Topics in Louisiana Energy & Environmental Regulation

Invited Lecture at the

LSU Center for Energy Studies

Dalton J. Woods Auditorium
Energy, Coast & Environment Building

November 1, 2007

Topics in Louisiana Energy & Environmental Regulation

Presentation Outline

I. Energy Picture for Louisiana

II. Environmental Regulation Impacts on Louisiana's Energy Picture

III. On the Horizon

IV. Conclusions

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Energy Picture for Louisiana

- Conventional Energy Sources
- Non-conventional Energy Sources
- Renewable Energy Sources
- Electricity Generation
- Energy Conservation and Efficiency
- Louisiana Energy Balance
- Energy-Related Carbon Dioxide Emissions

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Energy Picture for Louisiana

Conventional Energy Sources:

- Oil
  - A recent LMOGA study reports Louisiana ranks first in crude oil production with 26% of the nation's output.
  - State oil production (May 2007) was 6.01 million barrels.
  - Louisiana OCS oil production (February 2007) was 33 million barrels.
  - Louisiana is a major importer of crude oil from around the world, typically bringing in about one-fifth of all foreign crude oil processed in the U.S.
- Natural Gas
  - According to the LMOGA study, Louisiana ranks 2nd in the nation in natural gas production, with 18% of the nation's output.
  - Louisiana's natural gas reserves stand at about 10,447 billion cu.ft.(about 5.1% of U.S. reserves) with 292 million barrels of natural gas liquids.
- Coal (Lignite)
  - Louisiana has an estimated 1 billion tons of identified coal reserves consisting entirely of lignite.
  - Louisiana's two operating lignite mines have over 300 million tons of recoverable lignite.

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Energy Picture for Louisiana

Non-Conventional Energy Sources:

- **Heavy Oil** (Est. 2 billion barrels)
- **Potential CO2 Enhanced Oil Recovery** (Est. 662 million barrels)
- **Petroleum Coke** (LA produces an est. 10 million tons annually)
- **Petroleum Coke Gasification** (two major projects announced)
- **Coal Gasification** (A $5 billion project announced in 2006)
- **Coal Bed Methane** (Est. 1 trillion cu.ft. in Gulf Coast deposits)
- **Coal-Derived Liquids** (CTL costly ~$1 billion/10,000 bpd)
- **Landfill Gas** (3 operating projects – more opportunities)
- **Tire-Derived Fuel** (3 paper mills)
- **Municipal Waste-to-Energy** (Sun Project – more opportunities)

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Energy Picture for Louisiana

Renewable Energy Sources:

- **Hydroelectric** (Sabine River Authority, Louisiana Hydroelectric)
- **Geothermal –** Louisiana has some potential for direct heat along AR and TX borders
- **Solar –** some potential (2007 LA solar tax credit bill)
  - flat-plate collector around 5,000 to 5,500 Whr/sq m per day
  - concentrating collector around 3,500 to 4,000 Whr/sq m per day
- **Wind –** some potential along coast
  (LA authorizes lease of state-owned lands for wind power production)
- **Biomass –** good potential (forest residues, mill residues, agricultural residues, urban wood wastes, e.g. bark, wood chips, bagasse, rice hulls).
- **Biofuels –** good potential (grain/sugar ethanol, biodiesel, cellulosic ethanol, green diesel and gasoline, butanol, diesel/jet fuel from algae, pyrolysis liquids, syngas liquids).

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Energy Picture for Louisiana

Renewable Energy Sources: Biomass

- Annual wood and agricultural residue production in Louisiana are potentially available for biomass energy or other uses. Together, they could produce 6,620 million kWh and power 22% of Louisiana homes.
- Approximately 98% of the wood milling residues (bark, sawdust, etc.), 96% of the sugarcane bagasse, and 54% of the rice hulls are already being used for energy and other purposes and are not included in the numbers provided in the bullet above (source: LSU AgCenter, 2006).
- LDEQ lists 22 facilities with air permits that use biomass as an energy source.

