

National Petroleum Council

# Facing The Hard Truths About Energy

A Comprehensive View To 2030  
Of Global Oil And Natural Gas

Energy Summit 2007

LSU Center for Energy Studies

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## *The Secretary's Suggested Questions*

- What does the future hold for global oil and natural gas supply ?
- Can incremental oil and gas supplies be brought on-line, on time, and at a reasonable price to meet future demand without jeopardizing economic growth ?
- What oil and gas supply and / or demand-side strategies does the Council recommend the U.S. pursue to ensure greater economic stability and prosperity ?

# Dimensions of the Study



# *How This Study Is Different*

## Integrated, In-Depth Analysis

- Over 100 studies incorporated to include both public and aggregated proprietary outlooks
- Not another forecast of supply, demand or price

## Diversity of Expertise

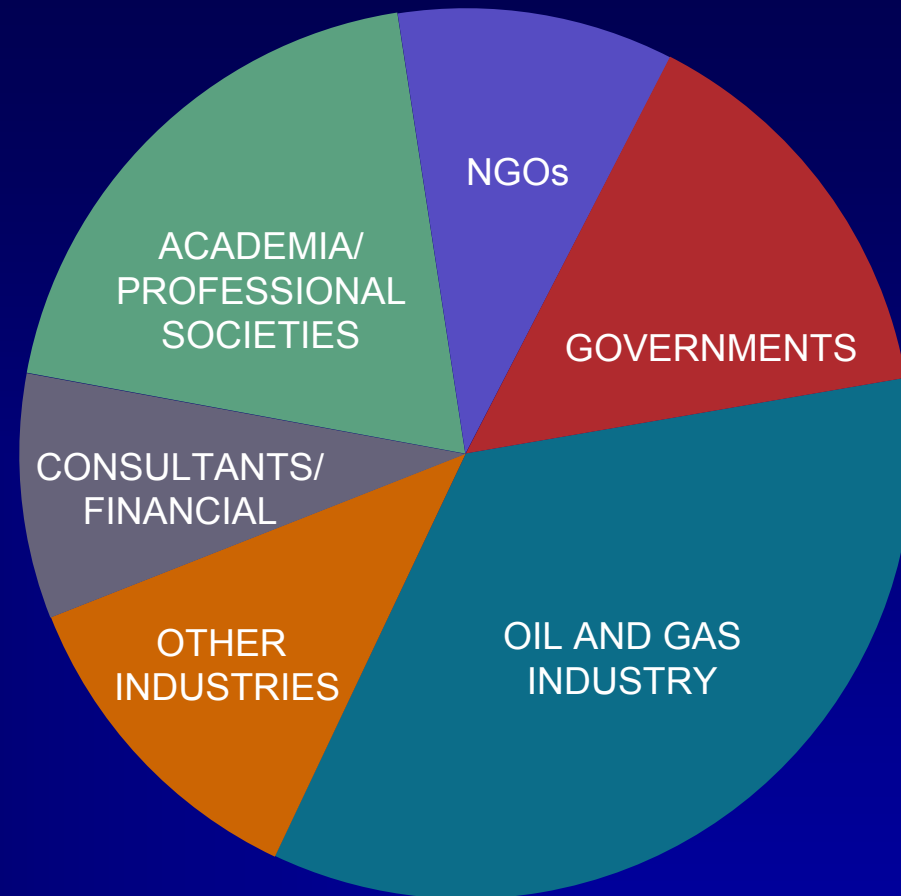
- 350 participants with backgrounds in all aspects of energy including efficiency, economics, geopolitics, environment

## Technology Assessment

- Identified achievable opportunities and likely deployment timing
- Looked across the energy spectrum, including both supply and demand

## How This Study is Different

*65% participants  
from outside of oil  
and gas industry*



**350 + participants, plus input from 1000 + others**  
**Over 920,000 report downloads**

# ***What We Learned: The Hard Truths***

## *What We Learned*

- ✓ Global demand growth projected at 50-60%
  - ✓ Improving living standards for a growing global population
- ✓ Coal, oil, and natural gas will remain indispensable to meeting total projected energy demand growth
- ✓ The world is not running out of energy resources, but
  - ✓ Risks are accumulating to continuing expansion of oil and natural gas production from conventional resources
  - ✓ Risks create significant challenges to meeting projected total energy demand

## ***What We Learned*** (continued)

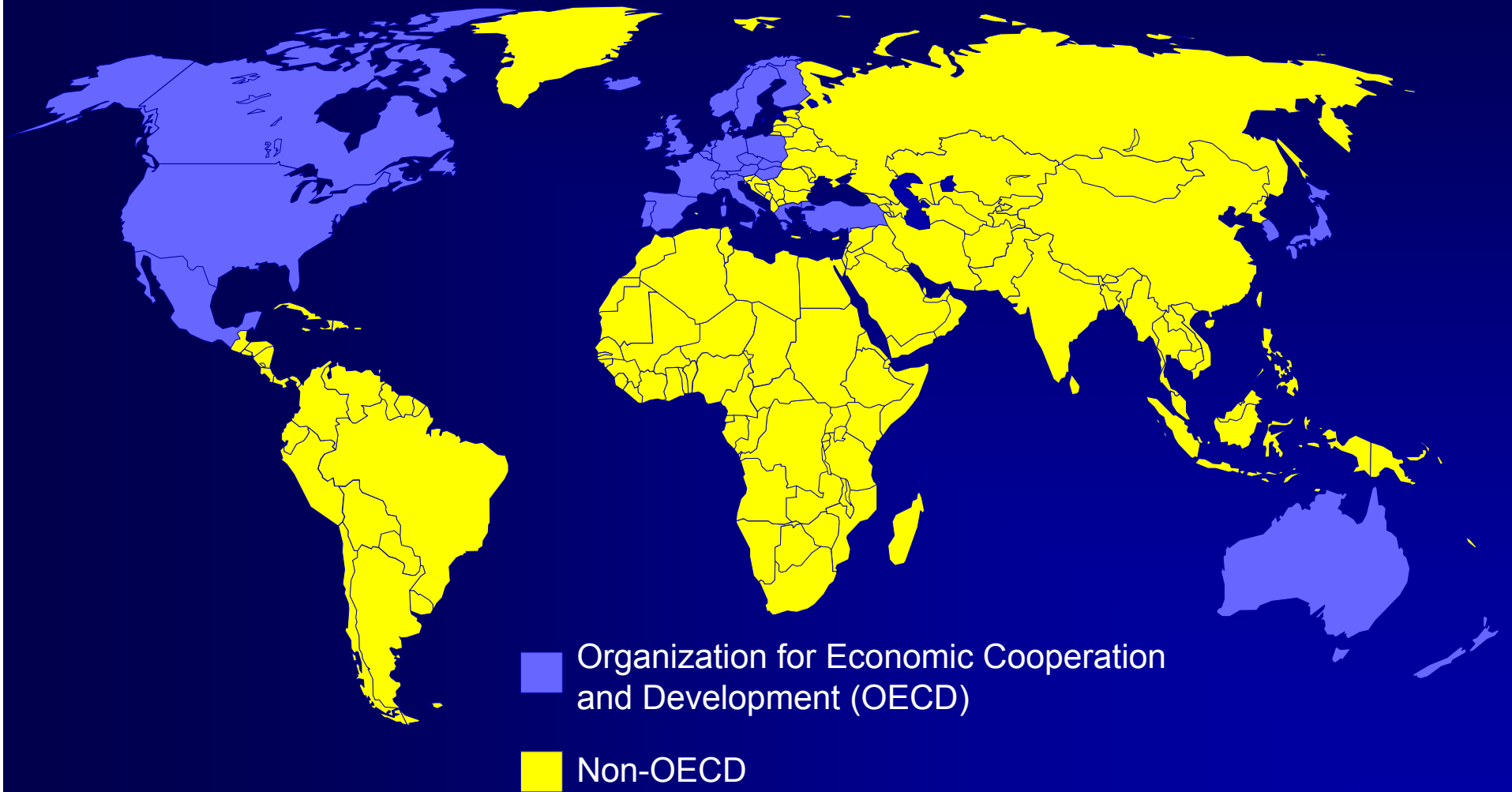
- ✓ Risk mitigation will require expanding all economic energy sources, including:
  - ✓ Demand growth moderation through energy efficiency
  - ✓ Biofuels, other renewables, nuclear, coal, and unconventional oil and natural gas
- ✓ Each energy source will face significant challenges including:
  - ✓ Safety, environmental, technical, political, and impose infrastructure requirements or economic hurdles



