National Petroleum Council

Future Transportation Fuels Study

Integrated Study Plan

September 14, 2010

NPC Request from Energy Secretary Chu

- **Study Future Transportation Fuels prospects through 2035/2050 for auto, truck, air, rail, and waterborne transport**
- **Address fuel demand, supply, infrastructure, and technology**
- **Advise on policy options and pathways for integrating new fuels and vehicles into the marketplace, including infrastructure development**
  - **Address the transition to an expanded suite of reliable, secure, and clean, low-carbon transportation fuels**
  - **Evaluate options, risks, and consequences**

(continued)

NPC Request from Energy Secretary Chu (continued)

- **Factors to consider include:**
  - **Technological advances**
  - **Energy efficiency**
  - **Environmental, e.g., impact on carbon, land, and water**
  - **Economic competitiveness and market dynamics**
  - **Cost/benefit tradeoffs**
  - **Manufacturing, distribution, and infrastructure**
  - **Customer expectations and acceptance**
- **Additional question:** **(Supplemental Letter April 30, 2010)**
  - **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?**

Guiding Principles

- **Scope, then execute**
  - **Develop a detailed scope of work for each task group before commencing work**
- **Diversity of thought**
  - **Involve a diverse set of participants to maximize input and acceptance**
- **Promote consensus-based leadership**
- **Maximize the use of prior studies**
  - **Provide a broad review of current research**
  - **Conduct new studies only as needed**
- **Clarity of assumptions**

(continued)

Guiding Principles (continued)

- **Examine the facts then address policy**
  - **Advance basic analytical work to reach consensus on the facts**
  - **Assess policy through three lenses**
    - Environmental
    - Economic
    - Security
- **Communications and outreach throughout the study**
- **Coordinate with NPC Resource Development study**

Deliverables

- **Deliver a report to the Secretary of Energy on Future Transportation Fuels prospects through 2035/2050 for auto, truck, air, rail, and waterborne transport which**
  - **Addresses fuel demand, supply, infrastructure, and technology in the context of U.S. objectives to:**
    - Protect the environment
    - Promote economic growth & competitiveness
    - Support energy security
- **Describe accelerated technology pathways to: improved fuel efficiency, reduced environmental impact, and deployment of alternative fuels at scale**

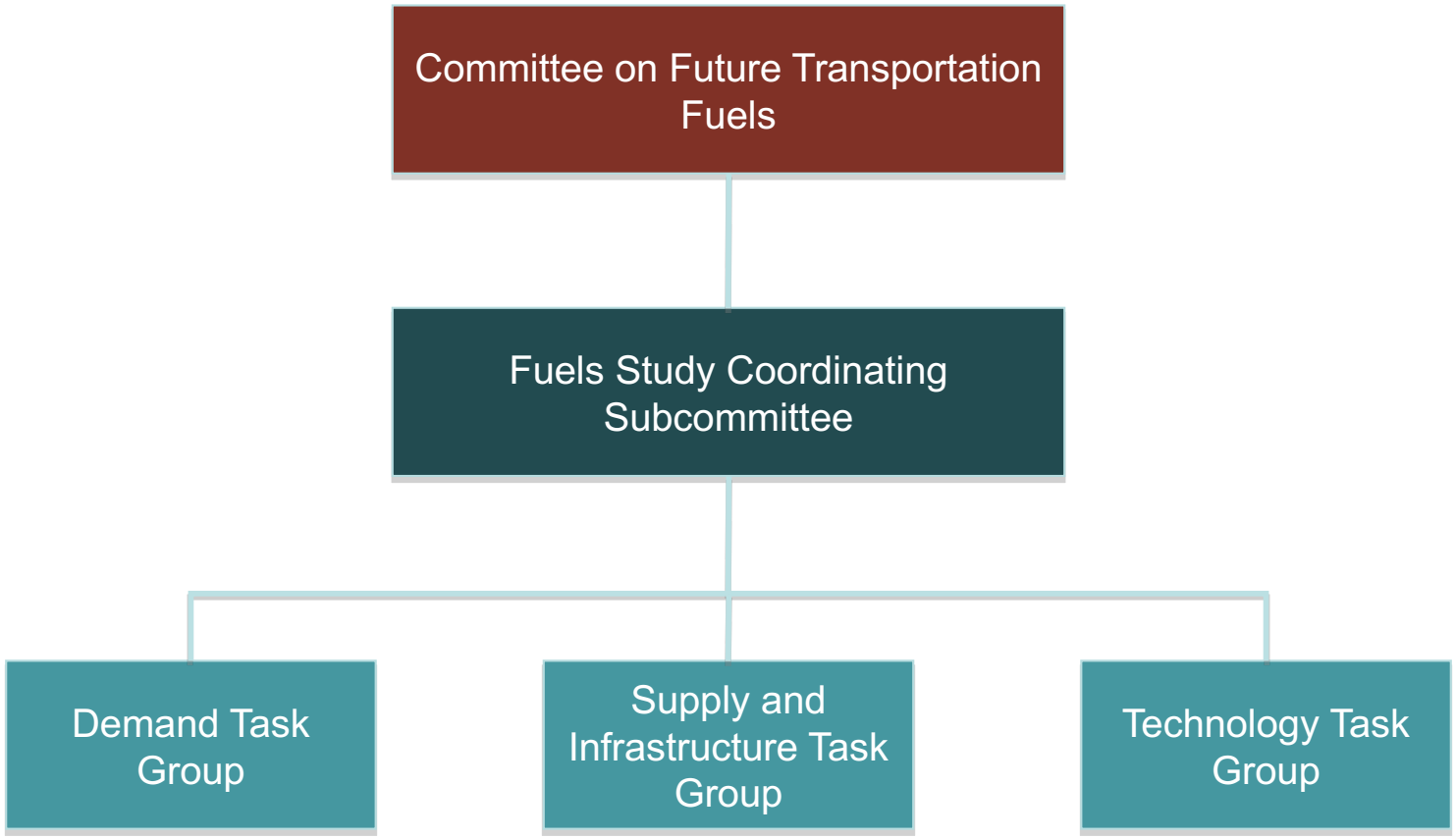
(continued)

