WRITTEN STATEMENT OF

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Before the

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Hearing on "Economic and International Issues in Global Warming Policy"

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Chairman Lieberman, Ranking Senator Warner and members of the subcommittee, my name is Garth Edward. I am the trading manager for the Shell Group's environmental trading business. In that capacity, I oversee Shell's trading in the European Union's Emission Trading System.

The Royal Dutch Shell Group is an international group of companies engaged worldwide in all of the principal aspects of the oil and natural gas industry. Shell also has interests in chemicals, power generation and renewable energy. Shell's environmental products trading business is active in over 15 environmental markets around the world. The markets in which Shell trades include: EU Greenhouse Gas Emission Allowance Scheme, the Danish CO2 quotas trading system, the Clean Development Mechanism Greenhouse Certified Emission Reductions, the UK Greenhouse Gas Emissions Trading System, the Houston/Galveston Area (HGA) NOx Emission Allowance Program, the
California South Coast Air Quality Management District (SCAQMD) Regional Clean Air Incentives Market (RECLAIM) for NOx; the US EPA expansion of the Eastern States Ozone Transport Commission NOx trading program under State Implementation Plans (SIPs) to a total of 19 states; the Netherlands NOx emissiehandel and the US EPA Acid Rain Program (Title IV of the 1990 Clean Air) SO2 Emission Allowance.

I am pleased to appear before you today to testify on economic and international issues in global warming policy. In particular, I would like to share what Shell has learned from its experience with the EU's emission trading system, a trading system that regulates emissions from more than 10,000 installations across 27 countries with more than USD$50 million worth of allowances traded each day through several exchanges and brokerage houses.

I will identify the key elements of a successful cap and trade program. In Shell's view, a successful program is one that achieves its environmental goals in a manner that ensures

economic growth and energy security. Based on Shell's experience with the EU's system, I will also identify some pitfalls to avoid in creating a program to regulate greenhouse gas emissions here in the United States.

Finally, I will address other policies that Shell considers important in reducing Greenhouse Gas emissions and should accompany a clear, workable cap and trade system. A single instrument like an economy-wide trading system is unlikely to deliver the necessary breadth of change that needs to start now. Rather, it may result in pockets of change. In particular, the carbon price set in a cap-and-trade system, say $50 per ton, may not be high enough to prompt change in the transportation sector. Therefore, a number of approaches will be required – but not many – to achieve environmental goals.

In addition to cap-and-trade for large, stationary sources, these approaches would include a three-prong policy approach to reducing GHG emissions in the transportation sector that prompts change by fuel suppliers, vehicle manufacturers and consumers and a strong investment by the government in the research, development and deployment of large-scale carbon capture and storage projects.

In addition, Shell supports robust energy efficiency standards for buildings, appliances etc. with incentives that encourage consumers, businesses and industry to retrofit existing infrastructure. Shell also supports continued public/private partnerships for the research, development and deployment of new technologies that conserve energy and reduce emissions.

First, let me congratulate you on your determination to act now to address the issue of climate change. Shell believes that now is the time to act on climate change. A clear, workable climate change policy implemented now that includes long-range, achievable environmental goals will have less impact on consumers, businesses and the economy than a more stringent policy with costlier mandates implemented years from now.

The later action is taken, the more mandate-driven the outcome is likely to be. Shell supports the flexible, market-based approach that is on the table today.

Shell supports a national U.S. climate change policy. We believe a national policy makes much better sense than dozens of regional policies or fifty state policies.

ELEMENTS OF CLEAR, WORKABLE CAP AND TRADE PROGRAM:

A cap-and-trade system is ideally suited to managing direct emissions in large industrial facilities and power stations. A cap-and-trade system is most effective at achieving environmental goals when the point of regulation is also the point at which emissions occur rather than separating these and relying on indirect price signals to encourage emission reductions.

Shell believes that a clear, workable cap-and-trade program would include the following essential components:

- The aim of a cap-and-trade system should be to provide an incentive for greater efficiency and to direct capital towards more CO2 efficient projects, via a market price for CO2 emissions.

- The trading system should not withdraw that capital from the industries or firms covered by the system. Removing capital from the market would slow down the necessary investment in more CO2 efficient technologies and projects to the detriment of the environment in the long term. For this reason, Shell discourages the auctioning of allowances in the early years of a program.

- Shell believes a workable cap-and-trade program sets clear, reachable goals then stays the course. Tinkering with carbon goals mid-course creates uncertainty in the marketplace and discourages investment due to concern that the government will change the rules and diminish the value of the investment. Today, companies invest billions of dollars in projects that last twenty-five years or more. The government must set a goal twenty years out or more, then include interim targets that bring the market to the final goal.

