National Petroleum Council

Global Oil and Gas Study

Status Update

October 26, 2006

Study Origins

2005

- June Secretary Bodman speech to NPC members
- October Secretary Bodman study request to NPC
- November Agenda Committee recommends acceptance
- December Membership concurrence via ballot
  Executive Committee established

2006

- April Coordinating Subcommittee established
- May Global Committee established
- June NPC approval of Study Work Plan

Study Request – Suggested Questions

1. What does the future hold for global oil and natural gas supply?
2. 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?
3. What oil and gas supply strategies and / or demand-side strategies does the Council recommend the United States pursue to ensure greater economic stability and prosperity?

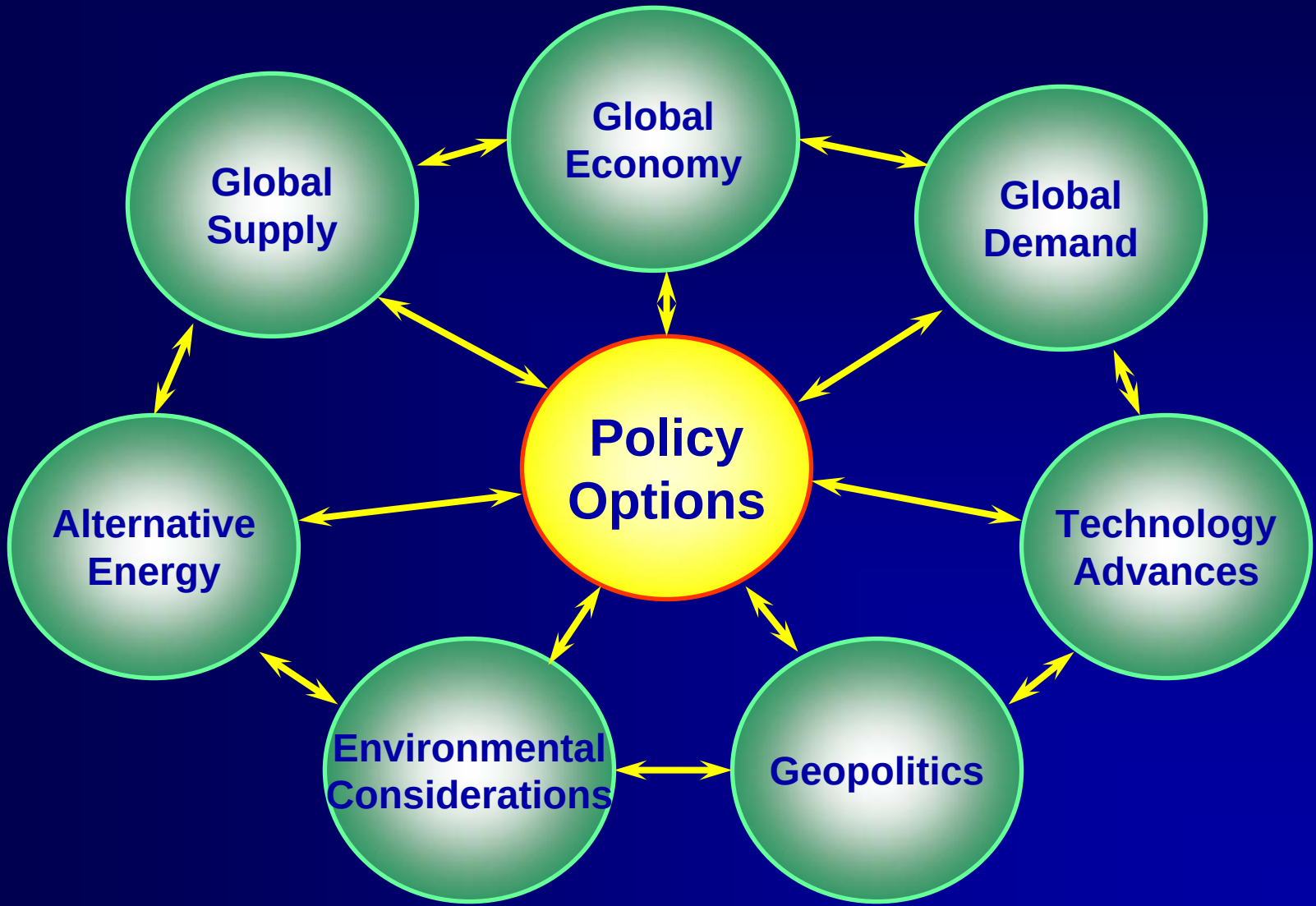
Study Principles

- Gather and analyze public and aggregated proprietary data.
- Not another “grassroots” energy forecast.
- Input solicited from a broad range of interested parties.
- Emphasize long-term conditions, not near-term volatility.
- Recommendations supported by sound data and science.
- All study teams work within scope and on time.
- Full compliance with antitrust laws and regulations.

