



# The U.S. Air Force's Approach

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# Air Force Goals and Tradeoffs

- 1. Energy independence for our military
- 2. Reduce fuel costs and increase price stability
- 3. Reduce carbon emissions
- 4. Diverse sources of supply

# We aim to create markets for clean alternative fuels

- We buy over \$4 billion in fuel each year
- We aim to incentivize private-sector innovation and help to overcome startup costs
- Military-led mega-projects often lead to civil and commercial innovation
  - Manhattan Project ... Nuclear power
  - Atlas Rocket Project ... Commercial space
  - ARPANET ... Internet

# My challenge to the Air Force...



- Test...Fischer-Tropsch fuel in the Air Force fleet
- Certify...entire fleet on synthetic fuel by 2012
- Proof.... Process for certification on Alt Fuels
- Fly...By 2016, 50% of the fuel our fleet uses should be a synthetic fuel blends

# What we have done so far...

- Aug. 2007 – Certified the B-52 to fly on synthetic fuel
- Nov. 2007 – Afterburner tests on the B-1 engine
- Dec. 2007 – A C-17 transcontinental flight on synthetic fuel

Research into AvGas from **Blended Bio Structures**

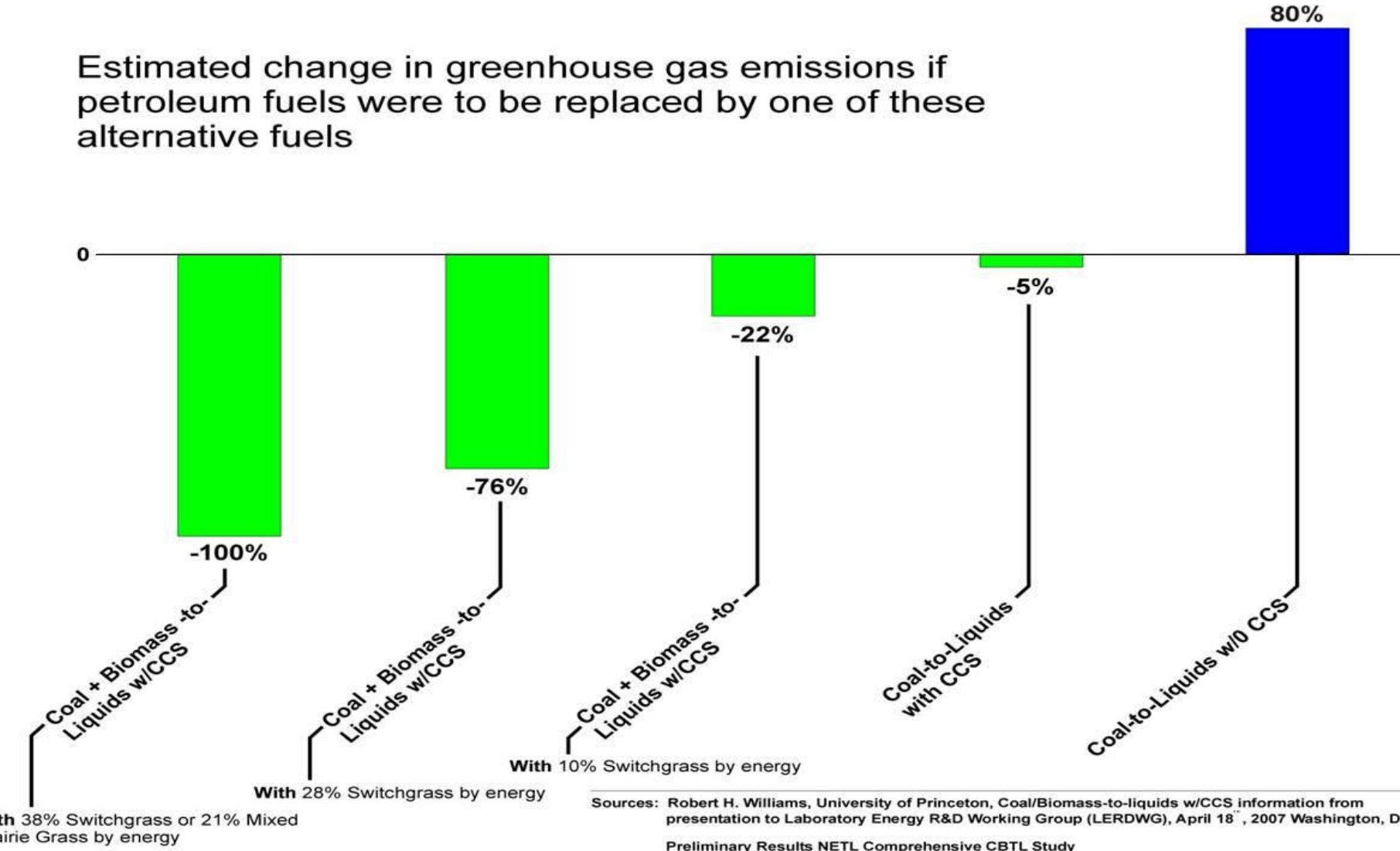


# Synthetic fuel economics

- Synthetic fuels increase supply
- Decrease the dynamics of commodity supply
- Increase price stability through manufacture
- Look at the whole impact on Environment

# Coal to liquid and carbon

Estimated change in greenhouse gas emissions if petroleum fuels were to be replaced by one of these alternative fuels



with 38% Switchgrass or 21% Mixed Prairie Grass by energy

With 28% Switchgrass by energy

With 10% Switchgrass by energy

Sources: Robert H. Williams, University of Princeton, Coal/Biomass-to-liquids w/CCS information from presentation to Laboratory Energy R&D Working Group (LERDWG), April 18, 2007 Washington, DC  
Preliminary Results NETL Comprehensive CBTL Study

# Beyond Aircraft Fuel ...

## Considering energy use as a system

- The “system” of energy usage
  - Extraction ... Processing ... Consumption
  
- Make energy a consideration in all we do
  - Reduce demand
  - Increase supply
  - Change the culture

# The big picture...

- 1 Examine carbon and alternative fuels as part of overlapping systems from extraction to consumption
- 1 Consider the externalities
  - Food prices
  - Water uses
  - Leverage on Commodity suppliers
- 1 Remember that technology follows incentives