

**BEFORE THE ENERGY AND NATURAL RESOURCES
COMMITTEE
UNITED STATES SENATE**

**POLICY OPTIONS FOR REDUCING
GREENHOUSE GAS EMISSIONS**

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Mr. Chairman, members of the Energy and Natural Resources Committee, good morning, my name is Jonathan Banks, and I am the Climate Policy Coordinator of the Clean Air Task Force. I appreciate the opportunity to speak to you today. Based in Boston, the Clean Air Task Force is a nonprofit organization with offices in the US and China dedicated to reducing atmospheric pollution through research, advocacy, and private sector collaboration. Our staff and consultants include scientists, attorneys, economists, and engineers. Our board consists of private sector leaders as well as environmental advocates.

In the fall of 2007, following the cloture failure of the Lieberman-Warner bill, CATF began to investigate a number of alternative policies that could be used to deal with climate change. Our work to date has made us realize that in terms of policy design there is no “right answer” for climate policy as long as it reduces the requisite tons and is passed into law. Rather, the best climate policies are “hybrids” that incorporate good ideas in a combination that can improve both the economics and overall environmental performance.

First, let me say that CATF supports immediate and comprehensive action to deal with climate change. We have supported the House climate process that led to the successful passage of the Waxman-Markey climate bill earlier this year. We have also been working to help enable passage of the Kerry-Boxer proposal in the Senate. We cannot, however, afford another multi-year delay in passage of the nation’s first climate policy. If the politics of the U.S. Senate demand it, we need to have alternatives to the current proposals available to policy makers. It is in that vein that we embarked on an exploration of alternatives to economy wide policies, not as a competitor, but as an alternative that may offer a realistic and enactable set of policies to help us get started dealing with climate change.

One more caveat before I speak to the work we have done. All of us here on this panel are speaking about climate policies that have not undergone the legislative process. What may appear in a white paper as a much more simplified way of dealing with climate change, will not be simple when it is put through the rigors of the Senate and House legislative process. For instance, have you ever seen a “simple” piece of enacted tax legislation? This caveat applies equally to cap and trade, cap and dividend, carbon tax, or sectoral policies -- which is what I came here to speak about. All of these policy alternatives have strengths and weaknesses and they are not mutually exclusive.

The debate surrounding Lieberman-Warner, as well as the debate this year over the Waxman-Markey bill (HR 2454) and the Kerry-Boxer bill has hinged on a number of key issues. Many of these issues were highlighted at the end of the Lieberman-Warner debate by a group of Senators known as the “Gang of 15”, many of whom serve on this committee. The issues highlighted include: costs, both to consumers and companies; US manufacturing jobs and impact on manufacturing; impacts to the coal industry and coal dependent power companies; believable technology pathways; gasoline prices; action by sectors other than just the power sector; and the size of the carbon market, to name a few.

In response, policy makers have explored a number of options: safety valves, price collars, strategic reserves, expansion of offsets, weakening of the interim caps,

protectionist trade measures, incentives for various technologies, and additional layers of programs and regulations to force reductions in other sectors.

There are, however, some areas where no amount of tinkering will suffice to deal with the real world issues raised by the Gang of 15. Gasoline prices will go up if we put in place an upstream cap or tax on petroleum products. The sheer size of the market, which is simply the number of allowances times the price of allowances, cannot be constrained without containing allowance prices or eliminating covered sectors. And the pathway to compliance, what we call “technology pathways,” presents a question mark in any economy wide policy, whether tax or cap, because we cannot be certain precisely how the market will react to the price signal.

In an economy-wide policy the price signal of the cap can be muted in some sectors of the economy, primarily the transportation sector and to a lesser degree the residential and commercial sectors. With an upstream cap on petroleum products, refiners pass the price of an allowance on to the consumer. But a \$50 a ton CO₂ allowance price, translates into you and I paying about 50 cents at the pump. While this may be a political liability for all of you, it would not likely be a huge driver of transportation sector emissions reductions. Instead, the petroleum industry will pay the power sector to further reduce emissions.

This sounds like good economics, that is, finding the cheapest tons throughout the economy and getting our reductions there. But, it raises two potentially significant problems.