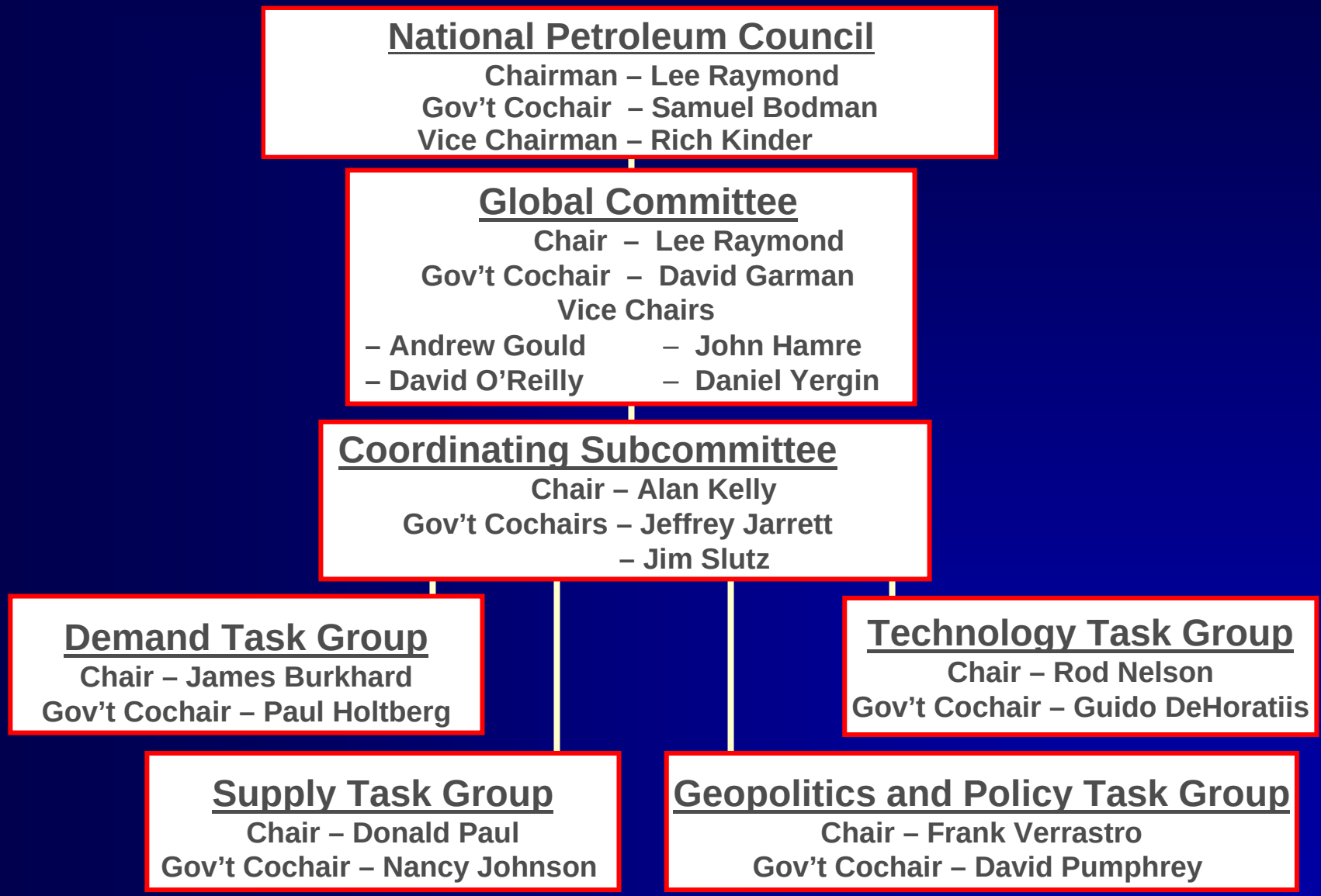
Study Approach

- Engage and include broad cross section of resources
  - ✓ NPC Membership and Global Committee
  - ✓ Coordinating Subcommittee and Task Group members
  - ✓ Subgroup participants
  - ✓ Expert panels
  - ✓ Workshops Briefings / Outreach
  - ✓ One-to-One dialogue
- Advise the Secretary of Energy
  - ✓ Policy recommendations will be developed by all study groups for review and approval by the NPC after completion of data analysis, interpretation, and findings.

Study Scope


Global Economy
Global Supply
Global Demand
Policy Options
Alternative Energy
Technology Advances
Environmental Considerations
Geopolitics

