



U.S. SENATOR MARIA CANTWELL
WASHINGTON

The Carbon Limits and Energy for American Renewal (CLEAR) Act:

**A Climate Policy that Pays Short and Long-Term
Dividends**

Questions and Answers

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THE CLEAR ACT: ANSWERS TO COMMONLY ASKED QUESTIONS

WHY SHOULD CONGRESS DO ANYTHING ABOUT CLIMATE CHANGE?

The scientific consensus demands urgent policy action.

The scientific case for action to mitigate climate change grows stronger every day. In its 2007 Fourth Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) published the most extensive analysis to date of climate change science, including historical data and projections of future changes. The IPCC's analysis concluded with greater than 95 percent certainty that human consumption of fossil fuels and land use practices are contributing directly to observed changes in climate. The Panel went on to say that continuing these practices would accelerate and exacerbate changes such as sea level rise, desertification, and species loss, which could have catastrophic implications for human populations and ecosystems worldwide over the next century. In the two years since the publication of the IPCC's Fourth Assessment, new scientific findings have added even greater urgency to the case for immediate action to reduce greenhouse gas emissions.

Federal agencies will regulate in the absence of Congressional action.

In the shorter term, Congress' failure to act will lead to the regulation of carbon and other greenhouse gases by the Environmental Protection Agency (EPA). A 2007 U.S. Supreme Court decision ordered the EPA to regulate these gases as pollutants under the 1990 Clean Air Act.

EPA issued a Finding of Endangerment on carbon dioxide in April 2009, which has since been finalized, and will take regulatory action in the coming years should Congress not adopt comprehensive climate change legislation. A regulatory approach is likely to be less effective and more costly than any legislative approach under consideration approach.

Foreign energy dependence is a national security and economic threat.

The United States' growing dependence on fossil fuels, particularly on imported oil and natural gas, presents real and present danger to national security and our nation's economic wellbeing. As global demand grows and fossil fuels grow more scarce prices will rise, especially for oil and natural gas. For example, the Department of Energy's *2008 International Energy Outlook* projects a long term rise in global oil prices through 2030 to levels in excess of those experienced in recent years when diesel fuel nearly reached \$5 per gallon.

Moreover, an ever-increasing share of oil and natural gas will come from OPEC countries that are often hostile to the interests of the United States. This long-term rising strategic dependence and increasing wealth transfer is not in the best interest of the United States. Adopting fossil carbon limits will provide a strong and sustained market signal that will spur clean energy technology innovation and domestic production of alternative fuels and energy technologies that will reduce rather than increase the security threats posed by dependence on fossil energy imports.

Business-as-usual will be very costly to the economy and the environment.

The alternative to emissions reductions—continuing on a business-as-usual path while risking irreversible economic and environmental impacts and ever-increasing foreign energy dependence—is untenable and could cause trillions of dollars in economic dislocation and adaptation costs. The 2007 Stern Review on the Economics of Climate Change estimated that climate change impacts could cost as much as five percent of annual world Gross Domestic Product during the latter part of this century, if climate change goes unabated.

Business-as-usual will be very costly to U.S. economic competitiveness.

A report by the International Energy Agency issued last year found that over the next half-century investment totaling \$45 trillion might be needed to prevent energy shortages and greenhouse gas emissions from undermining global economic growth.¹ While the extent to which this market is served by clean, renewable, and carbon-free energy sources and technologies will have far-reaching implications for the global environment and climate, it has equally important implications for U.S. economic competitiveness. According to a recent report of the President’s Economic Recovery Advisory Board,

“If the U.S. fails to adopt an economy-wide carbon abatement program, we will continue to cede leadership in new energy technology. The U.S. is now home to only two of the ten largest solar photovoltaic producers in the world, two of the top ten wind turbine producers and one of the top ten advanced battery manufacturers. That is, only one-sixth of the world’s top renewable energy manufacturers are based in the United States. ... Sustainable technologies in solar, wind, electric vehicles, nuclear and other innovations will drive the future global economy. We can either invest in policies to build U.S. leadership in these new industries and jobs today, or we can continue with business as usual and buy windmills from Europe, batteries from Japan and solar panels from Asia.”

China, in particular, is positioning itself to be a leader in carbon-free energy. A recent study by HSBC Global Research in Hong Kong concludes that 40 percent of China’s \$586 billion stimulus plan—\$221 billion over two years—is going toward public investment in renewable energy, low-carbon vehicles, high-speed rail, an advanced electric grid, efficiency improvements, and other water-treatment and pollution controls. This spending is in addition to historic levels of government spending and private investment in renewable technology, energy efficiency and low-carbon energy. China has also set a renewable energy standard that roughly doubles by 2020 to 15% and is on pace to have the greatest renewable energy capacity in the world. The

U.S. simply cannot afford to remain idle if it wants to lead the low-carbon energy future and remain competitive in the evolving global economy.

Does it make sense to address climate change during a recession?

It is important for the United States to adopt the CLEAR Act now for several reasons. First, new scientific findings continually suggest that changes to the Earth's climate are occurring more rapidly than scientists had anticipated just two years ago, when the Intergovernmental Panel on Climate Change (IPCC) issued its most recent assessment of climate science, and for which the IPCC was awarded the Nobel Peace Prize. The science indicates clearly that policy action can not be delayed any longer. Second, the CLEAR Act, if adopted now, would enter into force in 2012, allowing the U.S. economy a three-year period to recover from the current recession. Moreover, even after the CLEAR Act's entry into force, the upstream cap remains fixed at 2012 emissions levels until 2015 to facilitate a gentle onset to the emissions reduction schedule and allow industry lead time for planning and investment in anticipation of the policy. Finally, the CLEAR Act's refund mechanism is designed to compensate consumers directly for increases in energy prices resulting from the policy. This provision keeps the majority of American households whole, fully or more than fully offsetting energy cost increases, regardless of the state of the overall economy in any given year.

In a recent column, Nobel Laureate economist Paul Krugman wrote:

[I]n fact, this is an especially good time to act, because the prospect of climate-change legislation could spur more investment spending.

Consider, for example, the case of investment in office buildings. Right now, with vacancy rates soaring and rents plunging, there's not much reason to start new buildings. But suppose that a corporation that already owns buildings learns that over the next few years there will be growing incentives to make those buildings more energy-efficient. Then it might well decide to start the retrofitting now, when construction workers are easy to find and material prices are low.

The same logic would apply to many parts of the economy, so that climate change legislation would probably mean more investment over all. And more investment spending is exactly what the economy needs.

Couldn't we just wait until better technologies are available to reduce the cost of cutting emissions?

There is a significant insurance value associated with earlier rather than later action. The longer action is postponed, the larger the risks and potential economic impact become. Moreover, the sooner reductions are made, the lower the costs of reaching necessary carbon reduction goals. For example, delaying a carbon reduction program by just three years would mean that the rate of emissions reduction would have to nearly double to meet the same emissions stabilization level in 2050. There is already a large body of off-the-shelf clean energy technologies that can be deployed today. According to the McKinsey study, existing energy efficiency technologies could enable the United States to offset approximately 85 percent of

projected incremental electricity demand to 2030, largely negating the need for more power plants.

Also, policy actions undertaken now to avert the worst potential impacts of climate change or abrupt changes in climate will create incentives to accelerate the development and deployment of new energy technologies and, as mentioned earlier, many opportunities for the development of new businesses and industries.

ISSUES WITH CAP-AND-TRADE AND CARBON TAXES PROPOSALS

Traditional cap-and-trade and carbon tax approaches must choose between emissions certainty and price certainty.

Standard cap-and-trade approaches provide strict limits on emissions over the period of regulation, but they cannot provide price certainty. In fact, price volatility characterizes many existing cap-and-trade markets (e.g. the U.S. sulfur dioxide permit market and the European Union's Emissions Trading Scheme.) Conversely, standard carbon tax approaches provide an explicit treatment of price at the expense of emissions certainty. The CLEAR Act, however, follows a hybrid approach that sets solid limits on both emissions and price, achieving emissions reductions primarily through a stable, consistent price signal; the cap provides insurance against price indifference and other barriers.

Isn't there a consensus that cap-and-trade is the most effective system, and isn't that what Europe is already doing under the Kyoto Protocol?

There is increasing concern that cap-and-trade systems may not be the most effective or equitable means of addressing greenhouse emissions, although cap-and-trade is now in use in several places and one such scheme, the Waxman-Markey American Clean Energy and Security Act (HR 2454), recently cleared the U.S. House of Representatives by a narrow and overwhelmingly partisan vote of 219 to 212. For example, in 2005, the European Union's (EU) Emissions Trading Scheme was launched to manage carbon emissions as part of the EU's commitment under the Kyoto Protocol. Similarly, ten states in the U.S. Northeast recently launched the Regional Greenhouse Gas Initiative, a cap-and-trade system aiming to achieve a collective 10% reduction in greenhouse gas emissions by 2018. While these systems may achieve varying degrees of success in reducing emissions, there have been persistent concerns and conflicts surrounding emission allowances, sectoral coverage, the role of offsets, price volatility, windfalls for historic emitters, and opportunity for market manipulation.

Moreover, analyses of the cap-and-trade proposals that have been introduced in Congress over the past few years have shown that a strongly regressive income effect would be a likely outcome, since large corporations and financial firms would be the largest beneficiaries of the allowance distribution and trading process. The distribution of free allowances under HR 2454

also gives preferential treatment to the largest historic greenhouse gas emitters, who receive the majority of allowances given away by the federal government.

Isn't a carbon tax the most efficient, market-friendly way to reduce greenhouse gas emissions?

Under a carbon tax, the government would increase the costs of carbon emission sources, usually fossil fuels, to persuade or compel consumers to reduce their fossil fuel energy use. While relatively simple to administer, a carbon tax can create unnecessary and unacceptable burdens on family budgets, especially low income consumers.

The principal drawback to a tax approach is the inherent uncertainty regarding the amount of emissions reduction achievable at a given tax rate. The propensity to offer exemptions to taxes due to distributional concerns also exacerbates the problem of emissions uncertainty and the realization of environmental goals. While taxes could be adjusted periodically to try to bring emissions in line with policy goals, this process would be unwieldy and difficult to implement politically.

Moreover, there is considerable evidence that a carbon tax, because of its *exclusive* reliance on a price signal, could have to be unacceptably high to force consumers away from traditional fuels and meet emission targets. Recent research published by the Congressional Budget Office (CBO) suggests that consumers are not very responsive to changes in the price of gasoline for several reasons. CBO found, for example, that consumers are currently only about one-fifth as responsive to short-run changes in gasoline prices as they were several decades ago in part due to growth in real income which has rendered gasoline a smaller share of consumers' purchases from disposable income. CBO also found that price sensitivity declined because a gallon of gasoline takes a car farther than it did in the past because of the success of fuel economy standards. The study found that a \$0.50 per gallon increase in gasoline prices resulted in only a reduction of 0.7 percent in vehicles miles travelled on California freeways. Nationwide, when gasoline prices exceeded \$4 last year, demand only declined by about five percent. European and some Asian drivers regularly pay \$6 to \$8 a gallon of gasoline with relatively little impact on driving habits.

Finally, carbon tax burdens can exacerbate economic downturns as they become more pronounced. That dynamic is contrasted with the CLEAR Act's cap & refund approach that is almost as simple to administer as a carbon tax but whose costs naturally decline during a recession since reduced demand means less bidding activity for the same number of carbon shares. In other words, the CLEAR Act is counter-cyclical, while a standard carbon tax is not.

Wouldn't it make more sense to regulate only those industries or sectors that emit the most greenhouse gases?

Piecemeal regulation is likely to be more costly and less effective than a comprehensive approach that sends consistent price signals and incentives economy-wide. From an economic

standpoint, regulating only large emitters could result in missed opportunities for less expensive emissions reduction elsewhere in the economy. Moreover, a sectoral or industry-based approach to emissions litigation necessarily entails the government's picking winners and losers in climate policy. The CLEAR Act takes an even-handed approach by focusing on fossil carbon itself at the farthest upstream point in the system and then setting clear and consistent price signals to which all industries and end users can respond in the ways they find most cost-effective for themselves.

Why is it so important to get climate policy right the first time?

Climate policy will impact all economic sectors over a long period—getting the policy right the first time is essential. A flawed approach could impose significant and unnecessary costs and prevent America from realizing a tremendous economic opportunity and becoming a leader in the largest market of the 21st century. And because of the start-up costs and initial investments required, whatever climate policy is enacted first will most likely become locked-in and constrain future options significantly.

THE CLEAR ACT: AN ALTERNATIVE “CAP & REFUND” APPROACH TO CLIMATE POLICY

Why Is the Point of Regulation Upstream under the CLEAR Act?

There are several advantages to the CLEAR Act's upstream point of regulation—an upstream carbon cap mandating that fossil energy producers and importers purchase allowances in proportion to the carbon content of fossil fuels they bring into the economy. The upstream cap could effectively cover close to 100 percent of carbon dioxide emissions from fossil carbon by regulating the relatively small number of first sellers of carbon—approximately 3,000 upstream entities that produce or import fossil fuels. Compared with downstream regulation that generally applies to a subset of economic sectors, an economy-wide upstream cap expands low-cost emissions reduction possibilities throughout the entire economy and thus helps to reduce emissions abatement costs. Economy-wide coverage also provides abatement flexibility that can facilitate the achievement of emissions reductions goals even when there are persistent cost uncertainties across sectors.

Combined with an auction in which 100 percent of allowances are sold, upstream regulation ensures fairness by establishing a clear and consistent carbon price signal that runs across all sectors equally, extends from the upstream producer to the final consumer, and provides ongoing incentives for technological innovation and efficiency throughout the economy. For example, fossil fuels produced for use in the transportation sector are treated in exactly the same manner as fossil fuels produced for all other sectors. The upstream cap avoids the problem of partial fossil fuel emissions coverage and verification (both frequent criticisms of other points of regulation) because the carbon content is accounted for prior to it is spread downstream throughout the economy.

The CLEAR Act's upstream cap at the wellhead, mine entrance, or port of entry achieves full coverage of fossil carbon introduced into the U.S. economy that constitutes roughly 96 percent of all carbon dioxide emissions, 93 percent of the total annual U.S. greenhouse gas emissions by weight, and 82 percent of the total annual U.S. greenhouse gas emissions by global warming potential. By managing carbon as it enters the economy, the CLEAR Act eliminates the complexity of downstream emissions accounting. An upstream cap curtails arbitrage opportunities likely to result from a piecemeal, sector-by-sector regulatory approach that would result from downstream emission limits. Again, capping fossil carbon before it enters into commerce also allows any resulting carbon price signal to flow down throughout the economy guided by market forces and providing efficiency incentives throughout the economy, all the way down to final consumers. Finally, an upstream cap also minimizes regional income disparities (see page 19).