- Cap-and-trade requires the application of a fixed cap across the covered sector for each compliance period, with the number of allowances in circulation equating to the cap and less than a "business as usual" expectation. This then creates the necessary scarcity for trade to develop. The extent of scarcity should be set with a view to the efficiency gains and low carbon investments that are technologically feasible within the compliance period. Once allocated the number of allowances in circulation should not be changed.

- A compliance period could be up to 5 years in length. Allowance allocation for a given compliance period should be known 3-5 years before the start of the period.

- Allowances should be granted free (a concept known as "grandfathering") at the start of an emissions trading system and this should be based on historical emissions from a fixed year or average over a number of years. The allocation process must account for the entry of new facilities, significant expansions to existing facilities, or facility modifications required by regulation.

- Shell does not favor auctioning particularly in an initial phase of a system. However, governments may eventually use auctions because of the ease with which allowances can be allocated and to capture some of the value of the allowances. However, the system should not withdraw capital from the industries and firms covered by the scheme. Implementation of a profit-neutral system would require detailed information on each industry's market structure and demand conditions, which could potentially be developed during an initial phase of the system when allowances are distributed for free. It should be recognized moreover that there is not a one-size-fits-all approach to achieving a profit neutral scheme and that conditions to achieve profit neutrality may well differ across industries and firms. Auctioning also raises a number of specific and significant concerns, namely:

    - ✓ Payment for allowances withdraws capital from the covered sector to the extent that this cost cannot be recovered from higher product prices. The impact of a system on profits depends on an industry's market structure and demand conditions and consequently the arrangements to guarantee profit neutrality are likely to differ across industries.

- ✓ Some methods of achieving profit neutrality are likely to be more efficient than others. For example, a system of mixed grandfathering and auctioning would be more efficient than a system that recycles auction proceeds through corporate profit tax credits.

- ✓ The conduct of multiple auctions in the course of a continuous and free market has the potential to lead to price spikes and collapses.

- ✓ The administration of auctions is a serious undertaking because participation must be open to the public but must also involve financial checks so that auction participants can guarantee to be able to pay for the allowances they bid for.

- Should auctioning be used, two key design criteria must be incorporated:

  - ✓ The system be designed with the aim of profit neutrality at the industry and firm levels. Environmental objectives are not advanced by arbitrarily destroying shareholder value in existing firms; indeed this can act as a deterrent to necessary investment. The incentive for abatements comes from the carbon price signal.

  - ✓ There must be safeguards to ensure that this objective is delivered in practice and not just in principle.

- The point of regulation (allocation) should be set by the "make or buy" principle. This means that the holder of allowances should be both the emitter and (even more importantly) the party that can launch projects that reduce emissions. Under a system where the allowance holder is the project developer, the allowance holder can use the emissions market to help finance the project by selling the future reduction in the forward market and bringing capital back. Alternatively, if no reduction opportunities present themselves, the allowance holder can purchase allowances for compliance and thus channel capital into the market for others to use for their projects. This is called “make (reductions) or buy (allowances)”. “Make or buy” is fundamental to the operation of an emissions trading system.

- The system should operate as other commodity markets do. While an emissions market can only be created by regulation and the creation of a scarcity, such regulation should not affect the trading behavior of the market. For example, regulation should not be used to manage price (e.g. through caps or floors) or limit the trading of any of the instruments created for the market (e.g. flow to/from linked schemes). Doing so may lead to market distortions (e.g. price spikes), which in turn may lead to the call for additional regulation (e.g. price caps).

- There should be a design review process within five years of start-up to correct any design oversights or anomalies. The review should not be used to change the environmental goal.

- Key abatement technologies should be recognized from the outset. The program should embrace technologies as they mature (e.g. Carbon Capture and Storage - CCS). CCS is one of the few technologies that is entirely climate change driven. Other zero carbon

power generation alternatives exist, such as wind. But they are also driven by factors such as energy costs, security of supply concerns and local air quality standards. This is not the case for CCS. Without carbon emission targets, CCS technology will not develop or be deployed. To develop and deploy CCS, the government must:

- ✓ Provide suitable financial encouragement to a number of large-scale pilot projects in the United States in the period 2007-2015. Similar projects should be encouraged China and India. This will facilitate the development of a global CCS industry, accelerate technology cost reduction and promote economies of scale.

- ✓ Introduce additional tools to better manage the long-term carbon market risk associated with CCS.

- ✓ Include CCS in the cap-and-trade system and coordinate the development of standard rules and measurement protocols.

- ✓ Include CCS in any project-based offset mechanism linked to the cap-and-trade system.

- ✓ Address the issue of long-term liability for stored carbon dioxide.

- Policies should be designed so that activities such as cogeneration are incentivized.