Study Organization



Study Coordinating Subcommittee

DOE

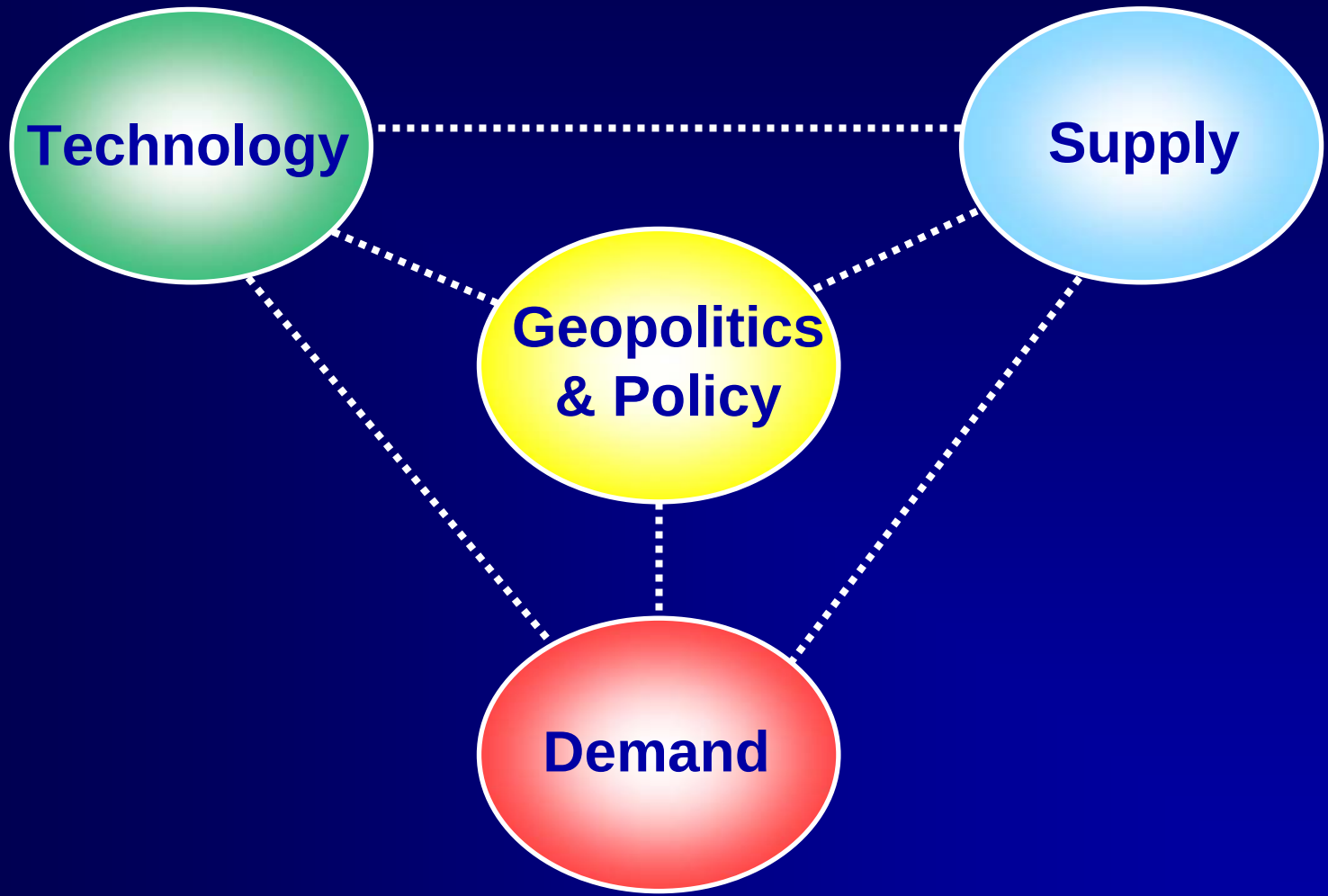
Deutsche Bank

ASE

CERA

RFF

Study Task Groups



Study Cross-Cutting Subgroups

- Carbon Management
- Macroeconomics
- Efficiency
- Parallel Studies

Coordinating Subcommittee

- Refining & Manufacturing
- Resource Endowment
- LNG & GTL
- Non-Proprietary Data
- Biomass
- Infrastructure
- Hydrogen
- Data Evaluation

Supply

- Cultural, Social, & Economic