## *What We Learned (continued)*

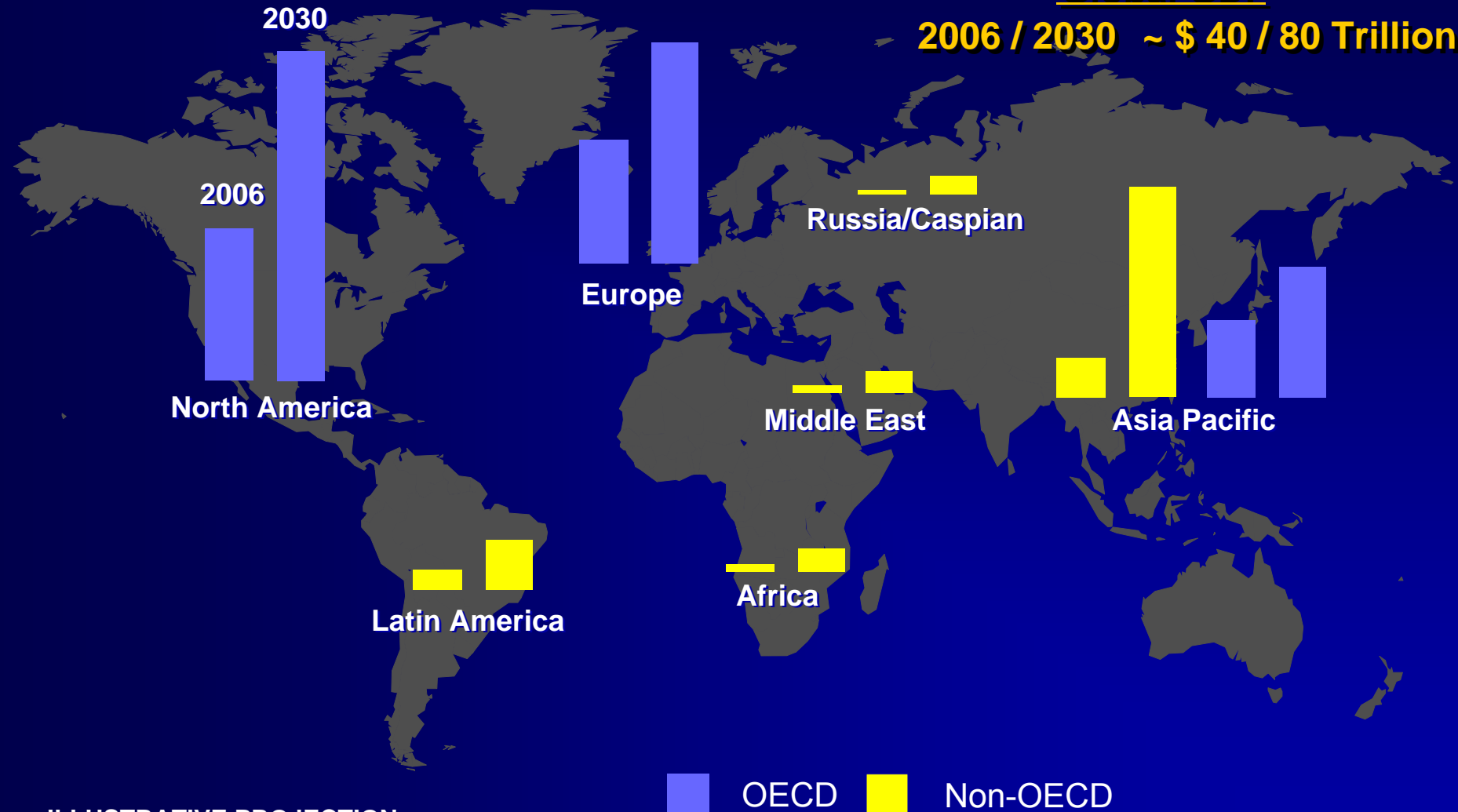
- ✓ “Energy Independence” is not realistic in the foreseeable future, however, U.S. energy security can be enhanced by:
  - ✓ Moderating demand growth
  - ✓ Expanding and diversifying domestic energy supplies
  - ✓ Strengthening global trade and investment
- ✓ Majority of U.S. energy workforce is eligible to retire within the next decade
  - ✓ Workforce needs to be replenished and trained
- ✓ Policies aimed at curbing carbon emissions will alter the energy mix, increase energy-related costs, and require reduction in demand growth

