
National Petroleum Council

North American Natural Gas and Oil Resources Study

Integrated Study Plan

September 14, 2010

Secretary Chu's Request Letter – September 19, 2009



The Secretary of Energy
Washington, D.C. 20585

September 16, 2009

Mr. Claiborne P. Deming
Chair, National Petroleum Council
1625 K Street, NW
Washington, DC 20006

Dear Mr. Deming:

It is the policy objective of the United States to protect our Nation from the serious economic and strategic risks associated with our excessive reliance on foreign oil and the destabilizing effects of a changing climate. All energy uses and supply sources must be reexamined in order to enable the transition towards a lower carbon, more sustainable energy mix. Transitions in the energy sector will require the replacement of vehicles, more efficient buildings and industrial facilities, and large scale deployment of new forms of energy. The Council is uniquely positioned to provide advice to the Department on Energy on two important topics: *Future Transportation Fuels* and *Prudent Development of North American Natural Gas and Oil Resources*.

The U.S. transportation system must evolve substantially over the next twenty years in ways that advance our national interests. Next generation vehicles, fuels, and infrastructure will be introduced to diversify fuel choice, increase fuel economy and lower greenhouse gas and other emissions. Conventional and advanced biofuels will make an important contribution, with liquefied natural gas and non-liquid fuels such as electricity and compressed natural gas also helping the transition to a clean, low carbon energy future. Each fuel has technical, economic, infrastructure and social attributes that must be considered in evaluating its role in a modern, prosperous U.S. economy.

Policies to address the transition to an expanded suite of reliable, secure and clean, low-carbon transportation fuels require a comprehensive understanding of options, risks, and consequences. Accordingly, I request the National Petroleum Council to conduct a study on future transportation fuels which would analyze U.S. fuels prospects through 2030 for auto, truck, air, rail, and waterborne transport. The study should address fuel demand, sources, manufacturing, distribution, and infrastructure. Of particular interest is the Council's advice on policy options and pathways for integrating new fuels and vehicles into the marketplace, including infrastructure development. Factors to consider include technological advances, market dynamics, environmental mandates, cost/benefit tradeoffs, and impacts on land and water use.

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Even as we transition to a lower carbon energy future, fossil fuels will continue to play a major role in the Nation's energy mix for many decades. An important part of this transition will be to recognize and responsibly develop the natural gas resources supply chain and infrastructure in North America. In recent years, there have been significant new developments in the North American natural gas and oil resource base. In particular, large new unconventional sources of natural gas and oil have been identified.

In order to consider energy policy measures that enhance U.S. energy security and economic competitiveness, it is important that Congress, the Administration, and relevant agencies have the best and most up-to-date understanding of conventional and unconventional resources supply chain and infrastructure potential. Accordingly, I request the National Petroleum Council to reassess the North American resources production supply chain and infrastructure potential, and the contribution that natural gas can make in a transition to a lower carbon fuel mix. Your study should describe the operating practices and technologies that will be used to minimize environmental impacts, and also describe the role of technology in expanding accessible resources. Of particular interest is the Council's advice on policy options that would allow prudent development of North American natural gas and oil resources consistent with government objectives of environmental protection, economic growth, and national security.

For the purposes of the Council's study of *Future Transportation Fuels* and the *Prudent Development of North American Natural Gas and Oil Resources*, I am designating Deputy Secretary Dan Poneman to represent me and to provide the necessary coordination between the Department of Energy and the National Petroleum Council. He will also provide coordination with the Department of the Interior, Department of Transportation, Environmental Protection Agency, and other Federal agencies as required.

Sincerely,

Steven Chu

Secretary Chu's Supplemental Letter – April 30, 2010



The Secretary of Energy
Washington, D.C. 20585

April 30, 2010

Mr. Claiborne P. Deming
Chair, National Petroleum Council
1625 K Street, NW
Washington, DC 20006

Dear Mr. Deming:

Other Department of Energy leaders and I greatly appreciated the dialogue you arranged on the National Petroleum Council's prior report, *Facing the Hard Truths About Energy: A Comprehensive View to 2030 of Global Oil and Natural Gas*, and preliminary plans for the upcoming studies on *Future Transportation Fuels* and *Prudent Development of North American Natural Gas and Oil Resources*. The discussions provided valuable insights for the path forward.

