

National Petroleum Council

# Facing The Hard Truths About Energy

A Comprehensive View To 2030  
Of Global Oil And Natural Gas

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# *The Secretary's Suggested Questions*

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- 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

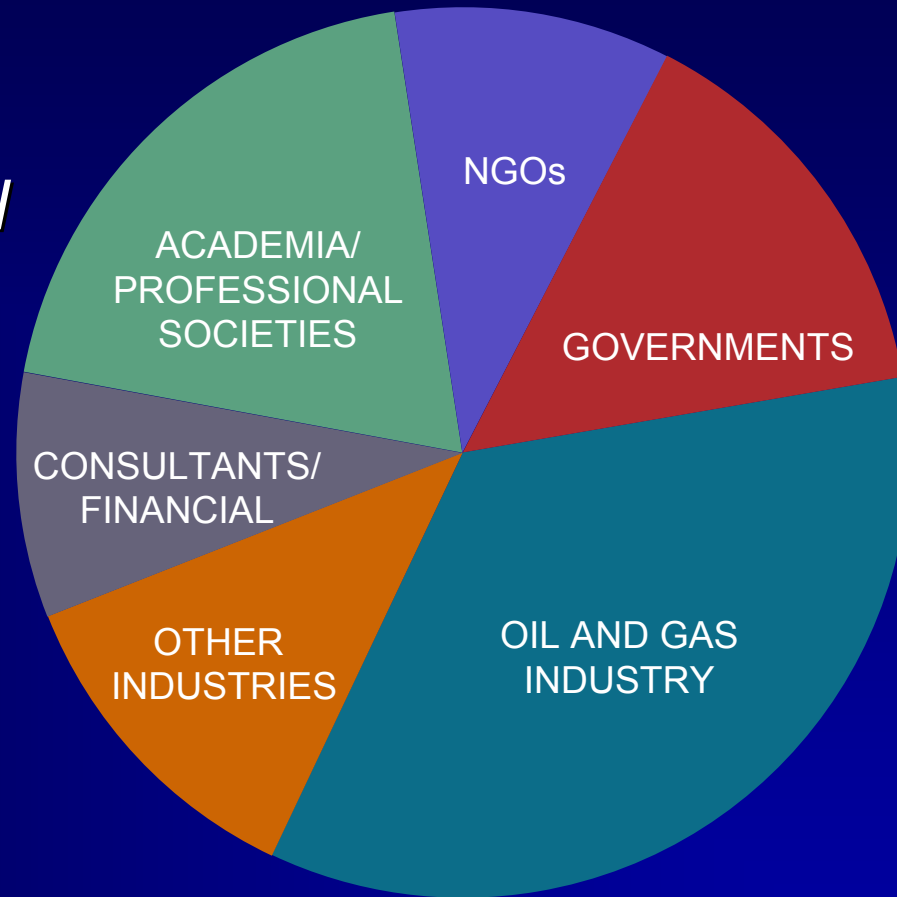
- 350 participants with backgrounds in all aspects of energy including efficiency, economics, geopolitics, environment

