

PREPARING LOUISIANA FOR THE POSSIBLE FEDERAL  
REGULATION OF GREENHOUSE GASES

**Presentation to**

**LSU Center for Energy Studies  
Advisory Council**

**By**

**Mike D. McDaniel, Ph.D.  
LSU Center for Energy Studies**

**May 15, 2008**



**LSU** CENTER FOR  
ENERGY STUDIES

# PREPARING LOUISIANA FOR THE POSSIBLE FEDERAL REGULATION OF GREENHOUSE GASES

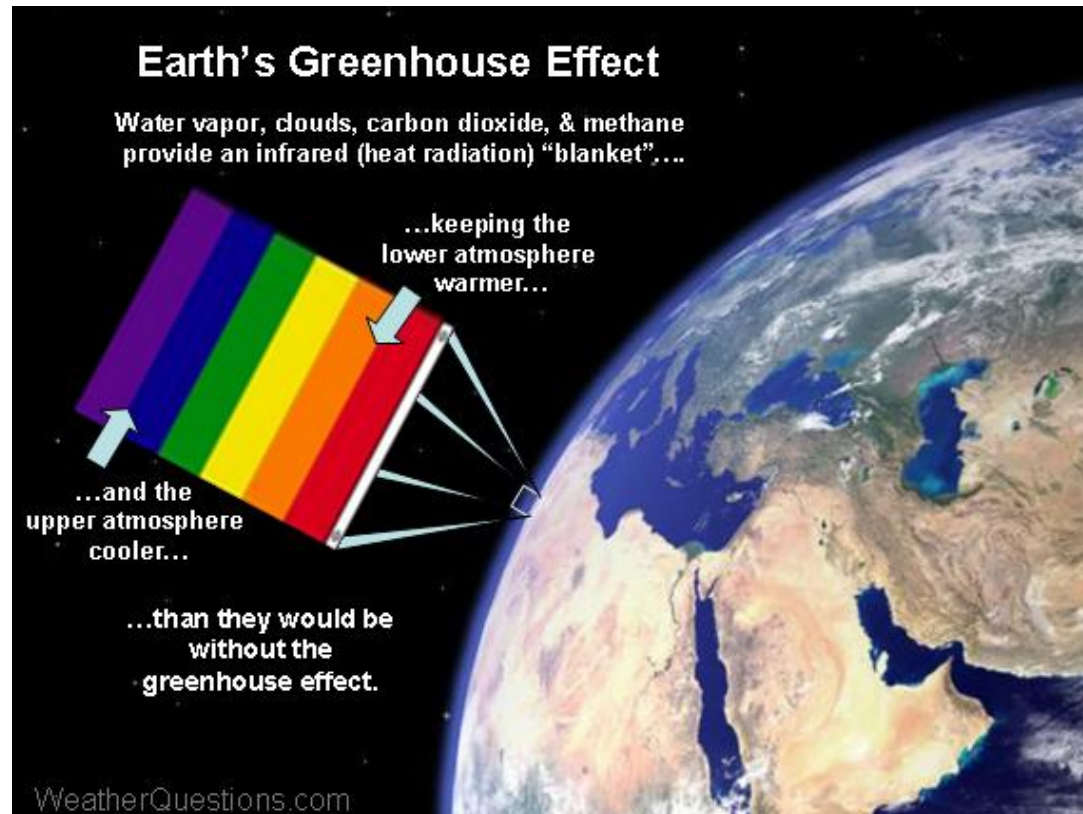
## Presentation Outline

- Introduction - Background
- Status of GHG Controls
  - Voluntary
  - Mandatory
  - Carbon Markets
- Outlook for Federal Regulation
  - Bills Before Congress
  - Presidential Candidates
- LSU CES Proposal
- Questions/Discussion



# Background

## GHG Gases and Global Warming

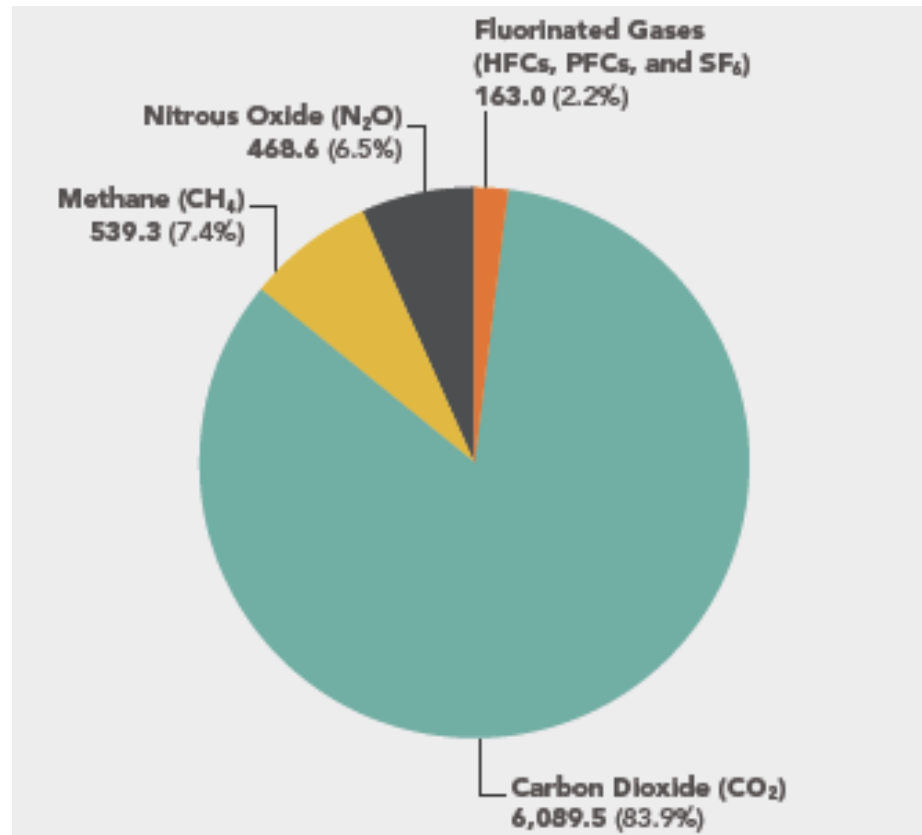


The most powerful greenhouse gases based on greenhouse effect are: water vapor (36-70%), carbon dioxide (9-26%), methane (4-9%), and ozone (3-7%).

Six internationally-recognized (IPCC) greenhouse gases are: carbon dioxide ( $\text{CO}_2$ ), methane ( $\text{CH}_4$ ), nitrous oxide ( $\text{N}_2\text{O}$ ), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride ( $\text{SF}_6$ ).

