CHAPTER 7: ADDRESSING CLIMATE CHANGE

- The Obama Administration's approach to global warming is ineffective and too costly; it is centered on U.S. emissions, on wind and solar power, and is unconcerned with costs.
- Greenhous gas emission reduction requires attacking large and fast-growing sources, which are in emerging economies, not in the United States.
- We should find ways to spur faster development in emerging economies, especially with respect to electrification that draws on various technologies and fuels the United States could supply.
- U.S. workers and businesses should benefit from increased gas and coal exports, in particular, and foreign direct investments in modern natural gas, coal, and nuclear power plants.

INTRODUCTION

Beyond rhetoric about U.S. leadership in greenhouse gas emission control and advancing nonbinding international goals for emissions reduction, the applied aspect of Obama Administration climate policy focused on the domestic economy. But domestic-only policies can lead to increased emissions abroad as a result of so-called carbon leakage, i.e., from production shifting to other countries with lesser controls. The domestic focus also misses that international trade and foreign direct investment can lead to technology diffusion that can lower emissions in other countries.[i]

Efficient Global Resource Allocation

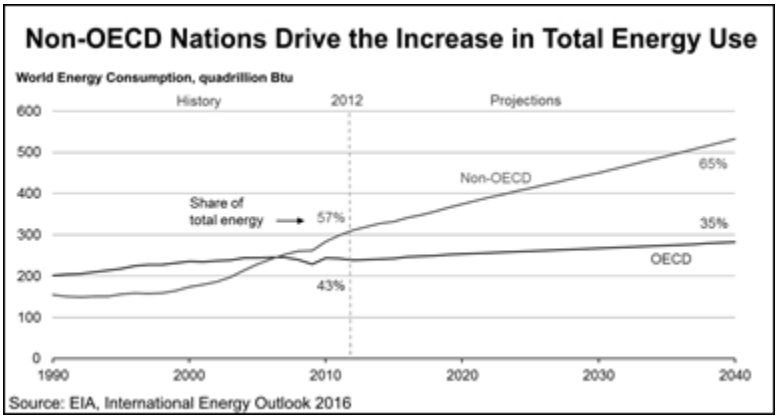
Economists are not climate scientists, but can speak to efficiently reducing global greenhouse gas emissions. The central principle

of using resources efficiently is to direct them where they make the greatest difference in reaching an objective.[ii] For cutting industrial emissions, that means adding more and better equipment where it makes proportionally the largest difference, or introducing control equipment where none exists. The same holds for substituting cleaner burning fuels or replacing an existing process with more advanced production processes.

In advanced economies, such as the United States, devoting resources to reducing greenhouse gas emissions is unlikely to produce the greatest incremental reduction. Emission controls are already far more extensive and intensive in North America, Europe, and Japan than other countries where the emission volume is large and growing. Incremental efforts dedicated to reducing emissions in the United States, for the most part, face greatly diminishing returns. Technology breakthroughs could change that, but until they occur, incremental steps to push emissions still lower are extraordinarily costly with marginal benefit and thus also prone to cause carbon leakage.

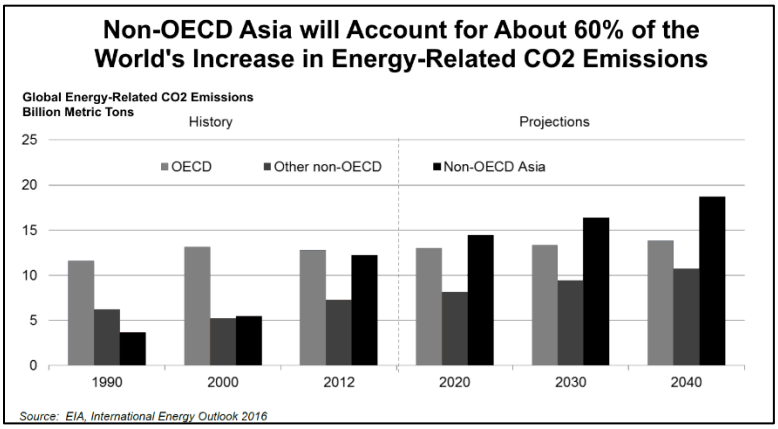
The reverse is true in India, for example, which uses lower fuel grades, less emission abatement equipment, and less efficient technology for electric power generation and other purposes. Energy consumption and associated emissions are rising substantially in developing countries like India (non-OECD countries), and not in the already more advanced countries like the United States [see, Energy Information Administration (EIA) projection in Figure 7-1].[iii]