## Technology Assessment

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

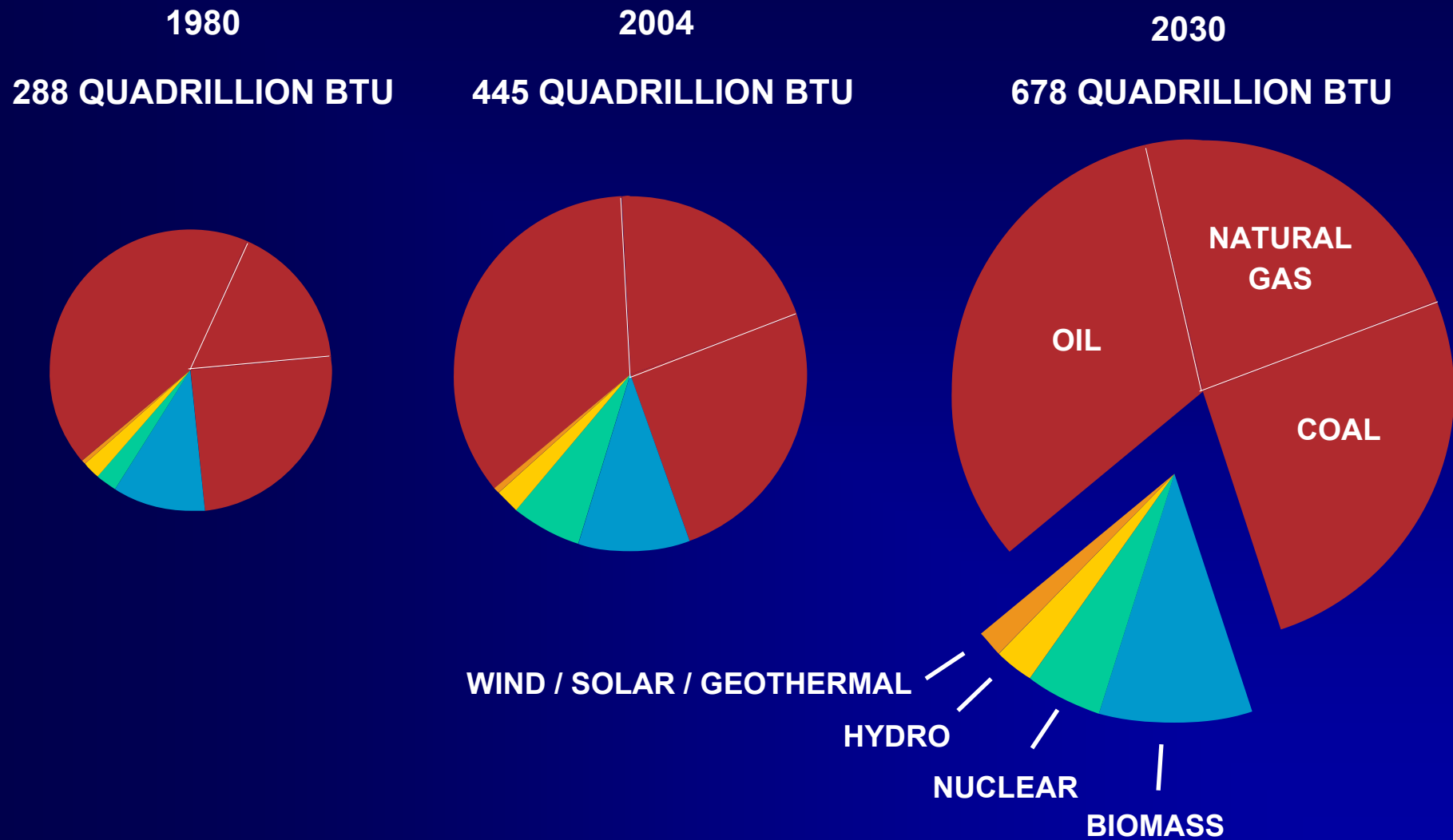
# How This Study is Different

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



***350 + participants, plus input from 1000 + others***

# Coal, Oil, and Natural Gas Will Remain Indispensable



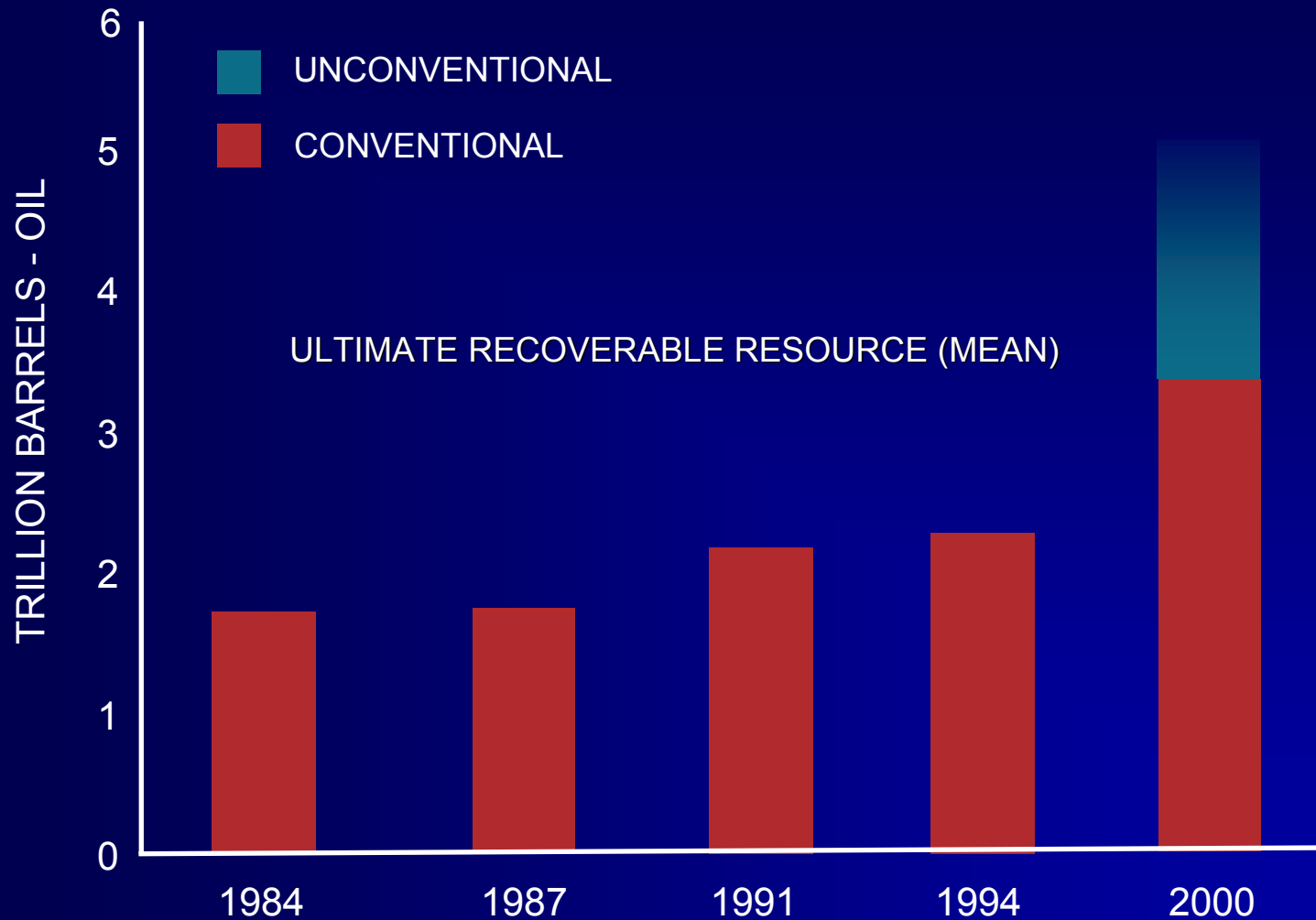
Source: IEA REFERENCE CASE

# *The Hard Truth: Supply*

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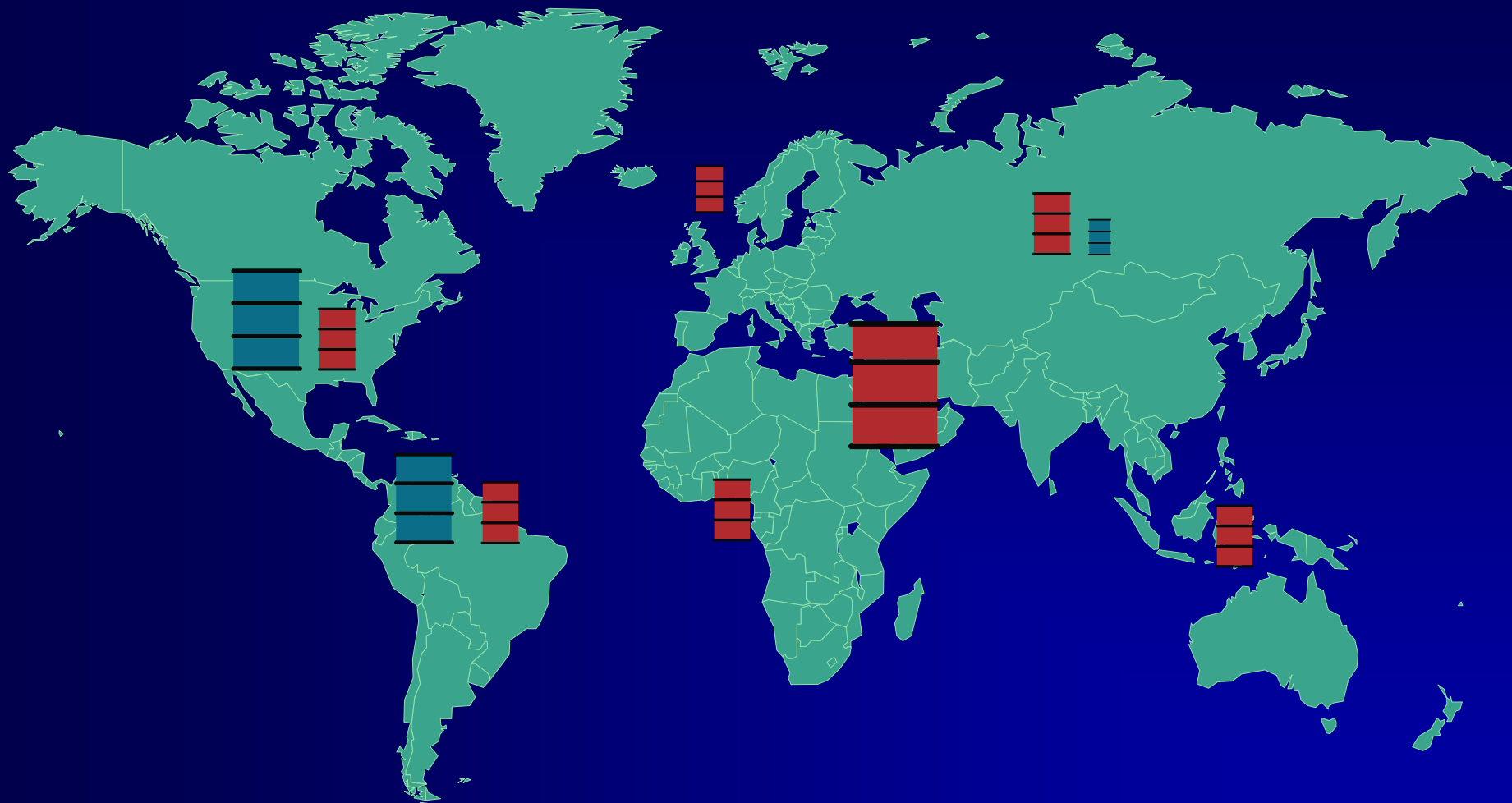
The world is not running out of energy resources, but there are accumulating risks to continuing expansion of oil and natural gas production from the conventional sources relied upon historically. These risks create significant challenges to meeting projected total energy demand.