# Background

2005 U.S. GHG Emissions:  
7,260.4 MMTCO<sub>2</sub>e



Source: Resources for the Future

# Background

## Climate Change Mitigation Measures

- Control/reduce greenhouse gas (GHG) emissions
- Use alternative low-carbon/renewable energy sources
- Reduce deforestation
- Employ energy conservation and efficiency measures
- Capture and storage (sequestration) of CO<sub>2</sub>

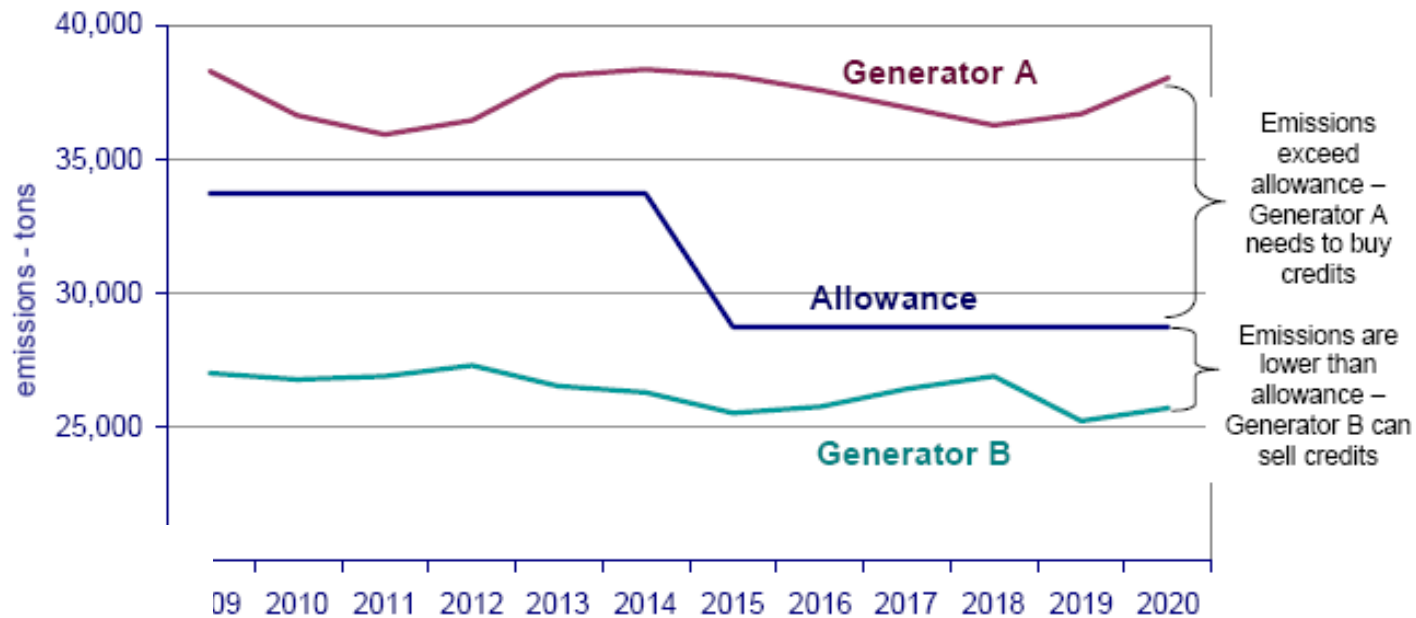


# Background

## Climate Change Mitigation Measures

Control/reduce greenhouse gas (GHG) emissions

### Cap-and-Trade Basics

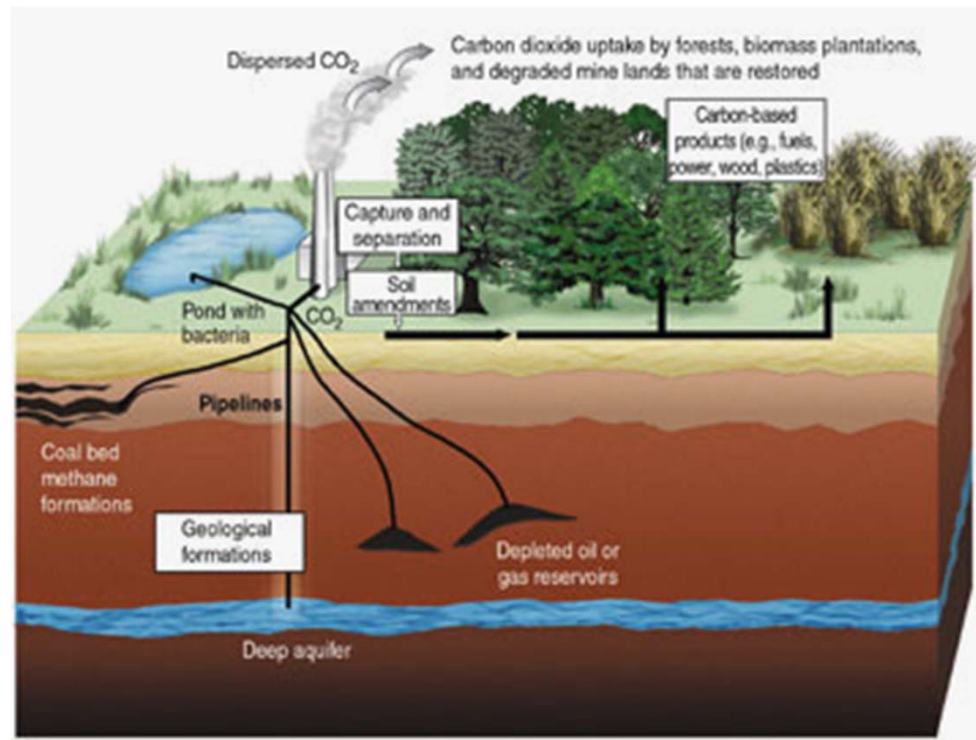


# Background

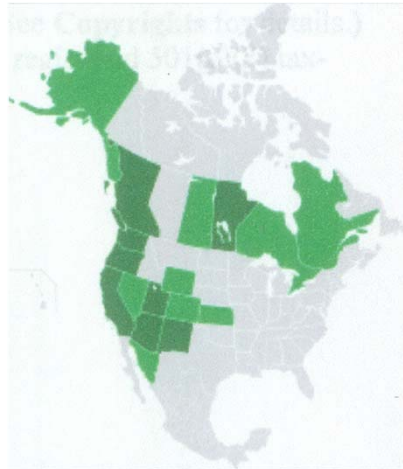
## Climate Change Mitigation Measures

### Carbon Capture and Storage

### Geosequestration - Biosequestration

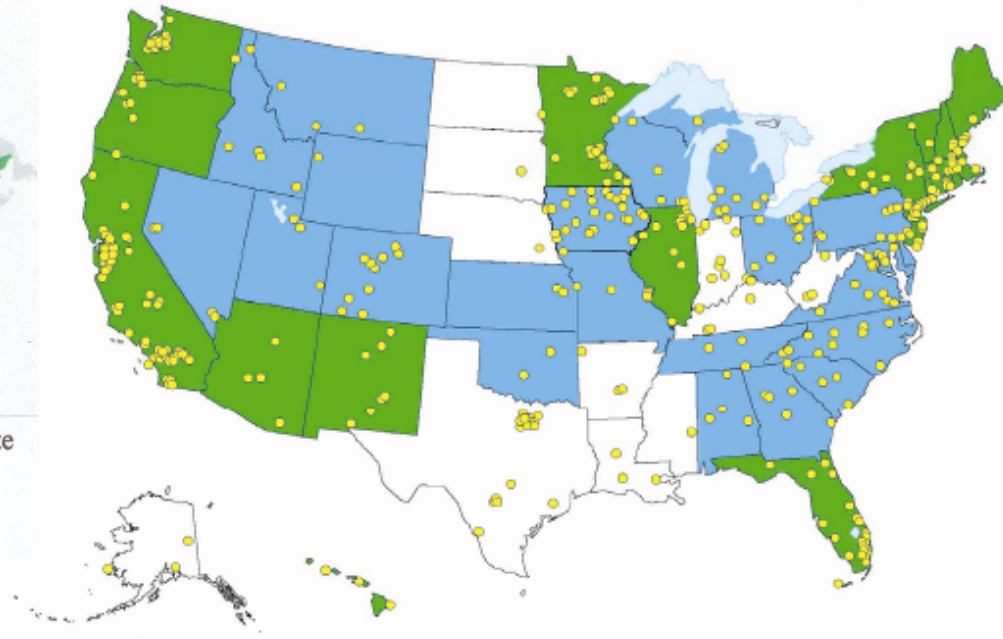


# U.S. Voluntary Climate Change Initiatives



The Western Regional Climate Action Initiative.  
Members  
Observers

State and Local Participation in Selected Climate Change Initiatives



- States with Greenhouse Gas Emission Targets and Participating in the Climate Registry (17)
- States Participating in the Climate Registry without a Greenhouse Gas Emissions Target (22)
- Cities Participating in the U.S. Mayors' Climate Protection Agreement (780)



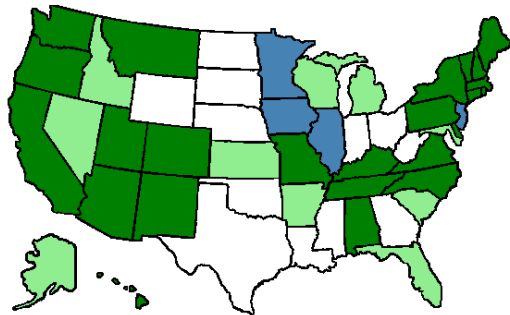
RGGI