- Stationary Efficiency
- Data Evaluation
- Coal Impact

Demand

- Conventional Recovery
- Unconventional Hydrocarbons
- Transportation Efficiency
- Coal Technology
- Carbon Management
- Technology Development &Deployment
- Exploration
- Deepwater
- Human Resources
- Nuclear Power
- Government Role

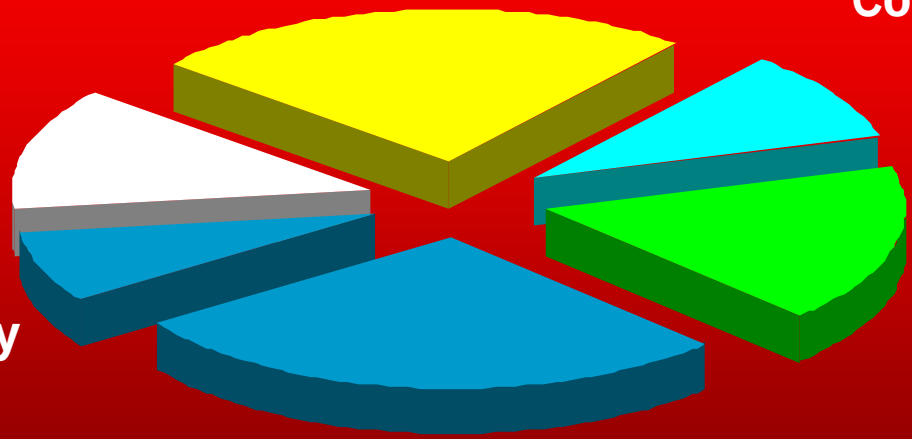
Technology

- Issues
- Regional Scholars

Geopolitics & Policy

Study Representation

(Coordinating Subcommittee, Task Groups & Subgroups)