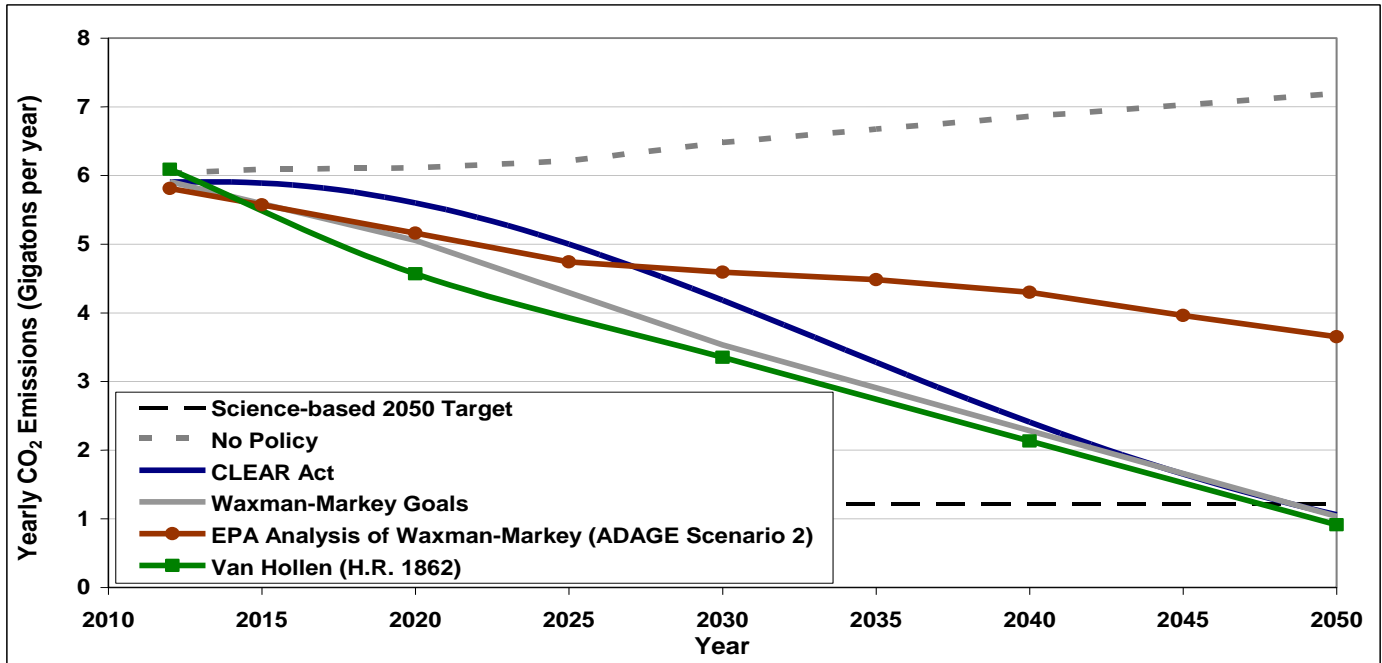
How does the CLEAR Act figure out how much CO₂ a facility has emitted historically and verify that its emissions are declining to meet the goals of the cap?

The CLEAR Act moves the primary monitoring and compliance functions upstream, where carbon first enters the economy. Upstream monitoring is far simpler to administer than a downstream system that sells or gives permits to individual emitters because it is based on the notion that if carbon does not enter the economy, it cannot leave it. All carbon in the economy would be covered and no smokestacks would have to be monitored.

A principal enforcement mechanism would consist of a requirement that fossil fuel suppliers (large companies that already report the quantities of fuel they sell) to periodically 'true-up' every other year by showing they own permits equal to the carbon content of the fuels they sold into U.S. commerce. Companies would be subject to carbon audits and spot checks to ensure compliance. Any firms found out of compliance would pay five times the carbon share price set at the auction whose date is closest to that of the sale of the fossil carbon subject to a noncompliance penalty.

How does the CLEAR Act set fossil carbon limits?

The cap would initially be set by the President based on the U.S. economy's projected carbon dioxide emissions for 2012, the first year of the policy. The carbon cap would be held constant at the 2012 level for the first two years of the policy. In 2015, and in each year thereafter, the cap would decline at an accelerating rate that increases by 0.25 percent every yearⁱⁱ, resulting in an emissions reduction schedule that would achieve more than 80 percent reductions in carbon dioxide emissions (from 2005 levels) by 2050 (see Figure below).



The CLEAR Act’s gradual and more cost-effective reduction rate minimizes the impacts of emission reductions by providing industry sufficient lead time for planning and investment in new, less carbon-intensive and efficient equipment and facilities.

By using a carbon budget approach to emissions reduction, the CLEAR Act avoids difficulties associated with the determination of historic emission levels for various industries, economic sectors, and countries, and also greatly curtails opportunities for “gaming” the system through base year manipulation. This “begin where you are” approach, will result in real and immediate emissions reductions from year one and scientifically-grounded reductions in future years.

Why does the President set the initial emissions baseline level?

The CLEAR Act directs the President to set the initial emissions level one year prior to the Act’s entry into force in 2012. The CLEAR Act does not specify an initial emissions level because of the many factors that can intervene to influence them. For example, the current recession has reduced U.S. greenhouse gas emissions by some 6 percent from 2006 levels. The President’s determination of baseline emissions one year prior to the CLEAR Act’s entry into force will facilitate a more accurate baseline estimate and provide some planning and investment certainty in the months leading up to the policy’s implementation.

What happens if the emissions reduction schedule needs to be adjusted later?

The President may adjust to the emissions reduction schedule (which sets the rate of emissions reduction in each year from 2012-2050) with “fast track” approval from Congress—a joint resolution, passed by a simple majority in both Houses.

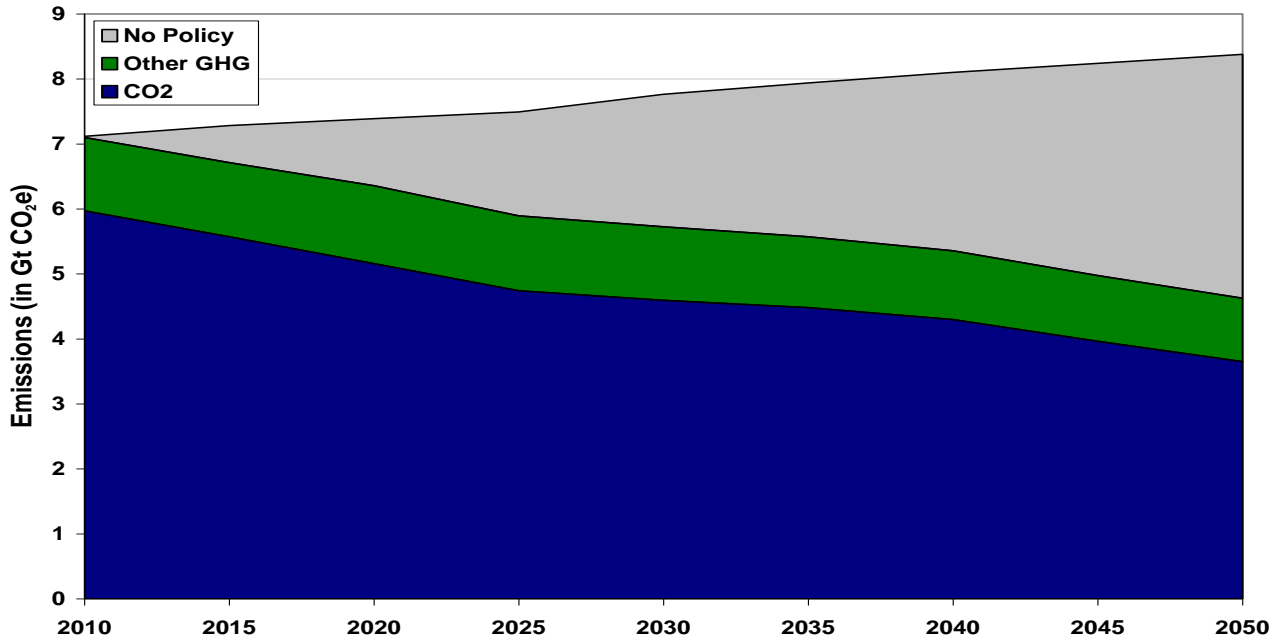
Why doesn't the CLEAR Act cap non-CO₂ greenhouse gases?

Other greenhouse gases (GHGs) are not included in the cap for a number of reasons:

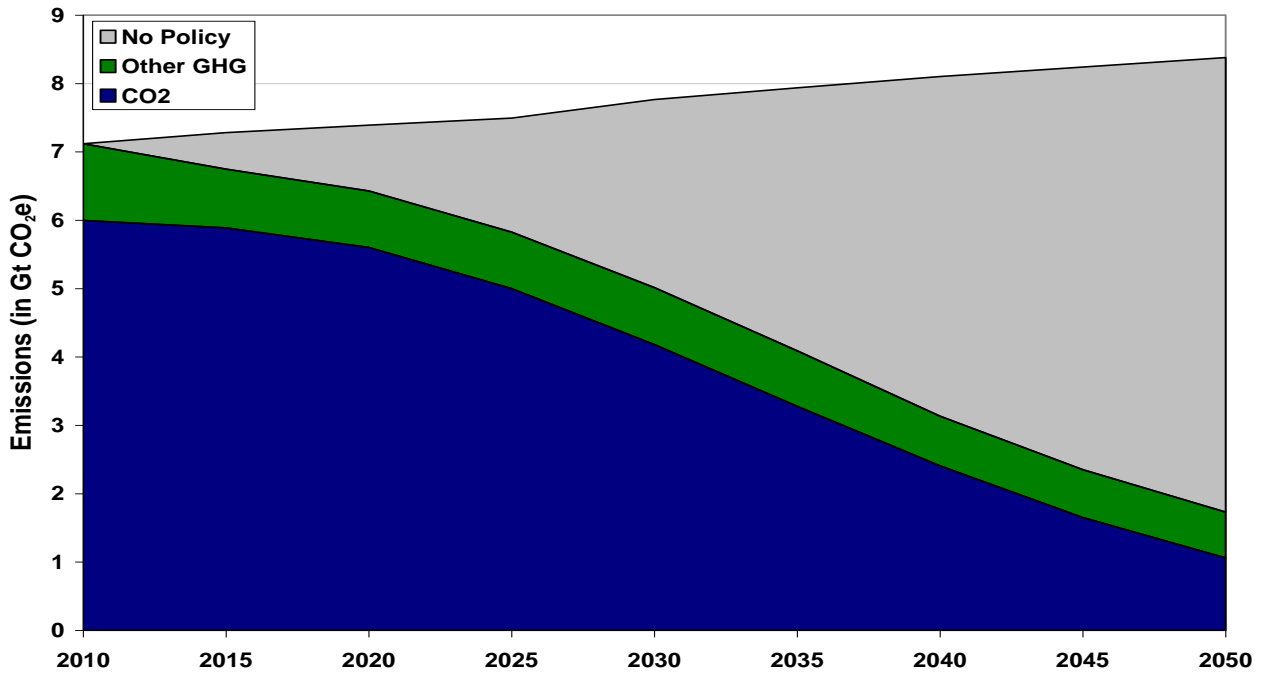
- Each greenhouse gas has unique physical and chemical properties, distinct atmospheric longevity (ranging from ten years to several centuries) and dissimilar sources, rendering the gases imperfect substitutes for one another. Thus, the inclusion of multiple gases under a single cap could impose significant economic burdens on emitters of some gases, yet achieve relatively small environmental benefits.
- Carbon dioxide constitutes the overwhelming share of global GHG emissions-- approximately 97% of the total GHG emission by weight and 85% of the total by global warming potential (over 100 years).
- The emission of carbon dioxide poses unique threats in making our oceans more acidic.
- Because most other anthropogenic GHGs are emitted in much smaller quantities and from more distinct sources and sectors than carbon dioxide, their inclusion in the upstream cap would create significant overall inefficiencies, inhibiting a timely transition to clean energy.

The CLEAR Act addresses non-CO₂ greenhouse gas individually and directly through projects underwritten by the CERT Fund (see page 9). Analysis of the EPA's marginal abatement cost curves for non-CO₂ GHGs concludes that only 10 to 15 percent of the expected CERT fund revenues will be needed for the mitigation of GHGs other than carbon dioxide to meet an 80 percent reduction by 2050. The figures below compare the emissions of GHGs for the CLEAR Act and Waxman-Markey, as projected by EPA's ADAGE model. Due to Waxman-Markey's heavy reliance on offsets—both domestic and international—the CLEAR Act results in fewer emissions of both carbon dioxide and non-CO₂ GHGs by 2030.

EPA Analysis of Waxman-Markey (ADAGE Scn. 2)



CLEAR Act



THE CLEAR ACT'S EMISSIONS REDUCTION STANDARDS

What level of emissions reduction does the CLEAR Act achieve by 2020?

Assuming that 42 percent of the CERT Fund are used for direct greenhouse gas emissions reduction efforts, the CLEAR Act reduces greenhouse gas emissions by 20 percent from 2005 levels by 2020.

Specifically, these reductions are achieved through a combination of:

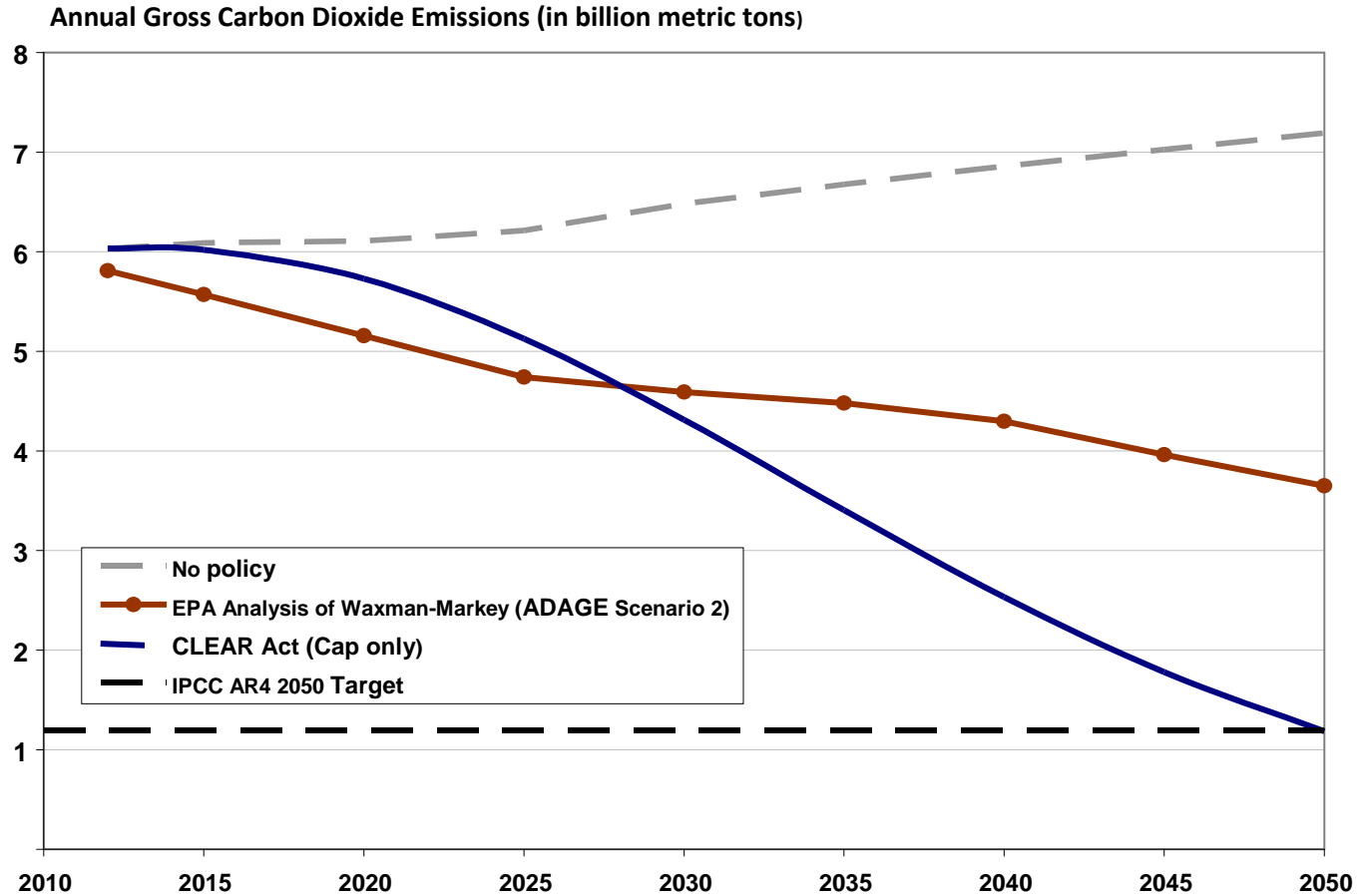
1. The bill's upstream cap on energy-related carbon dioxide emissions,
2. Allocating 3 percent of expected auction revenues for investments in the abatement of non-carbon greenhouse gases such as methane, nitrous oxide, and hydrofluorocarbons (HFCs), and
3. Allocating 7.5 percent of expected auction revenues for investments in a variety of other domestic and international emissions reduction projects such as energy efficiency, and agricultural and forestry sequestration efforts (basically projects that are used as offsets under a cap-and-trade approach).