The projected decline in U.S. gasoline demand through 2030 envisioned in the *Hard Truths* report clearly illustrated the potential energy, economic and environmental benefits made possible by implementing motor vehicle technology advances matched with aggressive yet achievable fuel efficiency standards. I salute the prior study leaders for their forward thinking recommendations.

President Barack Obama has called upon other countries to join the United States in reducing greenhouse gas emissions by 17 percent by 2020 and more than 80 percent by 2050 relative to 2005 levels across all energy sectors. The Council's new studies provide an opportunity to demonstrate U.S. leadership on transformational concepts in transportation and resource development.

The reduction of the carbon intensity of the U.S. transportation fleet will play an important role in meeting these goals. In addition to the objectives stated in my initial request, I would like the *Future Transportation Fuels* study to address the following question:

What actions could industry and government take to stimulate the technological advances and market conditions needed to reduce life-cycle greenhouse gas emissions in the U. S. transportation sector by 50 percent by 2050 relative to 2005 levels while enhancing the Nation's energy security and economic prosperity?

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With regard to energy supply, the United States sees a future in which valuable domestic energy resources are responsibly produced to meet the needs of American energy consumers consistent with national, environmental, economic, and energy security goals. The United States, the world's second largest producer of natural gas and the third largest producer of oil, has the opportunity to demonstrate global leadership in technological and environmental innovation. Accordingly, I request the Council's advice on potential technology and policy actions capable of achieving this vision as part of the *Prudent Development of North American Natural Gas and Oil Resources* study.

Our intent is to stimulate dynamic study processes that venture beyond business-as-usual industry and government assessments. I am pleased that the Council shares a mutual interest with the Department of Energy in seeking diverse participation in the study efforts including participation by industry, academia, environmental, and other public interest groups, and government leaders.

We look forward to reviewing the Council's detailed study plans.

Sincerely,

Steven Chu

PS: We would love to brief the members of the NPC and the task forces, where relevant, on the R&D the DOE is investing in that may dramatically improve the technology choices we could have in 5-15 years. These programs are in ARPA-E, FE and the office of Science.

