NATIONAL COMMISSION ON ENERGY POLICY
Design Issues in Market-based Greenhouse Gas Reduction Strategies

Mandarin Oriental Hotel
1330 Maryland Avenue, SW
Washington, DC 20024

Workshop 2: September 16, 2005
Point of Regulation

Attendees: See attached attendee list

FINAL AGENDA

Welcome—Jason Grumet, National Commission on Energy Policy (NCEP)

Introductions—Robert LaCount, Cambridge Energy Research Associates, Inc. (CERA)

Overview of Energy Point of Regulation—Joseph Aldy, Resources for the Future

Upstream Design Issues—Joel Bluestein, Energy and Environmental Analysis, Inc.

Downstream Design Issues—Robert Nordhaus, Partner, Van Ness Feldman and Adjunct Faculty, George Washington University Law School

Moderated discussion, led by CERA

ADMINISTRATIVE ITEMS

All workshop presentations are posted on the NCEP Web site (http://www.energycommission.org). Participants are invited to send comments and additional materials for posting on the Web site to Info1@energycommission.org.

The third workshop, **Allocating Greenhouse Gas Allowances,** is scheduled for

September 30, 2005
L'Enfant Plaza Hotel
480 L'Enfant Plaza, SW
Washington, DC 20024
Phone: +1 202 484 1000

A fourth workshop to address technology development and implementation is scheduled for October 18 in Washington, DC.

MODERATED DISCUSSION

Robert LaCount, CERA, facilitated the open discussion. The following points summarize the main comments made during the session. Comments are categorized into several major areas of conversation that emerged during the discussion.

Overarching Issues

- For an upstream system, the government could use a minimum production requirement whereby the smallest entities would be excluded from the program. This could help to limit the administrative burden for the regulators.
- There are many more wells for natural gas and oil than companies that operate them. Is there a risk that under an upstream system, companies will disaggregate to avoid being regulated under the system?
  - The options and incentives for companies to avoid regulation under any system will depend on the specific design of the program. A program could be crafted to limit this possibility by reducing the administrative burden associated with participation and by defining program applicability, such that a producer's options and incentives are reduced for withdrawing from the program.
  - Why would one consider any size exemption in an upstream system? Producers already need to report their sales, so there would be no new administrative burdens for the regulated companies under an upstream system. This is very different from a program that would require new requirements for using continuous emissions monitoring.
- Is there a difference between upstream and downstream regulation for dealing with non–carbon dioxide (CO_2) greenhouse gas (GHG) emissions?

  The issue of non-CO_2 gases is important but has not received the same level of attention as CO_2. Most of the options for non-CO_2 gases have focused on downstream regulation.
- We need to better understand the economic efficiency of different policy models—including upstream and downstream cap-and-trade programs and tax systems.
- One important question is whether the requirements for a CO_2 program should be applied at the facility or company level. This is important for ensuring good monitoring and compliance. Regulating specific facilities, as the Acid Rain Program currently does, may be advantageous because it would create a more transparent regulatory program.
- Choosing which entities to regulate will depend on whether the program is applied upstream or downstream. However, all levels of regulation could be applied to facilities. A downstream program could include a facility compliance scheme whereby emissions or fuel use are monitored at each facility. A program that regulates in the midstream by applying to the throughput of refineries and pipelines could also be done on a facility basis. In fact, any midstream approach that does not apply to facilities would likely cause problems for measuring compliance. Compliance under an upstream program

would likely be based on production reports that producers file with the regulatory agencies. There may be some challenges in adjusting the current system of production reports so that the information is appropriate for measuring compliance under a regulatory program.

- There are challenges in placing the obligation of compliance at the company level. Facilities and companies may be bought and sold, and this can be difficult for the regulator to track. Ultimately, the data used for compliance will be based on processes occurring at specific facilities, and this is the most appropriate point for regulation.
- Legislative proposals offered by Senators Joe Lieberman, John McCain, and Jeff Bingaman include numerical limits on the amount of offsets that could be used for compliance. Any limitations placed on the amount or types of offsets that may be used for compliance will increase the overall costs of the program. For this reason, no limitations should be included in a future program.