In other words, by relying strictly on the market incentives provided by the upstream cap and auction mechanisms, the CLEAR Act achieves real and durable emissions reductions comparable in the early years to those projected in EPA's analysis of the American Clean Energy and Security (ACES) bill, and exceeding President Obama's stated goal of 14 percent reductions relative to 2005 by 2020.

While the House-passed climate bill's greenhouse gas targets may appear to achieve deeper emissions cuts than the CLEAR Act in the early years (e.g., 2012 through 2025), this impression does not account for its extensive reliance on domestic and international offsets as compliance instruments. Accordingly, EPA's analysis of ACES finds that gross annual emissions do not decrease nearly as much as the cap due to the large number of used offsets.

What level of emissions reduction does the CLEAR Act achieve by 2050?

By 2050, the CLEAR Act achieves both an 81 to 83 percent reduction of gross CO₂ emissions and an 81 percent reduction of net CO₂ equivalent emissions relative to 2005 levels. The upstream cap on fossil carbon alone achieves the gross CO₂ emissions target (see figure below), while roughly a third of the CERT fund is required to be spent on offset-like projects to achieve the net emissions target.



What are the cumulative emissions from 2012 to 2050 under the CLEAR Act?

The CLEAR Act's cumulative gross CO₂ equivalent emissions from 2012 to 2050 are estimated at 185.3 gigatons, compared with 235 – 244 gigatons under H.R. 2454.ⁱⁱⁱ

Specifically, the CLEAR Act's upstream cap on fossil carbon alone limits cumulative gross emissions to 202.8 gigatons. An additional 17.5 gigatons of gross emission reductions comes from assuming 12 percent of the CERT fund will be used to finance non-CO₂ emissions reduction efforts.

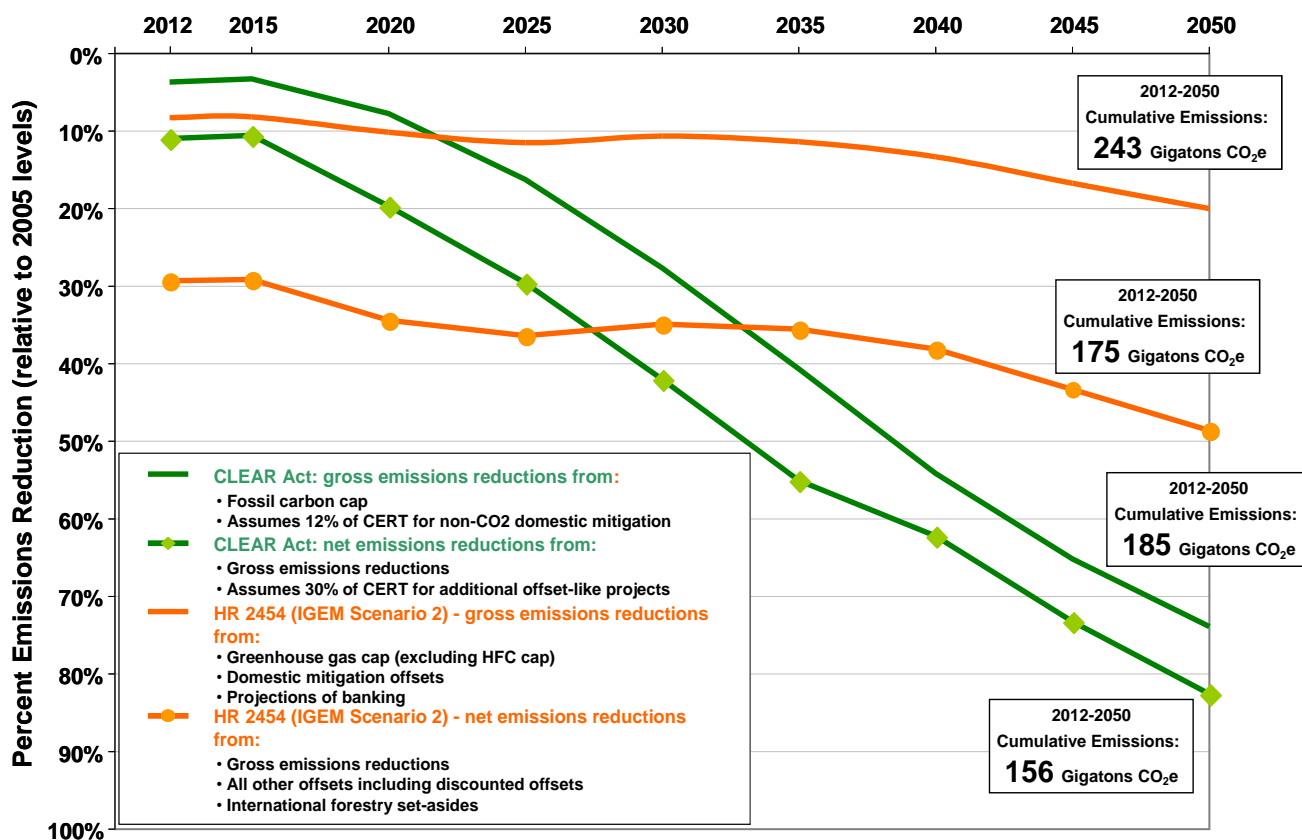
Assuming that an additional 30 percent of the CERT funds (7.5 percent of expected auction revenues) are spent on other offset-like projects, net emissions between 2012 and 2050 would be as low as 156 gigatons CO₂ equivalent under the CLEAR Act. The EPA's analysis of H.R. 2454 suggests that net cumulative emissions under that bill would be 165–174 gigatons CO₂ equivalent, when including discounted offsets and forestry set-asides^{iv} but not the separate HFC cap.

Cumulatively, the CLEAR Act attains its long-term emissions reductions targets with 17.4 gigatons of non-CO₂ mitigation and 29.7 gigatons of other offset-like projects (approximately

15.6 gigatons domestic and 14.1 gigatons international), approximately half of the 56 gigatons of offsets (roughly 12 gigatons domestic and 44 gigatons international) that EPA’s analysis estimates will result from the ACES bill.

The figure below compares the annual and cumulative emissions reductions achieved by the CLEAR Act with those of H.R. 2454, as estimated in EPA’s analysis. The annual emissions levels are further broken into gross and net emissions. Although net greenhouse gas emissions capture the effect of the policy on climate change mitigation, gross greenhouse gas emissions better represent the effect of the policy on the transition to a low-carbon economy. Also, gross emissions may turn out to represent the upper limit of net emissions in the case that offsets turn out to be not real or permanent.

Gross and Net Annual and Cumulative Emissions: H.R. 2454 and The CLEAR Act



Gross emissions reductions under the CLEAR Act come from the upstream cap on fossil carbon and the use of twelve percent of the CERT fund (or 3 percent of total auction revenues) to reduce non-CO2 greenhouse gases that are not included in the upstream emissions cap. Under the CLEAR Act, the difference between the gross and net emissions lines in the figure results from the assumed use of an additional thirty percent of the CERT fund (or 7 percent of total

auction revenues) to fund terrestrial sequestration and other offset-like projects. While these efforts resemble offset projects, emissions reductions achieved through this mechanism are never counted toward the emissions goals of the cap.

The CLEAR Act's net cumulative emissions from 2012 through 2050 amount to 156 gigatons of CO₂ equivalent. The corresponding cumulative gross emissions amount to 185 gigatons of CO₂ equivalent. These cumulative emissions are substantially less than those for the no policy case (303 gigatons of CO₂ equivalent) and compare favorably to those of ACES (175 to 243 gigatons of CO₂ equivalent) as projected in IGEM scenario 2 model.

Under HR 2454, gross greenhouse gas emissions fall by only 20 percent from 2005 levels by 2050, as a result of the bill's reliance on some 56 cumulative gigatons of domestic and international offsets to meet its emissions targets. According to EPA's analysis (IGEM scenario 2), the unlimited banking provision in ACES does lead to sharper emissions reductions initially, with 1.5 gigatons of allowances being banked in 2012, the first year of the policy, but dampens actual greenhouse gas emissions cuts in the long term, thereby effectively flattening the reduction curve.

Because the prices of offsets and allowances are expected to rise over time, EPA assumes that under the House-passed bill covered entities' bank free allowances early on and simultaneously rely heavily on offsets while they are also relatively cheap. Covered entities eventually use an increasing share of banked allowances over time, while continuing to rely heavily on offsets, to minimize and levelize their costs over the life of the policy (2012-2050). The government's overallocation of allowances and offsets in the first years of ACES (for example, supply is approximately 0.9 gigatons more than anticipated demand in 2012) creates significant slack in the policy that, through banking, ultimately allows emissions levels to remain higher in the later years of the policy.

Is it really necessary to reduce emissions by 80% relative to 2005 by 2050?

The goal of the CLEAR Act is to ensure a stable climate for current and future generations. According to the best available scientific assessment of climate change, published by the Intergovernmental Panel on Climate Change in 2007, long-term climate stabilization demands that global average temperatures not be allowed to rise more than 2 degrees Celsius above pre-industrial levels. Holding temperatures under the 2 degree Celsius threshold requires that atmospheric greenhouse gas concentrations are stabilized below 500 parts per million carbon dioxide equivalent. This stabilization goal corresponds with at least an 80 percent reduction in global greenhouse gas emissions from 2005 levels by mid-century.

The 80 percent greenhouse gas reduction target is now a mainstream goal that has been embraced by a wide range of governmental and industry groups. For example, at its July 2009 annual meeting, the G-8 leaders stated that they "support a goal of developed countries reducing emissions of greenhouse gases in aggregate by 80% or more by 2050 compared to 1990 or more recent years." Similarly, the Edison Electric Institute (EEI), an industry association

representing U.S. coal-fired electric power companies, stated in July 2009 that it supports the same goals.

From: <http://www.barackobama.com/pdf/issues/EnvironmentFactSheet.pdf>

100 Percent Allowance Auction: Barack Obama and Joe Biden's cap-and-trade system will require all pollution credits to be auctioned. A 100 percent auction ensures that all large corporate polluters pay for every ton of emissions they release, rather than giving these emission rights away for free to coal and oil companies.

What does the CLEAR Act do with auction proceeds?

Under the CLEAR Act, three quarters of auction proceeds would be paid out equally and directly each month to every U.S. citizen and legal resident, regardless of their age, income, or level of energy use. Refund income would be non-taxable and would put cash back in consumers' pockets directly, which for most low and middle income families will offset any price increases passed on to them by upstream fossil fuel producers or importers. An important feature of the system is that it would provide a strong incentive for energy efficiency—the more energy efficient consumers become, the greater the share of dividends that would remain in their pockets.

The remaining quarter of auction revenues would be directed to a dedicated trust, the Clean Energy Reinvestment Trust (CERT) Fund. The CERT Fund would finance a variety of essential climate mitigation and adaptation programs. The CLEAR Act does not allow auction proceeds to be used for non-climate related purposes such as deficit reduction, tax cuts, or funding other programs like universal health care.

Is it possible to give out monthly refund payments to every legal U.S. resident?

There are several systems already in place at the federal and state levels, including those administered by the Social Security Administration, the Internal Revenue Service, the Supplemental Nutritional Assistance Program, and the Alaska Permanent Fund, that make regular payments to large populations. The refund mechanism established under the CLEAR Act would draw on design features and databases of existing programs to create a system capable of reaching the U.S. population regularly and accurately.

Office of Management and Budget Director Peter Orszag declared in Congressional testimony last March that *"If you didn't auction the permits it would represent the largest corporate welfare program that has ever been enacted in the history of the United States. All of the evidence suggests that what would occur is that corporate profits would increase by approximately the value of the permits."*

The CLEAR Act grants refund program administrators the discretion to adjust the frequency of refund distributions in order to minimize administrative costs or to increase the value of each refund payment.

How will the Clean Energy Reinvestment Trust (CERT) Fund address other climate change policy priorities?

The Clean Energy Reinvestment Trust Fund will be allocated annually through normal Congressional budget and appropriations processes. Decisions on the allocation of CERT funds will be made by Congress, not by unaccountable federal bureaucrats. This mechanism leverages existing Congressional procedures and oversight functions and provides the necessary flexibility to adjust allocations to meet changing needs over time and respond to constituent feedback. For example, Congress will likely dedicate a significant share of CERT resources to targeted and region-specific transition assistance programs in the early years of the program and shift a larger share of resources to mitigation and adaptation efforts over time. Relying on the existing appropriations process also would ensure that CERT funds are complementary and not duplicative of other Congressionally-directed spending such as Energy Department R&D, Army Corps of Engineers projects, and existing clean energy tax incentives. CERT Fund programs authorized in the legislation include:

- targeted and region-specific transition assistance to workers, communities, industries, and small businesses of the United States experiencing the greatest economic dislocations due to efforts to reduce carbon emissions and address climate change and ocean acidification;
- targeted and region-specific compensation for early retirement of carbon-intensive facilities, machinery, or related assets in the United States that are stranded by new market dynamics;
- targeted relief for energy-intensive industries, including agriculture, that export their goods or products to countries that do not have similar restrictions on fossil fuels;
- training and development programs to prepare U.S. workers for careers in energy efficiency, renewable energy, and other emerging clean technology industries;
- mitigation of greenhouse gases other than carbon dioxide from fossil carbon and non-greenhouse substances that exacerbate or accelerate climate change (such as black carbon);
- cost-effective domestic and international projects that verifiably reduce, avoid, or sequester greenhouse gas emissions, such as agriculture, forestry, or other land use practices;
- investments in low and no carbon energy and fuels research, development, and deployment activities;
- projects or initiatives that verifiably increase energy efficiency or energy productivity;
- projects or initiatives that support residential fuel switching, particularly home heating oil;
- projects that verifiably increase energy efficiency and otherwise might not be undertaken without assistance;
- weatherization and energy efficiency improvements of low-income and public buildings;
- projects or initiatives that support residential fuel switching (with priority given to projects

or initiatives relating to home heating oil);

- funding for climate change mitigation and adaptation projects, activities and research to increase the resilience of human populations and communities, fish and wildlife, and managed and unmanaged terrestrial, aquatic and marine ecosystems;
- cost-effective projects that provide adaptation services in areas and countries in which climate change or ocean acidification impacts are likely to be most severe;
- programs that protect or advocate for energy consumers relating to changes in rates and services as a result of the CLEAR Act;
- ensuring that the program does not contribute to the budget deficit of the Federal Government.