# Large Oil Resource Base



Source: USGS

# Oil Resource Concentration



ILLUSTRATIVE PROJECTION  
Source USGS

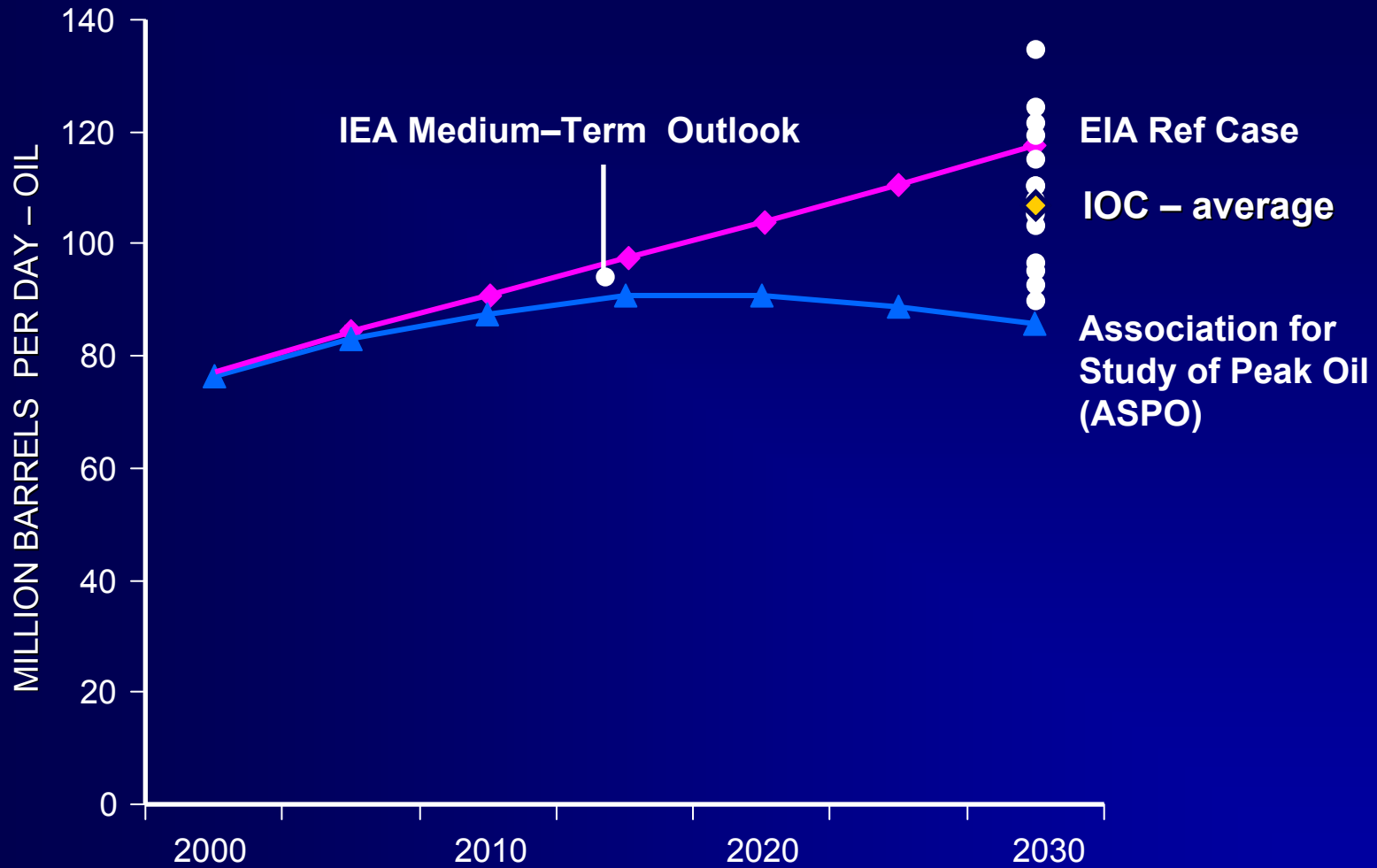


UNCONVENTIONAL



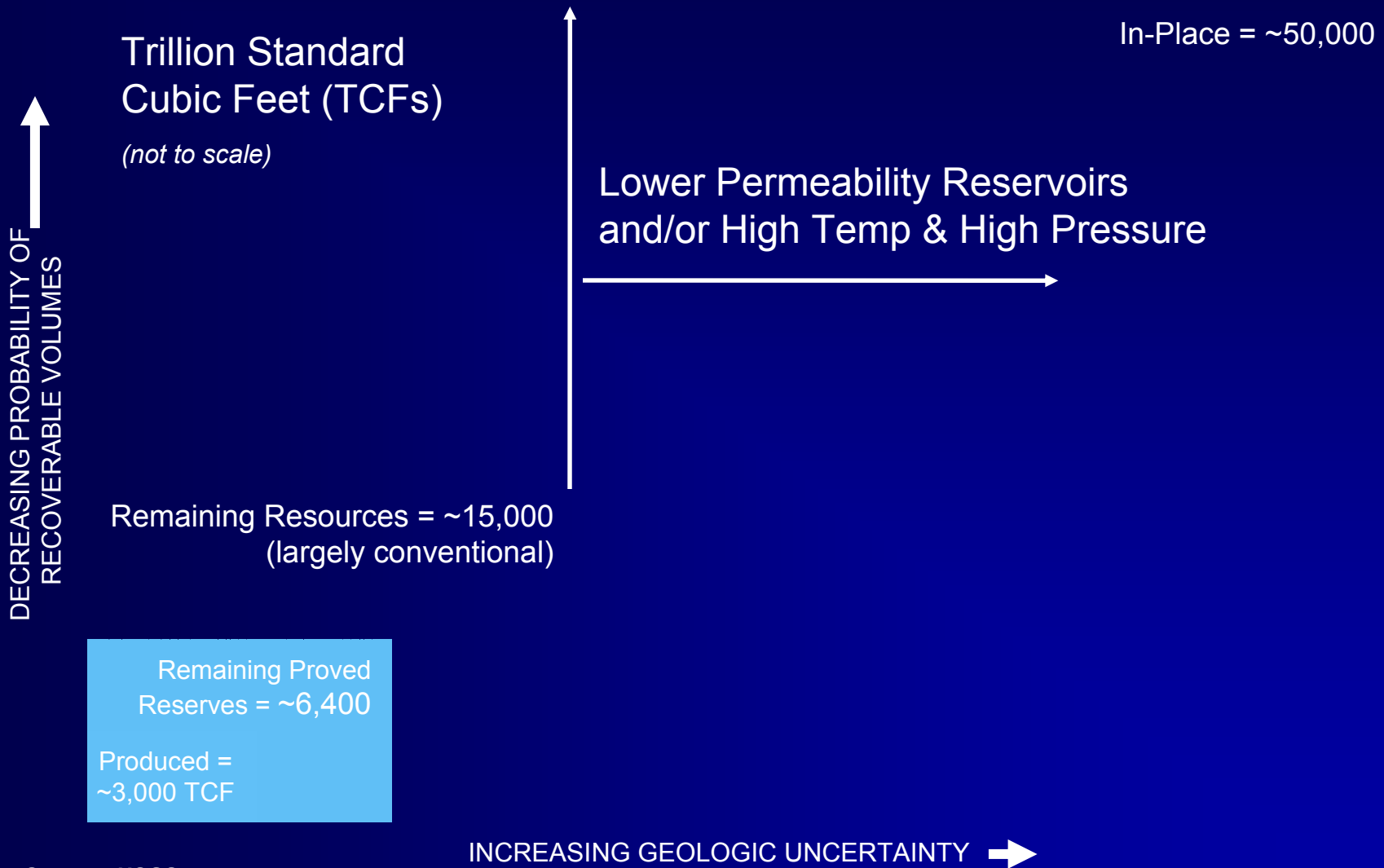
CONVENTIONAL

# Risks Reflected in Range of Production Projections



\* Source: NPC Data Warehouse.