<sup>11</sup> Information in this figure was taken from the Climate Registry, the Pew Center on Climate Change, and the US Conference of Mayors.



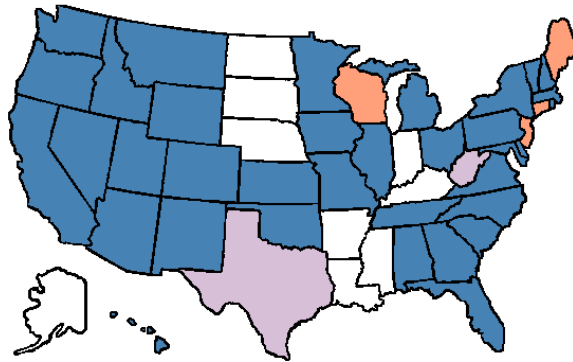
# STATES' CLIMATE INITIATIVES STATUS

## States with Climate Plans



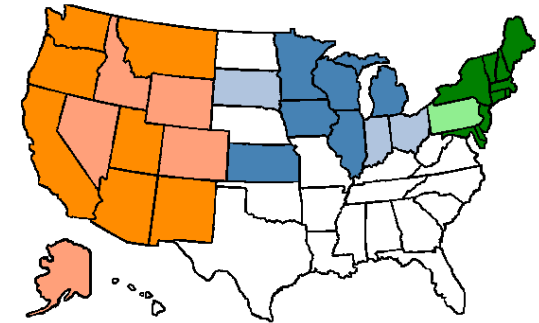
- In Progress
- Completed
- Revision In Progress

## States with GHG Registries

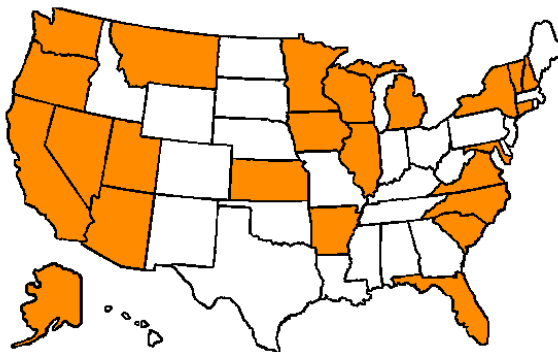


- The Climate Registry
- Climate Registry + Mandatory Reporting
- Independent Voluntary Registries

## Regional Initiatives

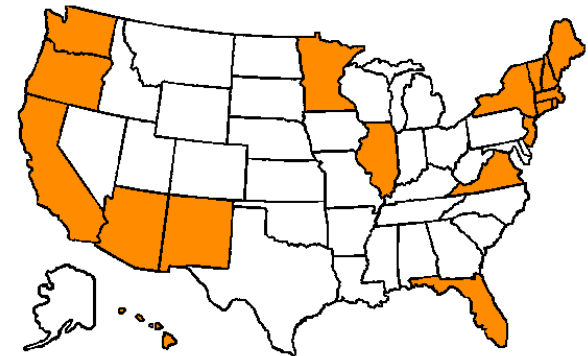


- Regional Greenhouse Gas Initiative RGGI
- RGGI Observer
- Midwestern Regional GHG Reduction Accord
- MRGHGRA Observer
- Western Climate Initiative
- Western Climate Initiative Observer



- Active Climate Legislative Commissions

## States with Climate Policy Groups



- States with GHG Emissions Targets

## States with GHG Emissions Targets

# Current Status of Carbon Markets

Global Activity \$31.2 B 2006; \$64 B 2007

## Voluntary

- Informal (negotiated offset values)

- Formal (tracked market values, e.g. CCX)

## Mandatory (global/federal/regional cap-and-trade programs)

- UN Kyoto Protocol

- EU ETS

- CANADA - Turning the Corner Program – currently drafting regulations

- RGGI/WCI /MRGHGRA – RGGI expected to initiate program Jan1,2009

- U.S. federal cap-and trade program?