Deliverables (continued)

- **Deliver insights into potential policy options and investments which industry and government can take to accelerate the acceptance of alternative fuels, engines, and vehicles**

- **Describe actions industry and government can take to stimulate the technological advances and market conditions needed to reduce life-cycle GHG emissions in the U.S. transportation sector by 50% by 2050 relative to 2005 levels, while enhancing the nation's energy security and economic prosperity.**

Fuels Study Structure



Fuels Study Leadership

Study Committee Leadership

Chair	Clarence Cazalot (Marathon)
Government Cochair	Dan Poneman (DOE)
Alternate Government Cochair	Kristina Johnson (DOE)
Demand Vice Chair	Jim Owens (Caterpillar)
Supply & Infrastructure Vice Chair	John Watson (Chevron)
Technology Vice Chair	John Deutch (MIT)
Secretary	Marshall Nichols (NPC)

Coordinating Subcommittee

Chair	Linda Capuano (Marathon)
Government Cochair	Steve Koonin (DOE)
Alternate Government Cochair	David Sandalow (DOE)
Assistant Chair	Mike Leister (Marathon)
Supply & Infrastructure Task Group Chair	Shariq Yosufzai (Chevron)
Demand Task Group Chair	Deanne Short (Caterpillar)
Technology Task Group Chair	Stephen Brand (ConocoPhillips)
Secretary	Andy Oliver (NPC)

Members

Chris W. Erickson (ExxonMobil)	William Reinert (Toyota)
J. Michael Gallagher (Westport)	Matthew C. Rogers (DOE)
Mitch Jackson (FedEx)	Arthur Rypinski (DOT)
Henry C. Kelly (DOE)	Paul Sankey (Deutsche Bank)
Deron W. Lovaas (NRDC)	Chris Sultemeier (Walmart)
Jan W. Mares (Resources For the Future)	Alan I. Taub (General Motors)
Margaret C. Montana (Shell)	Todd A. Werpy (Archer Daniels Midland)
Richard G. Newell (DOE)	

Demand Task Group

Leadership	
Chair	D. Short (Caterpillar)
Govt. Cochair	J. Conti (DOE)
Alt. Govt. Cochair	P. Holtberg (DOE)
Asst. Chair	C. Sultemeier (Wal-Mart)
Secretary	A. Oliver (NPC)

- **Evaluate demand forecasts** and assumptions of passenger and freight mobility demand through 2035/2050.
- **Estimate travel activity** and transportation operations efficiency under various conditions to derive fuel demand.
- **Estimate fuel and vehicle mix.**
- **Provide insight on policy options** that can influence travel activity and fuel consumption.
- **Provide mix of fuel/vehicle systems** given performance and cost characteristics.