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Energy Picture for Louisiana

Renewable Energy Sources: Biofuels

- Louisiana now has a renewable fuels standard (e.g. ethanol and biodiesel)
- LDEQ has issued permits for 7 ethanol production facilities with a total potential production rate of 715 million gallons per year.
- LDEQ has issued 3 permits and has one application for biodiesel production facilities with a total potential production rate of 269 million gallons per year.
- Dynamic Fuels, LLC (joint venture of Tyson Foods, Inc. and Syntroleum Corp.) plans to build a $150 million refinery somewhere in the south-central U.S. by 2010 to produce biodiesel from low grade animal fats, greases, and vegetable oils.
- There is good potential for biodiesel/jet fuel from algae. What is the potential for nuisance hydrophytes in Louisiana's waterways?
- LED lists 15 active biofuels prospects totaling around $1.47 billion in investments and offering the potential of 932 permanent jobs.

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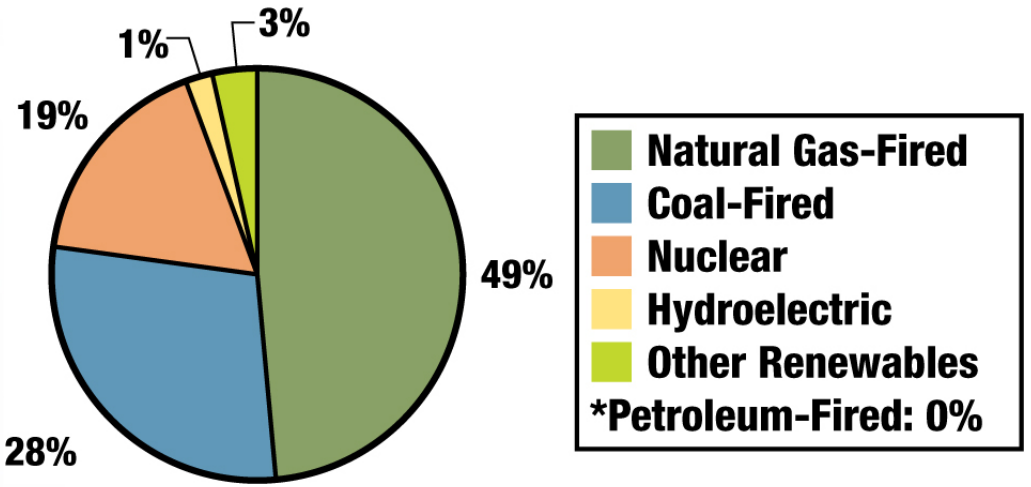
Energy Picture for Louisiana

Electricity Generation



- Net generating capacity of 92.6 million megawatthours (2005)
- In 2005, 58% of generating capacity came from electric utilities and 42% came from independent power producers (IPPs) and cogeneration.
- Louisiana is a marginal net importer of electricity.
- 4 new electricity generating facilities under construction or proposed for Louisiana.
- Louisiana's electric industry ranked 16th highest in CO2 emissions among states in 2004.
- PSC/Entergy has a pilot green pricing program with a 2.5 cent/kWh premium.

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Energy Picture for Louisiana

Energy Conservation and Efficiency:

- Transportation – economic drivers, CAFE standards, hybrids, volunteer programs
- Homes – building codes, LDNR HERO and Home Efficiency Loan Programs
- Commercial Buildings – Commercial Building Energy Conservation Code (LDNR reported 8.55 trillion Btu in savings for the 2006-2007 fiscal year)
- State Government – Energy Management Act of 2001
- Industry – economic drivers and voluntary programs
- Appliances – energy-efficient appliances - more than 1,700 manufacturers are using the Energy Star label on a total of over 40,000 individual product models.
- Energy Star Program – in 2006, EPA's Energy Star Program resulted in net energy savings of $13.7 billion and avoided 37.6 million metric tons of carbon equivalent emissions. Energy savings were about 170 billion kWh equivalent to the capacity of 70 power plants.
- Many other national, state and local volunteer programs