# Global Gas Resource Endowment



Source: USGS.

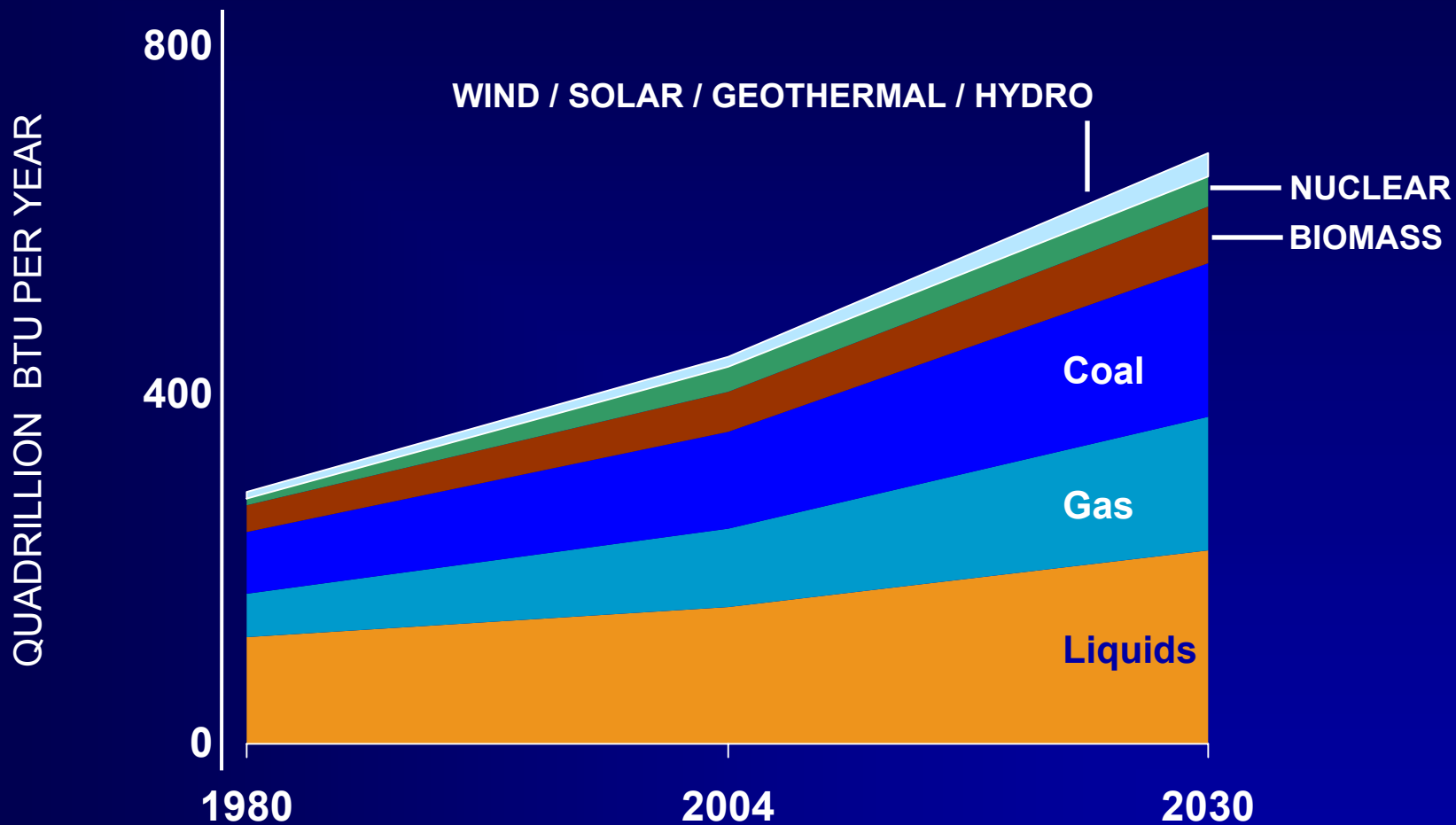
# *The Hard Truth: Energy Sources*

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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.

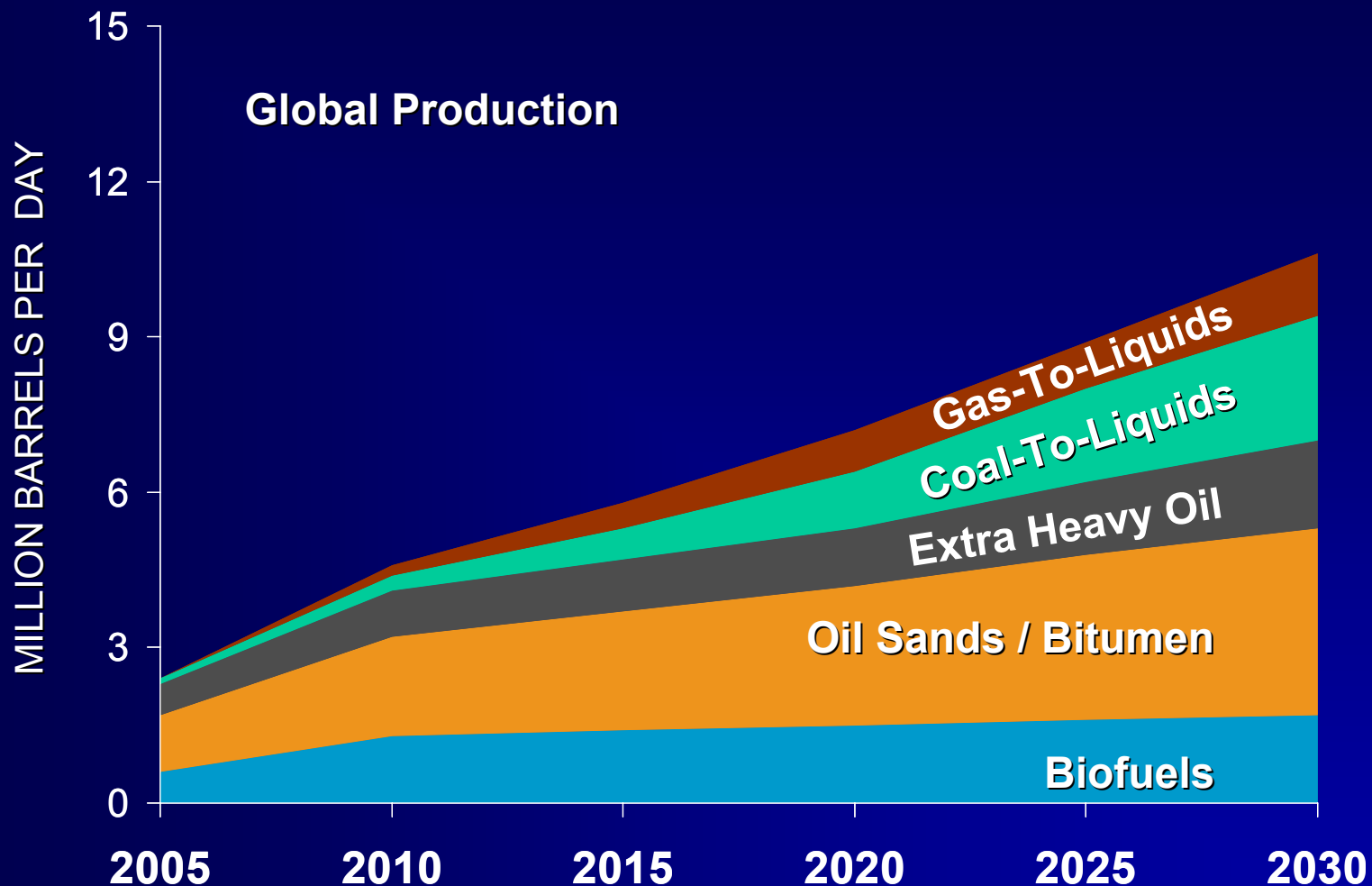
Each of these sources faces significant challenges including safety, environmental, political, or economic hurdles, and imposes infrastructure requirements for development and delivery.

