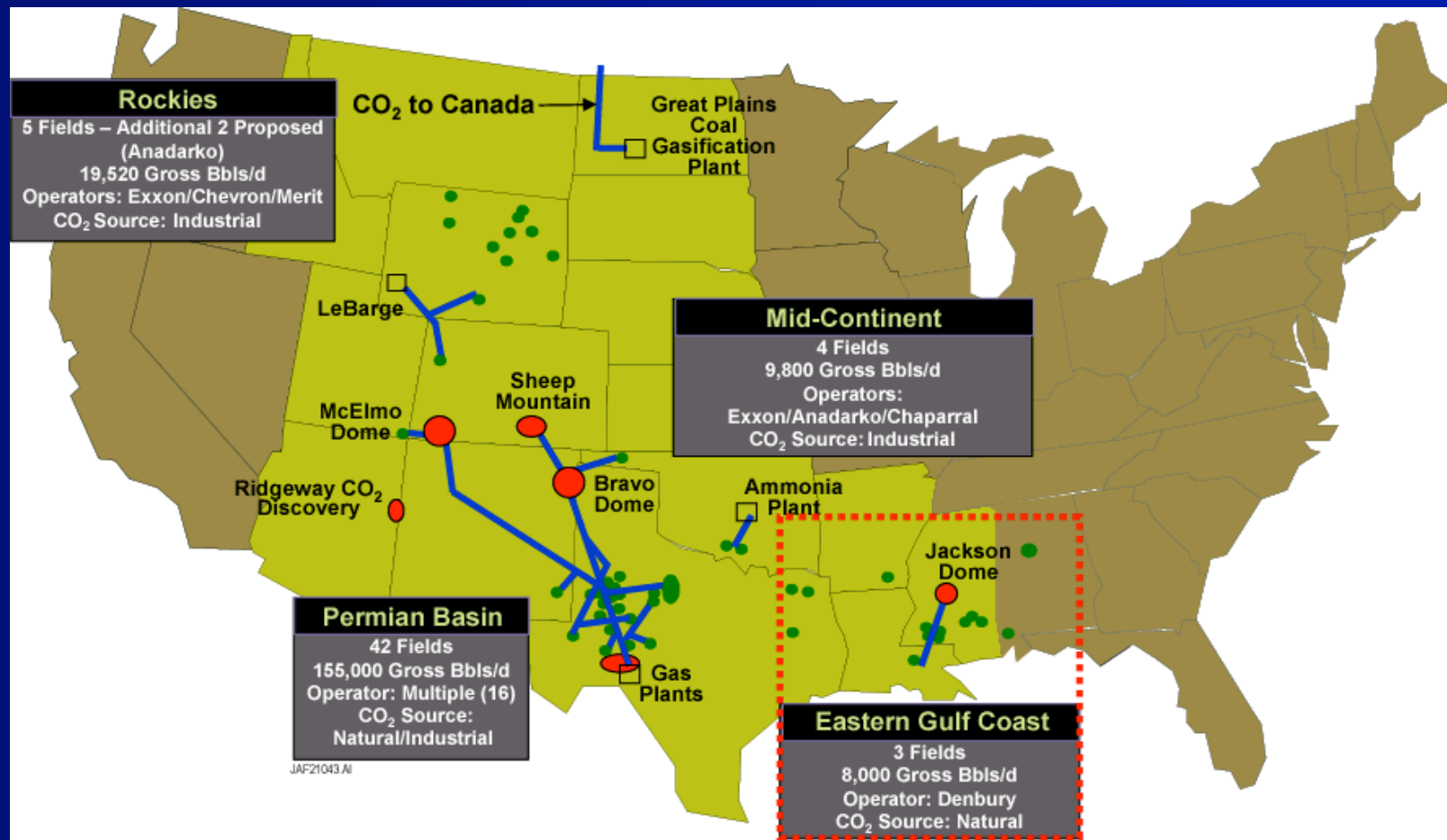
Potential Sequestration Volume through CO₂-EOR in Texas