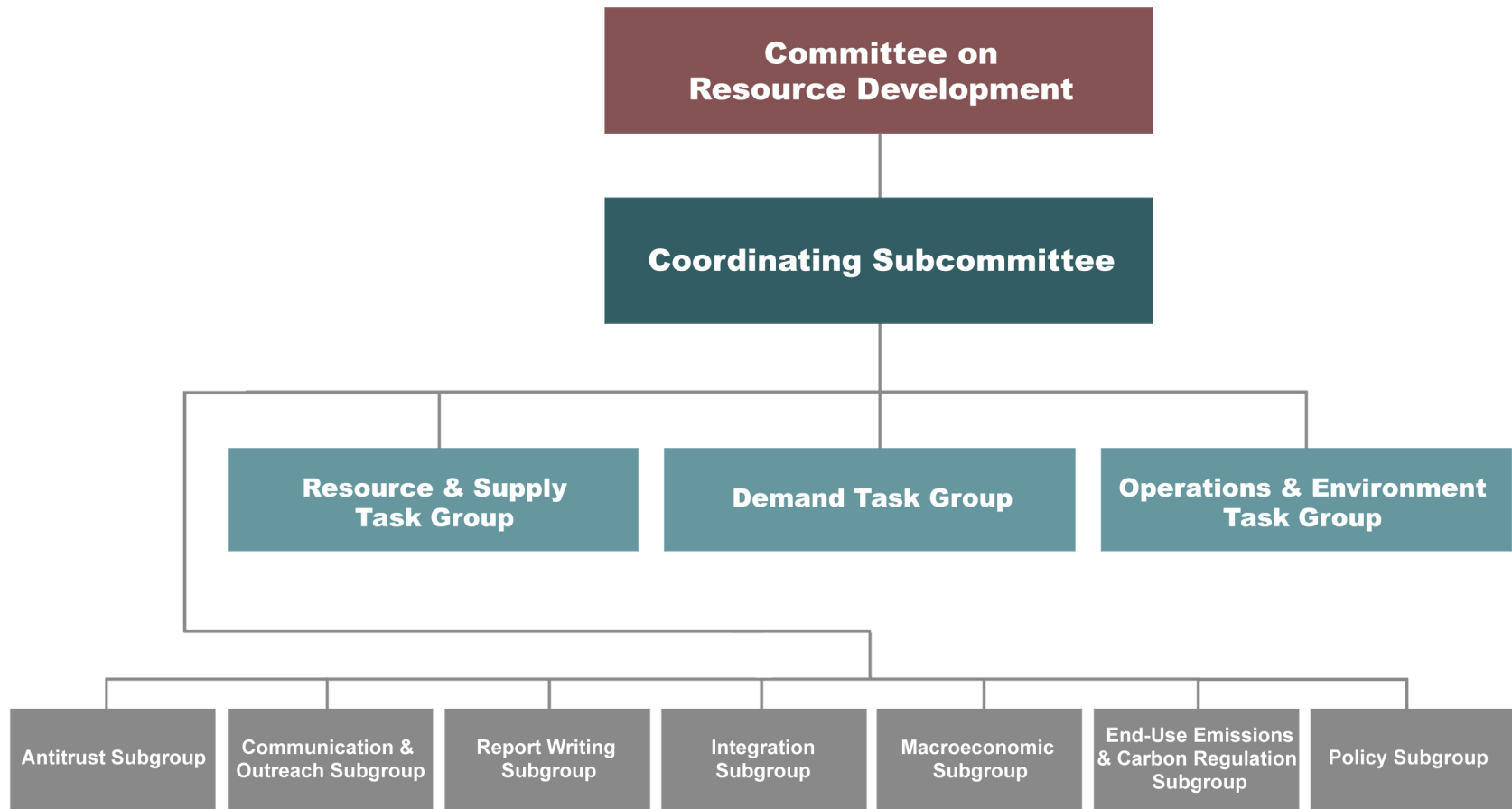
Proposed Resource Study Objectives

- Assess the North American natural gas and oil conventional and unconventional resource base.
- Assess the productive capacity of the resource base through 2035; and provide views to 2050.
- Explain the role of technology in making this resource producible.
- Describe demand for natural gas in the U.S. through 2035; and provide views to 2050.
- Identify how increased use of natural gas could result in lower GHG emissions in all sectors of the economy, including power generation and transportation.
- Describe the operating practices of the industry and the technology used to minimize impacts on the environment.
- Develop policy options that will allow for the prudent development of these resources with the objectives of:
 - Protecting the environment
 - Sustaining economic growth and competitiveness
 - Promoting energy security.

Resource Study Deliverables

- Provide the Secretary of Energy with recommendations for the prudent development of North America's oil & gas resources that reflect the government's objectives to:
 - Reduce greenhouse gas emissions
 - Protect the environment
 - Sustain economic growth and competitiveness
 - Promote energy security
- Full report on the methodology of the study, sources used, participants involved, and findings & conclusions.
- Report will contain detailed assessments to 2035 and a discussion of implications to 2050.