## Current Market Uncertainties

- Timing/features of potential federal program

- Federal preemption

- Assigned vs. auctioned allowances

- Amount of domestic and international offsets allowed

- Offset values (i.e. voluntary versus mandatory)

- Protocols (valuation, validation, verification)

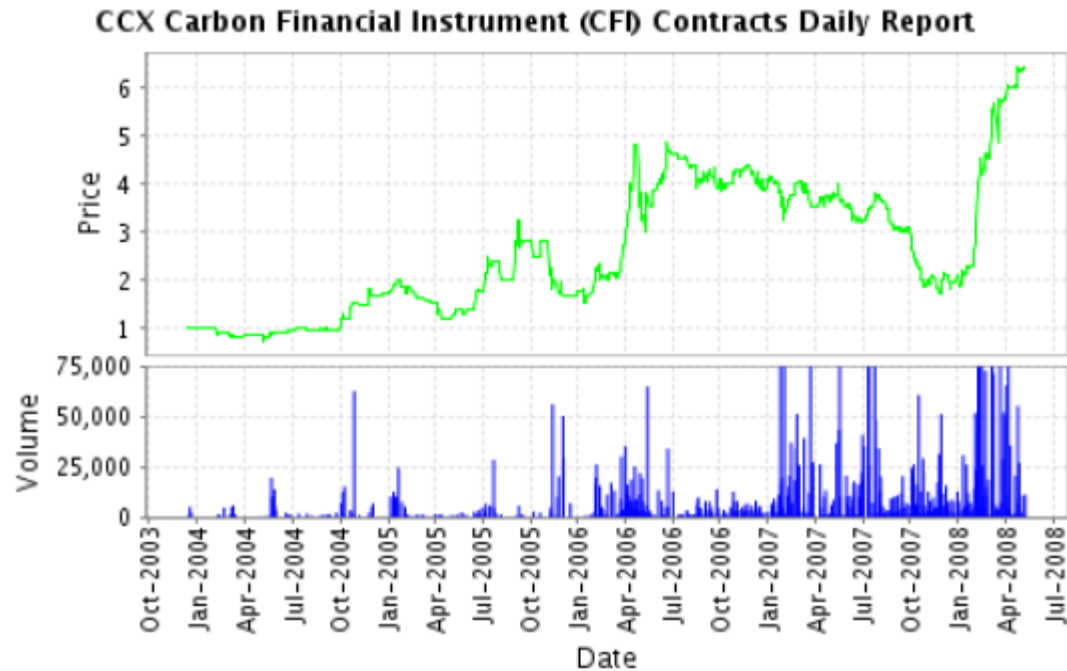
# Informal Voluntary Carbon Offsets Market

<b>Ecobusinesslinks.com Carbon Offset Survey</b>						
<small>(Prices are for individuals, businesses may be able to get volume discounts)</small>						
<a href="#">Share This</a>						
Carbon Offset Provider	Price (US\$/Metric ton CO2)	Non-profit	Projects Types	Project Choice	Offset Types	Product Certification/ Verification*
<a href="#">AtmosClear Climate Club USA</a>	\$3.98 <sup>a</sup> - \$25.00	No	Methane	No	Car, Home	Environmental Resources Trust
<a href="#">Carbonfund.org USA</a>	\$4.30 <sup>b</sup> - 5.50	Yes	Renewables, Efficiency, Reforestation	Yes	Home, Car, Air, Events, Business	Environmental Resources Trust, Climate Community and Biodiversity Standards, Chicago Climate Exchange, UNFCCC JI
<a href="#">e-BlueHorizons USA</a>	\$5.00	No	Renewables, Reforestation	No	Home, Car, Air	Chicago Climate Exchange, Environmental Resources Trust
<a href="#">Eco2Pass USA</a>	\$5.62-8.25	No	Projects from Chicago Climate Exchange	No	Car, Home, Personal, Family	Chicago Climate Exchange
<a href="#">DriveNeutral.org USA</a>	\$6.93 & up	Yes	Efficiency	No	Car	Chicago Climate Exchange
<a href="#">DrivingGreen Ireland</a>	\$8.00	No	Renewables	No	Car, Air, Events	SES
<a href="#">Terrapass USA</a>	\$10.91	No	Renewables, Methane	No	Car, Home, Air, Events, Business	Chicago Climate Exchange, Center for Resource Solutions, Gold Standard, Voluntary Carbon Standard
<a href="#">The CarbonNeutral Company UK</a>	\$12.64 (USA) £7.50 (UK VAT incl.)	No	Renewables, Efficiency, Reforestation, Methane	Yes	Car, Air, Events, Business, Deliveries, + many others	CDM Gold Standard, Edinburgh Centre for Carbon Management, Independent Advisory Committee, UNFCCC JI, PricewaterhouseCoopers
<a href="#">Standard Carbon USA</a>	\$15.00	No	Methane, Efficiency, Renewables, Carbon Sequestration	No	Car, Air, Sea, Events, Political Campaigns	Chicago Climate Exchange
<a href="#">Cleaner Climate UK &amp; Australia</a>	\$15.00-18.00	No	Renewables, Efficiency	No	Air, Car, Home, Business	CDM Gold Standard