Source: Texas BEG/GCCC

Percent Recovery	CO ₂ -EOR Resource (B bbls)	CO ₂ Sequestered (tons)	CO ₂ Sequestered (metric tons, tonnes)	CO ₂ Sequestered (Gigatonne, Gt)
10%	3.7	522,474,000	473,883,918	0.47
20%	7.4	1,044,948,000	947,767,836	0.95
30%	11.2	1,567,422,000	1,421,651,754	1.42
40%	14.9	2,089,896,000	1,895,535,672	1.90
50%	18.6	2,612,370,000	2,369,419,590	2.37
60%	22.3	3,134,844,000	2,843,303,508	2.84
70%	26.0	3,657,318,000	3,317,187,426	3.32
80%	29.8	4,179,792,000	3,791,071,344	3.79
90%	33.5	4,702,266,000	4,264,955,262	4.26
100%	37.2	5,224,740,000	4,738,839,180	4.74

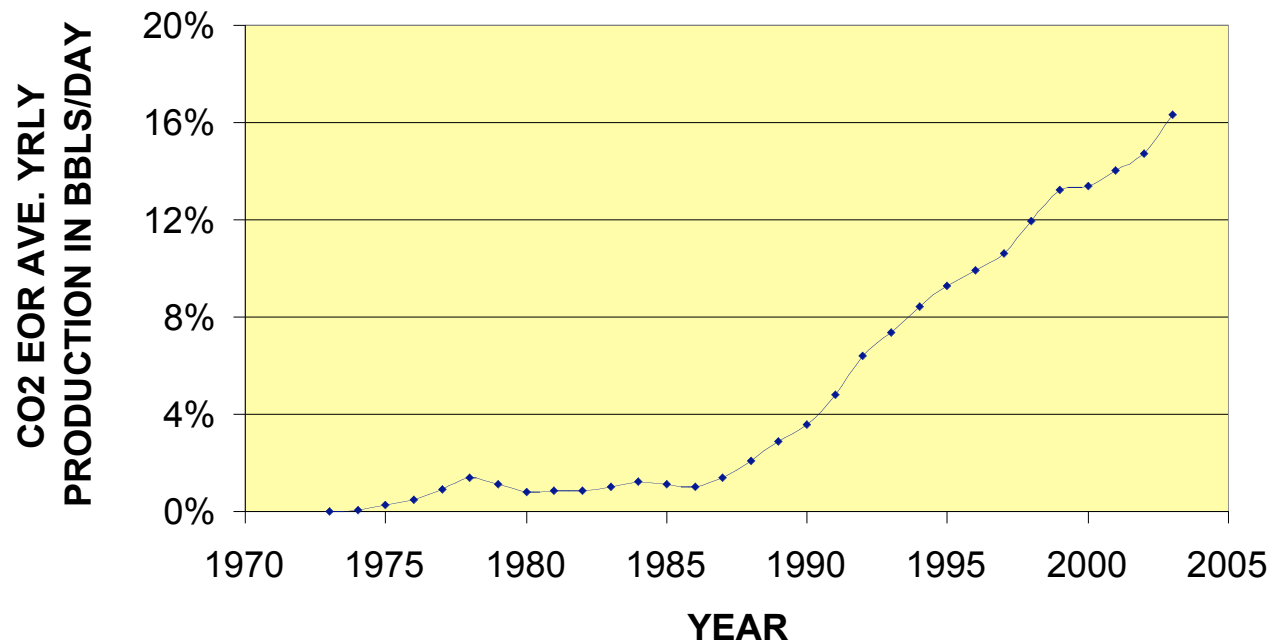
US CO2 driven EOR Projects and Infrastructure