# OECD and Non-OECD Countries



# Economic Growth Patterns Are Shifting

Global GDP  
2006 / 2030 ~ \$ 40 / 80 Trillion



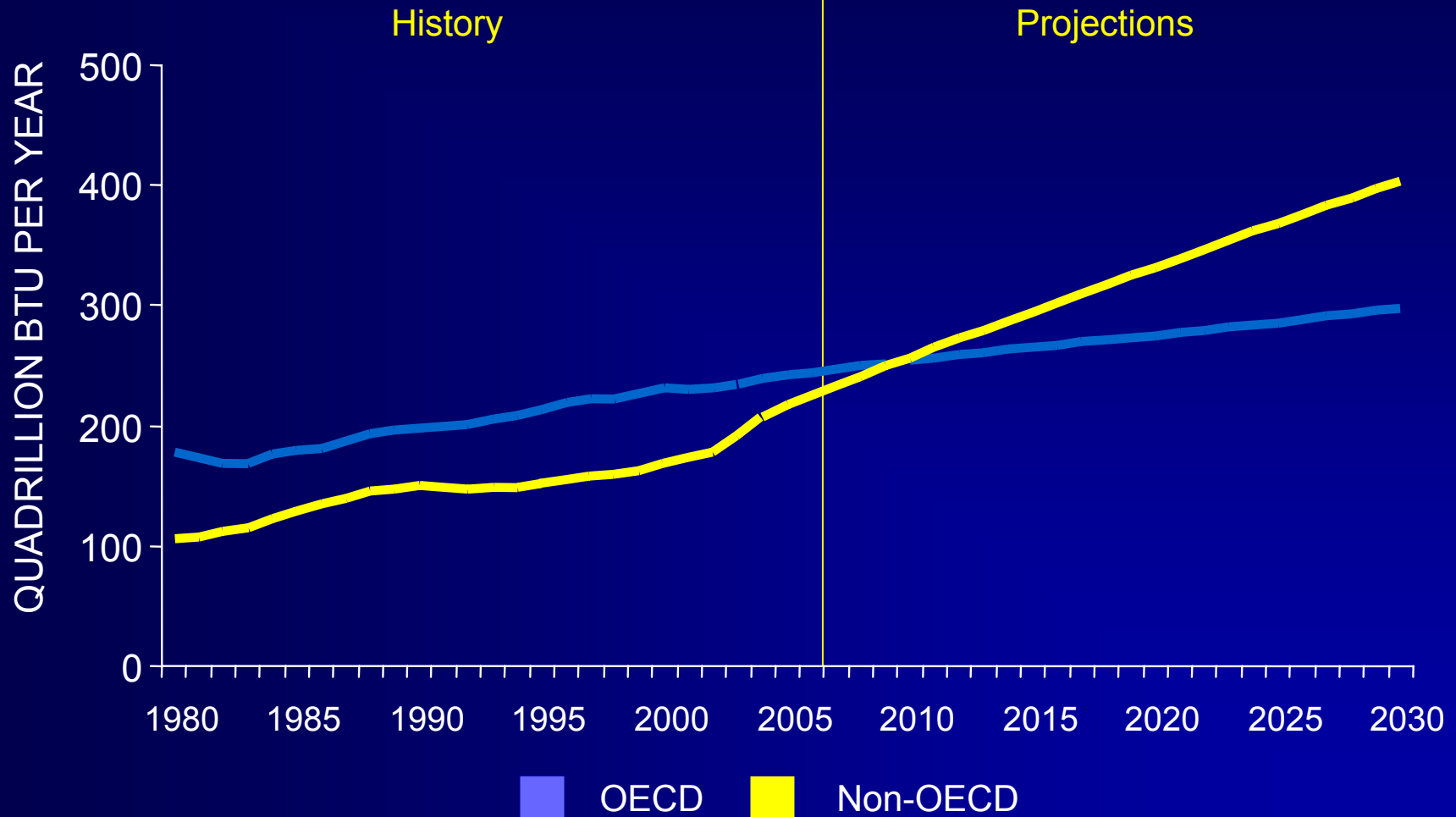
ILLUSTRATIVE PROJECTION

Source EIA, IEA & Other Outlooks

**NPC**

Global Oil and Gas Study