# Formal Voluntary Carbon Offsets Market

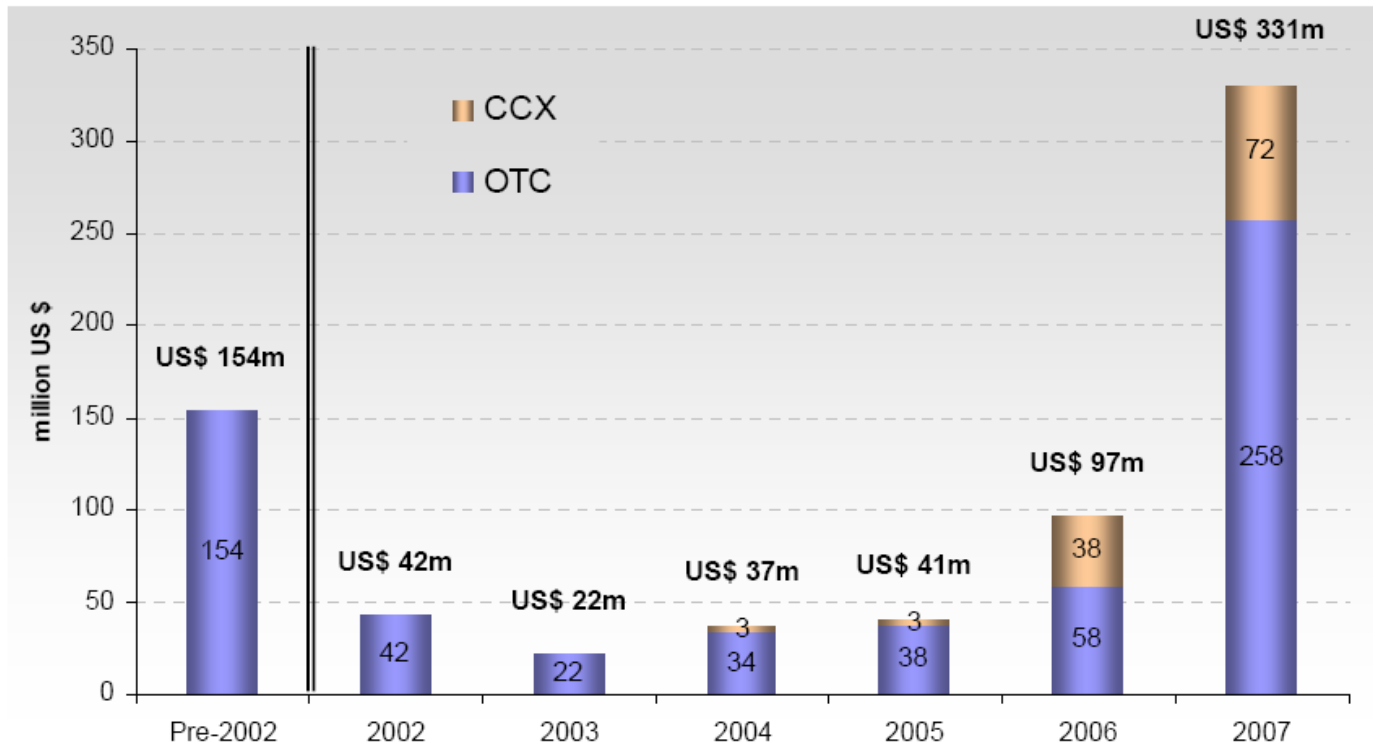
## Chicago Climate Exchange



Price and volume reported in metric tons CO<sub>2</sub>

# U.S. Voluntary Carbon Offsets Market

*Transaction Values on the Voluntary Carbon Market <sup>2</sup>*



Source: Ecosystem Marketplace, New Carbon Finance

# Outlook for Federal Regulation of GHG Bills Before Congress

As of March 2008, lawmakers had introduced more than 195 bills, resolutions, and amendments specifically addressing global climate change and greenhouse gas emissions. Some of the more notable are:

- **Lieberman-Warner Climate Security Act of 2008 (S. 2191)**
- **Bingaman-Specter Low Carbon Economy Act (S. 1766)**
- **McCain-Lieberman Climate Stewardship and Innovation Act (S. 280)**
- **Sanders-Boxer Global Warming Pollution Reduction Act (S. 309)**
- **Kerry-Snowe Global Warming Reduction Act (S. 485)**

Each of these bills proposes economy-wide cap-and-trade regulatory programs for reducing U.S. greenhouse gas emissions (principally carbon dioxide –CO<sub>2</sub>). Proposed emissions reductions range from around 60 to 70 percent of 1990 or 2005 levels by 2050 following different temporal reduction tracks.

General comparisons of these bills are provided on the Pew Center on Climate Change and the Resources for the Future web sites.

Of the bills described above, S. 2191 has progressed the furthest having passed out of committee to the Senate floor. It is scheduled to be heard in full senate in June.

It has also been reported that Representative John Dingell, Chairman of the House Energy and Commerce Committee, plans to release one or more draft global warming bills in the near future. Additionally, Senator George Voinovich is floating an alternative to Lieberman-Warner.



# Outlook for Federal Regulation of GHG Bills Before Congress



## Economy-wide Cap-and-Trade Proposals in the 110<sup>th</sup> Congress Includes Legislation Introduced as of January 30, 2008

Bill	Scope of Coverage	2010-2019 Cap	2020-2029 Cap	2030-2050 Cap	Allocation	Offsets and Other Cost Controls	Early Action	Technology and Misc.
<b>Lieberman-Warner</b> S. 2191 – 10/18/2007 <a href="#">Lieberman-Warner Climate Security Act of 2007</a> Version passed 11-8 by the Senate Environment & Public Works Committee on December 5, 2007	All 6 GHGs Economy-wide, "hybrid" – upstream for transport fuels & natural gas; downstream for large coal users; separate cap for HFC consumption	4% below 2005 level in 2012	19% below 2005 level in 2020	71% below 2005 level in 2050	Increasing auction: 25.5% in 2012 (includes 5% early auction), rising to 69.5% from 2031- 2050  Some sector allocations are specified including: 19% to power plants and 10% to manufacturers (transitions to zero in 2031), 11% to states, 9% to load serving entities (LSEs), and others  5% set-aside for domestic agriculture and forestry	15% limit on use of domestic offsets  15% limit on use of international emission allowances  Borrowing up to 15% per company  Creates Carbon Market Efficiency Board to monitor the trading market and implement specific cost relief measures, including increased borrowing and use of offsets	5% of allowances for early action in 2012, phasing to zero in 2017	Bonus allocations for carbon capture and storage  Funds and incentives for technology, adaptation, & mitigating effects on poor  Cap-and-trade system performance and targets subject to 3-year NAS review
<b>Bingaman-Specter</b> S. 1786 – 7/11/2007 <a href="#">Low Carbon Economy Act</a>	All 6 GHGs Economy-wide, "hybrid" – upstream for natural gas & petroleum; downstream for coal	2012 level in 2012	2006 level in 2020	1990 level in 2030  President may set long-term target at 60% below 2006 level by 2050 contingent upon international effort	Increasing auction: 24% from 2012-2017, rising to 53% in 2030  Some sector allocations are specified including: 9% to states, 53% to industry declining 2%/year starting in 2017  5% set-aside of allowances for agricultural	Provides certain initial categories including bio sequestration and industrial offsets  President may implement use of international offsets subject to 10% limit  \$120n CO <sub>2</sub> e "technology accelerator payment" (i.e., safety valve) starting in 2012 and increasing 5%/year above inflation  Allows banking	From 2012-2020, 1% of allowances allocated to those registering GHG reductions prior to enactment	Bonus allocation for carbon capture and storage  Funds and incentives for technology R&D  Target subject to 5-year review of new science and actions by other nations
<b>McCain-Lieberman</b> S. 280 – 1/12/2007 <a href="#">Climate Stewardship and Innovation Act</a>	All 6 GHGs Economy-wide, "hybrid" – upstream for transportation sector; downstream for electric utilities & large sources	2004 level in 2012	1990 level in 2020	20% below 1990 level in 2030  60% below 1990 level in 2050	Administrator determines allocation/auction split, considering consumer impact, competitiveness, etc.	30% limit on use of international credits and domestic reduction or sequestration offsets  Borrowing for 5-year periods with interest	Credit for reductions before 2012  Early actors may use offsets to meet 40% of reductions	Funds and incentives for tech R&D, efficiency adaptation, mitigating effects on poor
<b>Sanders-Boxer</b> S. 309 – 1/16/2007 <a href="#">Global Warming Pollution Reduction Act</a>	All 6 GHGs Economy-wide, point of regulation not specified	2010 level in 2010	1990 level in 2020	27% below 1990 level in 2030  53% below 1990 level in 2040  80% below 1990 level in 2050	Cap and trade permitted but not required. Allocation criteria include transition assistance and consumer impacts	Includes provision for offsets generated from biological sequestration  "Technology-indexed stop price" freezes cap if prices high relative to tech options	Program may recognize early reductions made under state or local laws	Standards for vehicles, power plants, efficiency, renewables, certain categories of bio sequestration
<b>Kerry-Snowe</b> S. 485 – 2/1/2007 <a href="#">Global Warming Reduction Act</a>	All 6 GHGs Economy-wide, point of regulation not specified	2010 level in 2010	1990 level in 2020	3.5%/year reduction from 2030-2050  62% below 1990 level in 2050	Determined by the President; requires unspecified amount of allowances to be auctioned	Includes provision for offsets generated from biological sequestration	Goal to "recognize and reward early reductions"	Funds for tech, R&D, consumer impacts, adaptation  Standards for vehicles, efficiency, & renewables