Figure 7-1



According to EIA projections, worldwide energy-related carbon dioxide emissions will rise from about 32 billion metric tons in 2012 to 36 billion metric tons in 2020 and then to 43 billion metric tons in 2040, a 34 percent increase with current policies and regulations.[iv] Most of the increase is in developing (non-OECD) economies (Figure 7-2).

Figure 7-2



Economic efficiency considerations clearly would direct emission reduction to countries like India where they are more easily attainable and will have a larger impact. The *Report* states that some of the least expensive marginal emission reduction opportunities are in the power sector, thereby invoking the

efficiency principle, but it refers only to the United States.[v] The CEA attaches great urgency to reducing emissions, but it ignores the largest and fastest growing emission sources worldwide.

Opportunities for U.S. Industry

U.S. industry finds ways of cost and revenue sharing with other countries to facilitate the development of their natural resources, particularly oil and gas. Foreign military sales can include joint production agreements that preserve or increase production and employment at home as well as abroad and possibly could serve as a model for equipment and technology sales that lead to lower emissions in emerging economies. Prior Obama Administration *Reports* never explored the critical question of what opportunities exist for expanding U.S. foreign trade and investment in emerging economies with respect to greener energy consumption and electricity generation.

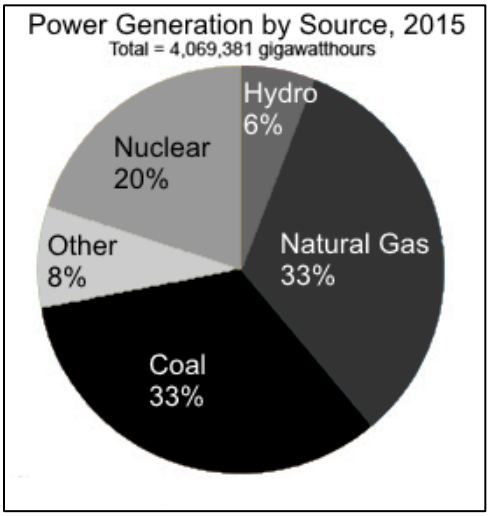
The United States has the world's largest reserves of coal, some of which is low in sulfur and some of which has a high "heat rate," and may be superior to what other countries are burning. The United States also has large natural gas and uranium reserves. American companies know how to build state-of-the-art electrical power plants using these fuels. Furthermore, the United States is a leader in wind and solar power generation.[vi] Besides reducing greenhouse gas emissions, greater U.S. energy exports and greater foreign energy investments also would reduce toxic pollutants resulting in substantial health and safety benefits, while increasing U.S. jobs and earnings from exports and international investments.

"All-of-the-Above" Strategy

Given the *Report's* emphasis on reducing emissions sooner rather than later, one would expect full consideration of all options. The Obama Administration initially paid lip service to an "all-of-the-above" energy strategy, but then devolved into advocating mostly

wind and solar—so-called zero emission sources—and energy conservation, all of which focused on the United States. Especially with respect to emission reduction, the omission of nuclear power is striking. It is a zero-emission source, and as shown in Figure 7-3, already supplies 20 percent of the nation's electricity—far more than wind and solar.

Figure 7-3



Source: U.S. Energy Information Administration, *Electric Power Monthly*, February 2015, preliminary data

Fear of radiation still causes anxiety the way electricity once did, but commercial nuclear power generation protects against radiation exposure. Nuclear power generation has been operational since 1958 in the United States, and U.S. submarines and aircraft carriers started using nuclear power more than a half century ago as well. In France, nuclear power plants provide 75 percent of the national electricity supply.[vii] Around the globe, more people are injured or die supplying the other energy sources shown in Figure 7-3 than nuclear power.[viii] Long ago, one major cause of anxiety was the so-called China Syndrome, which refers to an accidental nuclear chain reaction that would burn through the floor of a nuclear power plant and continue unstoppably through the

core of the earth all the way to the other side, i.e., come out in China, figuratively speaking.[ix]

