Remarks of Robert Shapiro

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First, it's a pleasure to address this conference. I sincerely welcome the debate we're engaged in here, because the question of which approach to climate change would be best--a cap-and-trade regime or carbon taxes–assumes that the time for serious action has finally arrived.

As an economist and as an advisor to American public officials, including some of current candidates for president, I have a decided view, that carbon taxes are a much preferable course for not only environmental and economic reasons, but also as a political matter. And it's clear that this is going to be very difficult politically. The Kyoto agreement was achieved only after ensuring that most nations would pay little or no price for many years, and the European Union's Emissions Trading Scheme, based on the Kyoto targets, will likely achieve even less. So, even as the risks of climate change grow, few countries have been prepared to pay a significant price to reduce their emissions. So a lot of work lies ahead before we can adopt any approach that will make a difference.

My remarks today focus on carbon taxes and cap-and-trade, but other policies also have important parts to play. Reforestation, for example, is the most cost-effective response available for many Latin American and African countries. Greater support for new, energy efficient technologies and alternative fuels also will be critical, although the greatest impetus for their development and spread will come from the higher prices that everyone will pay for energy under either a strict cap-and-trade program or carbon taxes.

Both of these approaches result in higher prices for fossil fuels, but in different ways. Carbon taxes raise those prices directly, predictably and in a constant manner, creating direct incentives to reduce carbon-based energy use or substitute cleaner forms of energy, until the cost of doing so is greater than the tax. A serious cap-and-trade program applies no direct charge to emissions up to its cap, but the cap is set below a country or industry's current or forecast emissions. So companies and countries whose emissions exceed their caps either have to cut their energy use, substitute cleaner forms of energy, or purchase permits to cover the gap. The costs of the permits or the steps taken to cut energy use or use cleaner fuels are passed on in higher prices, although the price increases under cap-and-trade will be less predictable and vary much more, than under carbon taxes.

This points us to a critical economic distinction. Cap-and-trade directly regulates the *quantity* of emissions, while carbon taxes directly affect their *price*.

The result is that cap-and-trade can produce a designated quantity of emissions, but with much greater volatility in energy prices; while carbon taxes will produce more certain prices for energy, but with greater uncertainty about the total quantity of emissions.

These two tradeoffs are not economically equivalent. By regulating the quantity of emissions, a strict cap-and-trade program will drive the price of permits to whatever level is required to bring emissions under its cap. The price of permits and their underlying energy source will rise sharply when emissions increase because, for example, an industry or country's growth accelerates or its winter is colder than expected. This will produce up-and-down movements in national energy prices, on top of the normal volatility in international energy prices. Under a cap-and-trade program strict enough to actually affect climate change, this additional volatility in energy prices will affect business investment and consumption.

This is not merely a theory. It's evident in the leading U.S. instance of cap-and-trade environmental regulation, our acid rain program, which has applied cap-and-trade arrangements to major producers of sulfur dioxide and nitrogen oxide emissions for more than a decade. Over that time, the trading prices for the program's permits have moved up and down an average of 10 percent per-month and 43 percent per-year, or several times the volatility over the same period in oil prices or the U.S. stock market. We see the same thing in the European Union's Emissions Trading Scheme for $CO_{2,}$, in which permit prices moved up or down by an average of 10 percent per-month in its first 12 months and by 23 percent per-month from March 2006 to January 2007.

Comparable price fluctuations for CO_2 permits under a strict, global cap-and-trade program will not only dampen business investment, especially in energy-incentive areas such as manufacturing. Just as important, unexpected energy-price increases publicly linked to cap-and-trade could undermine public support for the effort and force governments to roll back or suspend their caps, unraveling the entire program

A carbon tax doesn't affect price volatility. Instead, it raises the unit-cost of energy by a constant amount--depending on its carbon content--regardless of how fast a company, industry or nation's emissions grow. The predictable cost of a carbon tax should facilitate investment decisions, as well as other steps to cut emissions and thereby reduce the burden of the tax. Most important, it raises the relative price of more carbon-intensive fuels, and lowers the relative price of less carbon-intensive alternatives.

The catch is that no one knows how much a particular level of the tax will cut emissions, so the tax may be set too low to achieve the emissions reductions we want in any given year. But the environmental costs of greenhouse gases

occur over a long term; and in principal, a government can adjust the carbon tax rate, year by year, to achieve the long-term reductions it wants.