# Outlook for Federal Regulation of GHG

## Positions of Presidential Candidates:

\* All three candidates are on record supporting cap-and-trade programs for GHG emissions reductions

### Senator Barak Obama

- Favors cap-and-trade program to reduce GHG
- Cut greenhouse gas emissions by 80 percent from 1990 levels by 2050; reduce emissions to 1990 levels by 2020
- Require fuel suppliers to cut carbon content by 10 percent by 2020.

### Senator Hillary Clinton

- Supports a cap-and-trade program that auctions 100 percent of permits
- Wants to cut greenhouse gas emissions by 80 percent from 1990 levels by 2050
- Require all publicly traded U.S. companies to file report on climate change risks with the Securities and Exchange Commission

### Senator John McCain

- CoSponsored McCain –Lieberman S.280 (60 percent reduction from 1990 levels by 2050)
- Recent campaign media statements related to climate change. Return GHG emissions to 2005 levels by 2012, to 1990 levels by 2020, to 22 percent below 1990 levels by 2030, and to 60 percent below 1990 levels by 2050
- Appears supportive of Lieberman-Warner with additional support for nuclear energy



# Analyses of Lieberman - Warner

**Economic Analysis of the Lieberman-Warner Climate Security Act of 2007 Using CRA's MRN-NEEM Model**  
Summary of findings

**CRA**  
INTERNATIONAL

For Additional Information Contact:  
W. David Montgomery  
Anne E. Smith

April 8, 2008

U.S. Environmental Protection Agency  
Office of Atmospheric Programs

**EPA Analysis of the Lieberman-Warner Climate Security Act of 2008**  
S. 2191 in 110<sup>th</sup> Congress

March 14, 2008

EPA Analysis of S. 2191

**What Will it Cost to Protect Ourselves from Global Warming?**  
THE IMPACTS ON THE U.S. ECONOMY OF A CAP-AND-TRADE POLICY FOR GREENHOUSE GAS EMISSIONS

Nathaniel Keohane, Ph.D.  
Peter Goldmark

**e**  
ENVIRONMENTAL DEFENSE FUND  
finding the ways that work

**Analysis of The Lieberman-Warner Climate Security Act (S. 2191) Using The National Energy Modeling System (NEMS/ACCF/NAM)**

*A Report by the American Council for Capital Formation and the National Association of Manufacturers*

*Analysis Conducted by Science Applications International Corporation (SAIC)*

**ACCF**  
AMERICAN COUNCIL FOR CAPITAL FORMATION

**NAM** National Association of Manufacturers

08/OIAF/2008-01

**Energy Market and Economic Impacts of S. 2191, the Lieberman-Warner Climate Security Act of 2007**

April 2008

Energy Information Administration  
Office of Integrated Analysis and Forecasting  
U.S. Department of Energy  
Washington, DC 20585

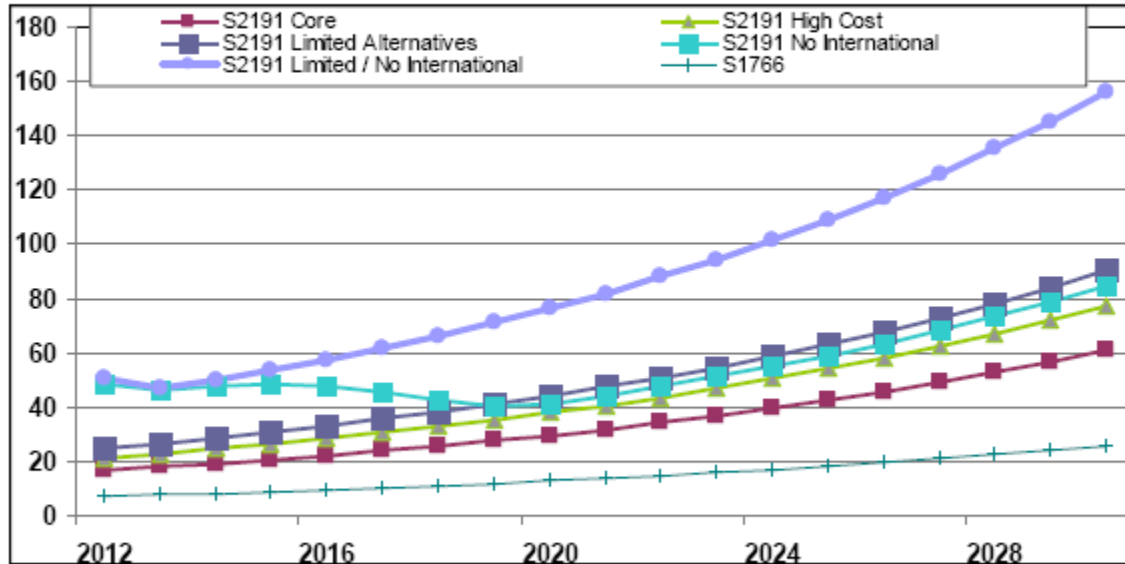
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# U.S. Federal Regulation of GHG Bills Before Congress