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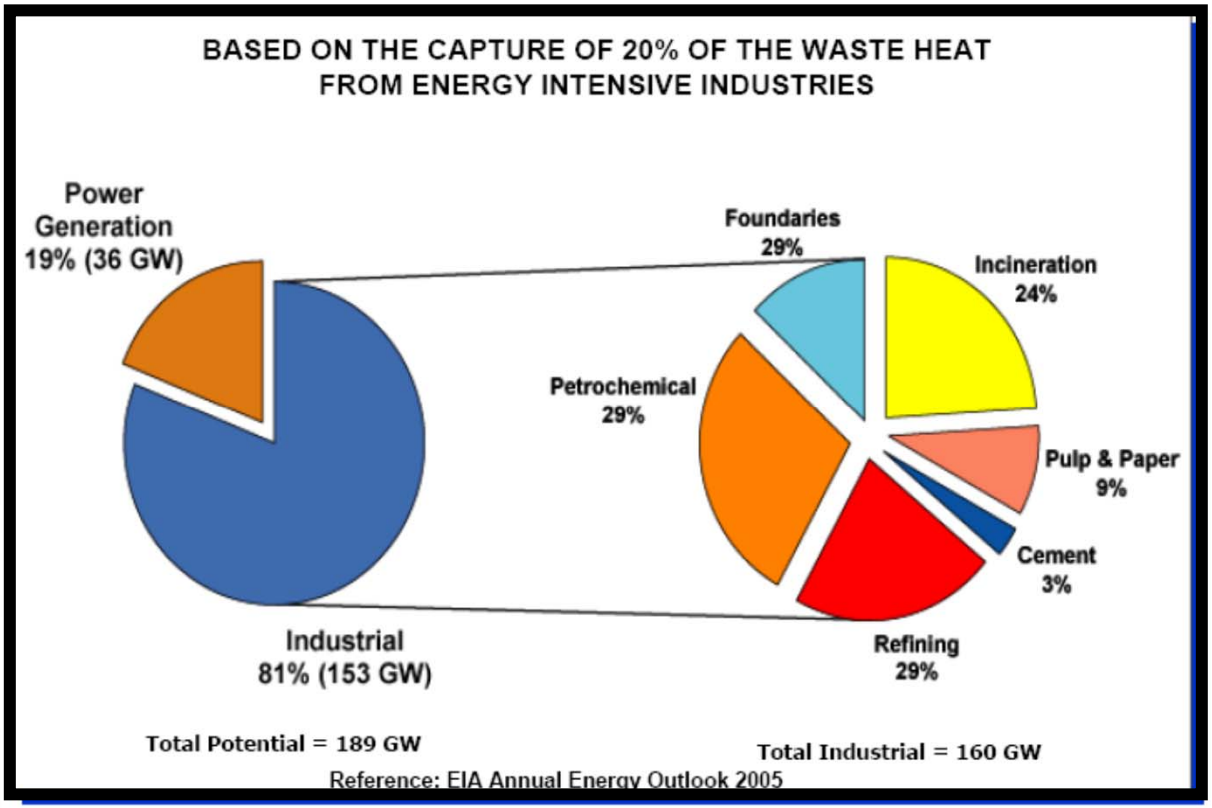
Energy Picture for Louisiana

Waste Heat Recovery



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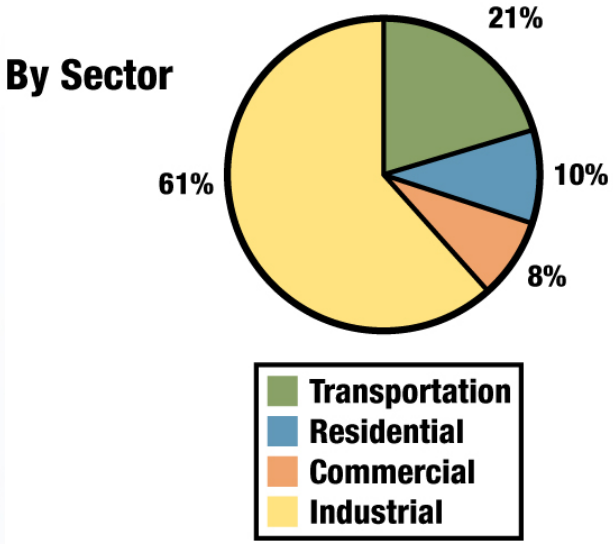
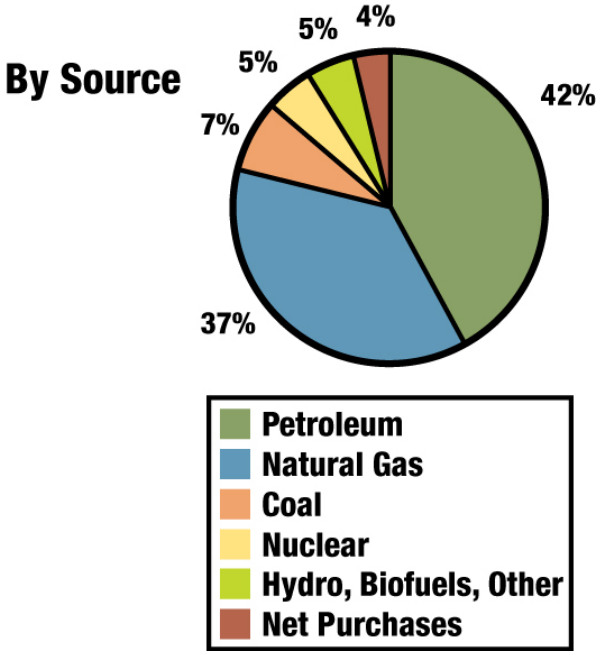
Energy Picture for Louisiana: Louisiana Energy Consumption





