Southern States Energy Board

The American Energy Security Study: The Case for Domestic Alternative Transportation Fuels

Presented by:
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Secretary
Southern States Energy Board

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Through innovations in energy and environmental policies, programs and technologies, the Southern States Energy Board enhances economic development and the quality of life in the South.

- SSEB Mission Statement

- Established 1960, expanded in 1978
- 16 U.S. States and Two Territories
- Each jurisdiction represented by the governor, a legislator from the House and Senate and a governor's alternate
- Federal Representative Appointed by U.S. President
Facts and Figures

- **World Population** = 6.8 billion in 2010; 8.2 billion in 2030
- **World GDP** = $88 trillion in 2010; $154 trillion in 2030
- **World Electricity Demand** = 9,000 billion KWH in 2010; 31,000 billion KWH in 2030
- **World number of Vehicles** = 812 million in 2002; 2.1 billion in 2030
- **Energy Consumption** – will increase 50% in the next 25 years
- **Energy Sources and Increases by 2030:**
  - Coal Production = 74%
  - Oil Production = 43%
  - NG Production = 64%
  - Nuclear Power = 38%
  - Renewables = 61%

Not Smoke and Mirrors!
Significant Global Energy Events

1970
- OPEC Sets 55 percent Minimum Tax Rate (1970)
- U.S. Institutes Price Controls (1971)
- Arab Oil Embargo Against U.S. (1973)
- Kissinger Announces “Project Independence” (1974)
- EPCA Authorizes Strategic Petroleum Reserve (1975)
- Windfall Profits Tax (1980)
- Iran/Iraq War – Oil Prices Doubled (1978-1980)

1983
- World Oil Glut - $29 BBL Oil - U.S. Synfuels Shutdown (1983)
- Chernobyl Nuclear Accident (1986)
- Alaska’s Prudhoe Bay Production Peaks (1988)
- Iraq Invades Kuwait - Prices Soar ($36 BBL) (1990)
- Clean Air Act - Changes Gasoline & Diesel Fuels (1990)
- German Government/Utilities Agree to Phase Out of Nuclear Power (2000)

2001
- U.S. Petroleum Consumption – All Time High (19.7 Million BPD) (2001)
- Terrorist Attacks on the U.S. (2001)
Recent Global Energy Events

2004
- Foreign Oil Dependence Rises to 65 percent (2004)
- Northeast Blackout Leaves 50 Million People in the Dark
- Natural Gas Prices Triple from 1990 Levels
- Oil Passes $50/Barrel
- Gasoline Exceeds $3/Gallon

2005
- Hurricanes Damage Oil/Gas Rigs
- Russia Halts Natural Gas to Ukraine
- Venezuela Moves to Nationalize Resources
- Oil Breaks $75/Barrel
- Nigeria Kidnaps Oil Workers
- Bolivia Secures Oil Fields
- Experts State Oil Production May Have Peaked
- Iran Threatens Nuclear Capabilities
- Saudis Talk of Propping Up $55 Oil
- Chad Orders Chevron to Leave
- BP Forced to Repair Pipeline Leaks
- China Extends Credit to Oil Nations
- Iran, Russia, Others Discuss Gas OPEC

2007
- Texas Utilities Cancel 8 of 11 Coal Plants
- Oil Breaks $83/Barrel
U.S. ENERGY IMPORTS ARE INCREASING

EIA forecasts that **by 2030 U.S. will be importing 2/3 of its oil and nearly 25% of its natural gas**

Source: EIA, Annual Energy Outlook 2007, December 2006
Why the Concern About American Energy Security?

- Crude Oil Production will “Peak”
- Growth and Use of Resources by Other Nations
- Global Competition
- World Oil Demand Exceeds Supply…and Growing
- Excessive Dependence on Imported Oil
- Supply Disruption by Natural Disasters, Terrorism
- Global Warming Threats
- GHG Emissions Dictate Technologies and Risk
- Natural Gas Price Volatility
- Liquid Transportation Fuels Crisis
- Social Injustice of High Priced Energy – Elected Officials Will Pay the Price
- Congressional Inaction
American Energy Security

- Military expenditures tied to defending Persian Gulf oil ($100+ billion)
- Lost employment/investment from diversion of financial resources ($160 billion)
- Cost of periodic “oil shocks” ($85 billion)
- Erosion of U.S. industrial base (830,000 jobs lost)
- 2006 Record U.S. Trade Deficit ($764 billion)
The Cost of Dependence

$1 Billion Per Day!
PRES. BUSH: “REDUCE OIL IMPORT DEPENDENCE”

First Thing to do: Stop Digging!