How will the government verify first sellers' compliance with the CLEAR Act?

Since the number of eligible first sellers will be relatively small, monitoring and auditing them for compliance will be simpler and more frequent under the CLEAR Act than it would be under a policy with a downstream point of regulation and/or with a private secondary market for carbon shares. The CLEAR Act adopts a rolling compliance window. First sellers are allowed two years to balance their sales of fossil carbon with purchases of carbon shares at auction or from other first sellers.

First sellers must also be able to demonstrate compliance (i.e., an equal quantity of carbon shares surrendered for the corresponding quantity of fossil carbon sold) for any period prior to the current two year window. For example, a first seller audited in March of 2015 (prior to the March carbon share auction), would not be asked to demonstrate compliance for the current compliance window, April 2013 through March 2015. However, that first seller could be asked to demonstrate compliance for all periods prior to March 2013.

Does the CLEAR Act allow for carbon "offsets"?

No, although the CERT will fund comparable projects on a competitive basis. A portion of CERT funds, determined annually by Congress, will provide competitive funding for offset-like programs in areas such as agriculture, forestry, animal waste management, or other projects, provided they can satisfy key criteria such as additionality and verifiability.

Verifying and monitoring the additionality and permanence of offsets is a significant challenge. Although many certification methods and agencies exist, there is no generally accepted accounting methodology or independent certification body (domestically or internationally) for offsets, further complicating any prospects for their inclusion in legislation. A 2008 report by the Government Accountability Office found that "the scope of the U.S. voluntary carbon offsets market is uncertain because of limited data...Participants in the offset market face challenges ensuring the credibility of offsets, including problems determining additionality, and the existence of many quality assurance mechanisms."

The House-passed bill, according to the EPA’s analysis, will send \$1.5 *trillion* overseas to fund roughly 51,115 million metric tons of international offsets through 2050. The CLEAR Act implicitly makes the judgment that those funds would be better invested in domestic agriculture and forestry offset projects and to develop U.S.-based jobs and industry to catalyze a transition to a clean energy economy.

How does the CLEAR Act treat agriculture and forestry?

Terrestrial carbon sinks in the U.S. such as agricultural lands, forests and other biomass and soils play critical roles as natural CO₂ sinks and provide multiple opportunities for carbon emissions mitigation, removing as much as 2 gigatons of carbon from the atmosphere each year (more than 25 percent of current U.S. carbon emissions), according to the U.S. Department of Energy. These resources will be relied upon to play an even larger role as an integral component of the CLEAR Act’s emissions mitigation, complementing the upstream carbon cap and efforts to reduce non-CO₂ greenhouse gases. Agriculture and forestry will also be increasingly important future energy sources. As the CLEAR Act’s carbon cap reduces the amount of fossil carbon in the nation’s fuel mix over time, biofuels such as ethanol, biogas, biodiesel, wood wastes and other biomass-derived fuels will meet a larger and larger share of U.S. energy needs.

Because agricultural and forestry sequestration and biofuels expansion must proceed in parallel with emissions mitigation in order to achieve the CLEAR Act’s aggressive greenhouse gas reduction targets, these projects are not included as offset opportunities and may not be used as a substitute for emissions mitigation. Instead, the CLEAR Act finances climate-related agriculture and forestry projects directly through the CERT Fund. Candidate projects will be carefully screened and evaluated for quality, additionality, permanence, and will be awarded on a competitive basis. CERT Fund financed projects will be “stackable,” allowing them to be combined with other funded activities that provide additional public benefits, such as clean water, wildlife habitat, and reduced soil erosion.

While agriculture and forestry will be indispensable tools in addressing climate change, they will also be among the sectors most directly affected by ongoing climate impacts such as rising temperatures, shifting precipitation patterns, and changing growing seasons. Thus, the CLEAR Act also authorizes the use of CERT Fund resources for agriculture and forestry adaptation to augment other government adaptation programs.

THE CLEAR ACT’S PRICE SAFEGUARDS

Why are price safeguards or a price collar necessary? Won’t the auction market find the right price without safeguards?

According to numerous economists and industry experts, price safeguards—explicit minimum and maximum carbon share prices that rise at a known rate over time—provide a critical

degree of price certainty that is a prerequisite to the substantial, long-term clean energy investments required to reduce carbon emissions over time.

While the CLEAR Act allows prices to fluctuate within the limits of the safeguards, it eliminates the deleterious price spikes and excessive volatility that have characterized the U.S. sulfur dioxide permit market and the European Union's Emissions Trading Scheme. For example, over the past several years, sulfur dioxide permit prices have swung from a high of \$1600/ton in 2006 to \$60/ton today—a twenty-six fold swing. In the case of oil, there is widespread agreement that price volatility decreases investment. Accordingly, Federal Reserve economist Steven Kamin noted in March 2008 that “[u]ncertainty about future costs lowers investment” and oil price shocks depress output. As in the oil market, extreme price volatility in the market for carbon shares will actually decrease investment and undermine long-term clean energy goals.

Testifying before Congress in 2005, then-Congressional Budget Office Director Peter Orszag stated that “CO₂ allowance prices could affect energy prices, inflation rates, and the value of imports and exports. If those prices were volatile, they could have disruptive effects on markets for energy and energy-intensive goods and services and could make investment planning difficult.”

Safeguards also increase emissions reductions when the auction clearing price would otherwise be lower than the floor price, and decrease emissions reductions when the cost is high, thereby reducing the total cost of achieving long-term emissions targets. Modeling results recently published by Resources for the Future showed that the cost of carbon abatement in climate change policies with price safeguards was as much as 18 percent lower than it was in policies without safeguards.

How do the CLEAR Act's price safeguards work?

The CLEAR Act's lower price safeguard, or reserve price, is set initially at \$7 in 2012 (the first year of the program) and rises by 6.5% annually plus the rate of inflation in each subsequent year^v. This floor provides certainty that in the future carbon share prices will not fall below known levels giving investors assurance that their assets will not be stranded by collapsing carbon share prices. By reducing risk and uncertainty, a price floor also greatly improves the ability of energy producers, energy-intensive industries, and other private investors to conduct long-term capital planning and secure affordable capital from the financial markets. As Dr. Anne Smith of CRA International testified before the Senate Finance Committee on May 7th, 2009, companies “...will be far more willing to undertake major capital investments in advanced, low-carbon technologies if they have some confidence that the carbon price level will either rise to or continue to remain at levels that make such investments cost-effective.”

The CLEAR Act's upper price safeguard, or ceiling, is set at three times the floor price at \$21 in 2012 and rises by 5.5% annually plus the rate of inflation in each subsequent year. The price ceiling assures investors that exceedingly high carbon share prices will not result in the

premature retirement of capital. In the absence of a price ceiling, energy producers and downstream consumers face significant uncertainties in their month-to-month cash flows. For example, price spikes necessitating large short-term cash outlays could create significant volatility on firms' balance sheets. Even if these costs were ultimately passed downstream and balanced by higher consumer dividend payments, extreme carbon price volatility could make borrowing for new capital investments much more difficult and would hurt the entire U.S. economy. These problems could retard the deployment of newer and cleaner energy technologies and delay the achievement of emissions reduction goals.

Together, a continually rising floor and ceiling provide clear price signals to industry that encourage investments in energy efficiency, renewable energy, and other low-carbon emitting energy technologies. The certainty of rising carbon floor and ceiling price levels also creates critical, sustained incentives for technological innovation and entrepreneurship. In addition, the safeguards facilitate least-cost achievement of the CLEAR Act's emissions reduction goals. As former CBO Director Orszag wrote in the *Washington Post* in July, 2008, "[t]he ceiling would limit firms' expenses when the cost of cutting emissions was high, and the floor would automatically tighten the cap (and thereby increase emission reductions) when the cost of cutting emissions was low."

Won't the CLEAR Act's price safeguards "bust" the cap and result in lower carbon dioxide emission reductions?

No. The figure below, based on data and modeling results from the Global Climate Assessment Model,^{vi} shows that under four possible technology adoption scenarios the CLEAR Act's price safeguards are sufficiently broad (starting at $\pm 50\%$ from the mean carbon share price in 2012 and decreasing to $\pm 35\%$ from the mean price in 2050) to prevent prices from reaching the boundaries except in rare and temporary circumstances and sufficiently predictable to reduce price volatility and provide clear investment signals to industry for planning and investment in less carbon-intensive technologies.

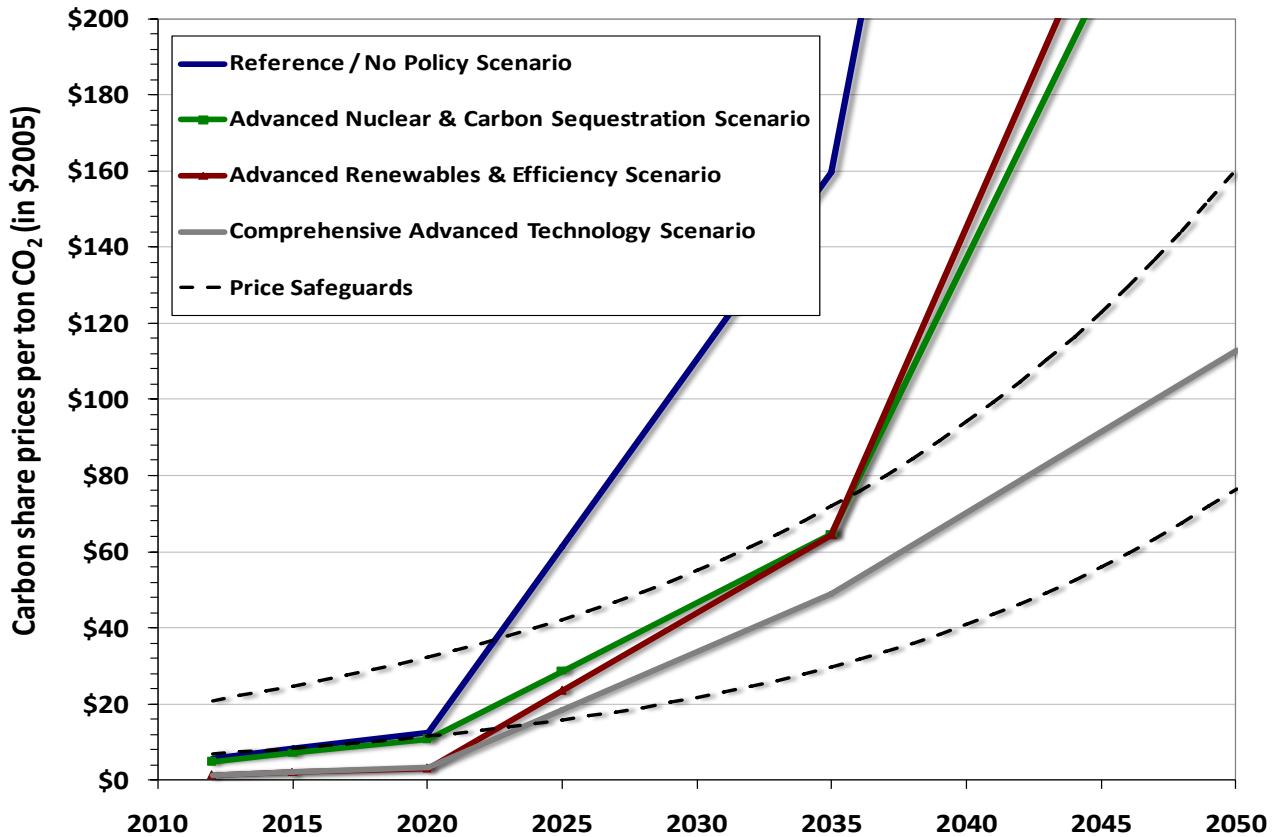
In the rare event that the price safeguards are reached, the CLEAR Act includes several provisions that prevent higher net greenhouse gas emissions. Any revenues raised by the sale of carbon shares in excess of the specified cap level are directed explicitly to the abatement of non-CO₂ emissions outside the cap and to cost-effective projects that verifiably reduce, avoid, or sequester greenhouse gas emissions. Because economists agree that these projects are cheaper than the equivalent CO₂ abatement at the safety valve price, this policy will likely lead to a tighter, not looser, cap when the safety valve is reached—i.e. for every carbon share sold in excess of the cap, emissions will be reduced at least as much and probably more due to relative costs.

How would the CLEAR Act address price volatility in the carbon share auction and secondary markets?

Several features of the CLEAR Act will mitigate carbon share price volatility:

- 1) Participation in auctions would be open only to firms operating in the upstream U.S. energy market and closed to Wall Street traders, speculators, or other firms.
- 2) Auctions would be held monthly and carbon shares would not be tradable on secondary markets. Carbon shares could be traded on a dedicated secondary exchange open only to first sellers—recipients of ‘bonus’ shares for carbon capture or sequestration would only be able to sell their shares on this exchange. Frequent auctions would encourage participants to purchase shares on an as-needed basis, as would the fact that purchasers would only be able to bank carbon shares for ten years, after which time they would expire.