First, the Energy Information Administration’s (EIA) modeling suggests that almost all the reductions come from two sources: offsets and reductions in the power sector (see figure 1 below). This chart shows what sectors EIA believes will contribute to the GHG abatement under HR 2454. As you can see almost all of the predicted abatement comes from offsets and reductions in the power sector. Again, we would expect to see this outcome in response to all economy wide proposals be they tax, cap and trade or cap and dividend.

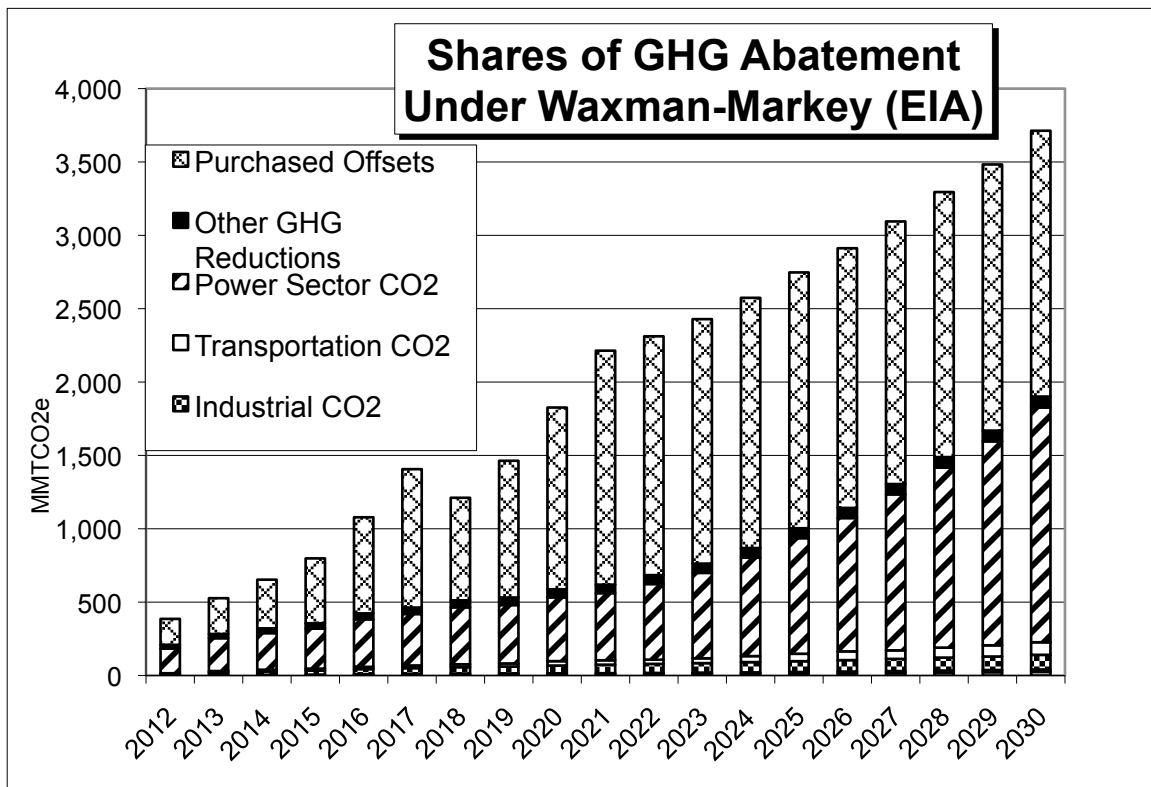


Figure 1. Shares of GHG Abatement Under HR 2454. Source EIA.

