THE U.S. COMMISSION ON SECURITY AND COOPERATION IN EUROPE

WRITTEN TESTIMONY OF:
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Chairman Cardin, Chairman Hastings, distinguished members of the Commission; it is indeed an honour to speak to you this afternoon on the environmental aspects of energy security. It is of course a timely topic as energy prices rise to record levels and the reality of climate change, water scarcity and other global environmental risks become more apparent and troubling. Governments, including European ones, are pressed to find and implement policies which simultaneously provide improved environmental performance and energy price stability and predictability. In my testimony I want to highlight the policies that can meet our energy security, economic and environmental goals.

The focus of my testimony is twofold: (1) on energy and greenhouse gas (GHG) emissions trends (as a surrogate for the broader issue of sustainability); and (2) on the policy and technology implications of meeting the challenges of economic growth, energy security and improved environmental protection. I will not speak to the nearer-term energy security policy measures because they are more indirectly related to longer term trends in sustainability

Energy security and emissions trends are indeed alarming. The IEA estimates that by 2030 primary energy demand will be 55% higher than in 2005 with fossil fuels constituting 84% of the increase in demand. Oil increases 37%, coal increases by 73%, natural gas increases only 1% and electricity use doubles. Without changed policies globally, the fossil fuel past is prologue to our energy future. Much of oil and natural gas comes from politically unstable regions and increasingly that will be true in the future as well.

Between 2000 and 2005, world CO_2 emissions from energy sources grew nearly 16%, and are projected in the IEA's *World Energy Outlook 2007* to grow, with no change in existing policies, by about 57% from 2005 to 2030. In fact, global emissions trends advance unabated despite the mitigation actions countries have taken since 2000. This is in part due to the restructuring of global energy demand as China and India have become the marginal consumer. China has increasingly met this demand with coal-based electricity generation; with recent annual capacity additions of nearly 100 GWs of which about 80% is from coal.

Inertia characterises both our climatic system and our energy infrastructure. Carbon dioxide has a long atmospheric residence time – more than a century – making the act of emitting nearly irreversible for the current generation and their children. Much of the electricity

generation and consuming energy infrastructure lasts many decades to a century. The turnover rates for such capital can be altered, but at a cost which is largely from the premature retirement of economically productive capital.

Flexibility with respect to timing and location of mitigation is a key factor in determining costs because more flexibility allows markets to better adjust to the slow turnover rates of energy capital.

Much of this capital has long construction times when considering the planning, decision, and governmental approval processes. This is an important consideration for identifying the appropriate policy choice. In IEA countries it is not unusual for coal and nuclear plants to take 10-15 years to complete this extended process. Almost all generation technologies – including renewables – have NIMBY problems with respect to siting, thus delaying their construction.

The inertia in the capital structure is particularly problematic because stabilising concentrations requires global emissions to reach nearly net zero for most concentration objectives currently under discussion among governments. Net zero is essential for stabilisation because of the long atmospheric life times of CO_2 and other GHGs. This is the heart of the energy and climate policy challenge. How to change the capital structure, at least its emissions profile, to one that is less emitting while at the same time continue to provide for the growth in energy services; which is so clearly linked to expanding the opportunities of our citizens. Economic growth, in turn, depends on affordable, predictable and relatively stable energy prices, i.e., energy security.

In addition to political stability of the national origin of our key fuels, it is important that investments occur in a timely fashion so they match-up with trends in demand. The IEA has been raising this issue for some time, noting that investments needed to meet the growth in demand are in excess of $22 trillion to 2030. While financial markets can certainly accommodate this investment need, it nevertheless requires that governments foster policies that encourage transparency with respect to energy market fundamentals. The size of energy resources, prices, energy demand and supply data, market rules, and technology performance characteristics need to be as transparent as possible for market participants if we expect investment to be timely. Governments can insure transparency by providing a legal framework that fosters the development and dissemination of such information.

While timely investment is indispensable to providing a stable, affordable and predictable price environment, making those investments cleaner is the essence of sustainability policy. As noted above, capital replacement that matches the economic obsolescence of capital can significantly lower the cost of policy – lower cost is, of course, essential for maintaining public support for environmental protection. But, timeliness has another sustainability dimension. The cleaner technologies need to be chosen by investors when they are cost

competitive. In *Climate Policy Uncertainty and Investment Risk, the* IEA analysed the electricity generation investment decision and demonstrated that governments can improve the timeliness of clean investments by clarifying the future course of climate policy over the next decade or so.

In addition to policy transparency, what else can governments do to foster clean investments? There can be no serious doubt that establishing a price on carbon is a foundation measure in any domestic and international, cost effective policy framework. No principle is so clear from the discipline of economics than that price is an effective allocation measure in most cases; nor have IEA governments found preferable means for allocating goods and services in their own economies to that of market price. Environmental services can also be allocated by prices effectively in some cases as the U.S. experience with conventional air pollutant trading has demonstrated. IEA governments certainly differ with respect to: (1) when price should be incorporated into the domestic and international portfolio; (2) the means for delivering the price signal (carbon taxes or trading); and (3) the sectoral and geographic application of price. Such questions are in negotiation among governments now. However, no policy measure can locate the least cost reductions in our highly diverse global economies as effectively as a price on carbon.