# ... And Energy Demand Growth Follows



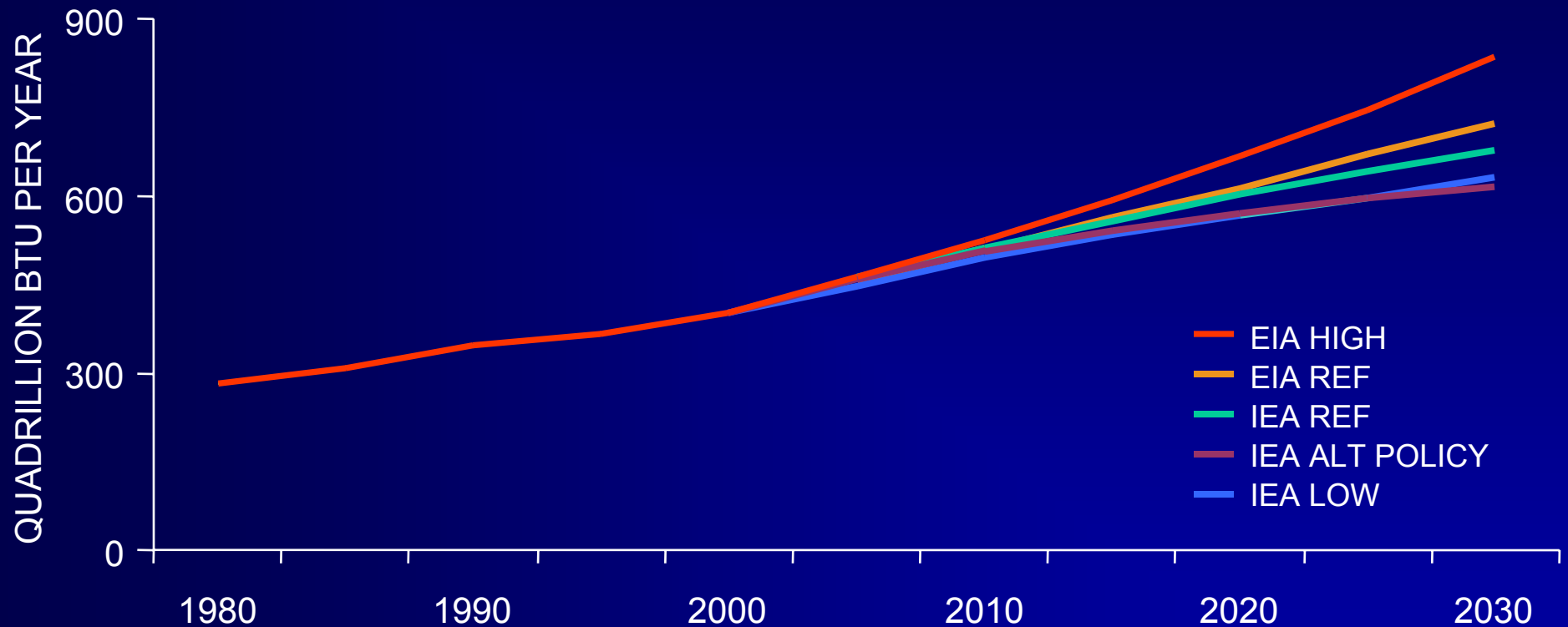
Source: EIA 2007

**NPC**

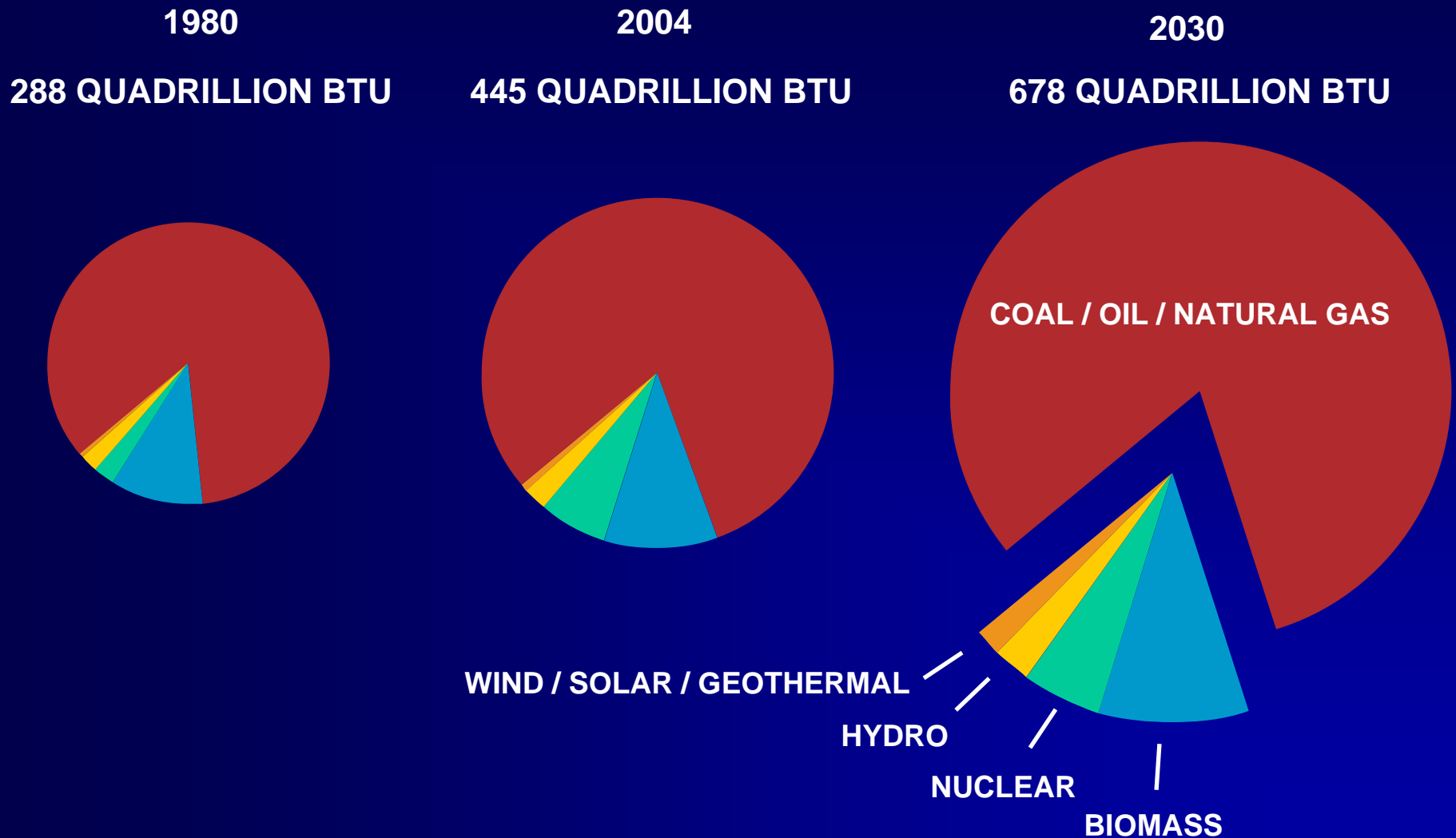
*Global Oil and Gas Study*

# Range of Projections Point to Growing Demand

## TOTAL ENERGY

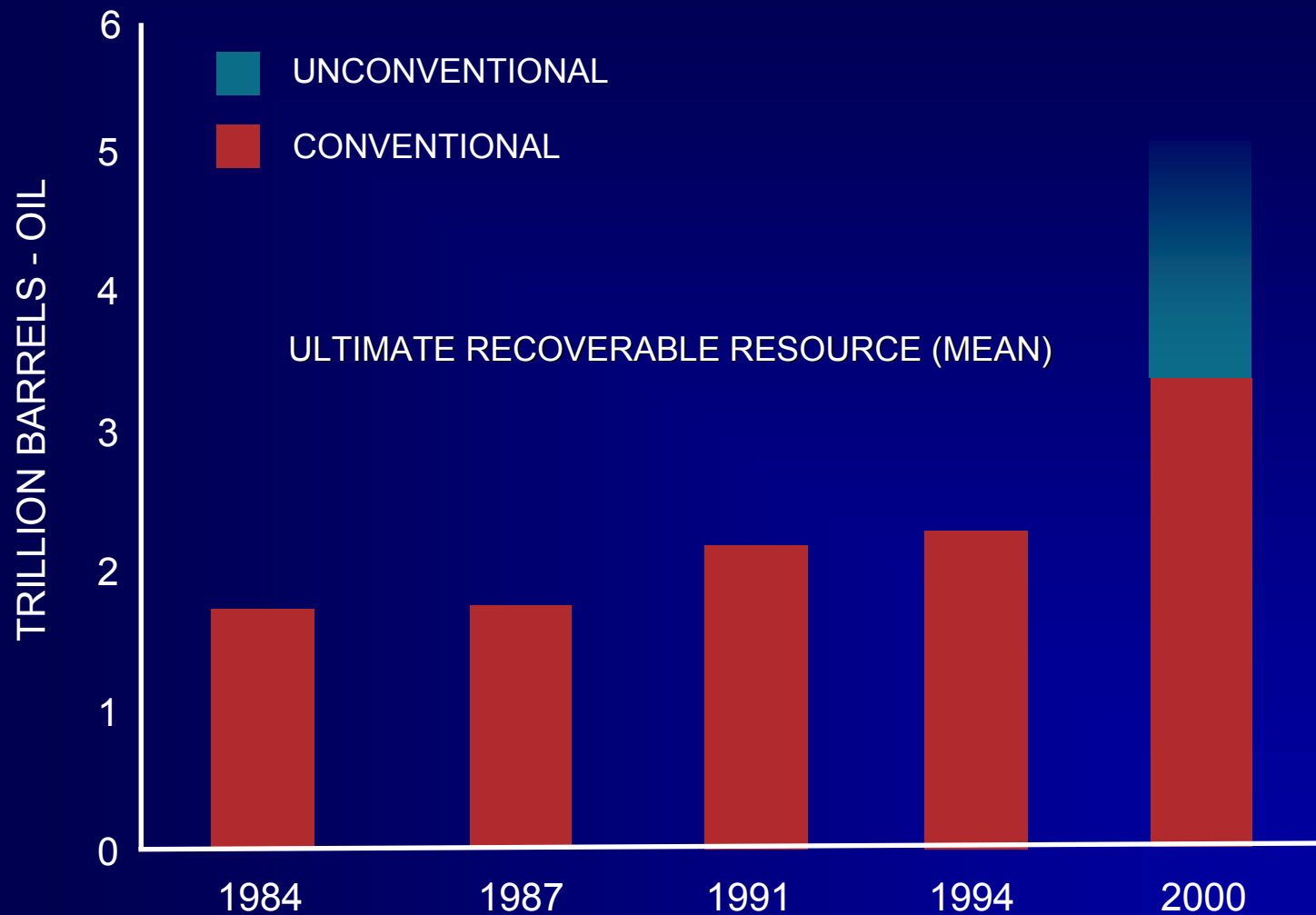