Carbon taxes also have generally comparable effects country to country, while a global cap-and-trade program usually doesn't. When slow growth or mild weather reduces a country or industry's energy use and emissions, they pay less carbon taxes; but in good or bad times, the tax imposes comparable costs and provides comparable incentives, from country to country, to develop and adopt climate-friendly technologies and alternative fuels.

A global cap-and-trade system, however, creates a range of effects and incentives across countries, depending on the base from which each country calculates its emissions targets. This has been one of Kyoto's most serious weaknesses. In 1997, its parties designated 1990 as the base year from which its 2008 and 2012 emissions targets would be calculated. They knew in 1997, for example, that 1990 was the peak year of economic activity in the Soviet Union and Eastern Europe, before their state-directed economic systems unraveled. Russia's economy contacted so much from 1990 to 2002, when Kyoto was ratified, that its CO_2 emissions fell from 2.26 million tons to 1.43 million tons. Since Russia's Kyoto target is an 8 percent reduction from its high, 1990 levels, the 1990 base year allows Russia to actually increase its emissions by 45 percent from its 2002 levels and earn enormous financial windfalls along the way by selling its excess, tradable permits. By one estimate, if the 38 nations assigned targets under Kyoto had all participated, Russia and Eastern Europe would have taken in $40 billion a year from excess permits, principally from companies in the United States, Australia, Canada and Japan, all with no environmental benefit..

The 1990 base year also let Germany and the United Kingdom off the hook--and they account for 80 percent of the EU-15's targeted reductions. After German reunification in October 1990, much of East Germany's high-polluting state-owned industrial plants also closed down. So, Germany's target of an 8 percent cut from 1990 levels also was a license to increase emissions. Similarly, the privatization of British coal mining in 1995 cut coal use in Britain just as its North Sea natural gas operations expanded, allowing Britain also to expand its emissions and still meet its target.

The 1990 baseline also penalizes countries that already had made the most progress. So, the Netherlands, Sweden, Denmark, and Japan, which had controlled much of their emissions by 1990, have found it difficult and expensive to further reduce them and will have to purchase permits from Russia and Eastern Europe. And the Kyoto baseline penalized the United States, Australia, Ireland and few other countries for their strong growth and consequent increases in energy use since 1990, producing 2012 caps which they couldn't meet regardless of how much they invested in new technologies and alternative fuels.

Kyoto's further undermined its own goals by exempting all developing countries, including major CO_2 producers such as China, India, and Brazil which agreed to go along only if they bore no burden at all. In 2002, when Kyoto was approved, six major exempt countries – China, India, Korea, Brazil, Mexico, and South Africa – accounted for more than 25 percent of global CO_2 emissions. By 2012, they will produce more than one-third of global CO_2. These exemptions concentrate all of the reductions on 38 countries that produce about half of all worldwide emissions; and with the U.S. and Australian withdrawal, the agreement covers just 30 percent of global emissions.

The result of the exemptions and the 1990 base year is that Kyoto will produce almost no progress on global warming: Even if the United States shifted course and participated, and Kyoto's provisions were all strictly enforced, the program would temper the expected increase in global temperatures between now and 2050 by just 0.02 to 0.28 degrees Celsius. Kyoto's shortcomings show how vulnerable cap-and-trade is to being gamed and how easily its goals can be undermined.

Cap-and-trade also is harder to administer and more vulnerable to evasion, corruption and manipulation, than carbon taxes. Administering a global, net carbon tax should be straight-forward: Each country would apply to every energy source a tax rate that, after counting the country's current energy taxes and subsidies, produces the global tax rate. Countries could collect the receipts the same way they collect their existing energy or business taxes. But with cap-and-trade, each country has to create a new system to distribute its national cap among its energy-related industries and their thousands of companies and plants, and then set up a system to monitor energy production or use at every site before and after permits are traded.

Cheating is also a serious problem under this kind of arrangement. To be sure, some companies will try to evade their carbon taxes, but the government on the other side of the transaction has a strong interest in discovering and stopping it. With cap-and-trade, if a company fraudulently understates its energy production and emissions so it can sell permits for some of them, the buyer on the other side of the transaction has no incentive to uncover or reveal the fraud. That's why Yale economist William Nordhaus has said that "cheating will probably be pandemic" under cap-and-trade.