Natural Gas

- Supply of natural gas is very constrained in the United States. With limited capacity for increased consumption, policymakers must address supply issues if we expect natural gas to serve as the bridge fuel.
- Prices for natural gas are very high today, creating significant challenges for large industrial facilities that consume natural gas and compete internationally. Any additional price increases caused by a CO_2 program would only add to the economic burdens that these companies are experiencing.
- The chemical industry uses natural gas as a feedstock and cannot afford to incur additional fuel costs resulting from a GHG trading program.
- The point of regulation should be attached to the physical commodity. Interstate pipelines don't own the natural gas. The roles of shippers and marketers are separate from the role of the pipeline operators. Regulating the pipeline operators is overly complicated because these entities do not own the natural gas.
- One must consider the regulatory structures that are in place to consider how various carbon programs could be implemented and how the costs of the programs could be passed on to customers. Pipeline operators cannot easily include the cost of carbon allowances in the transportation costs of natural gas. Pipelines are regulated through cost-of-service requirements through the Federal Energy Regulatory Commission (FERC) or through state bodies.
- Pipelines operate in a very competitive environment. Even if the FERC were to allow pipelines to recover the costs associated with a CO_2 program, pipelines would still be under pressure from the customers to discount costs in other areas. This has happened in the past with other costs incurred by the pipelines, such as costs associated with funding the Gas Research Institute.
- Should one consider regulating shippers of natural gas under a midstream program?

  - The role of shippers and marketers is separate from the role of the pipeline operators. The point of regulation should be attached to the physical commodity and the entity that owns the commodity. Pipeline operators generally do not own the natural gas that is transported.
  - Regulating at the producer level introduces several challenges and complications because of the large number of entities involved with production. Regulating at the pipeline is challenging because the pipelines don't own the commodity. Regulating the shippers would implement the requirements at the point where the natural gas is introduced into the pipelines; this would not capture all of the gas, but it would put the burden on the owner. One could also regulate further downstream by regulating the local distribution company (LDC) as it sells the natural gas to the end user. This would include many more entities than by regulating the pipelines, but it could be workable. All the options have their strengths and weaknesses.

- One study that analyzed the point of regulation for the natural gas industry concluded that regulating LDCs would be the most appropriate point to regulate the industry. The number of entities defined as LDCs was estimated to be 1,400. This option avoids some of the problems with monitoring natural gas flow because these entities must track exactly what they sell to their customers.
- Every challenge associated with regulating pipelines is also present when regulating LDCs. These companies often only offer transportation services and do not actually own the product. Regulating LDCs is further complicated because they work with 50 different state public utility commissions (PUCs). The PUCs are likely to take very different approaches to how the costs associated with a CO_2 program may be recovered.

Petroleum

- Personal transportation accounts for more than 40 percent of US petroleum consumption. There is a great deal of evidence to suggest that consumers don't pay a lot of attention to fuel economy when buying personal vehicles. Most consumers can't make an accurate economic analysis of the benefits and costs of fuel economy options for different vehicles. An upstream or midstream approach would simply apply a price signal to the consumer. There is little evidence to suggest that this price signal will affect consumer purchase decisions. This calls into question how well an upstream or midstream cap-and-trade program would affect emissions resulting from personal transport.
- If a CO_2 cap without a safety valve were to be implemented, the program would ultimately affect emissions. It would result in a reduction of emissions from the transportation sector to the desired level, or alternatively, the reductions would occur in other, more cost-effective sectors, included in the trading program. With a safety valve, there is no assurance that a specific amount of reductions will be achieved in any sector. Efficiency standards also provide an option for assuring that some reductions would be achieved in the transportation sector.

- As economists think about economic efficiency, they look for the lowest-cost way to achieve emissions reductions. If a price signal is not sufficient to motivate changes in the energy efficiency of equipment, then by definition, changes in energy efficiency are not economically efficient. The reason that energy efficiency standards may appear to be cost effective is that they hide costs. They force consumers to buy equipment that they would otherwise not choose on an economic basis.
- Economists must also consider that there may be market barriers for the use of energy-efficient products. Consumers may not recognize the long-term cost savings associated with the purchase of a more energy-efficient product.
- We must be careful not to force the emissions reductions too soon, before they are economically efficient. A CO_2 program must allow the most economically efficient reductions to be achieved first. Otherwise, the cost of any program would be driven up unnecessarily and would imperil the program's political viability.
- Gasoline demand is very inelastic, but it is not zero. A higher gas price creates more incentive to reduce gasoline consumption in the near term. It takes a long time to implement new fuel economy standards and to turn over the existing capital stock.