Source: Denbury Resources, Inc., 2004

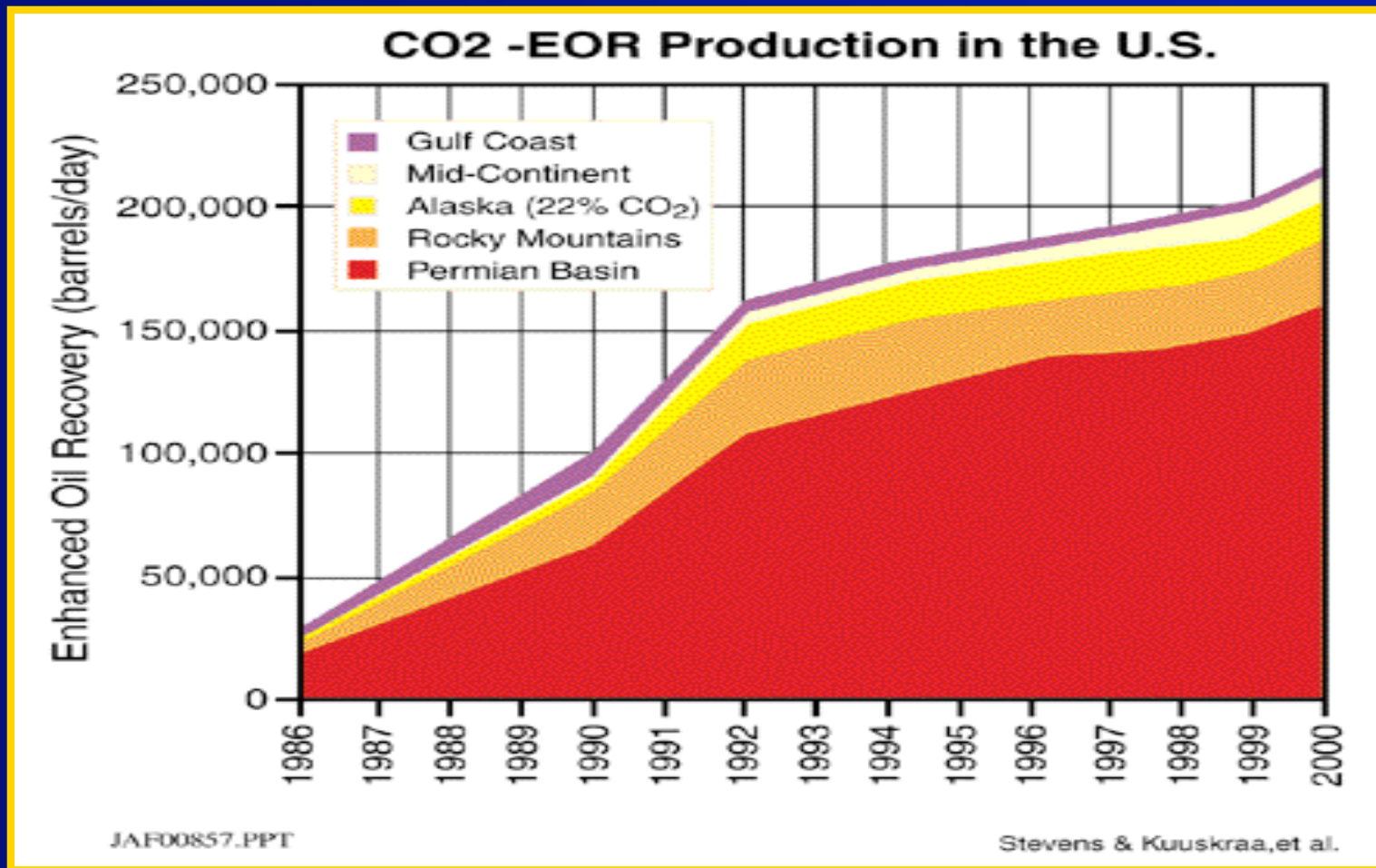


CO2 EOR is Important to Texas Hence, so is the CO2 Source