# All Sources of Energy Will Be Needed



Source: IEA REFERENCE CASE

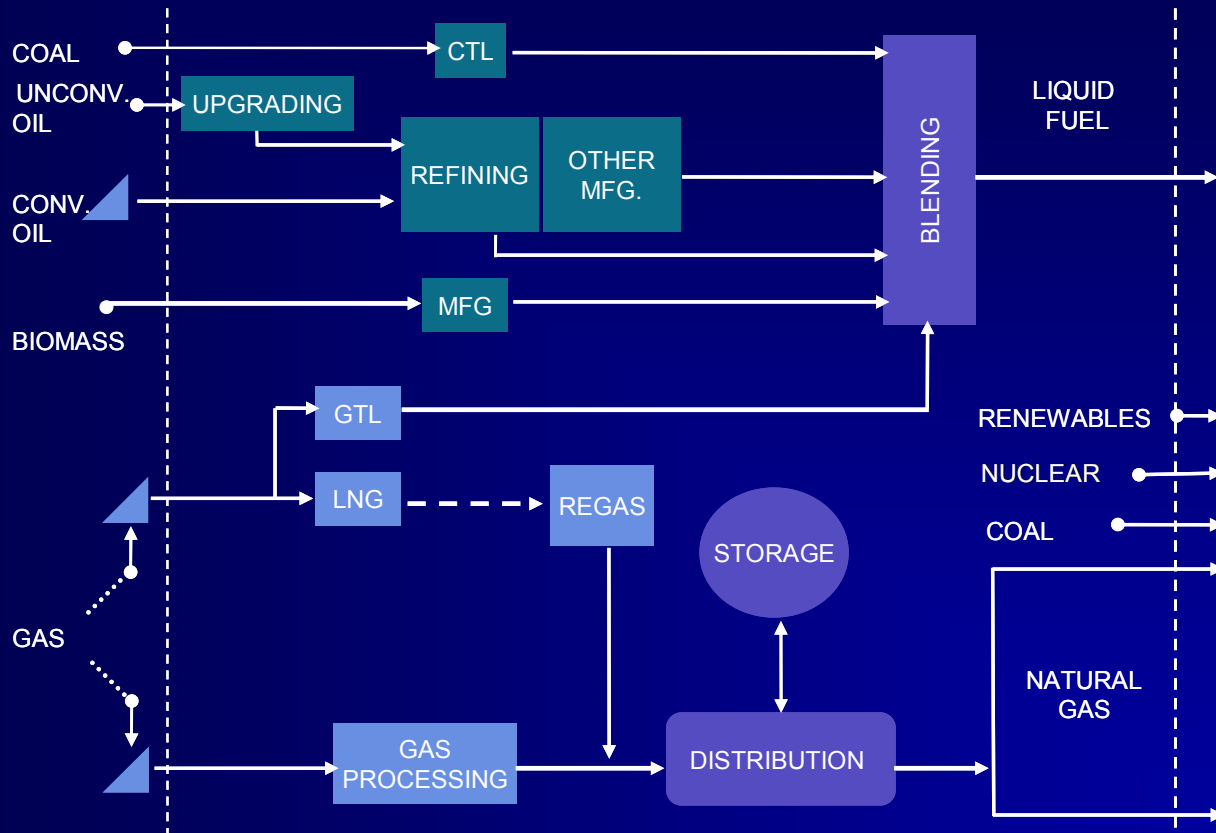
# Contribution of Unconventional Liquids



Source: Data From EIA 2007 Reference.

# Massive Infrastructure Investments Required

Supply



Demand

# *The Hard Truth: Energy Security*

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"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.