# Coal, Oil, and Natural Gas Will Remain Indispensable



Source: IEA REFERENCE

# Large Oil Resource Base

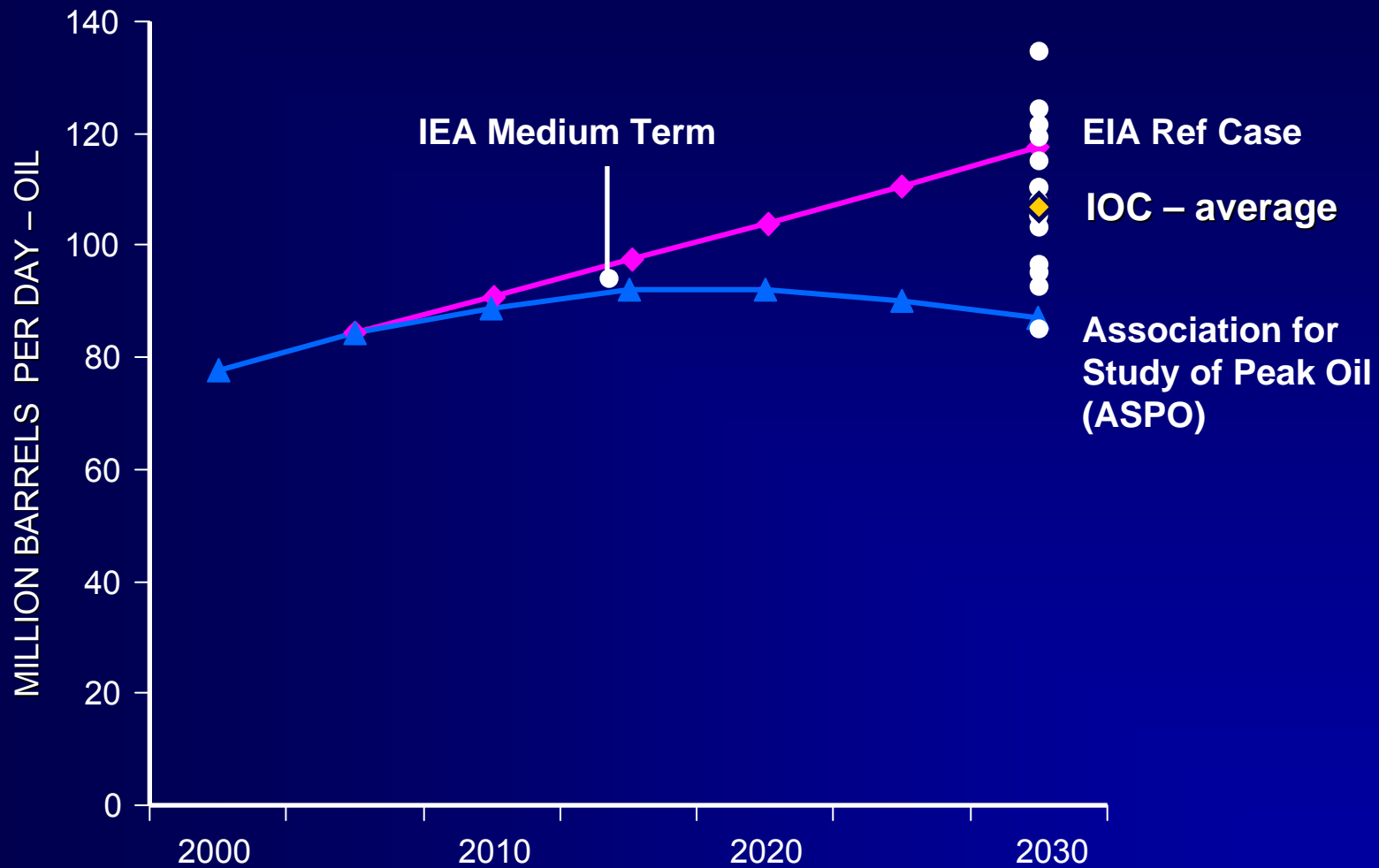


Source: USGS

**NPC**

*Global Oil and Gas Study*

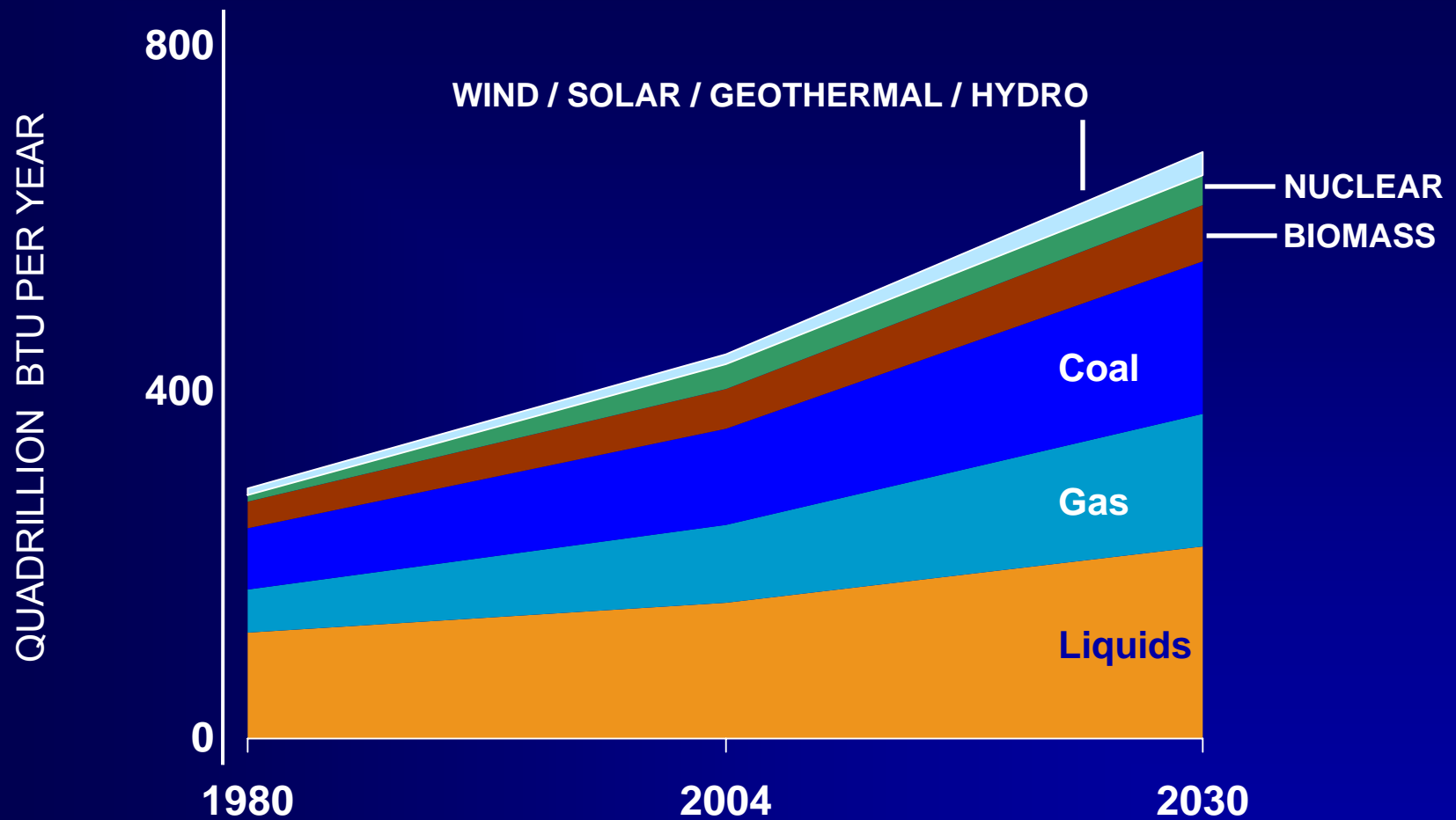
# Risks Reflected in Range of Production Projections