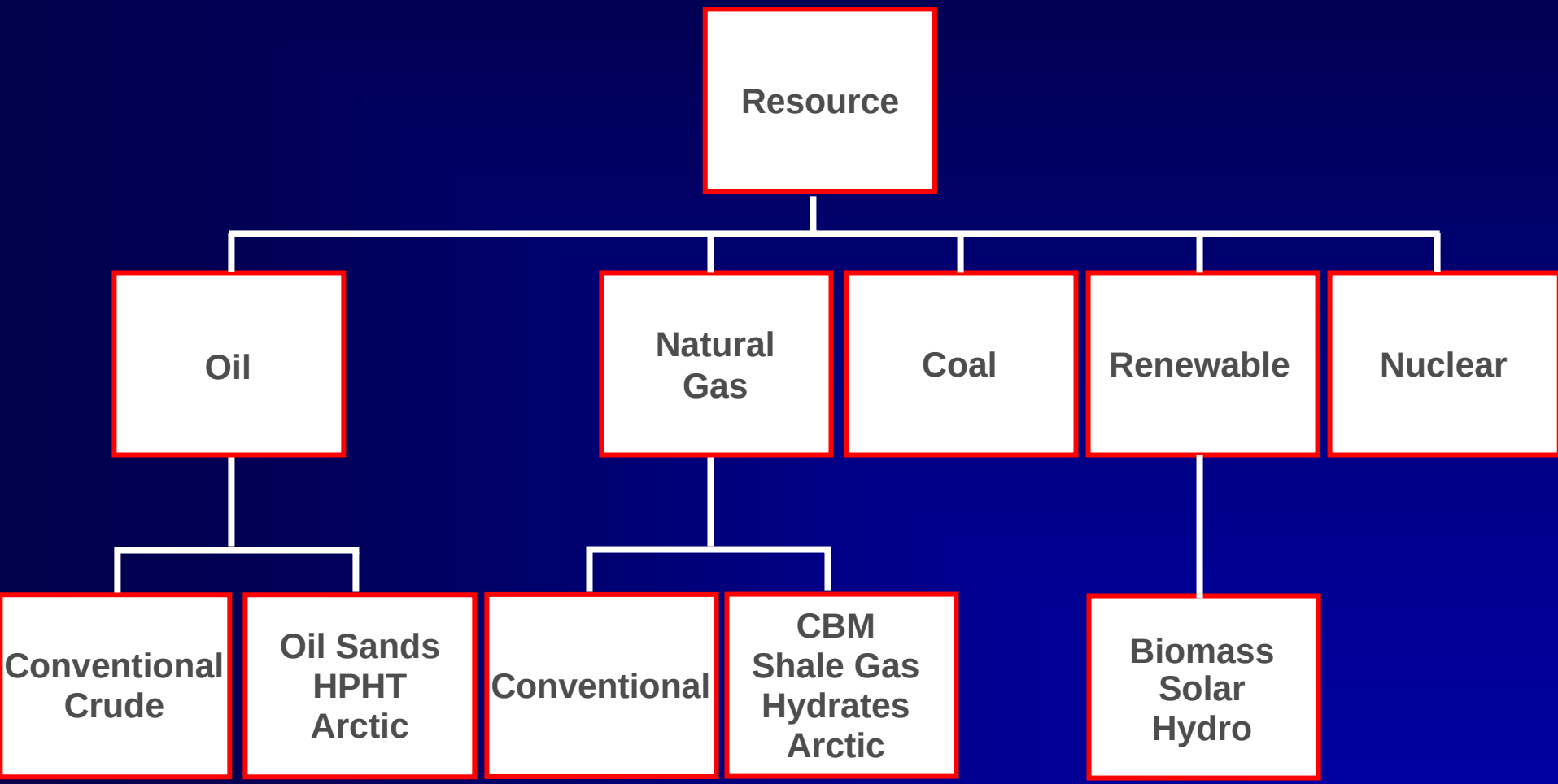


Supply

Supply Task Group – Approach

- Evaluate a broad range of public and aggregated proprietary oil and gas supply outlooks, including fuel and power dimensions.
  - ✓ Define key rates and factors of the conversion system from geologic resources to reserves, production, and manufacturing.
  - ✓ Summarize assumptions and findings for the range of supply projections and assess outcomes for probability, shape, and timing of supply curves.
  - ✓ Assess supply variables to economic, technology, geopolitical, and environmental factors.
- Develop policy recommendations with Geopolitics & Policy Task Group.