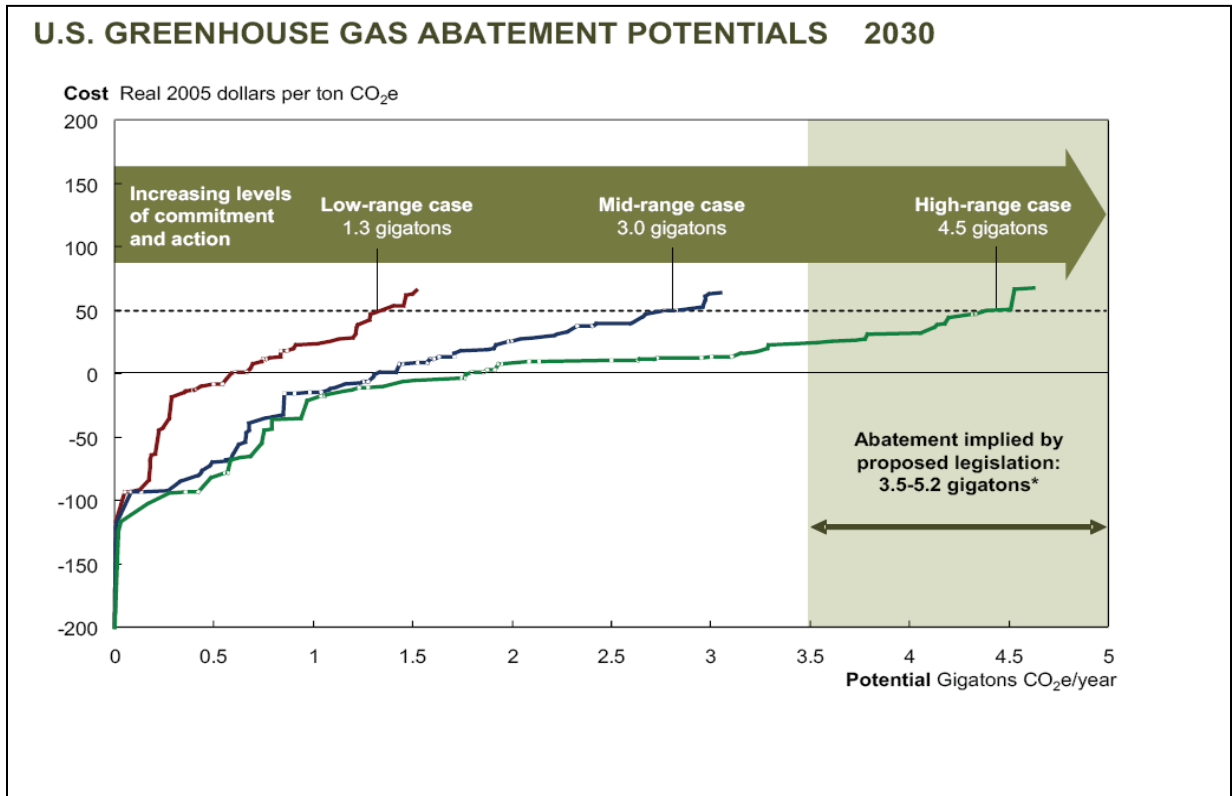
Moreover, while there could be some price volatility in the system, it is also important to note that U.S. industry and consumers have been hurt by very high levels of fossil fuel price volatility in recent years. For example, the price of gasoline fluctuated between \$1.69 and \$4.50 over the course of the past year alone. An important distinction between current fossil fuel market volatility and climate policy-related volatility is the fact that revenues from policy-related volatility would remain inside the U.S. and would be refunded to consumers. Up to now, the primary beneficiaries of fossil fuel market volatility have been foreign producers and multinational corporations. The CLEAR Act also creates incentives for energy producers to move away from fossil fuels and toward non-carbon, domestic energy sources which would reduce demand for fuels that have been responsible for much of the recent price volatility.



Projected permit prices under the CLEAR Act are comparable to those projected for other energy and climate bills recently introduced in Congress. For example, the EPA’s cost estimates for the House-passed bill (HR 2454) are \$13 to \$15 in 2015, \$16 to \$19 in 2020 and \$21 to \$24 in 2025. The price safeguards proposed by the CLEAR Act lie well outside these estimates, as the figure above shows. As noted earlier, EPA estimates that the actual CO₂ emissions reductions under Waxman-Markey are comparable to those in the CLEAR Act through 2030. In fact, the CLEAR Act should be slightly less expensive than Waxman-Markey through 2025, as the modeling results shown in the figure suggest.

The following figure from a recent McKinsey and Company study is further evidence that the price ceiling established under the CLEAR Act is unlikely to be reached. According to McKinsey’s comprehensive analysis, the cost of 2.0 gigatons (GT) of CO₂ equivalent abatement from a reference case in 2030 (which is roughly what the CLEAR Act would require) is significantly less than the \$55 CLEAR Act ceiling price for that year. Moreover, since a significant portion of the CLEAR Act’s auction revenues is devoted to incentives for investment in carbon-free energy technologies, these investments could enable 4.5 GT annual emissions reduction by driving down the cost of clean energy technologies and keeping allowance prices within the safeguard boundaries.

McKinsey & Company, December 2007: 'Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?'



Instead of imposing price safeguards, why not just have a carbon tax?

A carbon tax can define the price but not the quantity of emissions reduction, while a cap with no safeguards can define the quantity of emissions reduction but not the price. The CLEAR Act's combination of a cap and auction with price safeguards allows market forces to find least cost pathways to defined carbon dioxide emissions reduction targets while providing price stability. And unlike a carbon tax, which would need to be continually adjusted to meet emission reduction goals—something that is very difficult politically and results in harmful market uncertainties—the CLEAR Act provides reasonable price certainty for decades into the future. According to Jason Grumet, former executive director of the National Commission on Energy Policy, “[a] price collar or safety valve is a stronger means of reducing volatility.” Economic modeling of the CLEAR Act indicates that emissions targets will be met because the price safeguards will be triggered only during extreme price spikes when the costs of emissions reductions become excessively volatile. By combining market flexibility for cost-efficient emissions reductions with price stability, the CLEAR Act promotes long-term investment and economic growth.

ENERGY AND ECONOMIC EFFECTS OF THE CLEAR ACT

Won't fossil fuel users be disproportionately affected by the CLEAR Act?

The CLEAR Act is designed to be revenue neutral to all mid-stream fossil fuel users. Fossil-fueled power producers should be able to pass on to their ratepayers the marginal fossil fuel price increases resulting from the cap. And unlike the status quo, the CLEAR Act provides greater regulatory certainty resulting in a more stable long-term planning environment for utilities and other power producers.

Moreover, unlike most cap-and-trade proposals, the upstream cap also rewards energy producers and consumers who are early adopters of efficient processes and technologies, because they will have relatively lower operating costs. In addition, the CLEAR Act is non-discriminatory in its imposition of costs on firms within industries, which helps to preserve a level playing field for all competitors.

With an upstream cap, how will Carbon Capture and Sequestration (CCS) facilities and manufacturers of non-emissive fossil fuel (NEFF) products operate?

Under the CLEAR Act, CCS facilities and NEFF product manufacturers receive carbon shares commensurate with the quantity of permanently embedded fossil carbon. Because embedded fossil carbon is never emitted to the atmosphere, the carbon shares given in exchange for embedded carbon are granted in excess of the CLEAR Act's annual fossil carbon limits. These additional shares will have two important effects in that they will enable continued, non-emissive use of coal and other fossil fuels and that they will also allow CCS facilities and NEFF product manufacturers to recoup any additional input costs they might incur in the process of capturing and embedding carbon. This approach to carbon management provides a strong, positive incentive for fossil fuel power plants to reduce their net carbon dioxide emissions through permanent sequestration and keeps NEFF industries like plastics manufacturers whole. Recipients of carbon shares for embedded carbon may either use or monetize the shares at the public exchange for the current market clearing price.

The 'bonus' shares for CCS facilities and NEFF products also reduce the price of carbon shares by increasing their quantity at no cost to the environment. NEFF products alone account for roughly 4% of fossil carbon use.

Won't the CLEAR Act put domestic energy-intensive industries at a competitive disadvantage since foreign firms might not face similar constraints?

'Carbon leakage' occurs when carbon dioxide emissions move from one country to other countries because of a carbon policy. Because these foreign emissions are not subject to the domestic cap and otherwise would not have occurred, carbon leakage threatens the overall integrity and effectiveness of any carbon policy.

Under the CLEAR Act, importers of energy intensive commodities such as steel, glass, or concrete may also be required to pay fees equal to the auction clearing price for the production process carbon used to manufacture their products, subject to U.S. obligations to any international trade agreements to which it is a party.

This requirement will help ensure that domestic manufacturers are not placed at a disadvantage relative to competitors that operate in a country without carbon constraints. The CERT Fund also provides targeted relief to particularly vulnerable industries for their additional costs that arise due to disparate carbon policies among countries. This relief specifically assists energy-intensive industries that export goods or products to countries that do not have similar restrictions or fees on fossil carbon. The CLEAR Act sets guidelines to determine the appropriate targeted relief: those industries or economic sectors that are eligible to receive funding will receive relief that is equal to the average additional cost per unit output of the industry or economic sector multiplied by the number of output units. These guidelines will ensure U.S. competitiveness while preserving the economic incentive for these industries to become more efficient and less dependent on fossil carbon.

The CERT Fund is also designed to fund targeted and region-specific transition assistance to U.S. workers, communities, industry, and small businesses experiencing the greatest economic dislocations due to new carbon limits. Funds are also dedicated to provide compensation for early retirement of carbon-intensive facilities, machinery, or related assets in the United States impacted by efforts to reduce carbon emissions and address climate change and ocean acidification.

How does the CLEAR Act prevent excessive speculation, market manipulation, and a runaway derivatives market?

The only individuals or entities that are allowed to buy carbon shares are those that need the shares to comply with the cap. This means that individuals or entities that do not have a legitimate business need for carbon shares are excluded from both the auction and the public exchange. By keeping the auctions and exchange exclusive, the CLEAR Act ensures that carbon shares will be available to producers and importers of fossil fuels with legitimate business needs. Furthermore, to maintain a fair playing field among regulated entities, the CLEAR Act, which explicitly forbids market manipulation, also sets position limits on the number of carbon shares that can be purchased in any given year or accumulated over the period that the carbon shares are valid. Thus, even individuals or entities that are allowed to buy carbon shares are prohibited from purchasing significantly more shares than needed in any given year and accumulating shares in excess of what could conceivably be used during the lifetime of their accumulated shares.

To prevent any influence on the carbon share price from secondary markets, all carbon share buyers and holders are prohibited from creating, purchasing, selling or trading carbon share derivatives. Regulated entities do not need access to secondary markets because they can pass the carbon share price downstream and manage price risk with a flexible 2-year rolling

compliance period and a 10-year banking window in which shares can be held for future needs.

Other than risk management, the often cited advantages of completely open, uninhibited primary and secondary markets are liquidity and price discovery. Because the CLEAR Act auctions 100% of the carbon shares, regulated entities can easily participate in one of the monthly auctions to acquire any necessary carbon shares, whose availability is guaranteed by the safety valve mechanism. Thus, the need for completely open markets to supply liquidity is not necessary under the CLEAR Act unlike other cap and trade proposals that give away most of the allowances, auctioning only a small percentage. With the 2-year rolling compliance period and 10-year banking window, the regulated entities will discover the real price of the carbon shares without external manipulation or speculation from entities that have no legitimate business need for the shares. Outside speculators are not needed to bolster precautionary demand because unlike oil or natural gas, the number of shares in future years is known. And should carbon shares become extremely scarce, driving the price upward, the explicit price collar ensures the availability of carbon shares at the price ceiling.

How are businesses able to manage their risk under the CLEAR Act?

By keeping the carbon share market safe from excessive speculation and manipulation, the CLEAR Act provides a consistent and predictable price signal. The price collar in particular gives businesses price certainty regarding current and future carbon share prices. In addition to price certainty, the nominal carbon share prices are designed to be manageable. Not only is the carbon share price a modest fraction of the total oil, natural gas and coal prices, but the maximum volatility possible within the price collar is also small compared to the seasonal, annual, and inter-annual price volatility of oil, natural gas, and coal prices.

If for some reason, the risk associated with future carbon share prices necessitates substantial hedging of risk, a futures market will form to meet this need for entities without a compliance obligation -- but only if the price risk becomes great enough to produce a material risk premium. To prevent fraud, market manipulation, excessive speculation and fluctuation in prices, the CLEAR Act mandates that federal regulators provide effective and comprehensive market oversight of any secondary market that forms.

Won't greenhouse gas emissions reductions be too expensive for industry?

While addressing climate change will not be free, mitigation costs are often much less costly than initial estimates and in many cases action can provide net positive revenue streams. For example a recent study by the American Council for an Energy Efficient Economy found that energy efficiency measures could reduce greenhouse gas emissions 20-25 percent, and save consumers \$500 billion annually by 2030. Similarly, a December 2007 McKinsey and Company study on energy efficiency identified 3.0 to 4.5 gigatons greenhouse gas emission reduction potential (roughly 50 percent of current annual U.S. greenhouse gas emissions) through investments that had a marginal cost of less than \$50 per ton CO₂ equivalent and a far lower cost if the U.S. simultaneously took advantage of economy-wide energy efficiency

opportunities. In another example, since Dow Chemical decided in 1994 to pursue energy efficiency and carbon emissions reductions internally, they have saved \$8.6 billion, reduced their energy use by an estimated 1600 trillion BTUs of energy, and averted 86 million metric tons of CO₂ emissions.

What impact will the CLEAR Act have on the federal and state budgets?

The CLEAR Act is likely to spur economic growth by providing consumers with additional income and incentives for energy efficiency that will allow them to retain increasing portions of the refunds over time. Since the CLEAR Act pays for itself through the auction of carbon shares and also creates a revenue stream to fund a variety of related programs including transitional assistance, R&D, and climate change mitigation and adaptation projects, it is likely to be largely revenue neutral to the U.S. Treasury. However, in the event that CBO does calculate a net reduction in GDP as a result of the CLEAR Act, a small portion (approximately 16 percent) of the Fund could be used to ensure that the CLEAR Act not contribute to the federal budget deficit.

States could also elect to levy income taxes on refunds in order to fund programs addressing state- or region-specific problems related to climate change such as economic transition assistance and adaptation projects. States might also choose to direct tax revenues to help offset higher energy costs incurred by state government agencies, which would not receive refunds directly under the CLEAR Act.

“The allocation of allowances specified in H.R. 2454 would impose the largest loss in purchasing power on households near the middle of the income distribution.”

From: “The Economic Effects of Legislation to Reduce Greenhouse-Gas Emissions,” Congressional Budget Office, September 2009, p. 3.