Nevertheless, IEA analysis has demonstrated that price will not be enough to achieve stabilisation of emissions. Market failures and barriers sometimes prevent market participants from having the full range of options available to them for efficient and timely choices. Certainly technology research and development is one example. The market will not adequately invest in R&D except when a technology is near commercialisation. Governments have an essential role here. Zero emitting technologies are particularly relevant to sustainability. Three points need to be made:

1. government funding is essential;
2. carbon capture and storage is an essential technology as coal is an important feature of the future energy supply mix in even aggressive policy scenarios. Governments need to cooperatively build 10-15 carbon capture plants with various configurations to demonstrate to the market the essential operating characteristics of such as technology ; and
3. not all renewable technologies are free of energy security risks, nor environmentally benign. Biofuels that are produced with natural gas for example are certainly exposed to energy security risks and first generation biofuels can emit more CO_2 than petroleum. Other renewables can be subject to weather-related disruptions for considerable periods of time.

Energy efficiency is an essential element of any cost effective policy framework and will not be fully exploited through market price alone. The significance of market failures to energy efficient choices has been documented by the IEA in *Mind the Gap*: *Quantifying Principal-*

Agent Problems in Energy Efficiency. Such market failures shield the consumer from the full price effect or deny the consumer the full range of options for responding to changing energy prices. Governments have a range of policy tools available to them from informational to compulsory. Labelling, for example, has been helpful in raising consumer awareness of the energy significance of their decisions and has had an effect on technology development. Minimum energy performance standards have played a role in removing the older and most inefficient technologies from the market, in particular in the U.S. and Japan and increasingly in Europe.

The energy performance incentives can be applied at all levels of government. Frequently energy efficiency implementation is the responsibility of regional and local governments, in particular cities where the most electricity consumption occurs. Effective coordination and development of policy frameworks between levels of government are an essential feature of a sustainability policy that fosters clean and timely investment and consumption decisions.

It is important that energy efficiency policy address not only new capital decisions, but also fosters improvement in the existing capital. Again, price is the foundation measure, but other policies will be necessary as well due to market barriers. Improving the energy efficiency performance of the existing building stock will not occur through price alone. Refurbishment policy can improve the energy consumption character of refurbishment and maintenance decisions. It is difficult to imagine how lower stabilisation levels can be achieved without policy incentives that influence decisions about both the replacement of, but also the refurbishment of the existing capital stock given the realities of capital turnover rates and construction time.

Fortunately vast arrays of studies, including those by the IEA, have demonstrated the extent of energy efficiency that can be achieved at zero or negative costs. No better reason for featuring energy efficiency policy in an energy and climate change policy portfolio is needed, nor for its near-term priority. However, there is an additional reason for energy efficiency in meeting our energy security and sustainability objectives.

As I indicated earlier in my testimony, our energy system is characterised by considerable inertia where rapid change comes with a significant cost. The long-lived nature of GHG emissions however implies that altering current trends in the near term is essential. This conflicts with the existing turnover rates of much of our energy supply and consuming capital. Energy efficiency is the first pillar in a policy of reconciling these apparently conflicting realities. End use efficiency including that addressed at the existing capital refurbishment can alter trends now and provide time for new technologies to be made cost effective and to penetrate the market. Energy efficiency which is generally cost effective can make the path to a sustainable concentration more affordable by allowing the inevitable capital replacement decisions to be timelier and the technology choices cleaner.

The IEA has tried to walk the talk on energy efficiency. At the request of energy ministers and the G8 Gleneagles Summit, we have been assessing best practice in end use policies. From this work we have been making specific energy efficiency policy recommendations to the last three G8 summits. These recommendations should be adopted by all countries. I am pleased to inform this commission that progress in implementing the recommendations is now clear.

Let me illustrate this claim by pointing to just two of the recommendations. We have recommended that countries adopt a 1-watt standard for appliances when operating in the standby mode – this is mode when appliances are turned "off" – when a red light is on. This type of power consumption is rising rapidly in IEA countries and beyond. Reducing it can be significant for security and emissions. For example, the IEA estimates that without a standby power standard, IEA countries will build about 20 power plants by 2020 just to run our appliances when they are turned off! Governments are starting to act however. Australia has adopted a standard and the European Union has proposed one. Executive Order 13221 in the US predates the IEA recommendation and applies a standby requirement to federal purchases. The next step towards enhanced effectiveness would be for governments to coordinate their standard setting in the appliance area.

The IEA has also recommended energy performance standards for lighting that would have the effect of phasing out the most inefficient forms of incandescent light bulbs. Recent action by the US Congress is similar to that taken in other countries. All IEA member governments have either adopted or have put in motion such policy. Other IEA recommendations on stricter building codes, energy consumption data development, etc., are being adopted by governments as well.

I want to be clear however, energy efficiency is not a substitute for putting in place cleaner energy investment incentives now, but rather it empowers a technology change agenda by making it affordable and timely. Putting incentives in place now, like a cost on carbon, is essential for energy investors so they can begin to factor it into their investment decisions – so they can know where policy is going and how it will be structured. Investors can then respond effectively and in a timely fashion, and markets can deliver affordability – but only when governments clarify their intentions.

Thank you