Resource Types



Supply

Framing Questions

- What is the range of projections for world energy supply over the next 25 years?
  - ✓ What are the key drivers underlying the supply projections?
- What is the range of projections for oil and gas production over the next 25 years?
  - ✓ What are the key drivers?
    - ✦ Resource endowment
    - ✦ Recovery/conversion rates
    - ✦ Technology
    - ✦ Geopolitical
    - ✦ Environment
    - ✦ Infrastructure
    - ✦ Economics and expectations of future returns
- Are there projections of infrastructure limitations for any energy resource?
  - ✓ How might such projections be alleviated – detailed discussion for oil and gas, high level for all other?
- How have historical projections compared to actual?

Supply

Framing Questions (cont'd)

- What do other independent studies/forecasts project for coal contribution to energy supply over the next 25 years? (by the Coal Subgroup of the Technology Task Group)
- What do independent studies/forecasts project for non-hydrocarbon energy supplies over the next 25 years?
  - ✓ Biomass (by the Biomass Subgroup of the Supply Task Group)
  - ✓ Nuclear (by the Nuclear Power Subgroup of the Technology Task Group)
  - ✓ Solar, wind, hydro, geothermal (by the Stationary Efficiency Subgroup of the Demand Task Group)
- How quickly might industry bring on new discoveries and discovered but undeveloped fields considering regulatory, investment capacity, technology and other factors?
- What additional data and/or future work could help reduce the uncertainty associated with global energy endowment and timing to convert the endowment into production capacity?
- What are the costs and externalities of future energy supply options?
  - ✓ Unconventional oil and gas resources
  - ✓ Renewables
  - ✓ Advanced coal technologies

Demand Task Group – Approach

- Collect historic world primary energy demand data by region.
- Analyze historic data back to 1970.
- Gather public and aggregated proprietary demand outlook data to 2030.
- Evaluate EIA data as pilot prior to expanding full data analysis.
- Revise data collection and evaluation methods as necessary.
- Evaluate demand data from data aggregation effort.
- Develop policy options related to demand.
- Integrate demand policy options into Study policy effort.

Demand Task Group Framing Questions

- What is the range of projections for world energy demand to 2030?
- What are the key drivers underlying the demand projections?
  - ✓ Economic activity
  - ✓ Demographics
  - ✓ Use patterns
  - ✓ Efficiency
  - ✓ Environmental
  - ✓ Politics and Policy
- How have historical projections compared to actual?
  - ✓ What have been the significant drivers of differences?
- What is the potential for efficiency measures to affect demand?
- What is the potential for environmental concerns to affect demand?
- What are possible changes in fuel use patterns?
  - ✓ What would be the demand/environmental effects?
  - ✓ What would be the infrastructure implications?

Technology Task Group – Approach

- Identify and organize Subgroups around technical themes.
- Ensure broad participation in theme work sessions.
- Cooperate closely with other Task Groups.
- Engage NPC and non-NPC expertise on nuclear, coal, and renewables.
- Engage consumer groups and autos on efficiency issues.
- Cooperate with DOE to utilize past work on select topics.

Technology Task Group – Approach (cont'd)

- Develop views of :
  - ✓Time horizons
  - ✓Research budgets
  - ✓Human resources
  - ✓Technology penetration
- Develop policy recommendations with Geopolitics & Policy Task Group.

Technology

Framing Questions

Framing questions will be applied to the following impact areas:

- Technology Impact On Conventional Oil And Gas Recovery And Production
- Deepwater
- Exploration Technology
- Unconventional Hydrocarbons
- Coal Technology
- Nuclear Power
- CO_2 Sequestration And Environmental Mitigation Technology
- Transportation Efficiency, Including Technology Impact On Fuel Efficiency
- Oil And Gas Technology Development And Deployment
- Technology Impact On Human Resource Requirements And Impact Of "Big Crew Change" On Talent Pool
- Role Of U.S. Government In Technology Development And Deployment
- Enhanced Oil Recovery