By creating tradable financial assets worth tens of billions of dollars for governments to distribute and monitor, cap-and-trade also provides incentives for corrupt and radical governments to cheat, too. Even in a transparent and democratic society, distributing such a valuable benefit invites pressures that often produce special preferences for influential interests and companies. The German government, for example, has exempted its coal industry, the country's largest greenhouse-gas producer, from its CO_2 caps under the European ETS. And in countries that are neither transparent nor democratic–Russia, the Ukraine,

and many others–-political favoritism and corruption will almost certainly substantially determine how the permits are distributed. Corrupt governments also will understate their country's energy use and emissions, so they can collect billions of dollars in hard foreign currencies trading "excess" permits--and in the process undermine the environmental goals they don't care about. .

For these and other reasons, carbon-based taxes offer a better way to reduce greenhouse gas emissions. But taxes have their own shortcomings. For example, economists worry a lot about how taxes make an economy less efficient by changing what are called "relative prices." The gist of this issue is that whatever is taxed becomes more expensive relative to what remains untaxed, so what consumers and corporations buy and use is no longer determined simply by prices that reflect the costs to produce them. But here, raising the price of carbon-intensive products and operations, relative to those which are not, is the whole environmental purpose.

Moreover, the traditional concerns about taxes and efficiency are largely moot here. Accurate relative prices depend on a close correspondence between the total costs to produce prices a good or service and its market price. But economists have long recognized that the pollution created by fossil fuels is a cost not captured in the prices of those fuels. In the case of greenhouse gases, the costs are borne by almost everyone, but based not on how much fuel a person uses but on where he or she lives. A carbon-based tax could capture the costs of that pollution and embed it in the market price of fuel. Doing so should actually improve economic efficiency, by better aligning the relative prices of things with all of their costs.

Carbon taxes also should create more reliable incentives for companies to develop environmentally-friendly technologies or abatement strategies, because the permanent increase in the cost of carbon-intensive energy will raise the rate of return on technologies that reduce the consumption of those forms of energy. The evidence is that it works. Sweden and Denmark have had substantial carbon taxes in place since the early 1990s. While all Western European countries impose significant taxes on gasoline and other transportation fuels, only Denmark and Sweden also apply them to carbon-based energy used by industry. It has clearly affected emissions: For each dollar of GDP, the Swedish economy in 2003 generated 0.22 kg of CO_2 and the Danish economy 0.30 kg of CO_2. That's compared to an average of 0.46 kg of CO_2 per-dollar of GDP for all high-income OECD economies, 0.60 kg in the United States, and 0.72 kg in Australia.

With all of cap-and-trade problems, its principal attraction seems to be the claim that it's more politically acceptable. While most of the world did agree to Kyoto, that agreement now looks too weak to signify any meaningful consensus for the kind of strict caps that would be needed to really address climate change. Still, no one likes new taxes. Yet a global carbon tax at the levels required to affect climate change may just be achievable, when politicians recognize that the

revenues can be used to reduce existing taxes or to finance popular programs. These kinds of tax shifts could even be politically popular. In countries facing fiscal squeezes as their boomer generations retire, carbon tax revenues could be used to maintain public pension or health care programs. In developing countries such as China, the government could use carbon-tax revenues to finance infrastructure improvements, education and other parts of economic development. And in places like Australia and America, the revenues could be used to cut payroll taxes.

If there is a genuine, global common cause today, it is the pressing need to address the risks of climate change. The United States, as the world's largest economy and largest producer of greenhouse gases, has a responsibility to lead here, as it did initially with Kyoto. The next U.S. president could use America's considerable economic and political leverage to enlist the participation of major developing countries, including China and India. And as the world's leading developer of new technologies, the United States can apply its technological capacities to develop the alternative fuels and more energy-efficient and carbon-reducing technologies that ultimately will relieve much of the burden of climate change regulation. The United States will be more likely to assume leadership on these matters, however, if its allies call for it. Policy experts and political activists should initiate vigorous public examinations of the need for prompt and serious action and the alternative approaches for such action. I salute CEDA for leading this effort in Australia. Thank you.