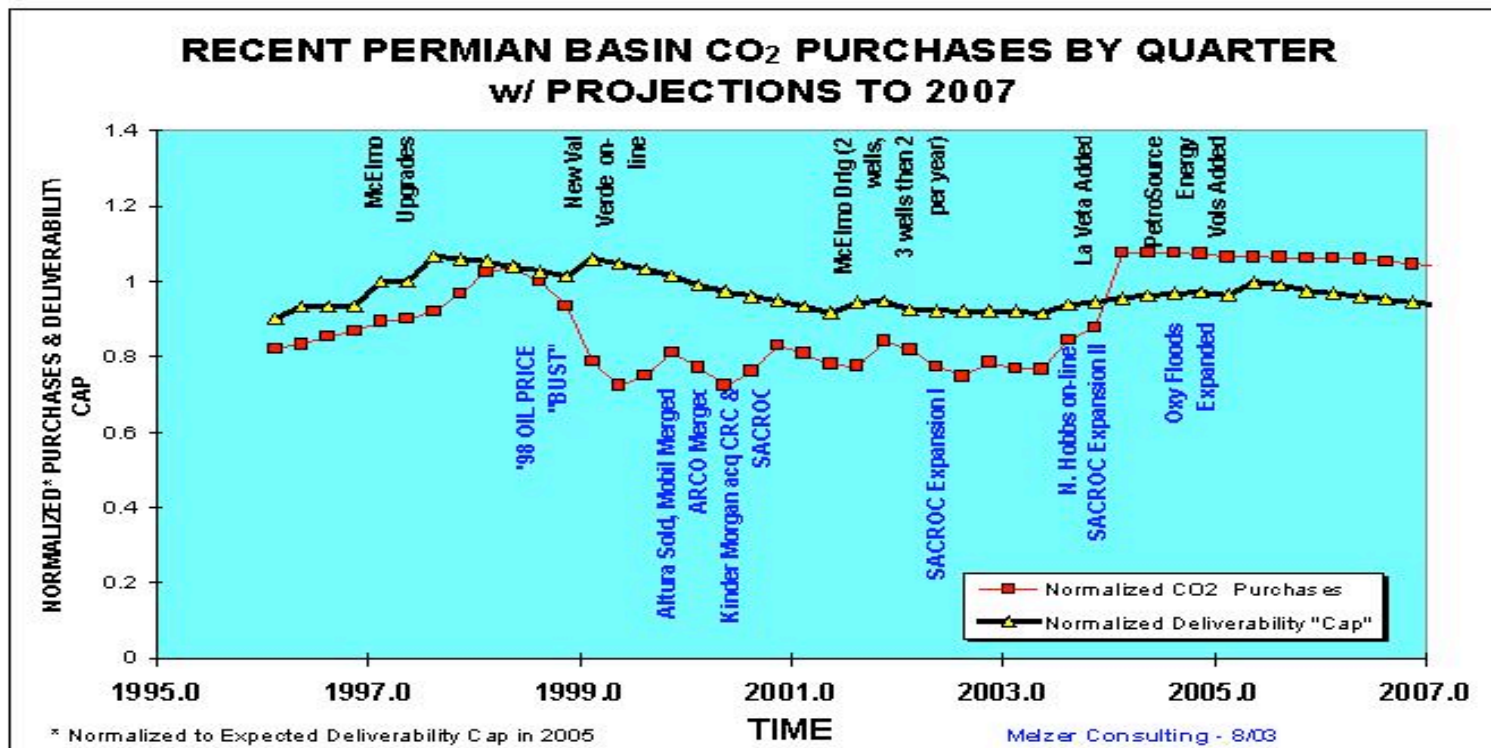
**GROWTH OF CO₂ EOR PRODUCTION IN TEXAS AS A
PERCENTAGE OF STATEWIDE PRODUCTION**



“We Have Only Just Begun”