Resource Study Structure



Resource Study Leadership

Study Committee Leadership

| | |
|-------------------------------------|-------------------------------|
| Chair | Jim Hackett (Anadarko) |
| Government Cochair | Dan Poneman (DOE) |
| Alternate Gov Cochair | Kristina Johnson (DOE) |
| Resource & Supply Vice Chair | Marvin Odum (Shell) |
| Demand Vice Chair | Dan Yergin (IHS CERA) |
| Operations & Environment Vice Chair | Aubrey McClendon (Chesapeake) |
| Policy Vice Chair | Phil Sharp (RFF) |
| Secretary | Marshall Nichols (NPC) |

Coordinating Subcommittee

| | |
|------------------------------|--------------------------|
| Chair | Clay Bretches (Anadarko) |
| Government Cochair | Jim Markowsky (DOE) |
| Alternate Government Cochair | Chris Smith (DOE) |
| Assistant Chair | Scott Moore (Anadarko) |
| Secretary | John Guy (NPC) |

Members

| | |
|------------------------------|------------------------------|
| Bob Anthony (NARUC) | Matt Letourneau (US Chamber) |
| Porter Bennett (Bentek) | Steve London (Halliburton) |
| Randy Broiles (ExxonMobil) | Jan Mares (RFF) |
| Mark Brownstein (EDF) | Doug May (Dow) |
| Chris Conoscenti (JP Morgan) | Phil Moeller (FERC) |
| Scott Davis (Chevron) | Frank Prager (Xcel Energy) |
| Jonathan Elkind (DOE) | Kyle Sawyer (El Paso) |
| Ned Farquhar (DOI) | Andrew Slaughter (Shell) |
| Fiji George (El Paso) | Sue Tierney (Analysis Group) |
| Paul Hagemeyer (Chesapeake) | Frank Verrastro (CSIS) |
| Steve Layton (E&B Resources) | Ken Yeasting (IHS CERA) |

Resource Study Leadership (Continued)

Task Groups

Resources & Supply Task Group

Chair Slaughter (Shell)
 Govt. Cochair Freitas (DOE)
 Alt. Govt. Cochair Duda (DOE)
 Asst. Chair O'Donovan (Shell)
 Secretary Guy (NPC)

Ops & Environment Task Group

Chair Hagemeyer (CHK)
 Govt. Cochair Harvey (DOE)
 Govt. Cochair Hummel (DOE)
 Asst. Chair Fowler (CHK)
 Secretary Slaughter (NPC)

Demand Task Group

Chair Yeasting (CERA)
 Govt. Cochair Kendell (DOE)
 Alt. Govt. Cochair Braitsch (DOE)
 Asst. Chair Osten (CERA)
 Asst. Chair Curry (Chevron)
 Secretary Guy (NPC)

Coordinating Subcommittee Subgroups

End-Use Emission & Carbon Regulation Subgroup

Chair George (El Paso)

Macroeconomic Subgroup

Chair Conoscenti (JP Morgan)

Policy Subgroup

Chair Tierney (Analysis Group)

Integration Subgroup

Chair Bennett (Bentek)

Report Writing Subgroup

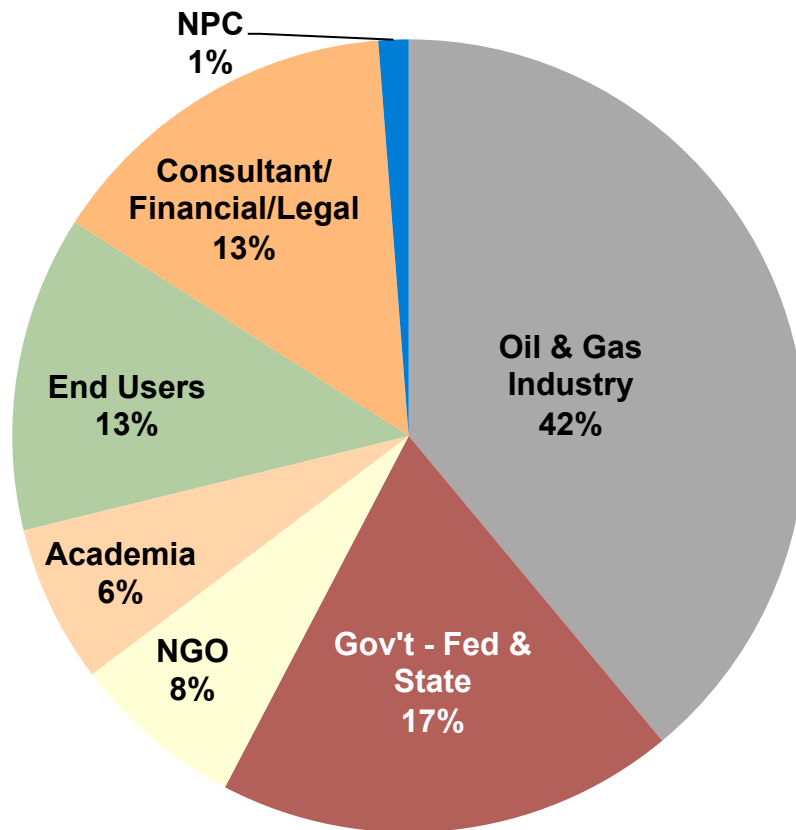
Chair Sawyer (El Paso)