- LA ranks 2nd among the states in industrial energy consumption, 3rd among the states in natural gas consumption, and 3rd among the states in per capita energy consumption.
- Forbes Magazine ranks LA 47th among America's greenest states.
- ACEEE (2007) ranks LA 40th on the State Energy Efficiency Scorecard.

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Energy Picture for Louisiana

Louisiana's Energy Balance

Energy Source		Production TBTU	Consumption TBTU	Net State Energy Production Excluding OCS	Net State Energy Production Including OCS
Petroleum	State Oil	485.3	1,651.10	-1,651.51	1,601.90
	LA OCS Oil	2,767			
Natural Gas	State Gas	1,404.20	1,400	4.2	2,959.20
	LA OCS Gas	2,955.00			
Coal-Lignite		55.5	256.7	-201.2	-201.2
Nuclear Electric Power		178	178	0	0
Hydroelectric, Biofuels & Other		189.9	189.9	0	0
Net Interstate Purchases of Electricity (including Associated Losses)			140.6	-140.6	-140.6
Totals	Excluding LA OCS	2,312.90	3,816.30	-1,503.40	
	Including LA OCS	8,035.60	3,816.30		4,219.30

Source: LDNR Energy Facts, August 2007 TBTU=Trilllion BTUs

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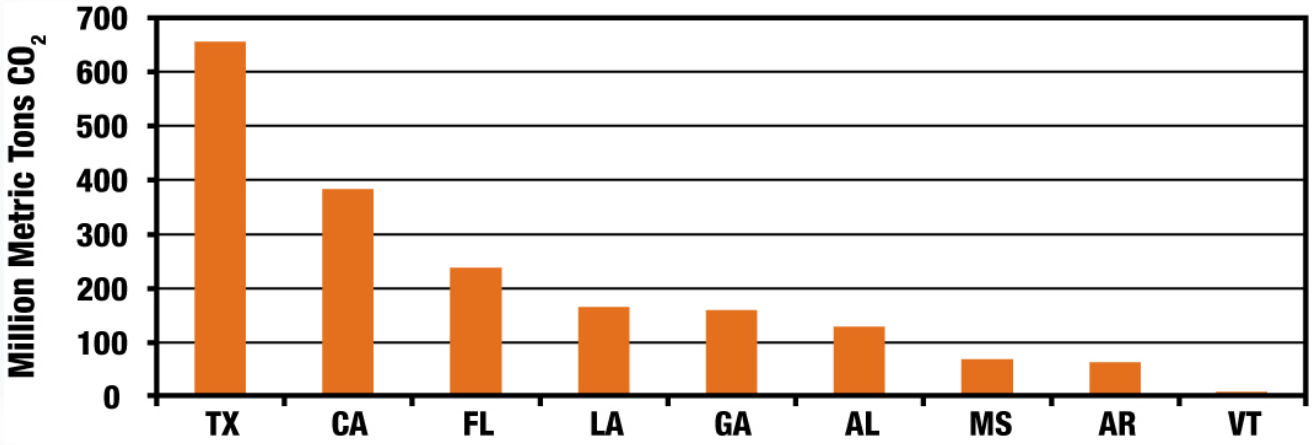
Energy Picture for Louisiana

Selected state energy-related carbon dioxide emissions for 2001



Louisiana – 22.4 (coal), 75.8 (petroleum), 67.2 (natural gas)

Source: DOE/EIA-0573 (2005)

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Environmental Regulation Impacts on Louisiana's Energy Picture