## EIA ASSESSMENT OF ECONOMIC IMPACTS OF S.2191

Figure ES2. Allowance Prices

(2006 dollars per metric ton CO<sub>2</sub>-equivalent)



CAP  
emission allowances  
2012 = 5.200 billion  
2020 = 4.432 billion  
2030 = 3.472 billion  
2040 = 2.512 billion  
2050 = 1.560 billion

Source: National Energy Modeling System runs AEO2008.D030208F, S2191.D031708A, S2191HC.D031708A, S2191BIV.D031608A, S2191NOINT.D032508A, S2191BIVNOI.D033108A, and S1766\_08.D031508A.



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# U.S. Federal Regulation of GHG

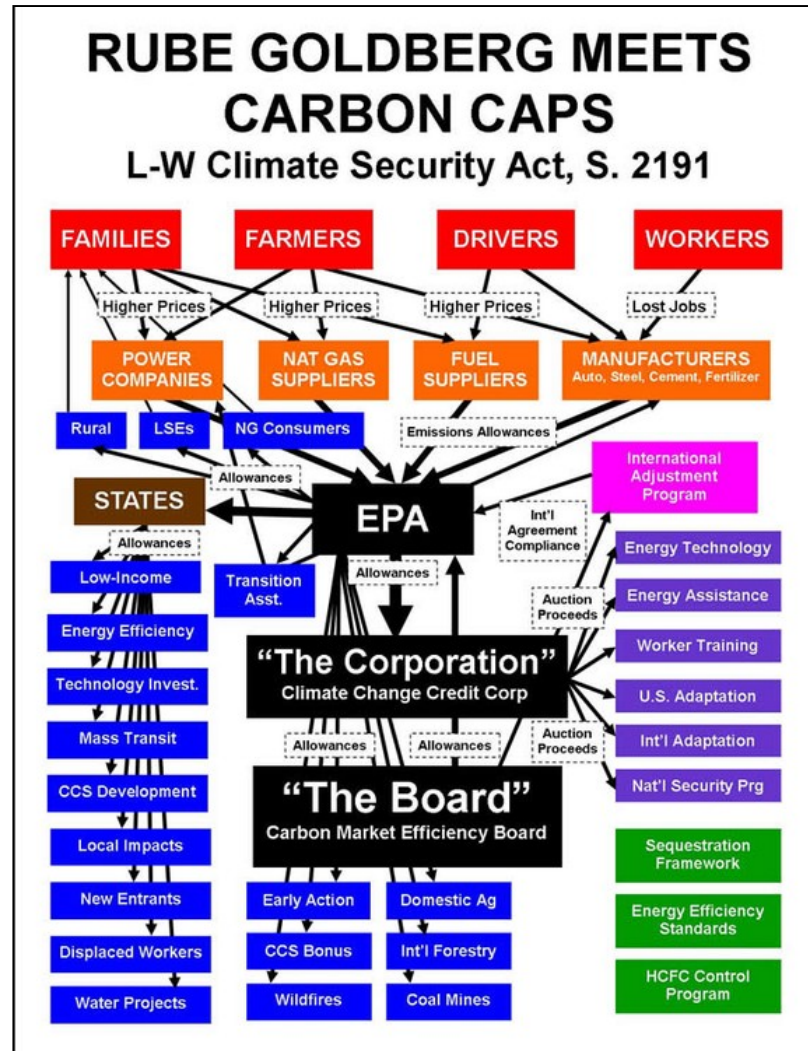
## Bills Before Congress

### EIA ASSESSMENT OF ECONOMIC IMPACTS OF S.2191

- Allowance prices range from \$30-76/ton in 2020 and \$61-156/ton in 2030 depending the cost and availability of technology.
- Coal generation is expected to cost between 161% and 413% more in 2020 and 305% to 804% in 2030.
- Power prices overall could climb from 5% to 27% in 2020 and 11% to 64% in 2030.
- The average home's energy bills could grow from \$30 to \$325 per year by 2020 and from \$76 to \$725 in 2030.
- By 2030, GDP could shrink between \$27 billion and \$163 billion –about 0.1% to 0.8%.
- Gasoline prices are only expected to rise 22-49 cents/gal in 2020 and 41cents to \$1.01 per gallon in 2030, though use will shrink since mandatory fuel economy standards are set to rise to 35 miles per gallon.



# Outlook for Federal Regulation of GHG Bills Before Congress



# LSU CES Proposal

## PROPOSAL

PREPARING LOUISIANA FOR THE POSSIBLE FEDERAL  
REGULATION OF GREENHOUSE GASES

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*Preliminary Concept Proposal – For Discussion Purposes Only*

Prepared by

LOUISIANA STATE UNIVERSITY  
CENTER FOR ENERGY STUDIES  
Energy, Coast & Environment Building  
Baton Rouge, LA 70803

Contact

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May 2008



CENTER FOR ENERGY STUDIES

# LSU CES Proposal

## **Purposes of the Proposal:**

1. To initiate and stimulate discussions concerning the strategic positioning of Louisiana interests to meet the challenges and take advantage of the opportunities brought by a federal GHG control program.
2. To present LSU CES's proposed approach and capabilities for taking some important first steps to prepare the state and its interests for the coming GHG controls.



# LSU CES Proposal

## **Principal Project Elements:**

1. Identification and Engagement of Stakeholders.
2. Prepare Comprehensive Statewide Greenhouse Gas Inventories.
3. Assess Potential Implications of Federal Greenhouse Gas Control Program Scenarios on Various Interests (e.g. business, industry, agriculture, energy, government, public) in the State of Louisiana.
4. Provide Recommendations for Strategically Positioning the State for the Challenges and Opportunities That Might Result from a Federal Greenhouse Gas Control Program.



# LSU CES Proposal

## Value for Stakeholders and State of Louisiana

The proposed project will provide information that will be extremely valuable to Louisiana public and private interests planning for the future. This value can probably best be qualified by providing a list of selected questions/problems for which solutions will be facilitated by information resulting from this project.