- Project offset mechanisms, such as the international Clean Device Mechanism (CDM) offset program should be linked to a cap and trade program. The program should not limit their use. It would be better to recognize the existing international project mechanism rather than developing a parallel system. The effort involved in establishing a good mechanism should not be underestimated. CDM works today as a result of such effort.

- A cut off for small facilities should be established in order to avoid an inefficient system that would require an immense effort in respect of administration and verification.

- It should be built on a sound infrastructure base, which includes clear definitions, measures and reporting protocols and adequate information technology to support the registries.

PITFALLS TO AVOID:

In my experience, there are five pitfalls to avoid when creating a cap-and-trade system.

- First, don't try to legislate "safety valves" into your cap-and-trade program. Set the basic rules of your cap and trade system, make them as clear and simple as possible, then leave the system alone. Let it self-regulate. Don't implement barriers to trade. For example, don't create offsets, then limit how much they can be used. Offsets are your natural safety valve when prices start climbing. A market-based cap-and-trade system will use offsets as needed to achieve both environmental goals and economic growth.

- Don’t rush into measures like the full-auctioning of allowances. Take a step-by-step approach. Prime the pump first. Start out by giving allowances away then consider how you might introduce auctioning or create benchmarks.

- Recognize that some changes take time to implement. For example, implementing a major efficiency project within a refinery may require the refinery to shut down. Full-scale shutdowns are expensive, can impact gasoline prices and only occur every five years or so. Bringing forward a refinery shut down, with its related impacts on price and supply, to implement efficiencies may be problematic.

- Don’t expect a single policy instrument to do everything. For example, the most effective cap-and-trade system is one where the regulation occurs at the point of emission. But it is difficult to regulate at point-of-emission in the transportation sector. No one expects personal drivers to hold carbon allowances and manage their emissions. Another policy instruments, such as vehicle efficiency and a low carbon fuel standard, may achieve better results.

- Don’t reinvent the wheel where you don’t have to. A vibrant international offset system exists and should be embraced. This international offset system has generated 549 projects underway in 120 countries, including India and China. Another 1,600 projects are in the pipeline, according to the May 2006 report by the UN Commission on Sustainable Development. These projects will send approximately $6.62 billion dollars every year to developing countries, lifting these nations out of poverty by providing to electricity while also reducing global greenhouse gas emissions.

SUCCESS OF THE EU-ETS:

I would like to talk briefly about the success of the EU-ETS since its launch on January 1, 2005. The price volatility in the first two years of operation and the low prices earlier this year have been seen by some as evidence that the EU trading system is not working well.

Shell disagrees. The EU-ETS is structurally sound, with a framework that broadly matches the ideal arrangement for a cap-and-trade system. It was largely modeled on the US Sulphur cap-and-trade system, which is seen as one of the most successful pieces of environmental legislation ever enacted in the United States.

If the EU-ETS could be improved in one key area (apart from some more minor harmonization fixes) it would be to give a longer-term perspective on the reductions required. This is slowly developing but has not been implemented with the very clear and pragmatic approach used in the U.S sulphur scheme, where allowances were issued many years into the future.

The EU-ETS started with very little data on the emissions of facilities across the EU. This lack of data led to the price volatility and low first-period price, not the underlying structure of the system. When EU Member States formulated the first allocation plans, they erred on the side of caution rather than over-constrain the system. The result is that the first period has likely suffered

from over allocation. This became clear to the market on the day of release of the first year compliance data, and the market reacted as expected, with prices moving sharply down.

The market can only be absolutely certain of over-allocation on the very last day of trading in the period when more sellers than buyers remain. Then the price will be effectively zero. Until that time the market will trend slowly downwards as increasing certainty of a surplus is gained with the passing of time. This is currently being seen.

However, this trend is no different than, say, the period in an oil market where the market becomes aware that one or more traders are holding a surplus cargo. The discovery can result in very low prices that are hardly reflective of the overall price in the market. The difference is that the oil market trades in days and months, not years, so these periods of very low prompt price are short lived.

Meanwhile, the further out prices remain robust in the emissions trading market. While 2005-2007 is trading at less than 1 Euro – less than $1.38 cents, the 2008-2012 price is at 20 Euros, or $27.63. This is the real price in the market today and the one that is driving investment and operational change.

The EU-ETS has managed this early volatility well. It has reacted promptly and clearly to market information, it has provided sufficient depth and liquidity for traders to execute their business and it has developed a forward price that reflects the longer-term supply and demand. These are all characteristics of a market that is working, not one that is failing.

TRANSPORTATION THREE-PRONG APPROACH:

As already indicated, cap and trade works best when the point of regulation and the point of emission are the same. But apart from aviation or large vehicle fleets, that's not feasible in the transportation sector. You would have to require every driver to hold allowances and manage their emissions. The best approach is to break the transportation carbon dioxide challenge down into its three basic components -- fuel, vehicle and driver – then use a three-prong approach to address each.