Technology

Framing Questions

- What is the range of technology assumptions in the projections surveyed?
- What have been the key historical impacts of this technology in the past 25 years?
- How might these technologies affect world energy supply/demand over the next 25 years?
  - ✓ What significant advances in this technology are currently being pursued?
  - ✓ What significant advances might occur by 2030? For each of these potential advances:
    - ✦ What would be the impact?
    - ✦ How might the potential advance be accelerated?
    - ✦ What would be the cost and value delivered?
    - ✦ How much could the advance be accelerated?
    - ✦ What are the risks and roadblocks?
    - ✦ How might environmental impacts and constraints enhance or threaten this advance?
    - ✦ How might this advance specifically impact the USA?

Geopolitics & Policy

Geopolitics & Policy Task Group - Approach

- Conduct literature review of geopolitical analyses.
- Establish and populate “core” geopolitics team as well as regional working groups.
- Expand outreach to include NGOs, environmental, diplomatic, and academic communities.
- Develop framework for identifying and analyzing key geopolitical trends and issues (globalism, security, environment, governance, etc.) across national, regional and global lines.
- Review design and outcomes of selected past policies.
- Establish and populate “core” policy team, including representatives from other Task Groups and expanded policy advisors group to:
  - ✓ Integrate Supply, Demand and Technology findings into policy discussions
  - ✓ Identify and analyze policy options
  - ✓ Develop range of policy recommendations

Framing Questions

- What is the range of geopolitical assumptions in the projections surveyed?
- How might sovereign national, regional and global policy decisions affect global supply and demand outlooks?
  - ✓Globalism, environment, security, governance?
  - ✓How might policy decisions affect energy investment?
  - ✓Can resource nationalism succeed and deliver adequate energy supplies?
- What have been the key attributes of the energy markets over the past 25 years?

Geopolitics & Policy

Framing Questions (cont'd)

- How might the energy markets change significantly over the next 25 years?
- How might environmental/sustainability issues affect the pace and timing of new energy supply development and fuel choices?
- How could U.S. policy be modified to avoid, mitigate, manage, or exploit market or political changes affecting energy supply and demand?
  - ✓What mechanisms might the U.S. use to affect global energy supply/demand and fuel choice?

Study Outreach

- Study principle is to inform and solicit input from a broad range of interested parties
  - ✓ U.S. Executive Branch agencies
  - ✓ U.S. Congressional committees
  - ✓ State and local governments
  - ✓ Foreign energy ministries, ambassadors, and national oil companies
  - ✓ NGOs including consumer and environmental groups
  - ✓ Academia and professional societies
  - ✓ Energy and other industries
- Outreach process developed and being conducted through:
  - ✓ Briefing sessions by study participants
  - ✓ One-to-one dialogues
  - ✓ Public website information
  - ✓ Views and information solicited and provided to NPC study groups
  - ✓ Follow-up conducted with engaged parties
  - ✓ Letters from DOE officials informing and requesting involvement from U.S. agencies and foreign governments
  - ✓ Follow-up with foreign governments and companies conducted by study participants to solicit input.

Study Activity to Date

- Resourced and launched Task Groups.
- Resourced and launched Cross-Cutting Subgroups.
- Developed communications plan and process.
- Domestic and International outreach underway.
- Developed process to collect, aggregate, and protect proprietary data.
- Public and proprietary data gathering underway.
- Conducted frequent reviews:
  - ✓Weekly CSC leader conference calls
  - ✓Monthly CSC and Task Group meetings

Study Forward Plan

- Complete communication and outreach activity.
- Complete collection and analysis of public and aggregated proprietary data.
- Commence development of supply/demand-side strategies.
- Begin policy development through collection of policy issues and ideas
- Continue to conduct periodic reviews:
  - ✓Weekly CSC leader conference calls
  - ✓Monthly CSC and Task Group meetings
  - ✓Milestone reviews with Global Committee
- Develop draft report 1Q07.
- Committee and NPC final report approval 2Q07.
- Presentation and explanation of study findings/recommendations

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