Supply & Infrastructure Task Group

Leadership	
Chair	S. Yosufzai (Chevron)
Govt. Cochair	C. Difiglio (DOE)
Alt. Govt. Cochair	T. White (DOE)
Asst. Chair	J. Caggiano (Chevron)
Secretary	A. Oliver (NPC)

- **Evaluate supply forecasts** and assumptions for passenger and freight mobility through 2035/2050.
- **Assess technology** and technology investments to accelerate delivery and adoption of new fuel/vehicle systems.
- **Analyze infrastructure requirements** for fuel types and volumes under various conditions.
- **Describe technology pathways** and timelines for introducing various fuel options into the supply chain.
- **Assess environmental impact, energy security and economic competitiveness** implications of fuel/vehicle technology options.
- **Analyze various supply situations** and provide a framework for developing policy options.

Technology Task Group

Leadership	
Chair	S. Brand (ConocoPhillips)
Govt. Cochair	P. Davis (DOE)
Govt. Cochair	E. Owens (DOE)
Asst. Chair	M. Stark (Accenture)
Secretary	A. Oliver (NPC)

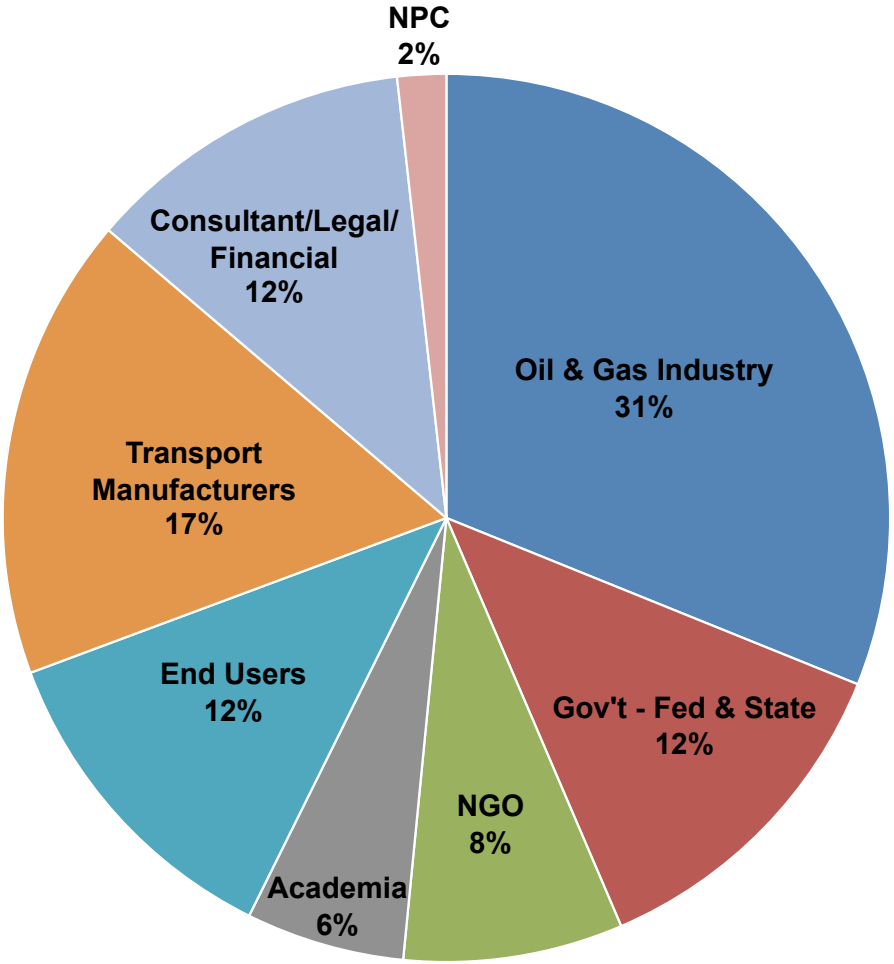
- **Standardize analysis** of innovation assumptions across study.
- **Conduct peer review** of technical premises, findings and readiness.
- **Provide subject matter expertise** that complements Supply and Infrastructure Task Group composition.
- **Analyze and evaluate key premises** of innovation development with respect to technical performance, cost, schedule and emissions.
- **Identify and evaluate disruptive technology** opportunities that accelerate deployment and commercialization which includes government sponsored research such as ARPA-E.