Growing Demand for CO2

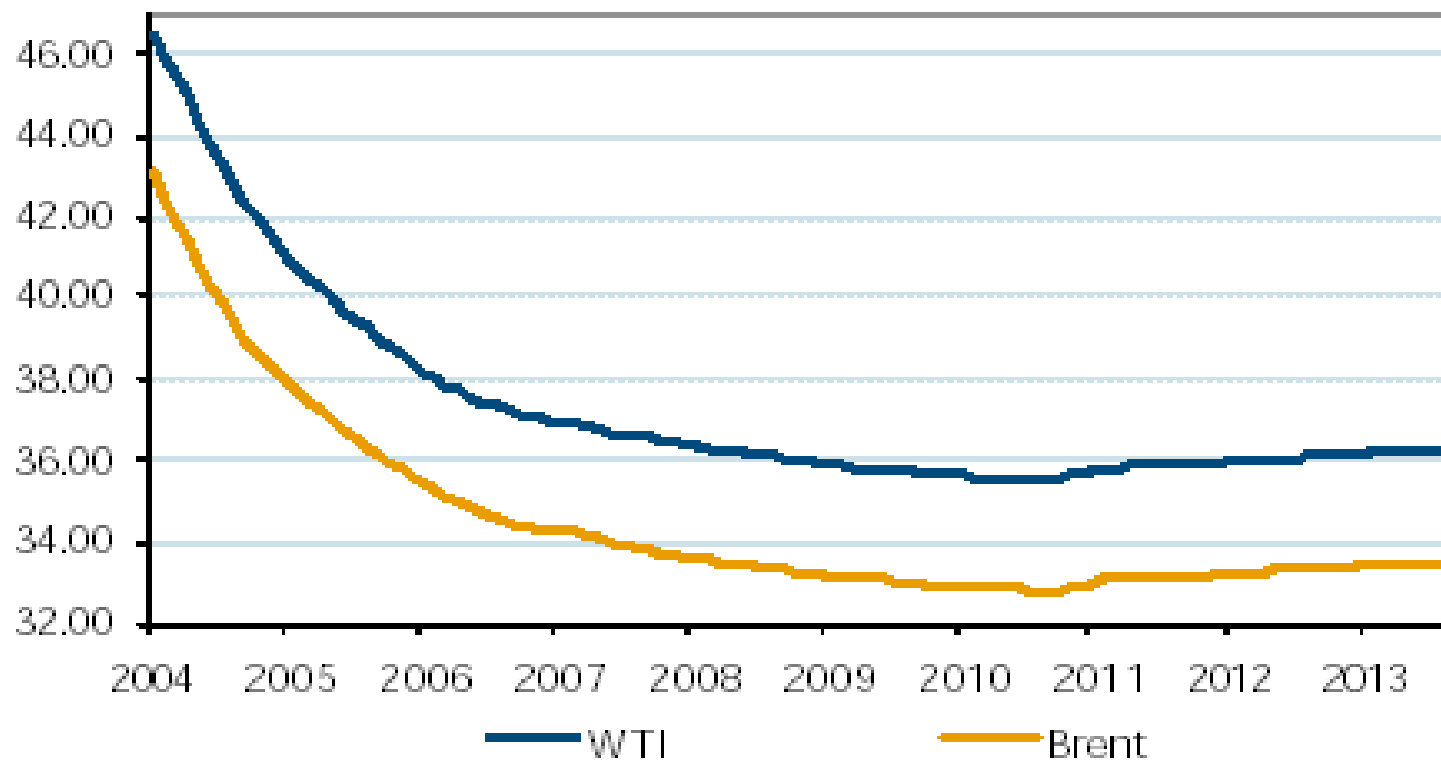


The Biggest Driver

10-Year Forward WTI Crude Oil Curve

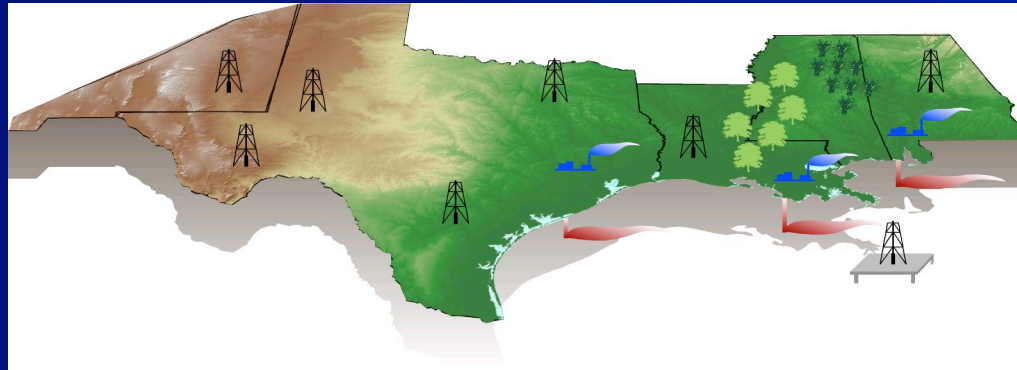
Source: Barclay's Bank

OTC Swap Curves



Gulf Coast Carbon Center

“Tapping the Potential for Large Volume Storage of Carbon in the Gulf Coast”



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The University of Texas at Austin
<http://www.beg.utexas.edu/environqilty/co201.htm>