Communications & Outreach Subgroup

Chair Letourneau (US Chamber)

Resource Study Demographics

Total Study Participation
(Committee, CSC, Task Groups, Subgroups)



391 Participants

As of September 2010

Study Diversity

| Oil & Gas Industry | Government | Non Governmental Organization | Academia | End Users | Consultants/ Financial/ Legal |
|--------------------|----------------|-------------------------------|------------------|-----------------|-------------------------------|
| Integrated (8) | DOE | EDF | Colorado – Mines | Industrial (7) | Consultants (16) |
| Independent (13) | DOI | NRDC | Harvard | Power (11) | Financial (2) |
| Service Cos (4) | EPA | Nature Conservancy | MIT | LDC (7) | Legal (5) |
| Pipelines (5) | FERC | Pew Center | Penn State | Trade Assoc (3) | |
| Trade Assoc (2) | EIA | RFF | Rice | | |
| | MMS/BOEMRE/BLM | Sierra Club | U. Texas | | |
| | State (6) | Other (3) | Other (7) | | |

() represents number of companies, agencies & institutions

... over 100 Companies, Agencies & Institutions participating in the study

NARD Process Flow and Status Report as of 8/30/10

| Project Flow | Phase I - Study Origination | | | | ◆ | Phase II - Study Evaluation | | | | | | ◆ | Phase III - Study Recommendation | | | | ◆ |
|---------------------------------------|-----------------------------|--|--------------------------------|--------------------------|----------------------------------|-------------------------------|--------|----------------------------------|---|---------------------------------|-----------------|--|------------------------------------|-----------------------------------|--------------------------------------|--------|---|
| | Define | | Refine | | | Analyze | | | Conclude | | | | Summarize | | Recommend | | |
| | Feb-10 | Mar-10 | Apr-10 | May-10 | | Jun-10 | Jul-10 | Aug-10 | Sep-10 | Oct-10 | Nov-10 | | Dec-10 | Jan-11 | Feb-11 | Mar-11 | |
| Key Milestones | Study Kick-off meeting | | Study Review Exec Cmte | Study Approval Full Cmte | | | | Initial work scope findings | | Report Findings Exec Cmte | | | 1st Report Draft Exec Cmte | 2nd Report Draft Exec Cmte | Final Report Full Study Cmte | | |
| | | | | | Phase I Status | | | | | | Phase II Status | | | | Phase III Status | | |
| Coordinating Subcommittee | | | | | | | | | | | | | | | | | |
| CSC Leadership | [Blue bar] | | | ✓ | [Blue bar] | | | | | | ● | [Blue bar] | | | | | |
| Task Groups | | | | | | | | | | | | | | | | | |
| Resource & Supply | Scope Item A | | [Hatched bar] | ✓ | [Blue bar] | | | | | | ● | [Blue bar] | | | | | |
| | Scope Item B | | [Hatched bar] | ✓ | [Blue bar] | | | | | | ● | [Blue bar] | | | | | |
| Demand | Scope Item C | | [Hatched bar] | ✓ | [Blue bar] | | | | | | ● | [Blue bar] | | | | | |
| Ops & Environment | Scope Item D | | [Hatched bar] | ✓ | [Blue bar] | | | | | | ● | [Blue bar] | | | | | |
| Subgroups | | | | | | | | | | | | | | | | | |
| End-use Emissions | Scope Item E | | [Hatched bar] | ✓ | [Blue bar] | | | | | | ● | [Blue bar] | | | | | |
| Policy | Scope Item F | | [Hatched bar] | ✓ | [Hatched bar] | | | [Blue bar] | | | ● | [Blue bar] | | | | | |
| Communication & Outreach | | | [Hatched bar] | ✓ | [Hatched bar] | | | [Blue bar] | | | ● | [Blue bar] | | | | | |
| Report Writing | | | [Hatched bar] | ✓ | [Hatched bar] | | | [Blue bar] | | | ● | [Blue bar] | | | | | |
| Integration | | | [Hatched bar] | ✓ | [Hatched bar] | [Blue bar] | | | | | ● | [Blue bar] | | | | | |
| Macroeconomic | | | [Hatched bar] | ✓ | [Hatched bar] | [Blue bar] | | | | | ● | [Blue bar] | | | | | |
| Meeting Dates & Milestones | | | | | | | | | | | | | | | | | |
| Coordinating Subcommittee | 2/5/10 Kick-off Meeting | 3/31/10 Finalize Scope and Framing Questions | | | 6/2/10 Review TG & SG Work Plans | 7/15/10 Review TG & SG Status | | 9/14-15/10 Review TG & SG Status | 10/27-28/10 Review TG & SG Initial Findings | | | 12/8-9/10 Review TG & SG Full Findings | 1/12-13/10 Review 1st Draft Report | 2/9-10/10 Review 2nd Draft Report | 3/9-10/10 Review Final Report | | |
| Executive Committee | | | 4/22/10 Review Scope & Members | | | | | | | 11/11/10 Status Update from CSC | | | | 2/16/10 2nd Draft Report from CSC | 3/31/10 Submit Final Report from CSC | | |
| Full Study Committee | | | | | | | | Approve Study Plan | | | | | | | 3/31/10 Approve Final Report | | |

Meeting dates highlighted in red are indicative placeholders

Work Timelines:

[Hatched bar] staffing & study orientation

[Blue bar] group at work

Work Status:

● on schedule

● minor delays

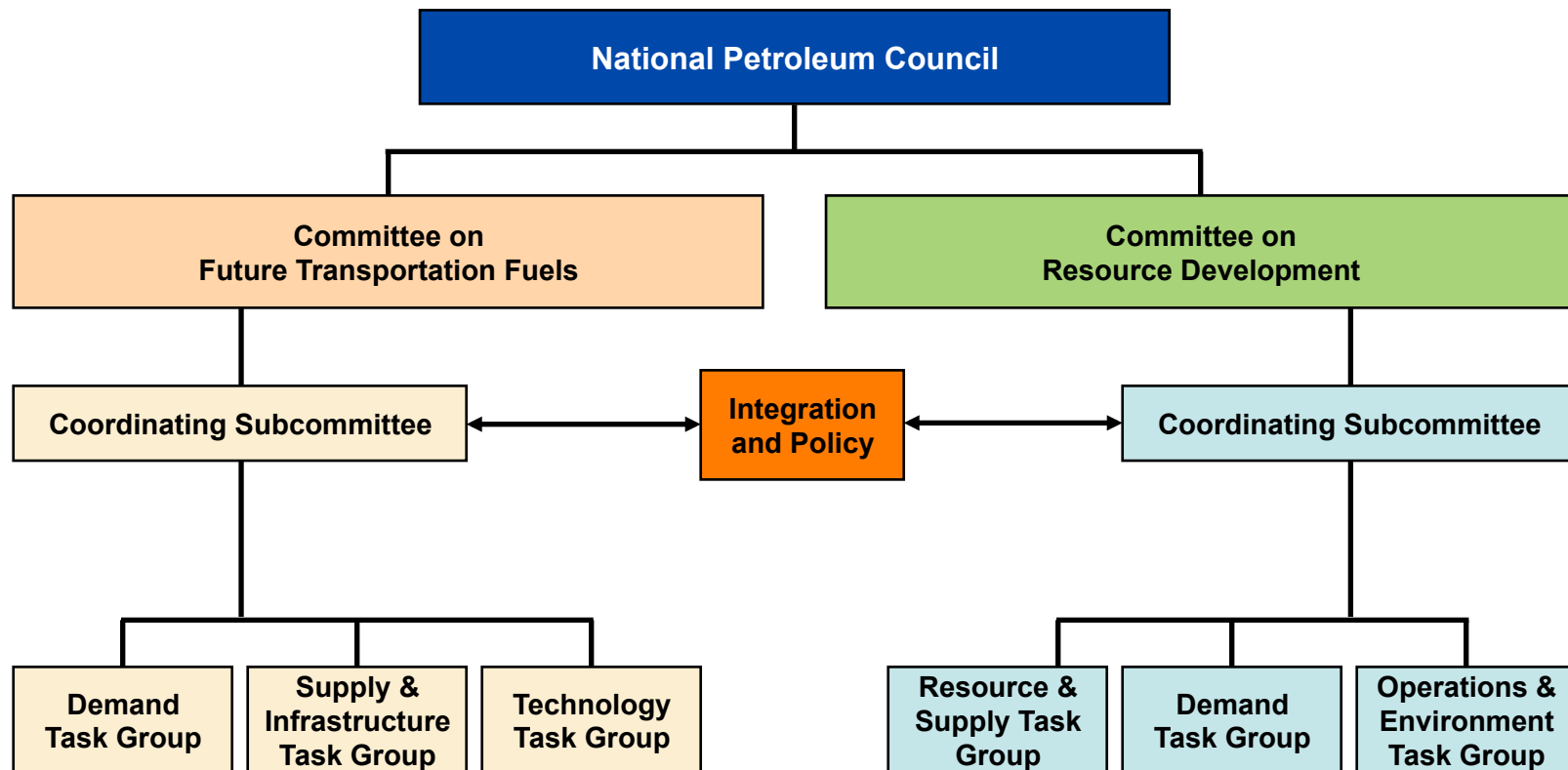
● major delays

✓ phase completed

Coordination with Transportation Fuels Study

- Natural gas use as a transportation fuel will be examined in the transportation study. Natural gas transportation demand (direct & indirect use) will be incorporated into the resource study.
- Oil demand for the U.S. economy is predominantly for transportation, which will be covered in the transportation fuels study. The resource study will provide a high-level overview of oil demand for completeness.
- All conventional and unconventional North American natural gas and oil resources and production, including infrastructure needed to bring supply to the refinery or city-gate, will be addressed in the resource study. Upgrading, refining and downstream infrastructure will be handled in fuel study. Gas to liquids will be addressed in the fuel study.
- Targeted completion date for the resource study is the end of Q1 11 and for the transport study is the end of Q3 11. The transport study will need to provide the resource study with its ranges of power demand for electric vehicles and natural gas demand for NGV's in time for inclusion in the resource study findings.

Structure and Integration of Two New Studies



Communications and Outreach

- Purpose: broadly communicate (1) the purpose and process of the study upon approval of the study plan and (2) the findings and recommendations of the completed and approved study.
- Target Organization Types
 - Government – federal executive, federal legislative, federal and state regulatory
 - Associations – petroleum, electric utility, industrial, consumer, professional, regulatory
 - Public policy – think tanks, academia, conferences
 - Environmental NGO's – national and regional
 - Media – general, industry, public policy
- Time Frame
 - Initial outreach – primarily fall 2010
 - Findings and recommendations – spring/summer 2011
- Coordination with Fuels Study
 - Initial study outreach will be conducted jointly with the fuels study.
 - Resource study findings and conclusions will be completed prior to the Fuels study and thus will be presented independently.

National Petroleum Council

North American Natural Gas and Oil Resources Study

Integrated Study Plan

September 14, 2010