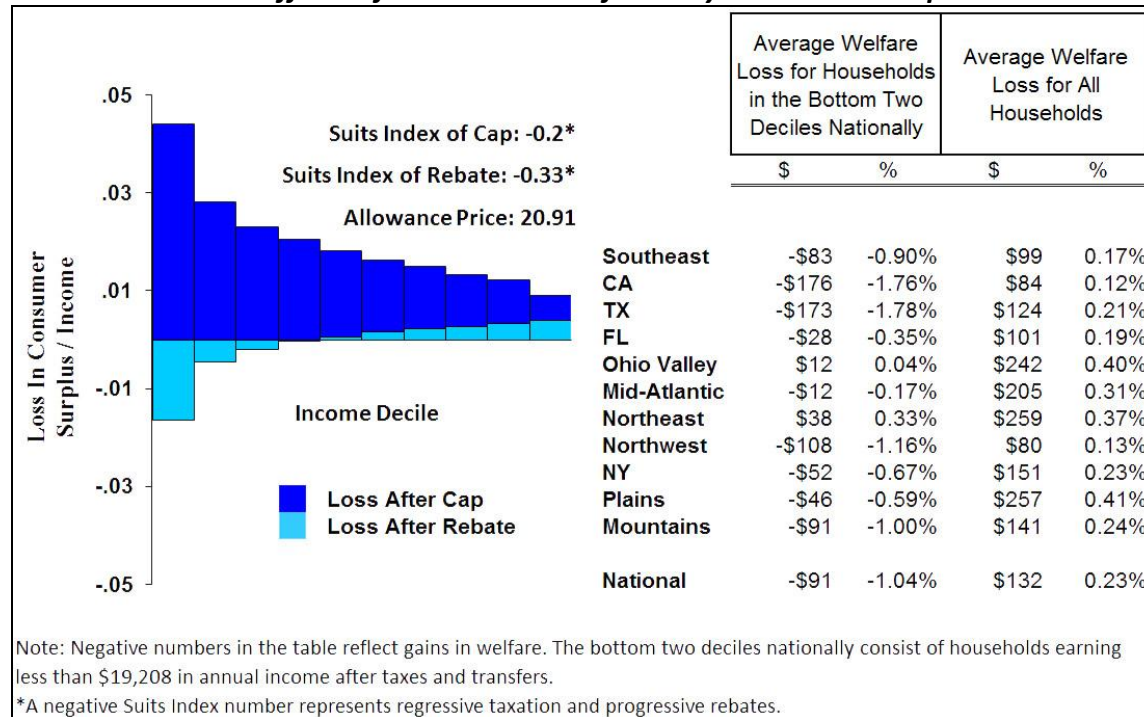
How does the CLEAR Act protect low- and middle-income households?

According to analyses prepared by the Congressional Budget Office and by the independent think tank Resources for the Future, equal per capita refunds to the general public, such as those included in the CLEAR Act, offer the best income protection to lower and middle-income households. As the figure below shows, equal per capita refunds offset climate policy-related energy cost increases fully for almost half of American households, while net costs to upper income households are less than 0.5%. Equal per capita refunds also dampen regional effects of climate policy, resulting in welfare gains in most regions. Under the CLEAR Act, regions incurring nominal net cost increases would be eligible for transition assistance from the CERT Fund to correct these disparities.

In contrast, the House-passed American Clean Energy and Security Act (ACES) allocates 15% of auction allowance value to compensate households in the lowest income quintile only. ACES also grants free emissions allowances to electric and gas utilities, ensuring that upper income households are net winners, principally through rising corporate share values and dividend payments. The 60 percent of households constituting the American middle class are the net

income losers under this cap-and-trade legislation, which offers no provision to offset middle class energy cost increases.

Household Income Effects of Non-Taxable Refund Payments under Cap-and-Dividend Policy



Source: Resources for the Future, 2009

Does the CLEAR Act impose higher costs on people with higher incomes?

The CLEAR Act establishes a uniform price economy-wide on fossil carbon through the upstream cap and auction. Thus, the unit cost of carbon is the same as it applies to each fossil fuel and it follows that a higher carbon fuel (like coal) will experience larger cost increases than a lower carbon fuel (like natural gas).

This structure aims to provide a consistent price signal to all fossil fuel consumers. Wealthier consumers are likely to pay more than lower income consumers as a result of the policy because they are, on average, more intensive per capita fossil energy users. There is a strong correlation between per capita income and per capita energy use. In short, the CLEAR Act does not aim to penalize the upper income deciles specifically for their higher levels of energy consumption, although it does set out to provide clear price signals and strong economic incentives for efficiency, conservation, and fuel switching. We want these incentives to influence the energy choices of consumers of all income levels.

It is also important to recognize that the CLEAR Act's monthly refund mechanism aims to provide additional incentives for more conscientious energy choices. Since the refunds will be distributed on an equal per capita basis, all consumers have some incentive to reduce their carbon-intensity in the interest of retaining a larger share of their monthly carbon refunds. Obviously, the refund payments will represent a larger share of income and thus a stronger motivator for people in the lower income deciles than those in higher ones. Yet, everyone will have something to gain by reducing energy use and keeping more of their refund in their pockets, and this incentive will grow stronger as carbon prices rise over time.

The principle objective of the price signal on fossil carbon is to spur a transition in our energy system and our economy from carbon to non-carbon fuels—not to redistribute wealth or penalize high-income earners. A refund based on carbon consumption would provide work at cross purposes with this objective because it would blunt the price signal. Furthermore, we believe a predictable price signal on carbon will induce investment to capture many of the “free” opportunities for energy efficiency and conservation that can be found throughout the economy. You may have seen the recent McKinsey report which found that \$1.2 trillion is wasted annually as a result of the inefficient use of energy—*excluding* the transportation sector. With only \$520 billion of upfront investment, this waste could be eliminated for a net economy-wide savings of \$680 billion. The upper two deciles are favorably positioned to make these upfront investments in energy efficiency and thereby reap the associated savings.

Does it make sense to pass climate change legislation during a recession?

There are important reasons why the United States should not wait to address climate change. First, the scientific evidence of man-made climate change indicates that the longer we wait to act, the more costly it will be to mitigate climate change and the greater the likelihood that some of the worst impacts will be unavoidable. Acting sooner rather than later preserves a wider range of response options and will help to control the long-term costs of climate policy. Second, recent economic indicators suggest that the U.S. economy may now be emerging from recession and showing early signs of growth. It is also important to recognize that the CLEAR Act, even if passed by the 111th Congress, would not enter into force until January 2012 and demonstrated compliance would not be required until January 2014.

Furthermore, climate change legislation could increase investment spending that would help to kickstart this economy. In a recent column, Nobel Laureate economist Paul Krugman wrote:

[I]n fact, this is an especially good time to act, because the prospect of climate-change legislation could spur more investment spending.

Consider, for example, the case of investment in office buildings. Right now, with vacancy rates soaring and rents plunging, there's not much reason to start new buildings. But suppose that a corporation that already owns buildings learns that over the next few years there will be growing incentives to make those buildings more energy-efficient. Then it might well decide to start the retrofitting now, when construction workers are easy to find and material prices are low.

The same logic would apply to many parts of the economy, so that climate change legislation would probably mean more investment over all. And more investment spending is exactly what the economy needs.

Office of Management and Budget Director Peter Orszag declared in Congressional testimony last March that *"If you didn't auction the permits it would represent the largest corporate welfare program that has ever been enacted in the history of the United States. All of the evidence suggests that what would occur is that corporate profits would increase by approximately the value of the permits."*

THE CLEAR ACT'S MONTHLY DIVIDEND

How would the monthly carbon share auction work?

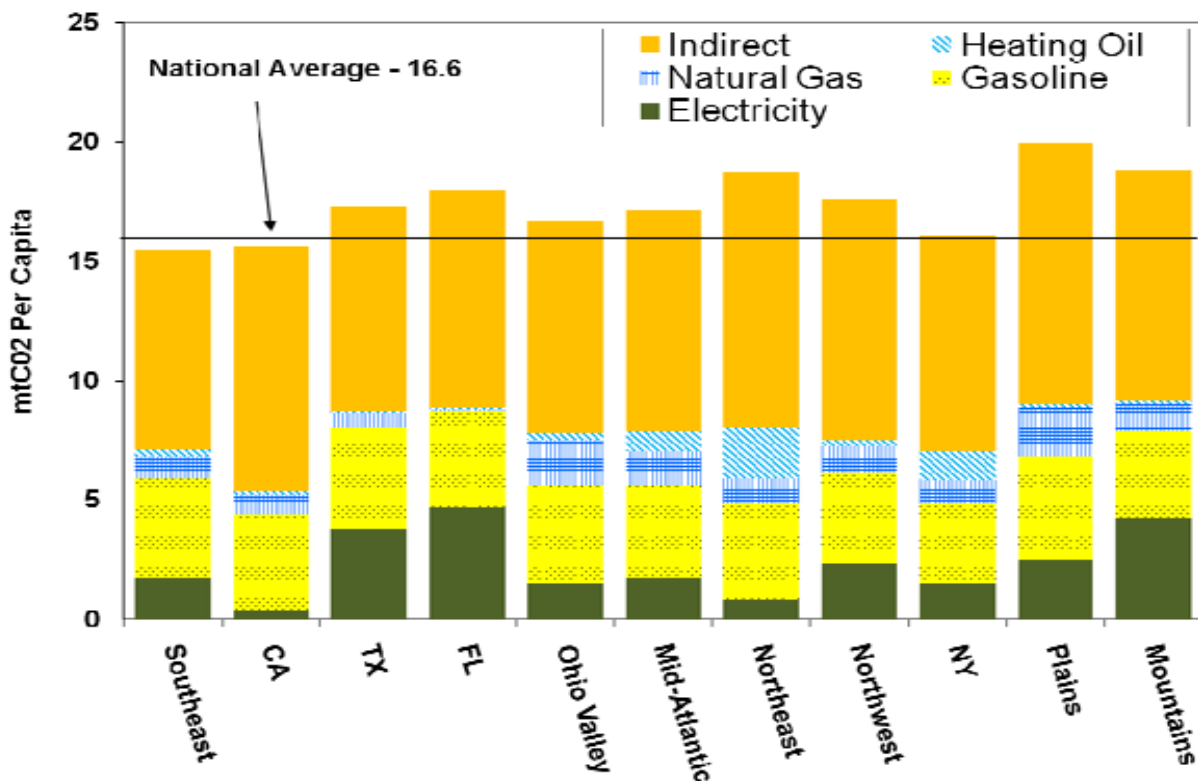
Unlike some cap-and-trade schemes which distort price discovery by providing emission allocations to historic polluters, unlimited banking, borrowing from future years, or allowing the use of unverifiable domestic and international offsets, the CLEAR Act would auction off 100 percent of carbon shares, allowing the market to determine a pure market clearing price for carbon entering the economy.

Participation in the auction would be limited to "first sellers" of carbon--the several thousand energy producing or importing firms operating in the U.S. Once carbon shares were purchased by these firms, they would not be tradable on secondary markets and would expire within two years, although first sellers would be permitted to trade carbon shares among themselves through an open and transparent exchange to accommodate business plan changes or unforeseen events. These design features would ensure that prices are set by stakeholders in the upstream fossil fuel industry based on supply and demand fundamentals, not what's best for the financial markets. Frequent auctions, price reserves and safety valves, and the inability to hoard carbon shares will prevent market speculation and manipulation from causing prices to rise or fluctuate excessively. First sellers who need greater price certainty can utilize the 2-year rolling compliance period and the 10-year banking window in which carbon shares can be redeemed after purchase.

Will the return of carbon auction revenues on a per capita basis result in massive regional income shifts?

The CLEAR Act's upstream cap minimizes regional and state income disparities because carbon use per capita varies remarkably little across the country. So while there may be significant disparities in carbon use per capita when it comes to electricity generation, when a carbon price signal is embedded across the economy from the top-down, as in the CLEAR Act, the cost per capita or by state is actually quite even. The figure below, published by researchers at the non-partisan think tank Resources for the Future^{vii}, illustrates how regional variance in average per capita carbon intensity is relatively small.

Indirect fossil fuel use (the “production process” carbon in products and services such as food, air travel, and other services) rather than direct energy use dampens the majority of regional variance in carbon intensity. Since overall regional fossil fuel intensities do not vary widely, there is not likely to be a significant net regional redistribution of income resulting from the program. A similar study by the Hamilton Project at The Brookings Institution^{viii} found that a per capita lump sum rebate, as in the CLEAR Act, would “not appear to disproportionately burden one region of the country more than any other region.”



Moreover, both market forces and the CERT should help adjust and harmonize any regional variance in refund income effects resulting from differences in regional fuel mix. Price signals will encourage upstream fossil fuel users to move toward less carbon intensive fuels and CERT assistance will help to accelerate the amortization of their most carbon-intensive facilities and spur the deployment of renewable energy technologies.

How could the government get refund payments to the entire U.S. public? Wouldn't some groups fall through the cracks?

There are several systems already in place at the federal and state levels, including those administered by the Social Security Administration, the Internal Revenue Service, the Veterans' Administration, the Railroad Retirement Board, and the Supplemental Nutritional Assistance Program, that make regular payments to large segments of the population. The refund mechanism established under the CLEAR Act would draw on design features and databases of these and other

existing programs to create a system effectively reaching the U.S. population regularly and accurately with electronic payments.

According to a 2008 Government Accountability Office report, some 34 federal benefit programs currently use electronic payments to distribute revenues to recipients regularly. These programs now reach more than 95% of the people in the lowest income quintile, which is likely to be the most challenging segment of the public to reach for refund payments under the CLEAR Act, and up to 98% of the next two income quintiles. Data from this extensive network of federal programs would be indispensable as a means of making refund payments to lower income individuals who often are not required to file income tax returns and who, consequently, might not be identified via Internal Revenue Service or Social Security Administration databases. The remaining upper income quintiles are more easily identified and reached since these groups regularly file annual tax returns and make contributions to (or receive benefits from) Social Security.

Under the CLEAR Act, qualified individuals could elect to have monthly refunds directed to a bank account of their choosing, or to an electronic payment card issued by the government. Those opting for electronic payment cards could use them as they would standard bank or debit cards. Both options satisfy the 1996 Debt Collection Improvement Act requiring federal programs to make payments electronically, while also enabling the government to reach an estimated 11 million individuals who do not have bank accounts or other means of receiving electronic payments.

Wouldn't it be prohibitively expensive to make monthly refund payments?

Issuing dividend payments electronically would significantly reduce the administrative costs associated with the CLEAR Act's monthly refunds. For example, in 2007 the Department of the Treasury estimated that the issuance of a paper check cost the federal government \$0.98, while an electronic payment cost 9¢--a tenfold savings. These cost estimates represent government-wide averages across programs with broad variance in frequency of payment and number of recipients. Considering the large scale and high frequency of electronic payments under the CLEAR Act, individual payment costs are expected to be significantly lower than 9¢. According to Nebraska's state treasurer, Shane Osborn, it only "costs a penny to put money into an account linked to a card" based on that state's experience with electronic payment systems.^{ix} The use of electronic payments streamlines overall administrative costs by reducing paperwork, printing and postage costs, and streamlining administrative processes. Estimates suggest that the total administrative costs of the CLEAR Act would most likely be less than 0.6 percent of program revenues.

How can we be sure the government will safeguard the personal information it collects from the public to issue electronic refund payments?

Several federal laws now in place set out strict guidelines for the government's handling and use of the personal information it gathers from the public, and for the procedures it must follow to notify individuals in the event of a breach of information security. These safeguards have proven highly effective in protecting citizens' personal information while facilitating its use for a variety of benefit distribution programs. For example, the Privacy Act of 1974 governs the collection, use, and dissemination of any "item, collection, or grouping of information"

pertaining to an individual that is maintained by a federal agency in a system of records.^x Also, Title III of the E-Government Act of 2002, the Federal Information Security Management Act (FISMA) of 2002, requires federal government agencies to provide information security protections for agency information and information systems and prevent unauthorized access, use, disclosure disruption, modification or destruction of personal information in its possession.^{xi} Should there be a breach of information security policy, a 2007 Office of Management and Budget memorandum, “Safeguarding Against the Breach of Personally Identifiable Information,” specifies the federal government’s notification procedures and obligations to affected individuals.^{xii}

The CLEAR Act also explicitly requires that the privacy of every qualified individual be protected and any personal information must only be used for the accurate distribution of carbon refund payments.