Just to keep oil imports at current level will require an additional 5 MMbpd U.S. production of liquid fuels by 2030.
COAL IS KEY TO U.S. ENERGY SECURITY AND INDEPENDENCE


[Diagram showing the contributions of different sources to oil production, including Coal-to-Liquids (29%), Biomass (24%), Oil Shale (16%), Enhanced Oil Recovery (15%), Transportation Efficiency (16%), and Conventional Oil Production (blue area).]
## LIQUID FUELS FROM COAL

### U.S. Could Be the New Middle East

1.55 Trillion Barrels of Coal Synfuel

<table>
<thead>
<tr>
<th>Old Middle East</th>
<th>U.S. Domestic Coal</th>
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<tbody>
<tr>
<td>Saudi Arabia: 261.8 Bbls</td>
<td>(oil equivalent)</td>
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<tr>
<td>Iraq: 112.5 Bbls</td>
<td>Recoverable reserves 0.55 T Bbls</td>
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<tr>
<td>UAE: 97.8 Bbls</td>
<td>Demonstrated</td>
</tr>
<tr>
<td>Kuwait: 96.5 Bbls</td>
<td>reserve base 1.0 T Bbls</td>
</tr>
<tr>
<td>Iran: 89.7 Bbls</td>
<td></td>
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<tr>
<td>Qatar: 15.2 Bbls</td>
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<tr>
<td>Oman: 5.5 Bbls</td>
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<tr>
<td>Yemen: 4.0 Bbls</td>
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<tr>
<td>Syria: 2.5 Bbls</td>
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<tr>
<td>TOTAL 686 Bbls</td>
<td>TOTAL 1.55 T Bbls Equivalent</td>
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**Note:** The figures are equivalent to 1.55 trillion barrels of oil.
COAL-TO-LIQUIDS TECHNOLOGY
A Proven Technology Currently in Use World-Wide

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<tbody>
<tr>
<td><strong>1</strong></td>
<td>GASIFICATION</td>
<td>Coal is converted into syngas</td>
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<tr>
<td><strong>2</strong></td>
<td>FT CONVERSION</td>
<td>Syngas passes through an FT catalyst and is converted into hydrocarbon liquid</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>UPGRADE</td>
<td>The FT liquid produced is upgraded into ultra clean synthetic fuels</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>STORAGE</td>
<td>Long-term storage of FT fuels at Strategic Petroleum Reserve</td>
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ESTIMATES OF U.S. CTL POTENTIAL

- SSEB Study (July 2006): **5.6 MMBPD by 2030**
- USDOE/National Energy Technology Laboratory Study (July 2006): **5.1 MMBPD by 2027**
- U.S. National Coal Council Study (March 2006): **2.6 MMBPD by 2025**
- USDOE Unconventional Fuels Task Force (November 2006): **2.5 MMBPD by 2035**

**Bottom Line:** All studies indicate huge potential for CTL in the USA
Is Coal a Low Cost Option?

- Global warming emissions are attributed to coal, oil, gas
- 35% - deforestation, livestock, soils, landfills, waste repositories
- 65% - electricity and heat, industrial processes, transportation, other fuel combustion, fugitive emissions
- NRDC
  - Coal - carbon intensive
  - Double amount of carbon in natural gas
  - 50% more than petroleum
- CTL Plants produce two streams of CO₂
  - Production plant
  - Vehicle exhaust
- Coal/biomass co-firing - carbon neutral event BUT requires mining and water resources
Is Coal a Low Cost Option?

- Carbon sequestration
  - Carbon capture and storage
  - Regional Carbon Sequestration Partnerships
  - Add 20-40% to cost of Plants
  - Add 25% to electricity costs (EPRI test)
  - Carbon “footprint” reduction

- Requiring coal plants to meet new standards will impact “dispatch” of plants in future
Essential Elements for Success

- **National commitment/national will** to begin implementation of all initiatives without delay

- **Federal incentives** building upon recent legislation (e.g., Energy Policy Act of 2005)
  - Enactment of recommendations needed for program startup in 2007

- **State and local incentives** that complement federal incentives

- **Mobilization of private capital** required to build the needed facilities and infrastructure
A Plan to Replace Imported Oil