Subgroups Supporting CSC and Task Groups

Subgroup	Leader	Scope
Biofuel	T. Werpy ADM	Supply, processing, distribution infrastructure, and technology requirements and pathways
Hydrocarbon Liquids	C. Erickson ExxonMobil	
Natural Gas	M. Gallagher Cummins Westport	Supply, processing, distribution infrastructure, and technology requirements and pathways, and vehicle technology options
Hydrogen	P. Verma Chevron (Acting)	
Electric	B. Reinert Toyota	
Engines/Vehicles	A. Taub GM	Fuel requirements, performance, engine and vehicle technologies for non-electric automobiles & trucks in the prospective U.S. vehicle fleet
Fuels/Vehicles Characteristics	M. Leister Marathon	Specifications and performance characteristics for comparative assessment of hydrocarbon and non-hydrocarbon fuels
Carbon & GHG Emissions	D. Rogers Chevron	Standardized base case emissions, projections, and accounting methodology for CO2 and GHG emissions in the transportation sector

Fuels Study Demographics

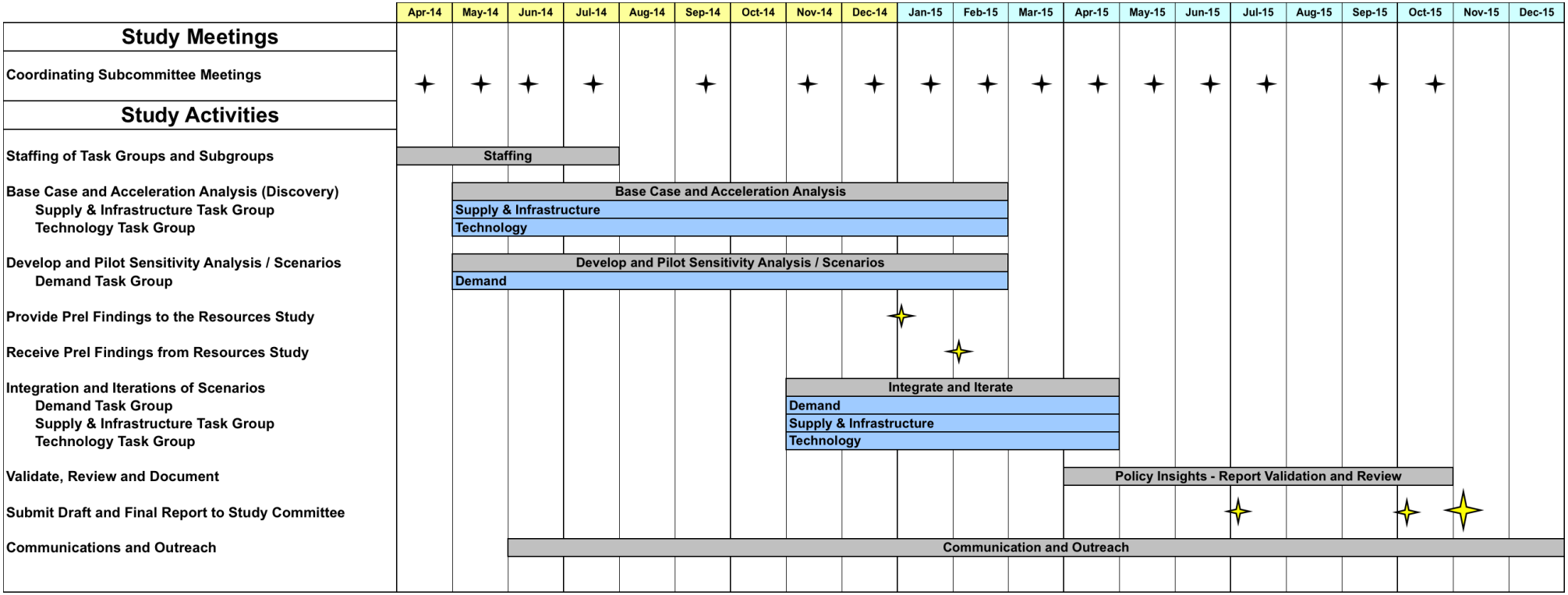
Total Study Participation
(Committee, CSC, Task Groups, Subgroups)