Why doesn’t the CLEAR Act distribute auction revenues to the public through local distribution companies (LDCs) and utility bills, like the House-passed climate change bill does?

Returning auction revenues to the public through LDCs, the local gas and electric power companies that deliver energy directly to households, has one important advantage: LDCs have a well-established means of reaching most households reliably, through monthly utility bills. Yet this approach also presents several inherent problems. First, electricity represents less than one-half of total household energy costs and less than a one-third of total costs from a carbon price signal, which includes indirect uses of carbon. Rebates via the LDCs would not reach individuals who do not pay electric bills but do incur increased costs from the consumption of energy other than electricity and the consumption of goods in which the cost of carbon is embedded. Second, this approach would require significant new regulation and oversight by state and federal agencies to ensure that LDCs actually returned funds to households as the policy intends. In the absence of additional oversight, it is possible that the LDCs would not pass on revenues to households to offset higher energy costs, but instead keep them as windfalls. Third, returning revenues to households via their LDC electricity and gas bills could dampen the carbon price signal and give consumers insufficient incentives for energy efficiency and conservation, effectively driving the total costs of the policy higher and undermining the purpose of climate change policy. Similarly, using utility bills as a rebate mechanism would make it more difficult for consumers to see the revenues returned to them and to make more informed energy decisions.

In his recent testimony before the Senate Finance Committee, Dallas Burtraw of Resources for the Future stated that in practice the approach in the House-passed bill ‘...is nearly unworkable. One reason is because bills do not separate the fixed and variable portions of the charge in this way, especially for residential class consumers.’ Even if the fixed and variable portions were separated, ‘it remains implausible that customers would respond to the marginal price signal in the desired way’ because few people distinguish between the marginal electricity price and the overall electricity bill. ‘I venture that in 99 percent of households, customers just sit down at

the computer to pay the bill, and if the bill is less, they figure electricity just got cheaper and their consumption is likely to increase.’

Although providing rebates through the LDCs may reduce some administrative costs of consumer rebates, the net cost savings are not clear. Enforcement would require significant expansion of state utility regulation that would increase other administrative costs. Also, this approach effectively would put LDCs, rather than government, in charge of allocation decisions for a significant share of allowances, raising questions of accountability. Finally, since the House-passed bill defers the details of LDC allowance distribution to state public utility commissions, the administration of rebates through the LDCs, as conceived, is neither uniform nor transparent and thus, complexity may undermine the intent of the legislation.

The CLEAR Act avoids these problems by returning auction revenues directly to consumers each month on an equal per capita basis in the form of an electronic cash payment. This payment method eliminates the need for oversight of intermediary agencies and ensures that auction revenues reach households. Also, by decoupling refund payments from utility bills, ratepayers will see a clear carbon price signal, even as they are being compensated for higher energy costs. The combination of cash payments and clear price signals gets the incentive structure right and gives consumers both information and money to allow them to make their own informed energy decisions in response to climate policy. The visibility and distributional equity of the payments aim to increase public support for climate policy, thereby bolstering its durability over the long term.

FUEL MIX EFFECTS OF THE CLEAR ACT

How would the CLEAR Act reduce energy demand?

As mentioned earlier, the goal of the CLEAR Act is to lower the overall carbon intensity of the U.S. economy. The CLEAR Act is not intended as an energy “demand destruction” program, although it does provide strong financial incentives for energy efficiency improvements and fuel switching. A likely and intended outcome of the program would be greater diversity in the U.S. fuel mix, with an expansion of non-fossil energy sources on an absolute basis.

Won’t the CLEAR Act approach unfairly penalize coal?

While the CLEAR Act aims to de-carbonize the U.S. energy system, it is fuel neutral. Coal will require more carbon shares because of its higher carbon content relative to natural gas and oil, but it is carbon—not the energy content of a given fuel—that is affected. Also, the emissions trajectory follows an economically optimized reduction pathway that will not promote fuel mix switches before new technologies are available. The cap is set in 2012, but emissions reductions do not start until 2015 — the fourth year of the program. The reductions subsequently begin to increase gradually at an accelerating rate. This pathway helps to ensure that capital investments will not need to be retired prematurely and allows time for

investment, development, and deployment of new and existing technologies before more robust emissions reductions begin after 2020.

Under the CLEAR Act, valuable bonus carbon shares, in excess of the cap, would be granted for each ton of fossil carbon that energy producers or end users captured and sequestered, thereby preventing its emission to the atmosphere. This aspect of the CLEAR Act means that, with sequestration, coal could continue to make up a significant portion of our nation's fuel mix indefinitely.

Isn't the CLEAR Act a giveaway to the nuclear and hydropower industries, since they don't rely on carbon-based fuels?

While the CLEAR Act aims to de-carbonize the U.S. energy system, it is fuel neutral. In many cases, nuclear and hydropower facilities are still amortizing much higher initial capital costs than those associated with the construction of fossil fuel powered facilities. However, emissions-free power production would have a relative advantage under the CLEAR Act, since non-fossil fuel assets would not be affected by price increases associated with the upstream cap. While the prospects for the expansion of nuclear power could change with new government incentive programs, those incentives are beyond the scope of this legislation.

Won't the CLEAR Act result in the proliferation of ugly wind turbines?

The CLEAR Act is fuel neutral and leaves decisions regarding energy technology choice to the market. Enactment should stimulate a shift to low- or non-carbon energy systems and technologies, which would be likely to stimulate the growth of the renewable energy industries generally.

Because wind power is currently the most competitive renewable energy technology for electric power production in many areas, it is likely that wind capacity would expand there. But biomass, solar photovoltaic, solar thermal, geothermal, biofuels, and electrified transportation would also be beneficiaries of the CLEAR Act's incentive structure. Utilities, other energy producers, communities, and public utility commissions would all have a role in determining appropriate technology choices to meet the energy needs of their respective areas.

How are the voluntary renewable energy market and voluntary purchases of carbon reduction credits protected in the CLEAR Act?

Voluntary carbon reduction credits are certificates available for purchase that verifiably reduce fossil carbon emissions and that are not used to meet any federal or state mandate such as renewable energy or energy efficiency standards. They include renewable energy certificates (RECs), energy efficiency certificates (EECs), and other similar credits that are now broadly available in many states and other eligible instruments, as determined by the Secretary of Energy.

Initially, the voluntary market for these credits was primarily residential, but in recent years it has expanded into the commercial, educational, and public sectors to include Fortune 500 companies, universities, and government agencies.^{xiii} In fact, demand for carbon reduction credits within the nonresidential sectors has led to the explosive growth of these voluntary markets, which have increased by nearly 50% each year. In 2008, the voluntary renewable energy market (24 billion kilowatt hours) actually exceeded the compliance renewable energy markets (23 billion kilowatt hours) that emerge from state renewable portfolio standards.

Like the Regional Greenhouse Gas Initiative (RGGI), the CLEAR Act's carbon cap is adjusted to reflect the volume of voluntary carbon reduction credits purchased. These growing voluntary markets could be undermined by a system without an adjustment mechanism to account for the carbon displaced by renewable energy spurred by REC purchases. Consequently, the renewable energy or efficiency gains that these markets deliver would be lost, making the transition to a low-carbon economy more difficult.

Through their willingness to buy RECs at a premium in the absence of a carbon cap, REC purchasers accelerate the growth of renewable energy, displacing a corresponding amount of fossil energy. In the absence of an adjustment mechanism, the introduction of a carbon cap can alter the incentive structure altogether, however, because the voluntary purchase of RECs has the unintended effect of placing downward pressure on carbon allowance prices. In order to maintain the incentives for continued purchase of RECs and sustain their environmental benefits under a climate policy that includes a carbon cap, the following additional mechanism has been included in the CLEAR Act:

- If the market value of the voluntary carbon reduction credits (i.e., RECs) is equal to or greater than the market value of carbon shares for the corresponding fossil carbon reductions, then the cap is adjusted for to account for these reductions on a one-to-one basis.
- If the market value of the voluntary carbon reduction credits is less than the market value of carbon shares for the corresponding fossil carbon reductions, then the cap is adjusted for these reductions at a discounted rate – the amount of fossil carbon reductions multiplied by the ratio of the market value of the voluntary carbon reduction credits to the market value of the carbon shares for the corresponding fossil carbon reductions.

This discounting method provides the smooth transition. When carbon share prices are low relative to the credit prices, the voluntary market acts the same as it would in the absence of a cap. As the carbon share prices increase relative to the credit prices, discounting increases to account for the differences in the relative value of RECs to carbon shares. It ensures that the voluntary markets still reduce emissions with a cap as they do without one, safeguarding the incentives for voluntary investments that will continue to accelerate the transition to a low-carbon economy.

How does the CLEAR Act system make sure that we reduce our foreign oil dependence?

The CLEAR Act does not specifically aim to reduce oil use. It restricts carbon and provides incentives via the price signal and by issuing cash refunds that consumers can use to make their own energy decisions and fuel choices. However, it is likely that the CLEAR Act will reduce our nation's dangerous overdependence on foreign oil by creating market dynamics that spur higher vehicle fuel economy levels and accelerate the development and adoption of promising new technologies for biofuels production and vehicle fleet electrification.

How would the CLEAR Act treat emissions associated with the production of foreign fuels imported to the U.S.?

Emissions associated with the production of foreign fuels imported to the U.S. may be required to pay fees like other energy-intensive commodity imports. Ultimately, these emissions need to be addressed through bilateral or multilateral international agreements and through international institutions such as the United Nations Framework Convention on Climate Change (UNFCCC). Since more than 270 nations have ratified the UNFCCC and have accepted its provision to "avoid dangerous anthropogenic interference with the Earth's climate," this treaty provides a legal foundation for subsequent international agreements to curb greenhouse gas emissions.

If you only limit the amount of carbon in fossil fuels sold in the U.S., aren't you missing many other sources of greenhouse gas emissions?

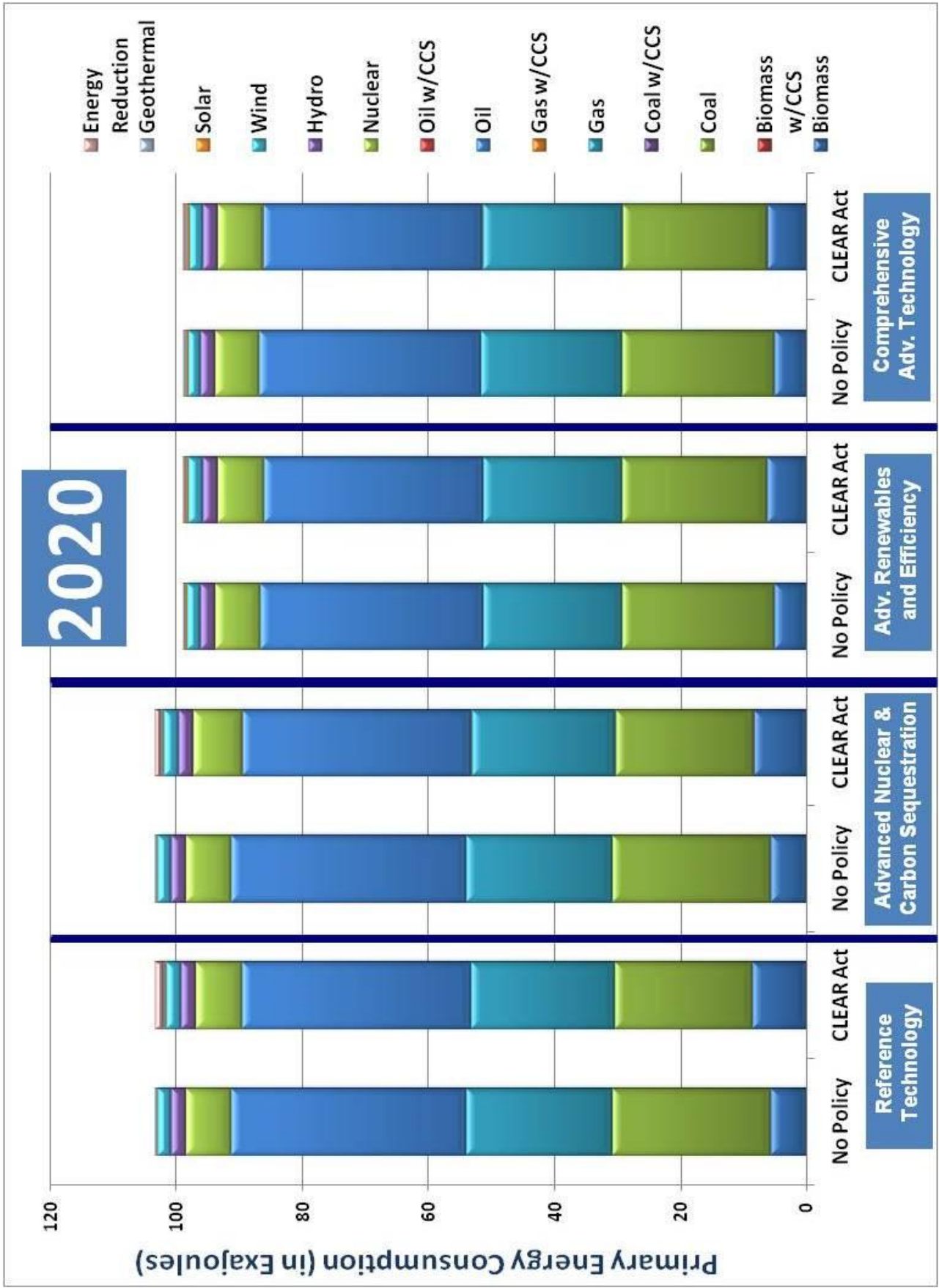
Carbon dioxide is the most important greenhouse gas, yet other anthropogenic greenhouse gases are major emissions sources that must also be addressed. The CERT would be a principle mechanism for reducing emissions of these sources.