- CAA Acid Rain Program – Purpose is to reduce acid deposition. Cap and trade program to reduce SO2 and NOx emissions. Emissions monitoring and reporting. Affects EGUs (38 facilities,100 units in LA)
- Clean Air Interstate Rule (CAIR) – Purpose is to reduce NOx, SO2, fine particulates. Cap and trade program. LA regulations have been promulgated. Adopted federal SO2 program; designed program for NOx specific for LA with PSC assistance. Affects about 35 facilities,101EGU units in the state.
- Clean Air Mercury Rule (CAMR) – Purpose to reduce mercury emissions from coal-fired power plants. LA adopted the federal cap and trade program.
- Visibility/Regional Haze Rules – Addresses man-made visibility impacts at Class I federal areas (national parks and wilderness areas). Program implemented through regional partnerships. Affects 26 source categories such as EGUs, refineries, carbon black plants, kraft pulp mills, chemical plants. Control of NOx, SO2, and particulate matter.

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Environmental Regulation Impacts on Louisiana's Energy Picture Continued

- Ozone Attainment – Areas not meeting the ozone standard must development plans for attainment. According to classification there are many onerous prescriptive measures including emission inventories, lower permitting thresholds, auto inspection and maintenance, transportation conformity, reformulated gasoline, offsets, progress goals, emission controls for NOx and VOCs, etc. Failure to meet requirements or to attain the standard can bring severe penalties. Five parishes currently nonattainment for ozone – the new proposed standard will potentially affect all urban areas of the state.
- CAA Vehicle Fuels/Emissions Programs – Purpose to reduce tailpipe emissions. Sets emissions limits for fuels and engines. Applies to light and heavy-duty motor vehicles as well as trains, planes, and marine vessels.
- EPACT -Tax incentives, renewable fuels standard, energy efficiency and conservation, etc.

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Environmental Regulation Impacts on Louisiana's Energy Picture

Environmental Regulation in the Courts:

- Remand of EPA's 8-hour ozone attainment implementation rules
- Mass. v EPA (regulation of CO2 – EPA regulations limiting vehicle GHG emissions expected by end of 2008)
- Riverkeepers v EPA (Phase II water intake structures)
- Overturn of EPA's pollution control projects (PCP) exemption for pollution control projects in New Source Review for permitting.

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On The Horizon

- **New Ozone Standard**
- **Possibly a More Stringent $PM_{2.5}$ Standard**
- **New Energy & Agriculture Legislation**
- **GHG/Climate Change – Possible CO2 Regulation**
- **GHG Registries and Carbon Markets**
- **Renewable Portfolio Standards and Green Pricing**
- **$100 Per Barrel Oil**
- **100 MPG Vehicles**
- **Near-Zero-Emissions Power Plants (e.g.FutureGen)**
- **Increasing Use of Renewables**