The point is not to advocate for nuclear power, but its benefits as a reliable, clean, and scalable option for power generation should be weighed against its risks and costs, and other alternatives. It is a reliable and, importantly, scalable option for affordable power generation that emits no greenhouse gases whatsoever. Unfortunately, the *Report* does not discuss nuclear energy at all.[x]

Economies and Diseconomies of Scale

The *Report* claims renewable sources are becoming cost competitive with conventional energy sources. It bases this claim, in part, on the contention that solar and wind technologies have no fuel costs.[xi] However, while sunlight and wind are free, they must be collected and processed into usable energy much like uranium, crude oil, coal, and natural gas, and the cost structure of doing so matters greatly to the final cost of delivering electricity.

How much of the United States would have to be covered in solar panels and windmills to raise their market share from a combined 5 percent to, say, 50 percent? Visualizing a greatly expanding area devoted to collecting and transmitting electricity derived from the wind and the sun over increasing distances to where it is consumed makes clear the long-run supply curve slopes upward. The cost estimates CEA cites consider only marginal increases in supply and do not take account of the increasing difficulties siting ever more windmills and solar panels presents. By contrast, it is not difficult to imagine the nuclear power supply increasing from a 20 percent to a 50 percent market share as it requires little space given its high energy density. Suitable placement of windmills and solar panels is far more geography-dependent and more likely to encounter land use limitations the larger the area they cover. In short, renewables, including biofuels,[xii] are subject to significant diseconomies of scale whereas the nuclear power supply is not, certainly not to the same extent; it may even be subject to

economies of scale. In any event, the cost comparison and its implications in the *Report* are incomplete and misleading.

Adaptation

Economists can also speak constructively to ways of protecting humanity from adverse climate change effects. The emphasis has been on mitigating warming, but if efforts to reduce emissions will be inadequate, then resources instead should be directed to mitigating the warming's adverse effects rather than the warming itself. This might include building higher, stronger dams, fortifying infrastructure, strengthening building codes, moving residences farther inland, and so on. Certainly, we should do so in places where mitigation efforts have reached diminishing returns and adaptation is subject to increasing returns.

The point of making adaptation to climate change a priority is not new. The Committee's 2013 *Response* remarked favorably on a section in that year's *Report* entitled "Preparing for Climate Change," but faulted it for not addressing the costs and benefits relative to alternative policies.[xiii] In 2014, former CEA chairman Ed Lazear published an op-ed entitled "The Climate Change Agenda Needs to Adapt to Reality"[xiv] suggesting that by simple arithmetic the Obama Administration's far-reaching policies to reduce carbon emissions and mitigate climate change are not capable of making a difference. He stated that we would be wise to "consider strategies that complement and may be more effective than mitigation—namely, adaptation." This year's *Report* also raises the subject of adaptation, but again, it does not follow through with any cost-benefit analysis.

A major weakness of the mitigation strategy is that we are not sure how much we reduce warming for a given reduction in emissions.[xv] It is easier to measure the benefits of adaptive investments based on the damage from past floods, storms, and droughts than of investments to reduce the global temperature. Hence, one can perform cost-benefit analyses for alternative

adaptive investments and compare their relative returns with reasonable accuracy, and one can do so without knowing the reasons why floods, storms, and droughts occur.[xvi]

It would help policymakers immensely if the connection between emissions and warming were reliably quantifiable. Until it is, economic reasoning recommends resources be devoted to protecting humanity from the natural elements, and emission mitigation efforts concentrate on where they have large incremental impacts, because they are more likely to affect the temperature and can cut high associated levels of toxic pollutants in the process.

U.S. Leadership

In its fight against climate change, the Obama Administration interpreted the U.S. global leadership role as demonstrating a willingness to impose large, unspecified costs on Americans. At the Paris Climate conference in December 2015, the State Department made a pledge for the year 2025 that the United States will reduce its greenhouse gas emissions by 26 to 28 percent below the 2005 level without specifying what it would mean for the economy.[xvii] Other countries made similar representations, but there is no enforcement mechanism. From an economic standpoint, this will not work.