The first prong: One way to address fuel is to reduce the carbon footprint of the fuel's lifecycle. Shell sees some merit in a national low carbon fuel standard that encourages a broad range of technologies that can reduce the well-to-wheels C02 emissions per unit of energy supplied.

Shell supports a low carbon fuel program that assigns a carbon value to existing fuel mixes and volumes then reduces that value over time, prompting fuel makers to reduce the amount of C02 released in the production and consumption of fuel.

Fuel makers should be given the maximum amount of flexibility to reach their C02 goals, helping to ensure that energy prices remain stable while environmental goals are achieved.

Fuel makers should be able to get carbon credits for: Implementing efficiencies that reduce carbon; switching to lower-carbon fuels such biofuels or alternative fuels like hydrogen; or using lower-carbon processes when making fuel, such as processing ethanol using methane from a cattle feedlot.

A workable program sets feasible goals on an achievable timeline and has long-term predictability that encourages fuel makers to make long-range investments in lower-carbon technologies, is easy to comply with and easy to enforce. Given that technologies expected to be used to comply with a low carbon fuels standard are not yet all-commercial, there must be a clear process for reviewing progress and making necessary adjustments to the program.

Shell prefers a standard that assigns a carbon value to various classes of fossil fuels because the global fossil fuel market is too complex to accurately measure actual carbon content. However, the ethanol market, which is largely domestic, should be measured by actual carbon content. This will drive the market for second-generation biofuels with low carbon footprints, helping to achieve environmental goals.

Calculation of the well-to-wheels C02 footprint of different fuels must be determined using scientific, peer-reviewed methodology and assumptions in consultation with relevant stakeholders.

Compliance with a low carbon fuel standard is likely to require a substantial increase in renewable fuel use. Policy makers should consider the full economic, environmental and societal impact of such an increase, including the effect on the food chain, fuels supply and distribution systems.

Shell believes that minimizing potential supply chain complexity by having one national fuel program versus many different state and local government programs is preferable. State "boutique" fuel requirements undermine the flexibility that Congress established in the federal renewable fuels program, which calls for a nationwide program that encourages the most economic use of renewable fuels for the benefit of consumers by not dictating where renewable fuels must be used and by allowing credit trading.

The second prong: An effective carbon dioxide reduction program also requires federal regulations to make vehicles more energy efficient. The program should include a higher CAFÉ standard or regulations/incentives to encourage the increased production of hybrids, plug-in hybrids, diesels and vehicles powered by batteries, fuel-cells or other low-carbon technologies.

Third prong: Finally, an effective program includes a national educational campaign and empowers consumers to make wise transportation choices that result in less fuel consumption such as purchasing fuel efficient vehicles, carpooling or using public transportation.

CARBON CAPTURE AND STORAGE:

Finally, I would like to address carbon capture and storage at greater length. A workable climate change program encourages the development of innovative technologies like the capture and storage of carbon, which can dramatically reduce the amount of carbon emitted in the production of electricity and fuels from fossil sources.

The Intergovernmental Panel on Climate Changes estimates that carbon capture and storage could play a role in as much as 55 percent of the total carbon mitigation effort until year 2100. The panel also estimates that carbon capture and storage technology applied to a modern conventional power plant could reduce CO2 emissions to the atmosphere by approximately 80-90% compared to a plant without this technology.

Hence, a sound U.S. climate change program must include policies to encourage the development and deployment of CCS technologies.

As I mentioned, Shell supports the creation of credits for the capture and storage of carbon dioxide that can be traded in a cap-and-trade program. This requires developing standard rules and measurements for carbon storage.

Shell urges the U.S. government to help fund the development and deployment of CCS technologies, including C02 storage demonstration projects. Such funding can be critical to success of first-of-a-kind technologies. We believe the United States must have at least 10 large-scale C02 storage demonstration projects up and running by 2015. Several projects are needed to test and refine different technologies and storage methods.

We believe the carbon storage component of the U.S. climate change program must interface with international efforts. Shell believes the reduction of carbon emissions anywhere in the world is a victory for the global environment. A U.S. program that encourages carbon storage projects in other parts of the world encourages the development of a global CCS industry and reduces the cost of the CCS technology, a savings ultimately passed on to consumers.

Because CCS technology is still evolving, Shell supports federal regulations that address the liability of leakage or migration of carbon once it has been stored. Shell believes these regulations must encourage the deployment of CCS technologies. Companies faced with unending liability for C02 stored in the ground will be discouraged from investing in carbon storage facilities. In the long run, this may diminish the important role CCS can play in reducing global carbon emissions.

Carbon storage operators expect to be responsible for monitoring and maintaining the integrity of a site and would encourage the active involvement of regulatory authorities in the monitoring process.