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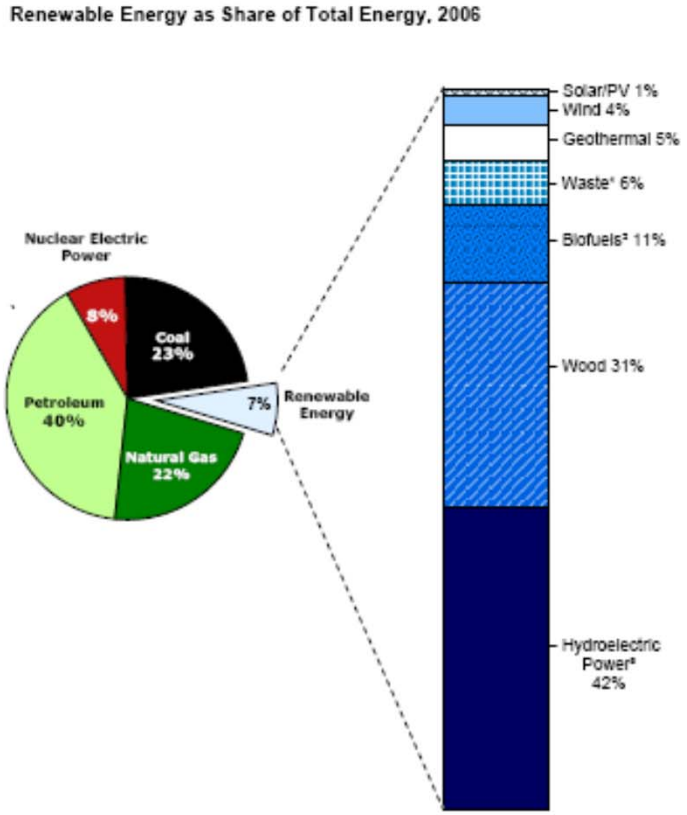
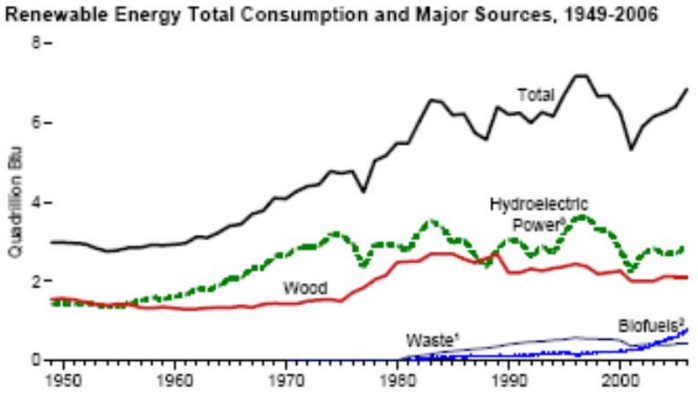
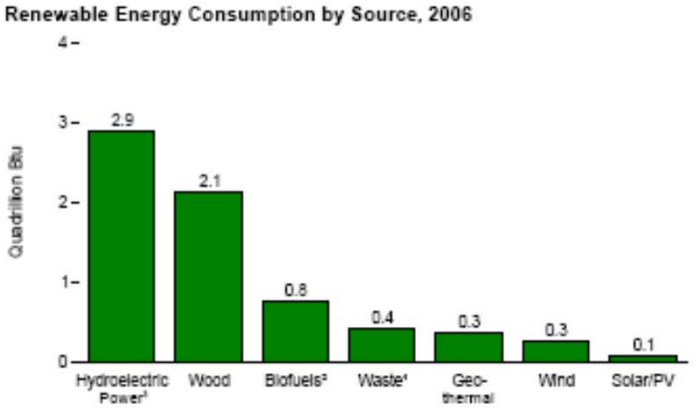
National Renewable Energy Consumption by Source







Source: EIA 2006

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Conclusions – Hard Truths for the Global Energy Picture (NPC)

- Demand – Coal, oil, and natural gas will remain indispensable to meeting total projected energy demand growth.
- Supply – The world is not running out of energy resources, but there are accumulating risks to continuing expansion of oil and natural gas production from the conventional sources relied upon historically. These risks create significant challenges to meeting projected energy demand.
- Energy Sources – To mitigate these risks, expansion of all economic energy sources will be required, including coal, nuclear, biomass, other renewables, and unconventional oil and natural gas. Each of these sources faces significant challenges including safety, environmental, political, or economic hurdles, and imposes infrastructure requirements for development and delivery.
- Energy Security – "Energy Independence" should not be confused with strengthening energy security. The concept of energy independence is not realistic in the foreseeable future, whereas U.S. energy security can be enhanced by moderating demand, expanding and diversifying domestic energy supplies, and strengthening global energy trade and investment. There can be no U.S. energy security without global energy security.

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Conclusions – Hard Truths for Carbon Emissions

- NPC – Policies aimed a curbing carbon dioxide emissions will alter the energy mix, increase energy-related costs, and require reductions in demand growth.

- Dr. Harlan Watson, Senior Climate Negotiator and Special Representative, U.S. Department of State –
  - Global fossil fuels use and CO2 emissions likely to increase.
  - Can't expect developing countries to reduce energy consumption or emissions in the foreseeable future.
  - Stabilizing GHG atmospheric concentrations is a long-term issue and no "silver bullet" technology is available.
  - The challenge is formidable and will be expensive.

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Conclusions – Louisiana Energy and Environment

- Louisiana is an energy-rich state
- Louisiana ranks among the top states in energy consumption – largely attributable to our industrial consumption that produces fuels, petrochemicals, plastics, fertilizers, and chemicals to the “greener” states.
- Environmental regulations and emissions controls will have a considerable impact on our state as the nation moves to cleaner air, lower greenhouse gas emissions, and alternative energy sources.
- Louisiana should take energy conservation and efficiency more seriously.
- Our state needs an overarching policy development capability for the converging issues of energy and the environment.
- There are many challenges, but also many opportunities for our state.

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Conclusions – Louisiana Energy and Environment

It ain't hard being green any more!