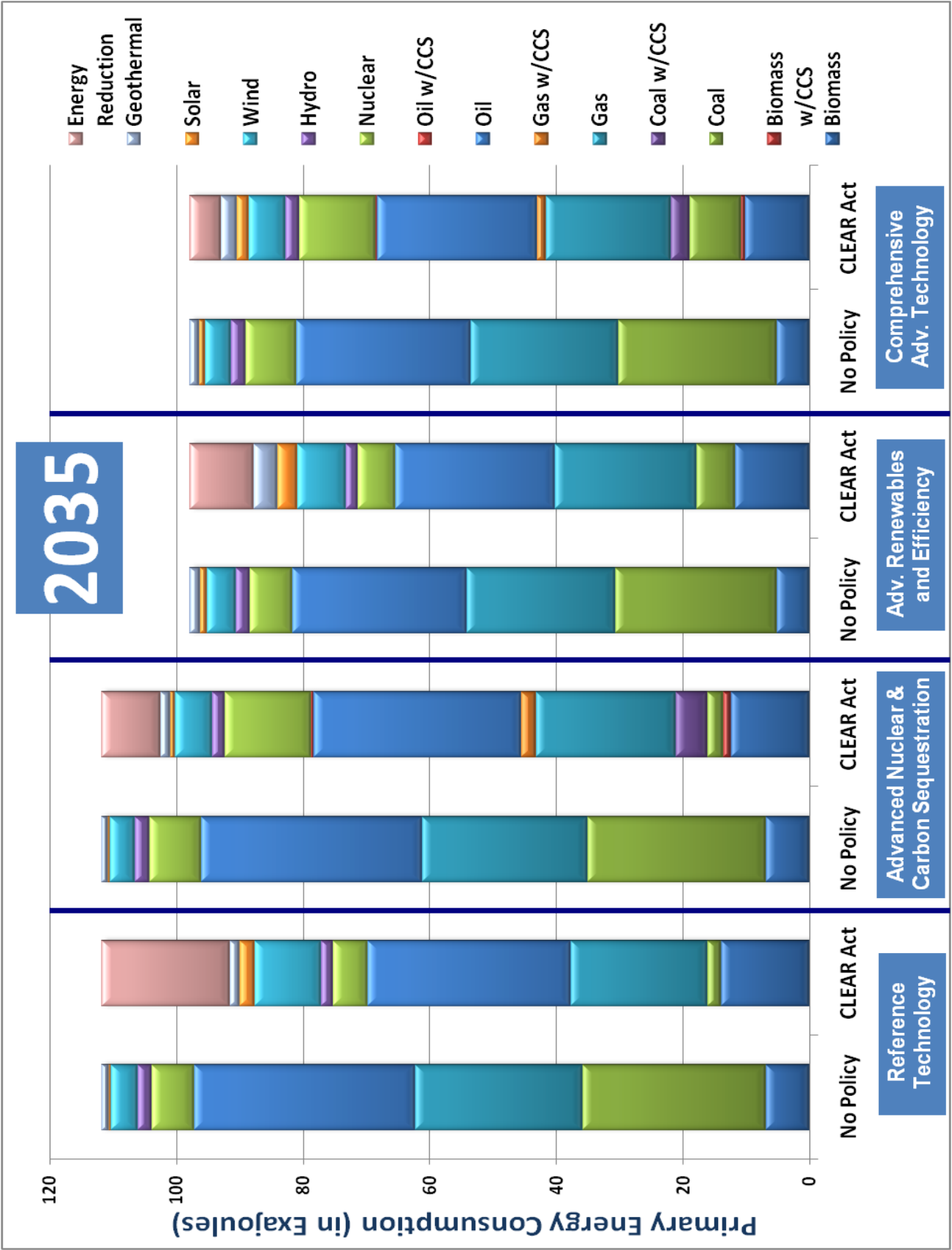
What effect will the CLEAR Act have on the U.S. energy mix? Is it even technologically possible to achieve an 80 percent reduction in greenhouse gas emission by mid century?

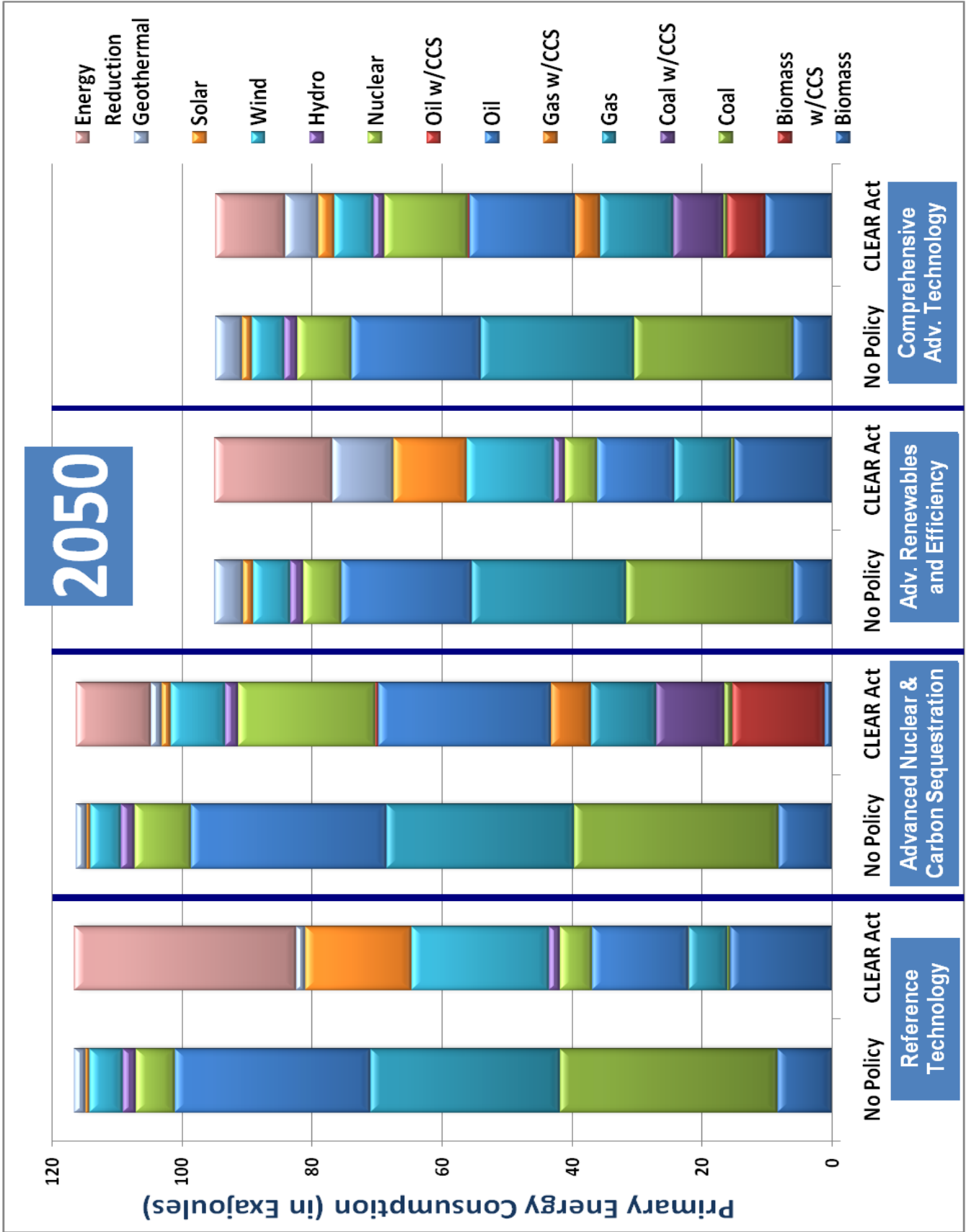
Yes, it is certainly possible, although an expanded range of commercially available energy technologies will be needed, especially to reduce costs. The CLEAR Act provides incentives for these developments by creating a market price for fossil carbon and an investment stream for advanced energy technology R&D, and then allowing the market to determine the energy technology mix based on economic considerations alone. The CLEAR Act also assumes continuation of a broad range of clean energy R&D investments, tax incentives, and supportive public policies that will help bring new, cost-competitive energy technologies to market.

Modeling of the CLEAR Act, done using the Global Climate Assessment Model, shows the composition of the U.S. fuel mix in 2020, 2035, and 2050 under four different technology advancement and deployment scenarios. As the three charts below illustrate, policy action, investments in expanded nuclear and carbon capture and sequestration (CCS) capacity, renewable energy, and efficiency are all needed to transition to a clean energy economy by 2050. In fact,

without enactment of the CLEAR Act, fossil fuels without CCS still dominate the total primary energy consumption in 2050, even in the advanced technology scenario.







In the charts above (and the carbon share price per ton modeled on page 13) the **reference** technology scenario assumes historical annual rates of technological change in several energy technology areas, including wind solar, advanced grid and plug-in electric vehicle technologies. Other key aspects of the reference case are the assumptions that nuclear capacity remains constant at current levels and that CCS technologies do not become commercially available by mid-century.

The principal assumption of the **nuclear and carbon sequestration** scenario is that the sole barrier to increased nuclear capacity and CCS is high deployment cost. Whereas nuclear and CCS technologies do not deploy under any circumstances in the reference case, their deployment is limited only by economic factors in this scenario.

The **advanced renewables and efficiency** case assumes the accelerated development and cost competitiveness of advanced technology for enhanced geothermal systems and advanced electric grid technologies, plug-in hybrid electric vehicles, building technologies, cheaper wind and solar power, and more energy efficient industrial technologies including manufacturing processes, such as industrial boilers and motors. This case also assumes reference technology for nuclear and CCS (i.e. no additional nuclear capacity or CCS).

The comprehensive **advanced technology** scenario assumes additional nuclear and CCS capacity as well as all of the factors included in the advanced renewables and energy efficiency case.

INTERNATIONAL CONSIDERATIONS

If China and India don't reduce their emissions, isn't it pointless for us to try to reduce ours in the U.S.?

China recently surpassed the U.S. to become the world's largest greenhouse gas emitter and other large developing countries including India and Brazil are also experiencing rapid energy and emissions growth. Yet, the U.S. remains the world's sole superpower and largest historic greenhouse gas emitter, responsible for 29% of global greenhouse gas emissions since 1850, according to a report by the World Resources Institute

U.S. leadership in climate change mitigation is likely to have significant long-term impacts. First, by its example, the U.S. will influence other countries to follow suit with their own emissions mitigation policies; in fact, China and other major developing countries have stated that they would not act to reduce their own emissions without the U.S. as a "prime mover." Second, by providing incentives to domestic industry, U.S. climate policy will create export opportunities through the development of alternative energy technologies and other green products. Emissions reduction policies have provided the impetus for Germany, Denmark, and Spain to become global leaders in the rapidly growing markets for wind turbines, solar panels, and other renewable energy technologies. Denmark currently holds the largest share (23 percent) of the global wind turbine export market—a market that has grown by more than 50 percent annually over the past decade.

Can the United States impose border equalization fees on carbon-intensive imports and still comply with its treaty obligations as a member of the World Trade Organization (WTO)?

Yes. Article II.2(a) of the General Agreement on Tariffs and Trade (GATT) allows WTO members to apply charges to imports equivalent to those applied to like domestic goods, while Article III.2 permits border adjustments to taxes charged on inputs used in the production of process associated with a given imported products. While not without controversy, border equalization fees leveling the carbon playing field are permissible according to the WTO, provided that they constitute adjustments ensuring that domestic and foreign producers of like products face equivalent levies in a given market.

Why should Americans pay for emissions reductions and adaptation projects outside the U.S.?

Since the Earth's atmosphere is a shared global resource, a ton of carbon emitted anywhere in the world has the same effect on global climate. It is in the U.S. long-term interest to seek cost-effective greenhouse gas emissions mitigation opportunities wherever they may be. These opportunities may be particularly great in developing countries, where financial and other resource constraints prevent governments and communities from undertaking high-benefit mitigation projects themselves. Moreover, U.S. efforts to assist other countries in mitigating

and adapting to climate change helps to fulfill what many view as a moral obligation on the part of the U.S., which is the world's largest historic greenhouse gas emitter.

STATE OF THE SCIENCE

Why do we need to control carbon emissions when the science of climate change is still uncertain?

The scientific debate about the reality of man-made climate change is now over: climate change is real, urgent, and largely man-made. Over the past five years in particular, multiple independent scientific bodies worldwide have issued findings from their own research and expressed high confidence that human emissions of carbon dioxide and other greenhouse gases are the principal causes of documented increases in global average temperature and consequent impacts on the climate. The vast majority of climate scientists are confident that this warming trend will continue and intensify in the absence of serious efforts to reduce global greenhouse gas emissions sharply by 2050. Among the scientific bodies that have reached this conclusion are: the Intergovernmental Panel on Climate Change, the U.S. National Academy of Science, the American Meteorological Society, the U.S. Climate Change Science Program, and the National Science Academies of Brazil, Canada, China, Germany, India, Italy, Japan, Russia, and the United Kingdom.

While uncertainties still exist concerning the timing, extent, and regional impacts of climate change, the science has settled the debate over the existence of human-induced climate change. These remaining uncertainties make a strong case for—not against—decisive action to mitigate climate change. As U.S. Office of Science and Technology director John Holdren recently testified, in cases where scientific uncertainties persist, policy makers are best advised to bet with rather than against the odds.

What future climate changes are projected by current climate science?

As greenhouse gas emissions continue their rapid ascent worldwide, further temperature increases and climate impacts are likely. Since greenhouse gas concentrations in the atmosphere are higher now than they have been for at least the past 500,000 years, there is no way to know with certainty what impacts might be expected. But scientists warn that cataclysmic impacts are possible—even probable—if greenhouse gas emissions accumulate in the earth's atmosphere above 450 parts per million (ppm). The current atmospheric CO₂ concentration in the earth's atmosphere is 385 ppm—the highest level in more than 500,000 years.

Serious changes in regional climate patterns are already occurring within the U.S. and include increasing storm frequency and intensity in the Gulf of Mexico, pine bark beetle infestation in the Rocky Mountains, declining snowpack and lower summer stream flow in the Pacific Northwest, and sea level rise in densely populated coastal zones nationwide. An acceleration of these trends will cause trillions of dollars in economic dislocations and impact the livelihoods of tens of millions of Americans.

ⁱ http://www.iea.org/press/pressdetail.asp?PRESS_REL_ID=263

ⁱⁱ So in 2015 the cap is 0.25% less than 2014, in 2016 the cap is 0.5% less than 2015, in 2017 the cap is 0.75% less than 2016, and so on.

ⁱⁱⁱ A separate HFC cap in H.R. 2454, not included here, achieves an additional 19 gigatons of emissions reductions.

^{iv} For reference, 66 to 85 percent of domestic and international offset projects have to be successful for H.R. 2454 to limit cumulative emissions under 181 gigatons.

^v CBO estimates that the economy's underlying ability to produce output from its capital stock provides a real return of about 6 percent [From 'How CBO Estimates the Costs of Reducing Greenhouse-Gas Emissions,' April 2009].

^{vi} The Global Climate Assessment Model (GCAM) is a partial equilibrium energy-economic integrated assessment model that was developed by the U.S. Department of Energy's Pacific Northwest National Laboratory.

^{vii} Dallas Burtraw, Richard Sweeney and Margaret Walls, April/June 2009: 'The Incidence of U.S. Climate Policy: Alternative Uses of Revenues from a Cap-and-Trade Auction?'

^{viii} Gilbert E. Metcalf, October 2007: 'A Proposal for a U.S. Carbon Tax Swap: an Equitable Tax Reform to Address Global Climate Change.'

^{ix} Source: 'A plastic prop.' *The Economist*, August, 20th 2009.

^x 5 U.S.C. § 552a(a)(5).

^{xi} Title III of the E-Government Act of 2002, P.L. 107-347; 44 U.S.C. § 3541; see, Gina Stevens, "Federal Information Security and Data Breach Notification Laws," Congressional Research Service Report RL34120 (January 29, 2009).

^{xii} <http://www.whitehouse.gov/omb/memoranda/fy2007>

^{xiii} For a list of organizations that voluntarily purchase renewable energy, see the EPA's Green Power Partnership website: <http://epa.gov/greenpower/toplists/index.htm>