Post Capture Main Cost Points

CO₂ Separation, Processing, and Compression

CO₂ Transportation, Aggregation, and Distribution

CO₂ Injection, Collection, Re-injection

CO₂ Reservoir Surveillance: MMV

Note: Source to Sink distance critical

Commodity CO2/ERC's is a Global Event



Joint OPEC/WPC Workshop
OPEC Headquarters, Vienna, Austria, June 8-9, 2004



Photo: OPEC PR & Information Department

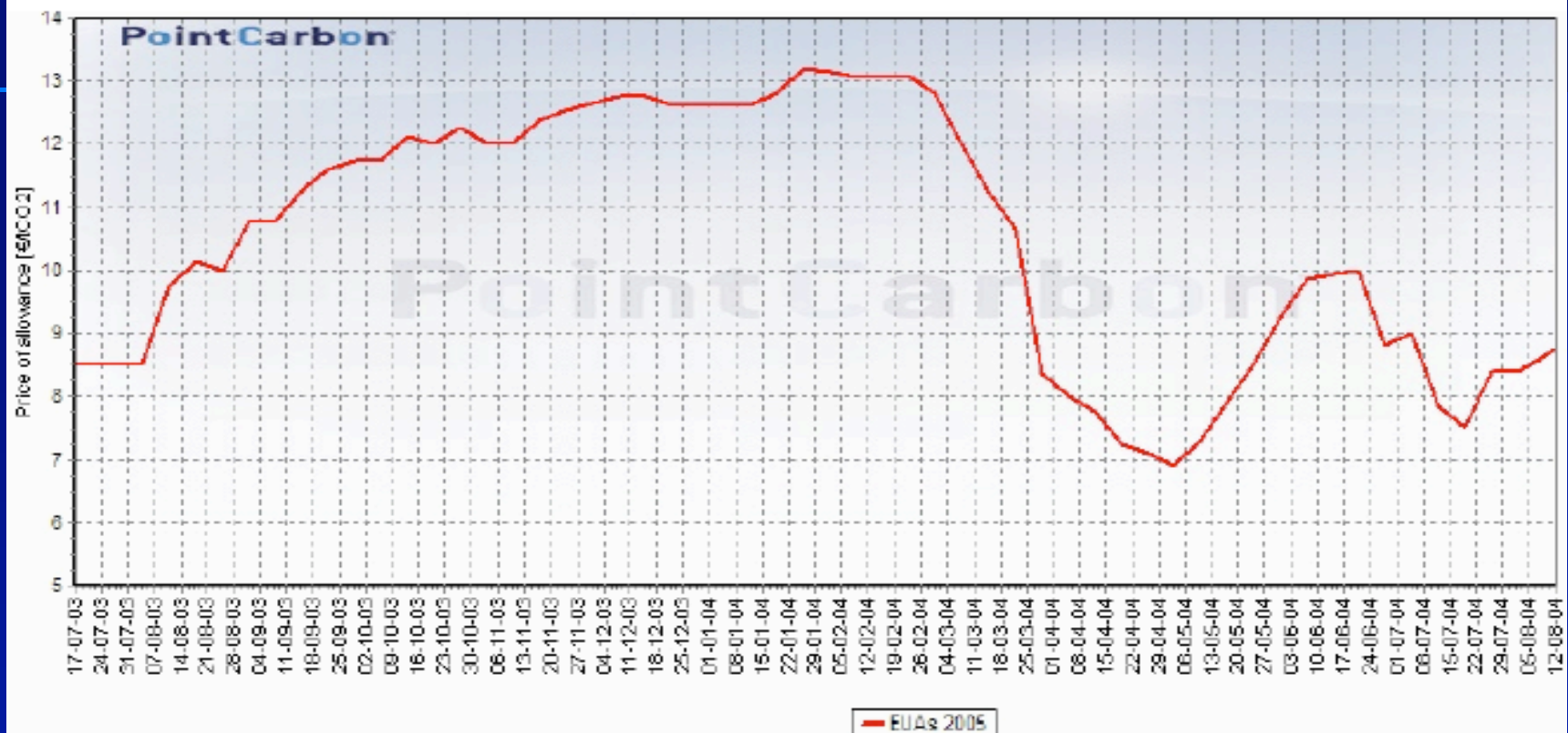
Conclusion

- Large scale EOR driven CO2 sequestration system works: Large scale reductions in anthropogenic CO2 happen
- Gulf Coast makes geographically sense
- Large scale and scalable, second life cycle in Gulf Coast
- GCCC can link other initiatives in source to sink infrastructure
- Creates leadership role
- Motivated participants
- Huge opportunity for regional emitters and sinks as well as technology, equipment, and service providers
- States benefit from positive economic impacts and extended asset life
- Jobs

- Michael E. Moore **Managing Partner** was a founding partner in Amerex Power. Emerging commodity market development for past 20 years
- George Lyons III **Managing Partner** recently Senior VP of Trading Tractebel USA. Energy market trading past 20 years
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Europe's Activity Reviving



The graph above illustrates the historical price development in the EU 2005 emissions trading market. As there in periods have been few trades with publicly announced prices, the graph is based on reported bids and offers.