\* Source NPC Data Warehouse

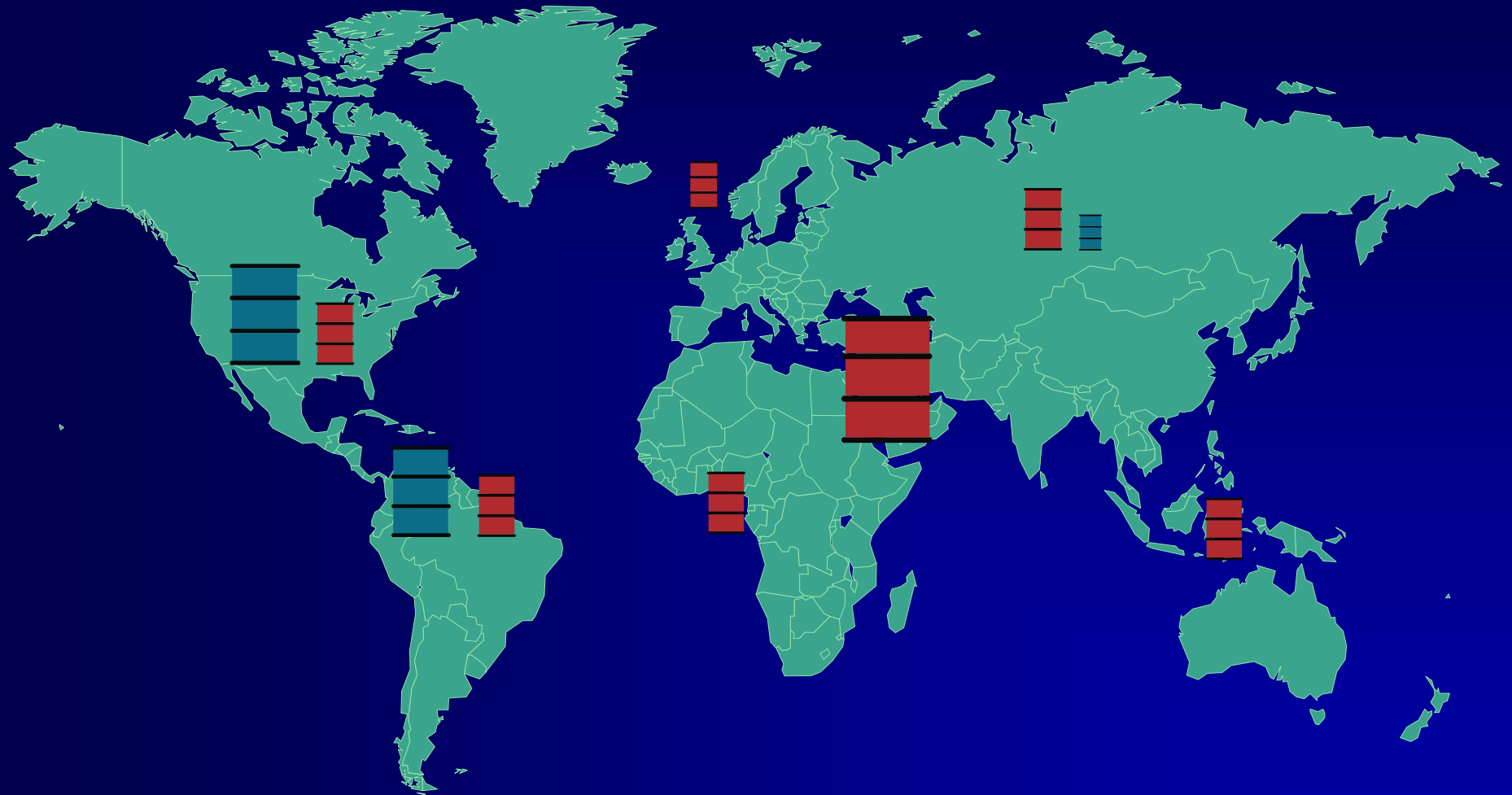


# All Sources of Energy Will Be Needed



Source: IEA REFERENCE CASE

# Oil Resource Concentration



ILLUSTRATIVE PROJECTION  
Source USGS

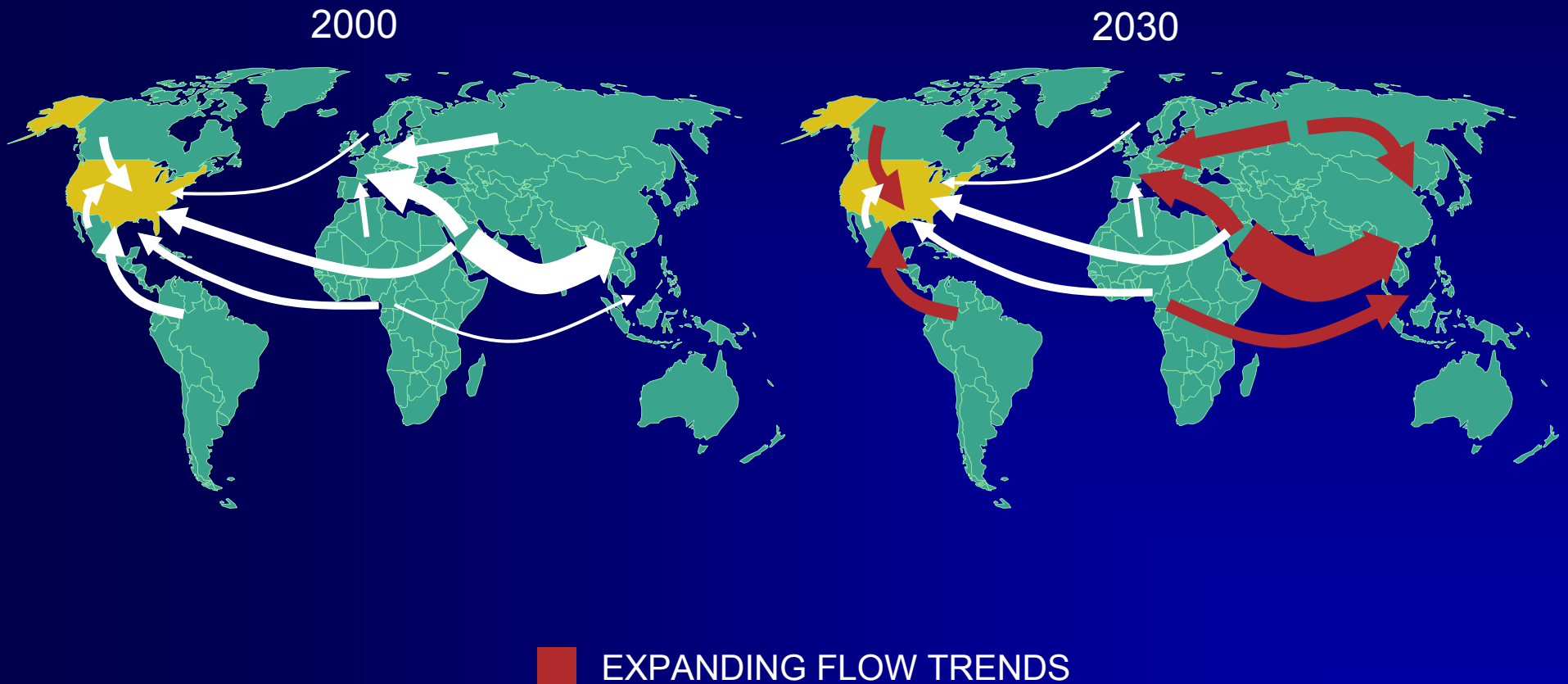
 UNCONVENTIONAL

 CONVENTIONAL

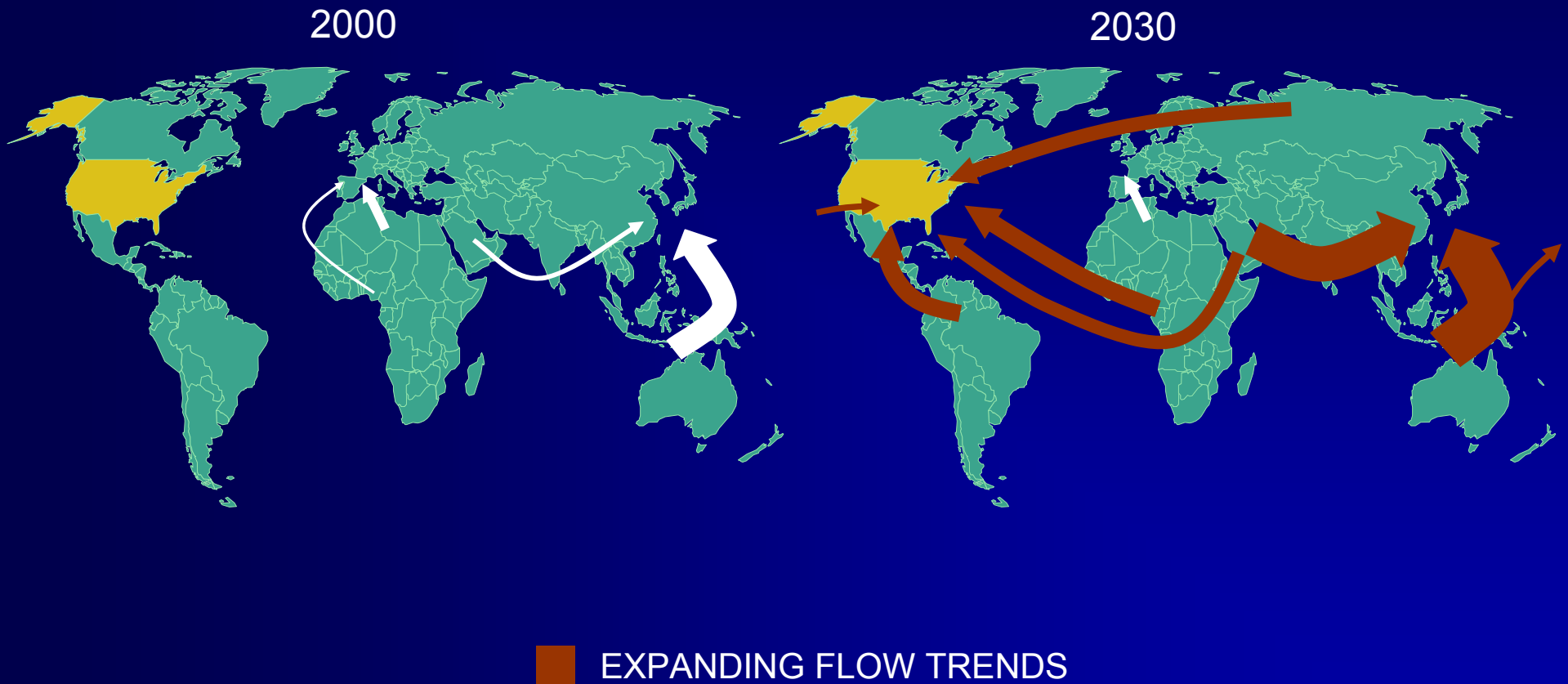
*Global Oil and Gas Study*

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# Global Oil Trade



# Global LNG Trade

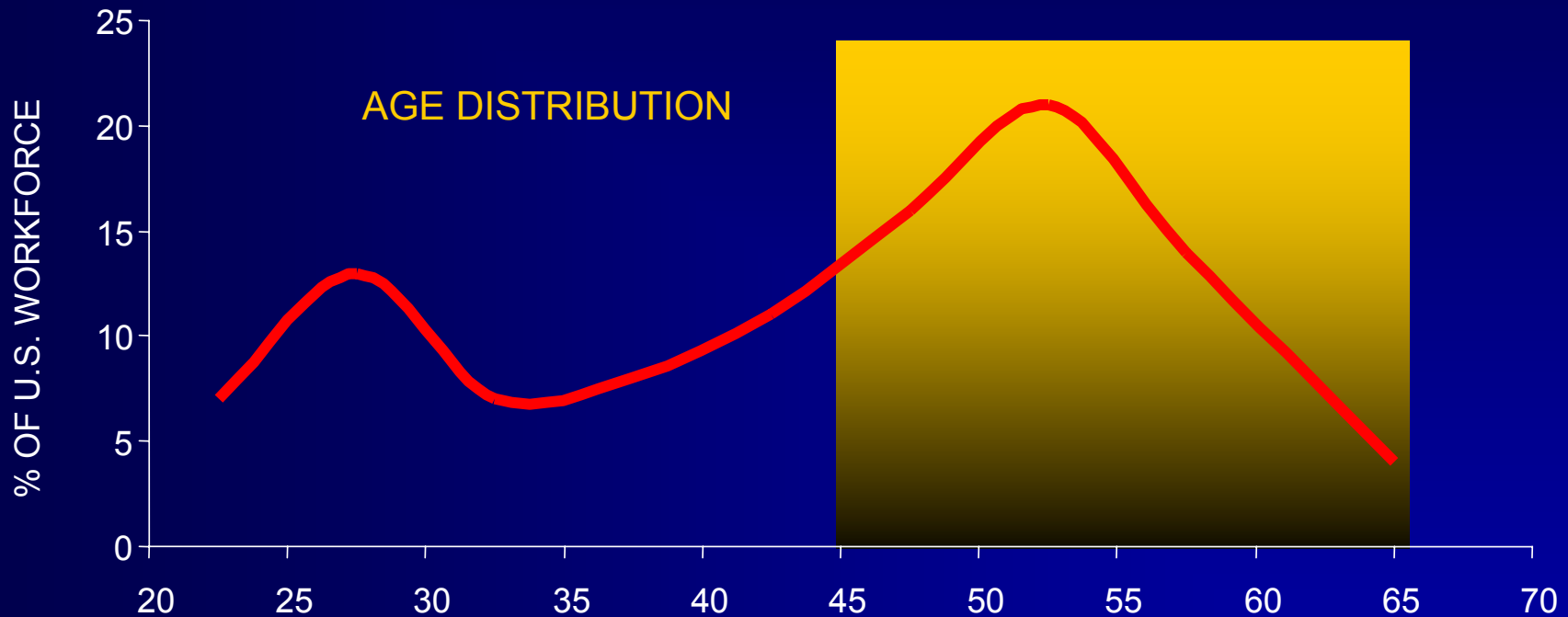


# Supply Vulnerability Zones



# U.S. Human Resources Challenge

OVER HALF OF THE WORKFORCE ELIGIBLE TO RETIRE IN NEXT 10 YEARS



Source: U.S. Dept of Labor

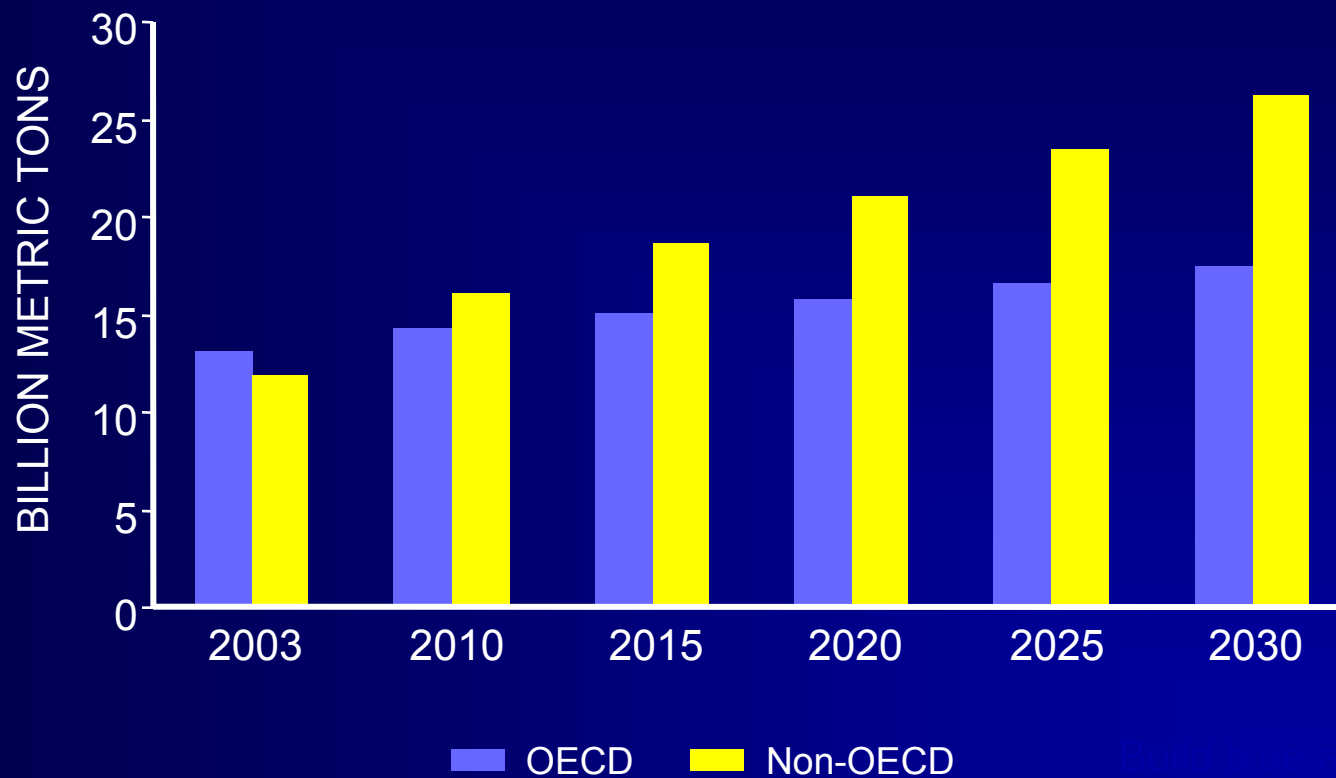
# *CO<sub>2</sub> Emission Limits Will Alter Energy Strategies*

Growing concern that climate is warming and CO<sub>2</sub> concentrations in the atmosphere play a role.