# OECD and Non-OECD Countries



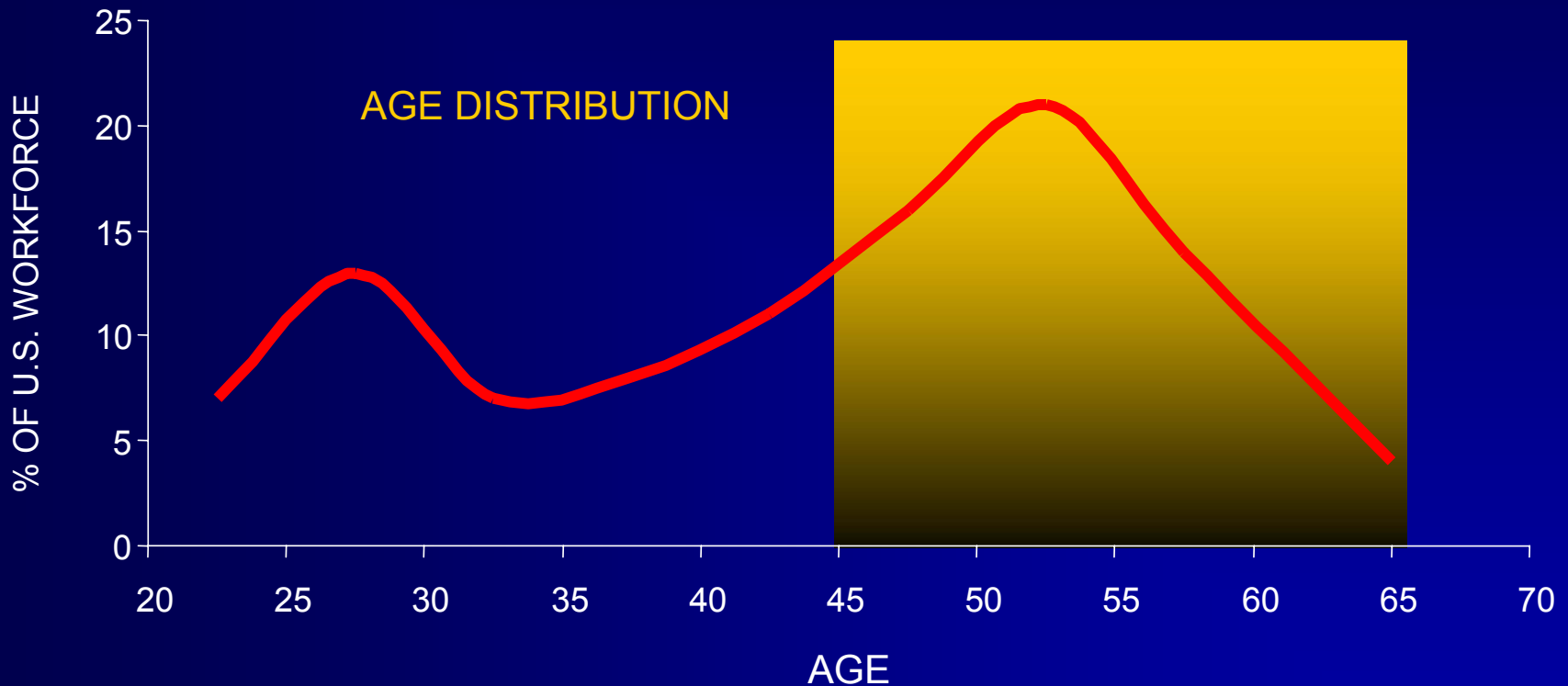
# *The Hard Truth: Workforce*

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A majority of the U.S. energy sector workforce, including skilled scientists and engineers, is eligible to retire within the next decade. The workforce must be replenished and trained.

# U.S. Human Resources Challenge

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



Source: U.S. Dept of Labor.

# *The Hard Truth: Carbon Emissions*

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

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

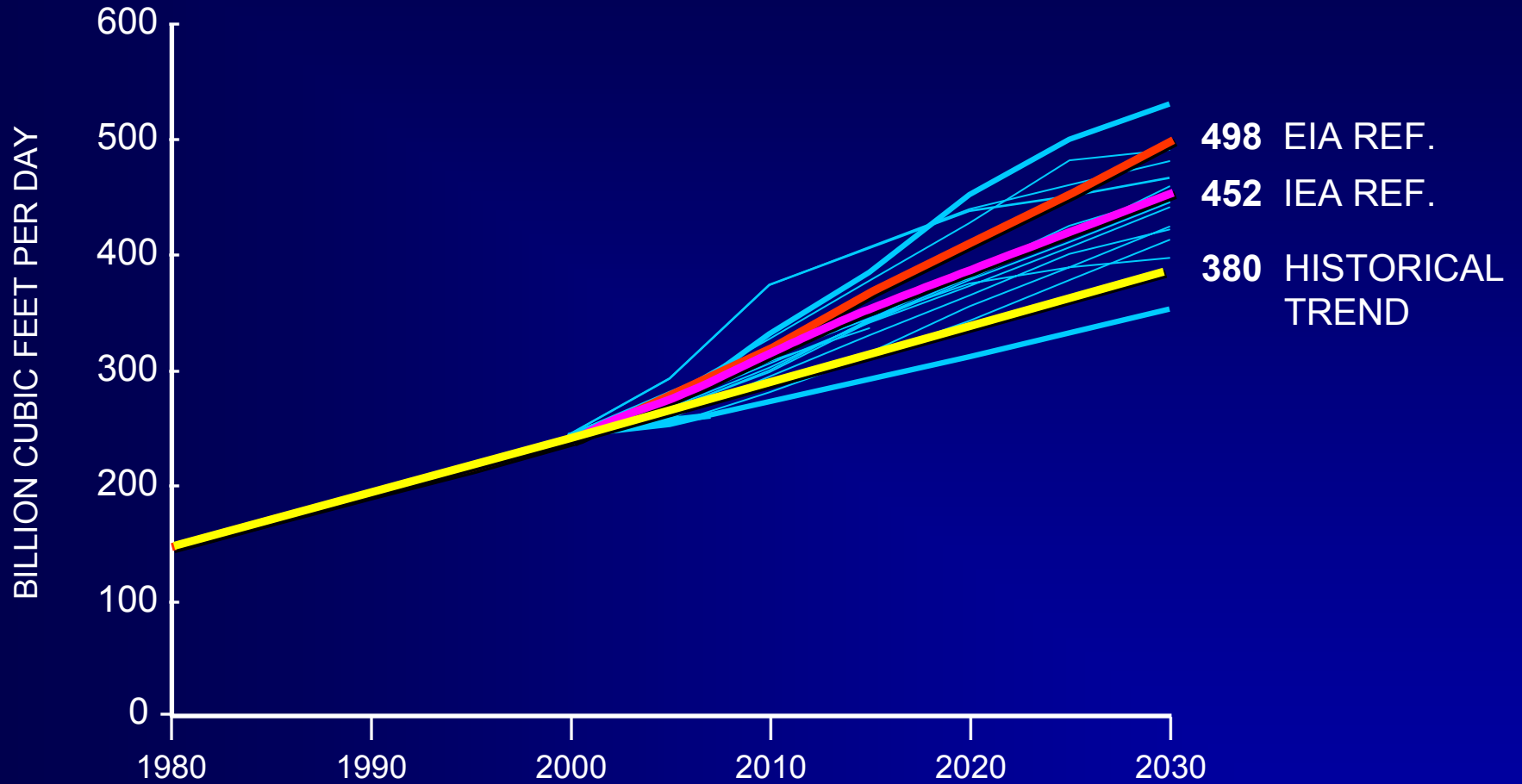
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Growing concern that climate is warming and CO<sub>2</sub> concentrations in the atmosphere play a role.