India and other emerging economies struggle with the economic growth tradeoff that emission control entails. Whatever governments and their citizens believe about global warming, they know they have a pollution problem. That is obvious from pictures of people in China, for example, wearing protective masks to filter the particle-filled air they must breathe. The population in emerging economies endures the pollution, because the alternative is abject poverty. What they want are solutions that help their economy grow with less environmental stress.

Some believe massive aid transfers from rich countries is the answer. However, the general population in advanced economies

does not consider itself rich, for one thing; and for another, subsidies are fraught with distorting, deleterious effects that get worse the larger they are. Market reforms and engaging with the global economy bring accelerated economic growth and ultimately lower harmful emission levels.[xviii] Relying on markets should be the first priority, and then the question is how the U.S. government can best advance emissions-oriented public policy through international trade and investment initiatives with particular emphasis on benefits to U.S. companies and workers.

The *Report* touts President Obama's call for global free trade for specified environmental goods both in his Climate Action Plan in 2013 and in his negotiations on the Environmental Goods Agreement the following year, with "a group of countries that accounts for more than 85 percent of global trade in environmental goods."[xix] But it fails to mention that World Trade Organization talks on that subject collapsed in December 2016.

CONCLUSION

America expends many resources where it makes relatively little incremental difference to emissions, and it is unknown whether the difference averts adverse temperature increases; it may even push production abroad where there are fewer emission controls. Facilitating trade and investment associated with diffusion of modern technology around the world can create jobs at home, raise living standards abroad, and lower undesirable emissions of various kinds.

The *Report* does not address the relative efficiency of different approaches to reducing emissions nor alternative approaches preparing us for a warmer climate. The government could do more to protect citizens from the elements where the benefits are clear and relatively large. Doing so has calculable benefits for society and the economy. Specifically, it would not erode our economic growth potential, as does blindly pouring resources into domestic emission reductions. The Committee Majority's responses of

prior years have pointed out previous *Reports'* neglect to take these perspectives.

The Obama Administration and former CEA recognized the need for emission mitigation around the globe, and they touted the good intentions many other countries have professed. But if the problem is big and the urgency great, then the focus and mechanism are not up to the task. We would need to get international trade and investment moving in a way that can make major inroads against emissions.

Recommendations

The Committee Majority recommends that policymakers:

- Scope out opportunities for economic development deals that can have environmental and climate benefits among other things with foreign countries, such as electrical grid buildout, power station upgrades, and cleaner fuels;
- Evaluate the costs and benefits of expanded nuclear power plants use at home and abroad;
- Analyze the costs and benefits of adaptive investments in the United States to protect the population and the economy from severe weather events and increase resiliency to them.

[i] Golub, Stephen et al., "Defining and Measuring Green FDI: An Exploratory Review of Existing Work and Evidence," Organization for Economic Co-operation and Development, OECD Working Papers on International Investment, 2011/02, September 1, 2011. http://dx.doi.org/10.1787/5kg58j1cvcvk-en

[ii] This is the reasoning underlying the concept of "cap-and-trade," incidentally, although the emissions cap in legislation that passed the House (it was never brought to a vote in the Senate) was only on the United States.

[iii] Sieminksi, Adam, "International Energy Outlook 2016," Center for Strategic and International Studies, U.S. Energy Information Administration, May 11, 2016. http://www.eia.gov/pressroom/presentations/sieminski_05112016.pdf

[iv] "International Energy Outlook 2016," p. 3. Figure 7-1 is on page 10. Figure 7-2 is on page 34.

[v] ERP 2017, p. 433.

[vi] "Solar Industry Data," Solar Energy Industries Association. www.seia.org/research-resources/solar-industry-data

The United States ranks 5th in the world in solar module manufacturing and total installed capacity, but market shares are not necessarily a good measure of technological leadership as government subsidies affect them and there may be excess capacity as well. Data on reserves of U.S. natural resources is available on EIA's website.

[vii] "Country Analysis Brief: France," U.S. Energy Information Administration, August 2016. www.eia.gov/beta/international/analysis.cfm?iso=FRA

In 2015, nuclear power generated about 76 percent of total net generation in France.