- Goal of 5% reduction per year for 20 years, beginning in 2010.
- We must start programs now as lead times are long.
“Peaking” World Oil Production

- 2010 - with NO alternative fuels production programs, U.S. economy will lose (2010-2020):
  - $4.6 trillion in GDP
  - 40 million job years of employment

- 2020 - with NO alternative fuels production programs, U.S. economy will lose (2020-2030):
  - $13 trillion in GDP
  - 100 million job years of employment
  - $4 trillion in federal, state and local tax revenues
Proven Technologies Are Available Today

- Commercial Coal-to-liquid fuels
- Biomass derived liquids
- Oil shale: surface retorting/in situ processing
- Large liquid fuels plants
  - Blend coal, biomass, oil shale
  - Gasification to Fischer Tropsch liquids
  - EOR, ECBM, sequestration
Alternative Energy Farms

Multi-source energy complexes
Polygen plants
Coal - to - liquids/gas/electricity/fertilizers/chemicals/steam/biomass co-firing
Biomass - to - liquids/gas/electricity/fertilizers/chemicals/steam
Oil shale - to - liquids/gas/electricity/chemicals/steam
Wind, solar, fuel cell, hydro modules
Policy Recommendations
www.americanenergysecurity.org

- Government policies are necessary
- Market manipulation
- Predatory business practices
- Prevention of alternative fuels development
- To maintain homeland security
Federal Fiscal, Tax, Legislative and Regulatory Recommendations

- Extend the $.50 per gallon Alternative Liquid Fuels Excise Tax Credit
- Provide accelerated cost recovery to alternative fuel plant owners
- Incentivize refining of alternative liquid fuels
- Provide explicit DOE authority and appropriations for loan guarantees
- Fund the Military Alternative Fuels Testing and Development Program
- Authorize and fund military purchases of alternative fuels under long-term contract
- Eliminate the $10 million cap for tax exempt Industrial Development Bonds
Federal Fiscal, Tax, Legislative and Regulatory Recommendations (continued)

- Provide regulatory streamlining for the production of alternative liquid fuels and for mine permitting
- Establish a self-sustaining government corporation to provide market risk insurance
- Expand the Strategic Petroleum Reserve (SPR) program to include alternative liquid fuels products
- Provide incentives for existing ethanol plants to convert to coal
- Provide incentives for enhanced oil recovery (EOR), enhanced gas recovery (EGR) and enhanced coalbed methane recovery using CO₂ captured from alternative fuel plants
State Fiscal, Tax, Legislative and Regulatory Recommendations

- Fund multi-year state/local government purchases of alternative transportation fuels under long-term contract
- State loans or grants on matching basis with private industry to assist with preliminary engineering and site qualification
- Tax incentives:
  - Investment tax credits;
  - Corporate tax abatement; and
  - Property tax abatement.
State Fiscal, Tax, Legislative and Regulatory Recommendations (continued)

- Incentivize use of CO₂ for carbon capture and storage
- Regulatory streamlining and central state agency coordination of the permitting process for the production of alternative liquid fuels
- Involve state research and development enterprises
Achieving Energy Security Through Liquid Fuels Independence

- Reduce risk, lower oil prices and volatility
- Industrial and economic growth
- Job creation
- New technologies
- Eliminate trade and budget deficits
- Strategic fuels for the military
- Stable/reliable domestic energy base
The Energy Workforce of the Future

- All energy industries face issues
  - Coal miners are retiring; average age 51
  - Technologies are changing
  - Boilermakers are offshore
  - Nuclear welders do not exist
  - Stigma of a vocational technical education
  - Power generation industry - average age 50
    - Employs 1 million nationwide
    - ½ workforce retirement in 5-10 years
    - 62% of managers are 50 and older
    - 61% of line superintendents are 50 and older
    - 43% of foremen are 50 and older
The Energy Workforce of the Future

Today’s workers want education opportunity for advancement trained on latest technologies new recruiting tools needed

- Promote CAREER opportunities
- Promote technical education
- Use simulators for training
- Offer skilled craft training
- Offer skilled craft advancement

Kentucky Coal Academy
- The best of the best
- Strong partners for the mining industry
- Kentucky Junior Coal Academy (KJCA)
- Mine emergency rescue teams?

Doug Klein (left), shows Josh Horn, a senior at Lawrence County High School, how to operate the controls of the Success Xpress' computerized continuous mining machine simulator. Klein is a pre-engineering instructor with the KJCA at the high school. Photo Courtesy of KJCA.
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