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

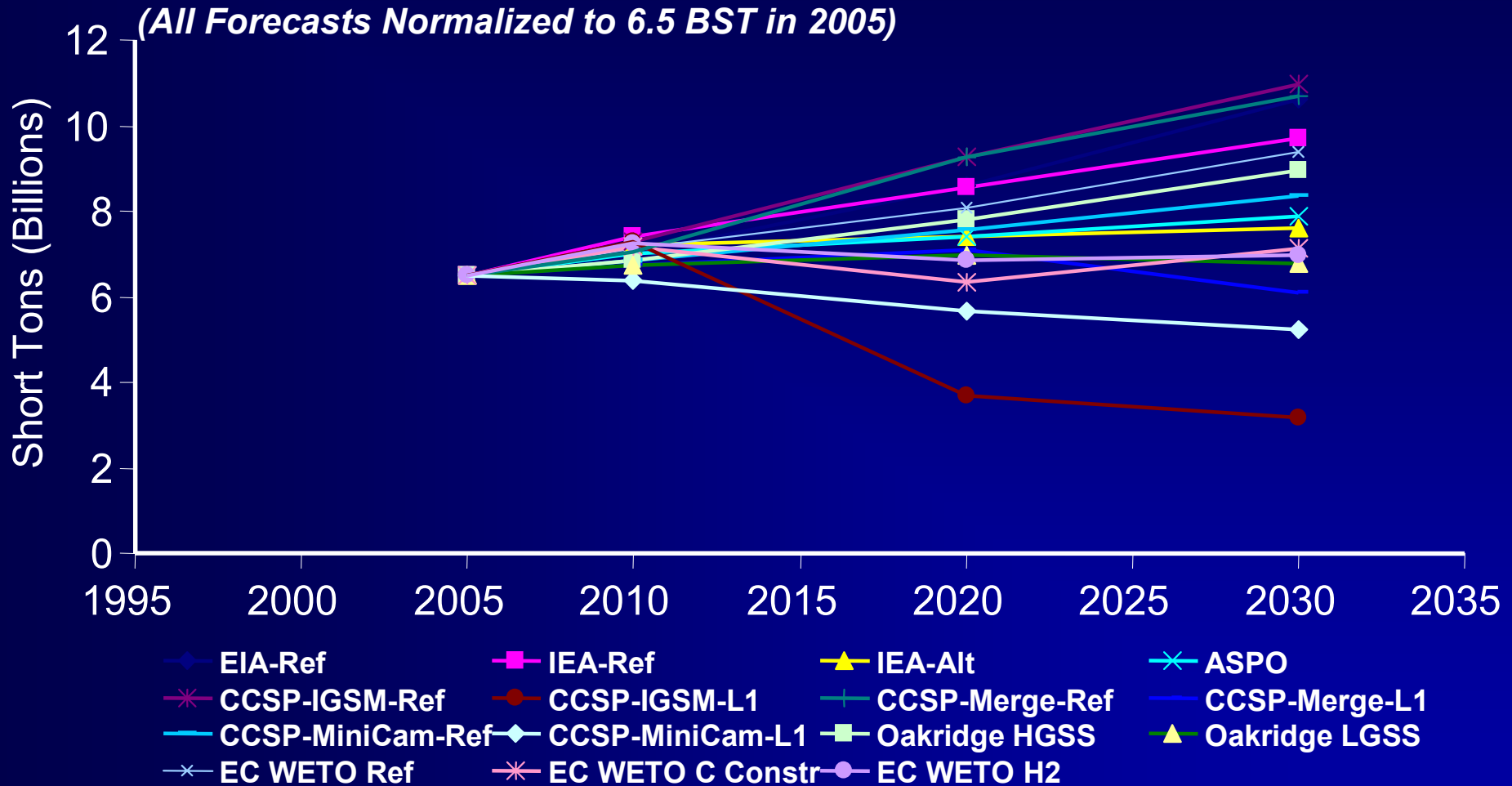
- Global, broad actions on multiple fronts
- Long time horizons
- Major additional investments

# Range of Global Supply Projections – Gas

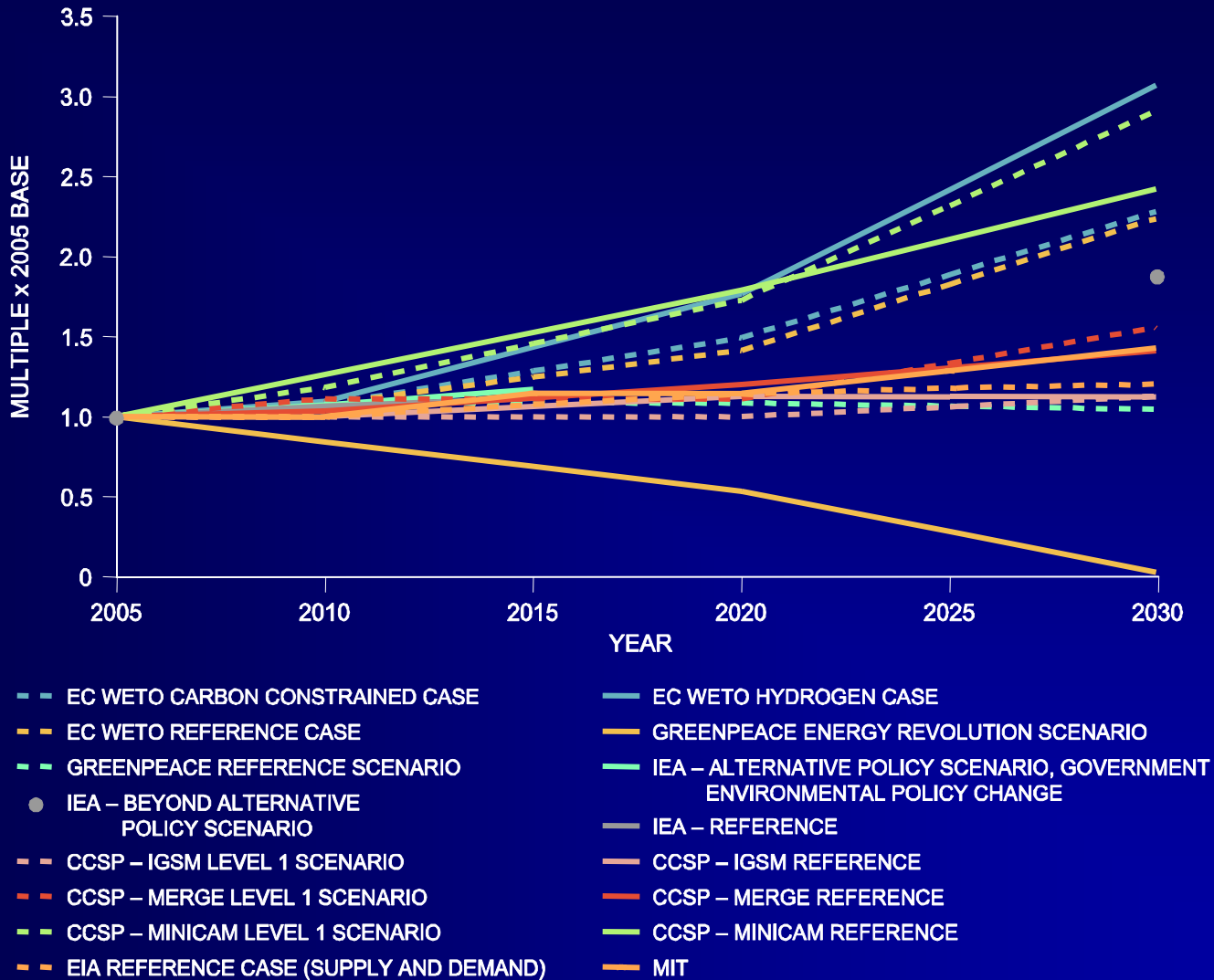


Source: NPC Survey for the Oil & Gas Study.