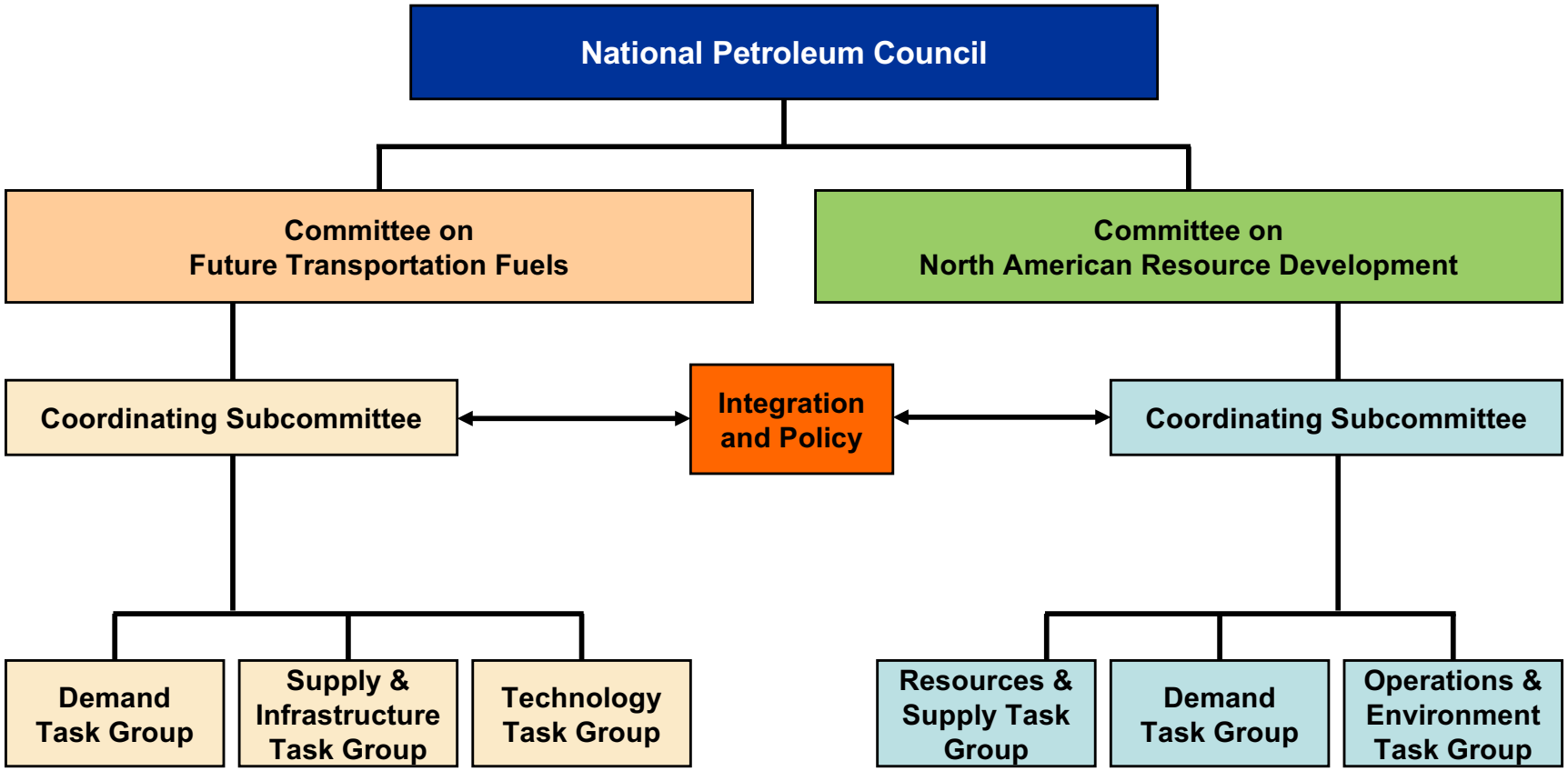
224 Participants

As of September 2010

Coordinating Subcommittee and Task Group Timeline



Proposed Organizational Structure for Two New Studies



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