The challenge of significantly reducing CO<sub>2</sub> emissions is unprecedented and will require:

- Global, broad actions on multiple fronts
- Long time horizons
- Major additional investments

# 60% of Emissions Growth in Developing World



Source: EIA, IEO (2006)



# *Carbon Mitigation*

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Continued use of fossil fuel in a carbon constrained world will require:

- Moderating demand by improving energy efficiency
- Developing low / no-carbon energy sources
- Implementing large scale carbon capture and sequestration

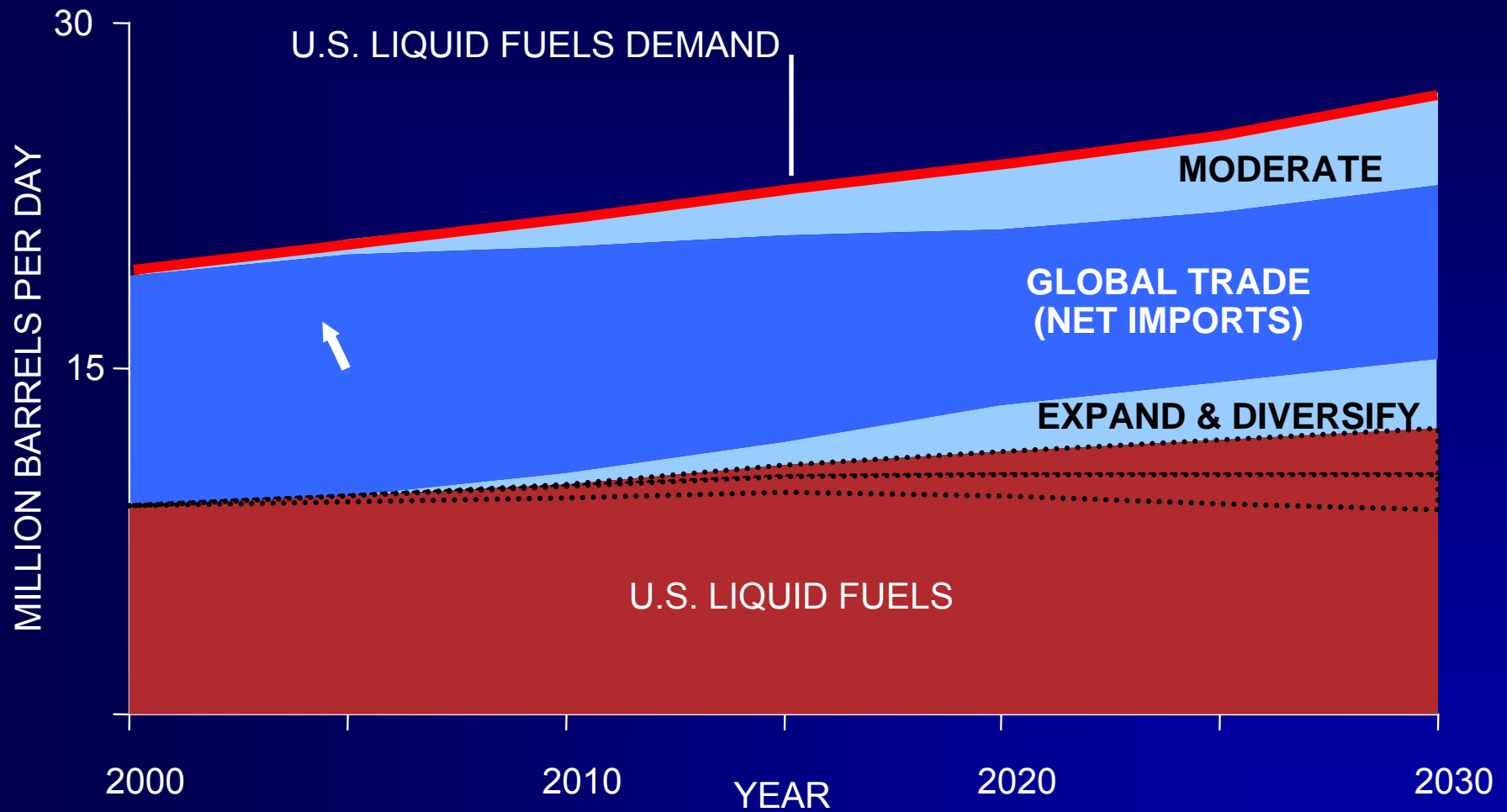
## *The Five Core U.S. Strategies*

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- Moderate Demand by Increasing Energy Efficiency
- Expand and Diversify U.S. Energy Supply
- Strengthen Global and U.S. Energy Security
- Reinforce Capabilities to Meet New Challenges
- Address Carbon Constraints

***There Is No Single, Easy Solution***

# All Strategies Are Essential



Source: EIA Reference Case / NPC Global Oil and Gas study survey.

Illustrative View

**NPC**

*Global Oil and Gas Study*

## ***There Is No Single, Easy Solution***

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- All five strategies must be addressed together
- Global cooperation required
- Begin now and plan for sustained commitment

## ***“Facing the Hard Truths About Energy”***

***For information, please refer to the NPC Website  
for a complete list of available resources:***

***<http://www.npc.org>***

***Send your follow-up questions and comments to:***

***[comments@npc.org](mailto:comments@npc.org)***