# Coal Supply Projections

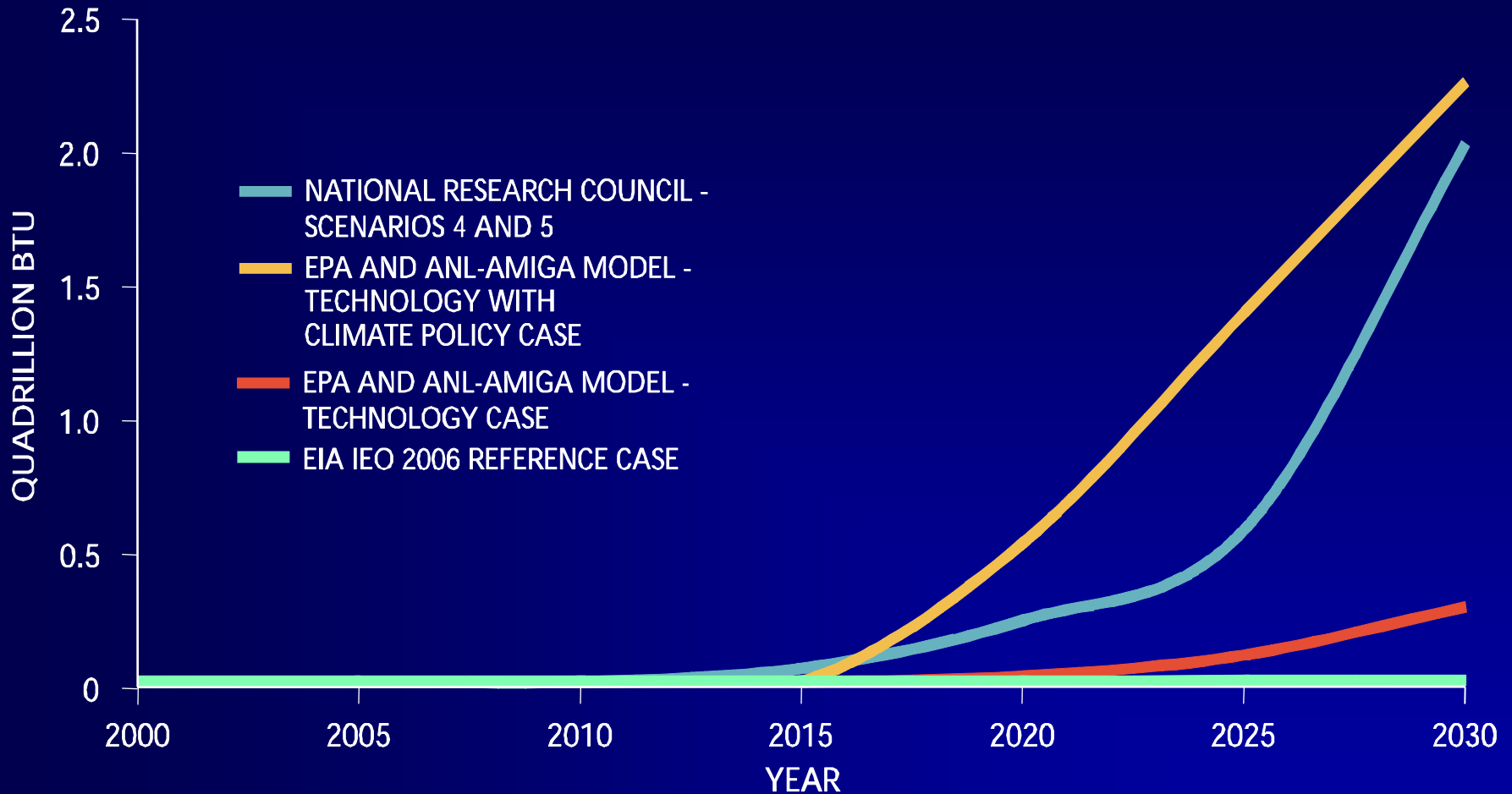


# Nuclear Power Outlook



Source: NPC Survey of Outlooks.

# Hydrogen Fuel Outlook



Sources: National Research Council, *Implications of a Transition to Hydrogen in Vehicles for the U.S. Energy System Scenarios*, 2004; Argonne National Laboratory, *AMIGA U.S. Technology Case Projections*, 2005; and Energy Information Administration, *International Energy Outlook 2006*.

# *Five Core U.S. Strategies*

# *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***

# *Expand and Diversify Supply*

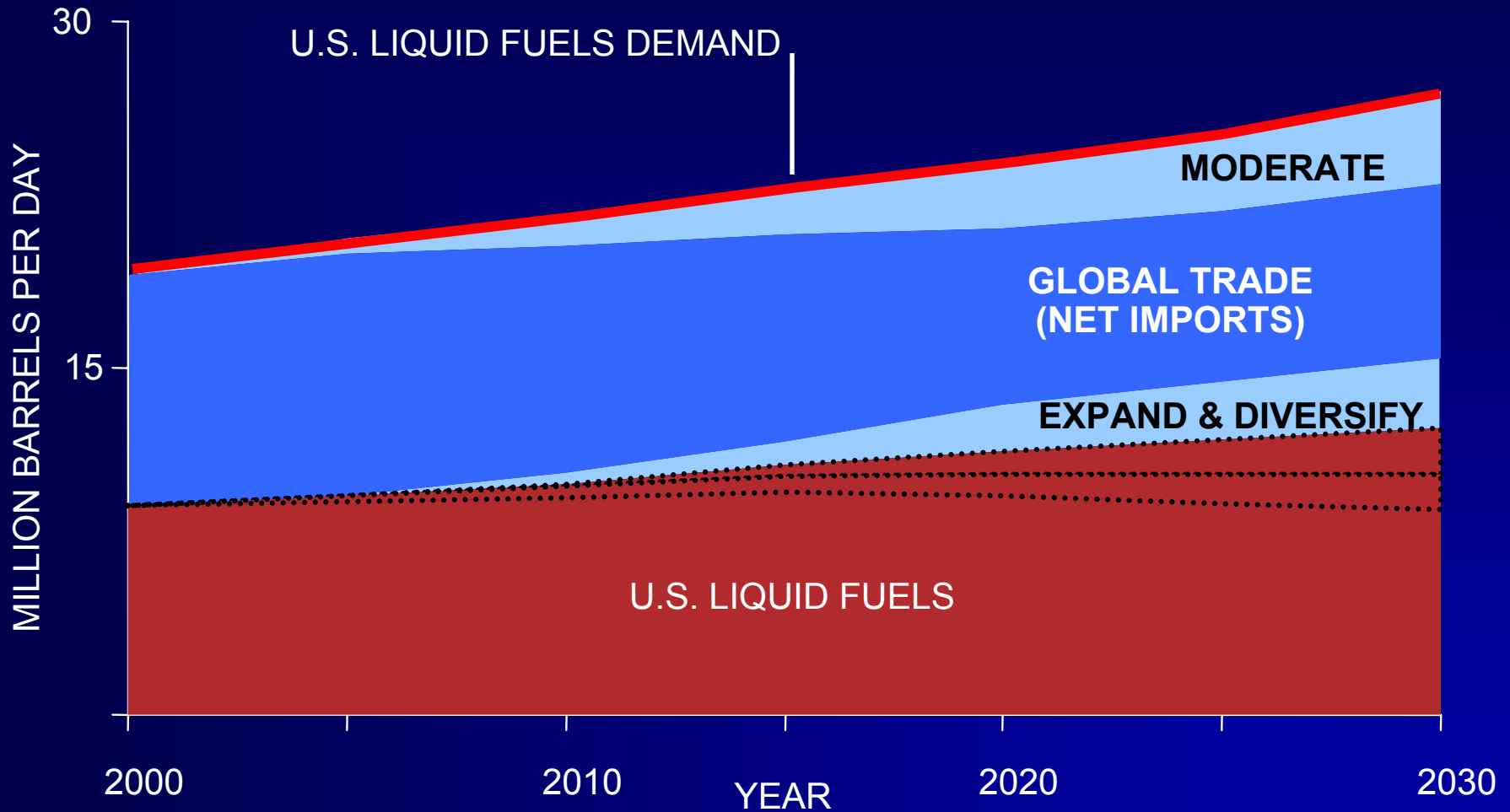
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*For each strategy, the Council provides in-depth recommendations, such as:*

## **Diversify long-term energy production**

- **Accelerate development of energy from biomass**
- **Enable the long-term environmental viability of coal for power, fuel, and feedstock**
- **Expand domestic nuclear capability**

# All Strategies Are Essential



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

Illustrative View

# *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

# *Additional Information and Comments*

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*“Facing the Hard Truths About Energy”*

*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)*