Coal

- In addition to regulating natural gas upstream at the wellhead, it could be regulated midstream at the pipelines. Is there a midstream option for coal?
  - Although this has not been evaluated in great detail, the theoretical midstream point of regulation for coal would be different forms of coal transportation, which include railroads, barges, and trucking.
  - There are a number of small coal producers that may be resistant to regulation. Coal processors also represent a midstream point of regulation option.
- Many in the industry are uncomfortable with an upstream system because they are familiar with the Acid Rain Program, which is a downstream program. In addition to this challenge, many downstream companies, such as power companies, are very comfortable with managing risk associated with commodity markets, which would extend to a GHG market. Many entities that operate upstream, such as coal companies, may be more familiar with bilateral and long-term contracts, and they may not be set up to manage another commodity.

Geographic Scope of Program

- One must consider the boundaries of any GHG market. Depending on how an upstream system is designed, there may be opportunities for gaming the system. For example, a program may provide an incentive to ship liquefied natural gas to Mexico, where it would be burned to generate electricity to be transmitted to the United States. In this example, the upstream system may not assign any carbon costs to that electricity consumed in the Unites States.

- The issue of program boundaries is very important to program design. It is relatively easy to track the flow of hydrocarbons in and out of the United States. The question is how to track the emissions that are used to generate products, including electricity, that are imported into the United States. Would a CO_2 program create incentives to generate emissions outside of the United States and increase the import of finished products?

- The topic of emissions resulting from electricity that is generated and transmitted long distances is important to consider when defining the boundaries of a CO_2 program. This issue, also termed leakage, received a lot of attention during the development of the Regional Greenhouse Gas Initiative (RGGI) proposal. A number of stakeholders in the RGGI process are concerned that the future program could result in increased electricity generation in Canada and Pennsylvania. We could see this as a problem if we have a US program that is divorced from international programs. There are no simple answers to this question, but it should be addressed.

- In the near term, Canada will have a more stringent cap than anything being contemplated in the United States. For this reason, leakage is likely to go in the reverse direction between the United States and Canada—i.e., increased emissions in the United States and greater imports of finished products into Canada. To address these issues, a carbon policy could require the importer of electricity to pay a carbon tax if the electricity was generated in a country that does not have a cap on CO_2 emissions. However, this type of policy could raise other legal questions associated with international law.

- The issue of leakage applies to both upstream and downstream programs.

- When considering the issue of leakage, it is important to think not only about international trade issues but also about potential leakage issues within the US economy. The program should ensure that there are no opportunities for companies to avoid the program requirements by gaming the applicability provisions. For example, if there is a cutoff size for regulating a specific facility, will companies develop smaller facilities to avoid regulation?

- Some policy proposals would apply a fee or tax on imported petroleum products, but these policies would not address the emissions from refineries. Refineries consume a significant amount of energy to produce end products. Domestic refineries are in competition with foreign refineries, and the domestic refineries could be disadvantaged compared to their foreign competition. This creates a leakage problem with refineries located overseas.

- This issue applies to the import and export of all energy-intensive products, including chemicals and metals. The cost of CO_2 allowances should not affect the international competitiveness of most industries. However, a strong case can be made for a border adjustment for energy-intensive products that are imported from foreign sources not subject to a CO_2 cap. This would also apply to energy-intensive products that are exported from the United States. In this case, the exports could be eligible for a rebate to back out the CO_2 costs embedded in the product's overall costs.

- In the United States we associate the issue of leakage with industry located in China. In the European Union they currently associate the issue of leakage with industry located in the United States. This issue must be addressed under any national program and there are manageable ways to do this.

CO_2 Price Signal

- Although the recent significant price increase in natural gas has caused some demand destruction, natural gas is still in strong demand. What price signal is necessary to affect consumer decisions and eventually reduce emissions resulting from natural gas consumption?

- The goal of a program is not only to add the incentive of a carbon price signal in the near term, but also to use this as a consistent long-term signal. People will not make long-term capital investment decisions, such as updating the furnace, based on high prices that are only expected to last for a short period. Climate change is a century scale problem. A $7 per ton, CO_2 cost added to the cost of natural gas would have only limited effects in the near term, and this is the expectation of a program that gradually implemented limits on GHGs. Most stakeholders would not support a program that causes an abrupt shock to the current economics of fossil fuel consumption.