- What will be the magnitude of GHG reductions required for the state?
- What strategies will be needed to effect the reductions with the least adverse impact to the state?
- What kinds of changes in state policies and law might be required to accommodate federal GHG controls?
- What will be the anticipated cost and availability of carbon allowances should some industries require them to comply with GHG controls?
- What will be the overall cost to the state of a federal GHG control program?
- What will be the impact of a federally imposed GHG cap on economic development in LA?
- What economic development opportunities might come from GHG controls?
- How will GHG controls impact the price of fuels and electricity?
- How will GHG controls affect capital investments in the state in general?
- How will electric utilities be impacted?
- What is the future viability of energy-intensive industries in LA?
- What strategies for GHG reduction will work best for the state?



# LSU CES Proposal

## Value for Stakeholders and State of Louisiana, Cont.

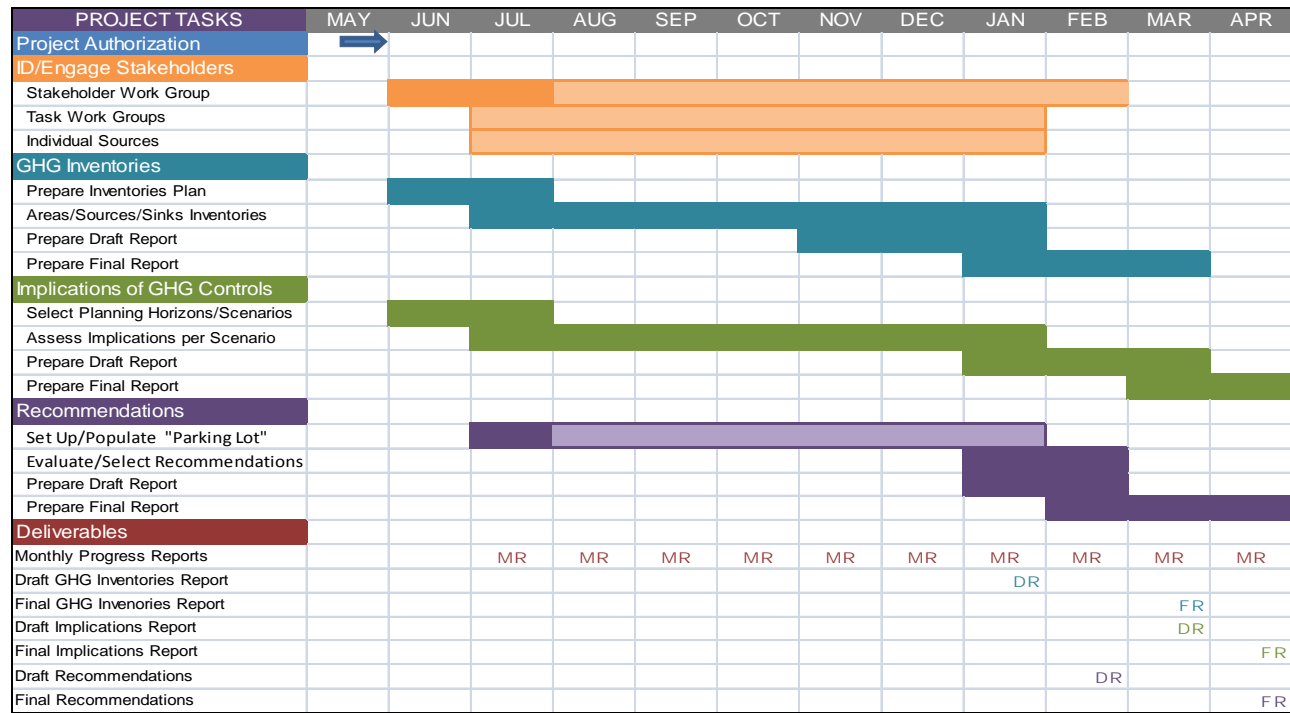
- Will agriculture be a winner for biosequestration (offsets) and biofuels or a loser to increased fuel costs?
- What are the opportunities for renewable fuels industries in LA?
- What kind of changes can we expect in transportation?
- What will be the magnitude of new jobs created in the GHG mitigation sector?
- Should “green jobs” potential be accommodated in workforce development?
- Can the state take advantage of carbon offset generation from state-owned lands?
- What are the prospects for carbon capture and geologic storage in the state? S. 2191 has a multiplier of 4.5X for carbon credits created by geological sequestration of CO<sub>2</sub>.
- Can captured CO<sub>2</sub> stimulate enhanced oil recovery in the state? A recent study concluded that 128 reservoirs in Louisiana containing 9.4 billion barrels of “stranded” crude oil are amenable for CO<sub>2</sub> enhanced oil recovery.
- Does waste heat from our industries present a good opportunity for zero-emissions electrical generation?
- What does the waste-to-energy future look like?
- How important are energy conservation and efficiency going to be to GHG reductions?
- Can the state’s existing hydrogen infrastructure be leveraged to position the state for the hydrogen economy and fuel cell driven transportation?



# LSU CES Proposal

Project Management and Technical Direction: Drs. McDaniel and Dismukes

## Project Schedule:



Project Cost: Very preliminary estimate of between \$460,000 to \$520,000.



# LSU CES Proposal

## CES Qualifications to Perform the Proposed Work

LSU's Center for Energy Studies is uniquely qualified to perform the proposed work. ***It is the type of work the Center was established for***, it has available some highly qualified staff and supporting resources to perform the work, and has actual experience in having completed a GHG emissions inventory for the state back in 2000.

***In 2000, LSU CES completed an investigation and prepared a report entitled "Inventory of Greenhouse Gases in Louisiana" for the Louisiana Department of Natural Resources*** (Mesyanzhinov, D. V., et al. 2000). ***Also during 2000, the Center completed another study for the Louisiana Department of Natural Resources entitled "Modeling Greenhouse Gas Emissions in Louisiana"*** (Pulsipher, A. G., et al. 2000). Although the standards for GHG emission inventories are much more rigorous now, the information and experience gained in these earlier studies should serve the Center well in this proposed work.

Dr. Mike McDaniel, former Secretary for the Louisiana Department of Environmental Quality and now Professional-in-Residence at CES is proposed to serve as Project Director and Principal Investigator for GHG emissions inventories activities. Dr. David Dismukes, Associate Director and Professor at CES is proposed to serve as Principal Investigator for assessing implications of GHG control programs on the state of Louisiana. ***Drs. McDaniel and Dismukes have previously worked closely together in DEQ's structuring the federal Clean Air Interstate Rule (CAIR) for Louisiana, which has features (e.g. cap-and-trade of emissions) similar to the expected federal GHG program.***



# PREPARING LOUISIANA FOR THE POSSIBLE FEDERAL REGULATION OF GREENHOUSE GASES

## Questions/Discussion