[viii] "Safety of Nuclear Power Reactors," World Nuclear Association, May 2016. http://www.world-nuclear.org/information-library/safety-and-security/safety-of-plants/safety-of-nuclear-power-reactors.aspx

According to the World Nuclear Association, no nuclear workers or members of the public have ever died as a result of exposure to radiation from a commercial nuclear incident, with the exception of the 1986 accident at the nuclear reactor in Chernobyl, Ukraine where the death toll was 56 people. That accident and the ensuing release of radiation were the result of major design deficiencies including that the Chernobyl reactor did not have a containment building as used in the West and in post-1980 Soviet designs.

[ix] A movie by the title "The China Syndrome" was released in 1979 by Columbia Pictures shortly after the Three Mile Island nuclear power plant accident. However, the fear of such an uncontrolled chain reaction is unfounded, as it would soon fizzle.

[x] ERP 2017.

Nuclear receives incidental mention twice in the text, in some footnotes, and it appears without commentary in two graphs, one of consumption by source (Figure 7-16) and the other of future cost of new generations of different technologies (Figure 7-22).

[xi] ERP 2017, p. 462.

[xii] For example, ethanol encounters a so-called blend wall in the gasoline supply, which refers to the incompatibility of mid- and high-ethanol fuel blends with the vast majority of vehicle engines and fueling infrastructure. See Lewis, Marlow, Jr., "Running Drivers into the Blend Wall," OnPoint, No. 219, Competitive Enterprise Institute, July 25, 2016. https://cei.org/content/running-drivers-blend-wall

[xiii] "Joint Economic Report 2013," Joint Economic Committee, p. 30-40, December 11, 2013. http://www.jec.senate.gov/public/_cache/files/e00331db-e083-4b36-ab60-aa14946bc71b/2013-joint-economic-report.pdf

[xiv] Lazear, Edward, "The Climate Change Agency Needs to Adapt to Reality," *The Wall Street Journal*, September 2, 2014. https://www.wsj.com/articles/edward-p-lazear-the-climate-change-agenda-needs-to-adapt-to-reality-1409700618

[xv] Lomborg, Bjorn, "Obama's Climate Policy Is a Hot Mess," *The Wall Street Journal*, July 1, 2016. https://www.wsj.com/articles/obamas-climate-policy-is-a-hot-mess-1467327996

Bjorn Lomborg, president of the Copenhagen Consensus Center, cites a range of temperature estimates for the promises made at the Paris Agreement worldwide of 0.08 degrees Fahrenheit from the U.N.'s model to 1.6 degrees Fahrenheit for the Climate Action Tracker by the end of the century. The Paris Agreement runs through 2030, but if one assumes that the cuts are not only met but sustained through the rest of the century, then the U.N. model projects a temperature drop of 0.3 degrees, the equivalent of delaying global warming by less than four years at the end of the century. The Climate Tracker estimate assumes that deeper cuts follow the Paris agreement. Lomborg cites cost estimates running in the many trillions of dollars for these miniscule, model generated temperature reductions decades into the future.

[xvi] One can also run the analysis with alternative rates of future floods, storms, droughts, etc.

[xvii] JER 2016, p. 123.

For the 2015 United Nations Climate Change Conference held in Paris from November 30 to December 12, the State Department made a pledge for the year 2025 that the United States will reduce its GHG emissions by 26 to 28 percent below the 2005 level, substantially surpassing the targeted reduction pledged at the Copenhagen Conference for 2020.

See also: "Budget of the U.S. Government Fiscal Year 2017," Office of Management and Budget, p. 15 - 29, February 9, 2016. https://www.govinfo.gov/content/pkg/BUDGET-2017-BUD/pdf/BUDGET-2017-BUD.pdf

The Administration's 2017 budget does not address quantitatively what its climate policies mean for economic growth. In the section entitled "Economic Assumptions and Interactions with the Budget," the Office of Management and Budget discusses its economic forecast at length and mentions policies related to trade agreements, immigration reform, business tax reform, infrastructure investment, community college subsidies, and boosting the labor supply, but not climate change.

[xviii] The stagnating centrally planned, nationalized economies of the former Soviet bloc were among the worst environmental offenders—an important fact to keep in mind whenever someone blames the profit motive for pollution.
[xix] ERP 2017, p. 56.