- An upstream program would impose CO_2 costs on all fossil fuels, and especially coal. The CO_2 cost will be reflected at different levels in the costs of the fossil fuels based on the carbon content of each fuel. Some analyses show that natural gas consumption would increase as some demand from the power sector could move away from coal. Natural gas is often described as a "bridge fuel" that can be used until lower-carbon alternatives are commercialized.

- The discussion of fuel switching mostly addresses fuel choice issues for new investments in power generation facilities. One question that should be addressed is whether the addition of a moderate cost for CO_2 to fossil fuels would affect fuel choice decisions for the developers of new generating facilities. Coal enjoys a significant cost advantage compared with natural gas. Would a moderate carbon cost significantly alter the economics of new generation in either competitive or regulated electricity markets? And even if a CO_2 price signal were to alter the economics, won't developers, specifically in regulated electricity markets, build the type of power plant that think is appropriate based on a variety of considerations and just pass the costs through to the consumers?

- For a regulated electric utility, there is pressure to keep total costs, including fuel costs, as low as possible. High energy prices create political pressure, and it is in the utility's interest to lower costs for its customers.

- There is not much incentive for fuel switching at a $7 per ton CO_2 safety valve price. What's the point of the safety valve if it doesn't produce many emission reductions?

- Many of the policy models that we are discussing rely on a price signal for CO_2 to be embedded into the cost of fossil fuels and then transferred into the cost of end products, including gasoline and electricity. The success of these models will be strongly

predicated on whether the full price signal is transferred down through all components of the energy sector. Because this is such a fundamental component of the systems, policymakers should consider changes to the various regulatory systems to ensure that the price signal is fully transferred.

- It is important to implement an economywide program rather than focusing only on a few sectors. This approach would spread costs across as many sources as possible. Dispersing the costs will alleviate the magnitude of costs on specific industries.
- What is the impact on emissions reductions for implementing efficiency standards for vehicles and residential furnaces versus relying on a carbon price signal that would be generated under an upstream program?
  - It is difficult to estimate the ultimate emissions reductions generated under any program that does not impose a cap. A number of analysts have concluded that a program that imposes efficiency standards is less economically efficient than a carbon tax or cap-and-trade program. If a trading element were added to the efficiency standards, the economic efficiency of this option would be improved, but it would still be less economically efficient than carbon taxes or cap-and-trade programs.
  - Efficiency standards can also be costly to the economy because they only affect the emissions rate of new products. The standards would affect the utilization of the new products covered under the efficiency standards and they would not address emissions resulting from existing products currently in circulation that have lower efficiency ratings.
  - If the price of electricity goes up by half a penny, it would not have much of an impact on individual customers. However, a half penny multiplied by the number of all electricity consumers adds up to a large number. Spending this money, in aggregate, on efficiency improvements could have a large impact on overall emissions. The realities of the real world are that cap-and-trade programs may not be the most efficient way to achieve all emissions reductions. Regulatory mandates, in some cases, may be a more efficient way. In this context, the program should include opportunities to trade credits with manufacturers affected by efficiency standards and other entities affected by a cap-and-trade program.

Carbon Sequestration

- Under a carbon constrained program, it is very important to provide strong incentives for investing in integrated gasification combined-cycle (IGCC) coal plants that can sequester CO_2 emissions. IGCC technology will enable our continued use of coal and will help to take some of the pressure off of the supply constraints experienced in the natural gas markets.
- Most climate change policy proposals recognize the value of sequestration and provide incentives by recognizing emissions reductions that can be achieved through this type of activity.

- Senator Jeff Bingaman's proposal includes a safety valve for the cost of CO_2 allowances that starts at $7 per ton of CO_2 and escalates to approximately $20 to $30 per ton CO_2 by 2030. These prices are significantly below cost estimates for sequestration and therefore would not provide a strong incentive for investing in this technology. When will the technology be cost effective and enable significant emissions reductions?
- How should an upstream system handle non–fossil fuel related reduction projects such as biological sequestration? To include these types of reductions in an upstream GHG trading market, the program would need to include a provision for granting additional credits for these actions.
- How do downstream systems deal with biological sequestration?
  - Emissions reductions achieved through sequestration occurring at a source of emissions would be automatically recognized in the program. The issue of how to address sequestration occurring away from a specific source of emissions, such as biological sequestration, is basically the same for both downstream and upstream systems. One option for recognizing these activities would be to grant additional allowances for sequestration activities. These allowances would be in addition to the allowances originally allocated or auctioned to covered entities under the program.