Second, with most of the action coming in the power sector, we need to make sure that the needed reductions from that sector are achievable and therefore believable. However, when we look at the energy technology build-out necessary to meet these caps that rely on power sector over-compliance the problem comes into focus: EIA’s modeling of the Waxman-Markey bill predicts that 100 GWs of nuclear power, 70 GWs of carbon capture and storage (CCS), and 90 GWs of renewables, will be built by 2030. To put that in perspective, 100 GWs of nuclear plants by 2030 would require completing 7 very large nuclear plants every year from 2016 to 2030.¹

While models spit these numbers out without a problem, in the real world this is likely to be very difficult to achieve. This, though, is not just a near term problem, EIA states in its most recent work on HR 2454:

“Unless substantial progress is made in identifying low- and no-carbon technologies outside of electricity generation, the ACESA emissions targets for the 2030-to-2050 period are likely to be very challenging as opportunities for further reductions in power sector emissions are exhausted and reductions in other sectors are thought to be more expensive.”²

If the power sector cannot achieve these reductions, then other sectors will have to make up the difference. We cannot wait till 2020 or 2030 to develop policies that set other sectors on a path to contribute to the necessary reductions.

¹ 2016 is the earliest date NEMS will complete new nuclear facilities.

² EIA, Energy Market and Economic Impacts of HR 2454, the ACESA of 2009.

CATF chose to explore a combination of policies that target specific sectors, with the goals of reducing costs, creating more believable technology pathways, and maintaining environmental integrity. This policy represents economy-wide coverage, without an economy-wide cap. We conducted an initial set of modeling runs on a set of proxy policies using EIA's National Energy Modeling System (NEMS). Since then, the economic downturn, and a number of additional changes have dramatically altered EIA's view of business as usual (BAU). Just recently, we updated our initial set of runs to reflect these changes and pegged the work to modeling EIA has performed on HR 2454.³ Our formulation represents a work in progress and the results we are sharing with you today are preliminary, but very promising.

After a number of rounds of tweaking, our latest work employs the following policies:

- A cap on power and industrial sector emissions on a trajectory equaling 90% below 1990 levels by 2050;
- An accelerated light duty vehicle fuel economy program reaching 45 miles per gallon by 2030;
- Technology incentives for renewable energy generation and coal with carbon capture and sequestration (CCS);
- Proxies that reflect significant but achievable increases in federal energy efficiency standards for energy using equipment; and
- An HFC cap and trade program.

We are continuing to refine these elements, as well as develop additional policies (and the necessary analytics to be able to better model them) such as:

- A program to spur domestic black carbon and methane reductions;
- Additional transportation policies, primarily focused on commercial vehicle efficiency, that would "bend the curve" on emissions from the transportation sector so that total transportation GHG emissions are declining before 2030;
- A program to develop and deploy advanced renewable technologies such as dispatchable wind;
- A comprehensive, but realistic CCS commercialization program to include broad deployment of post combustion CO₂ capture technology and geologic carbon sequestration at existing coal and gas plants;
- Cost characterization for underground coal gasification with CCS; and,
- Realistic model constraints on CCS, nuclear, and renewable generation expansion through 2030.

So what does all of this achieve? The answer is a policy that achieves considerable greenhouse gas reductions at a lower cost and, in our view, with more believable technology pathways. But, we recognize that the policy entails a mix of positives and negatives, some of which can be dealt with through further refinement of the policy

³ We used EIA's interpretation of the offset provisions, CCS incentives, banking provisions and allowance distribution system all scaled to a program that covers 60% of energy related GHG emissions.

proposal. And, some of the results could be viewed as both positive and negative depending on where you stand.

First, allowance prices for the power and industrial sector cap and trade are cut in half as compared to EIA's modeling of HR 2454, with prices reaching about \$34 in 2030 (vs. \$64 for HR 2454). The size of the market and the revenue generated by it is also considerably lower (about 67% lower) as would be expected with a cap that covers only a portion of the economy and one whose allowance prices are so much lower. Of course, this would also mean less allowance value and/or auction proceeds that could be devoted to all the purposes included in the Waxman-Markey bill. Although more analysis is needed, we feel that a major emitter cap at this stringency could be structured to protect electricity consumers and fund the necessary power sector technology innovation.

Under our modeled sectoral policy, total economy wide emissions are somewhat higher than HR 2454 (see figure 2 below). However, in the early years of the program, covered emissions reductions are the primary source of reductions, meaning more reductions are happening on system than in an economy wide program. For the power and industrial sectors their emissions are higher than in HR 2454 because they are not doing the work of the transportation sector.

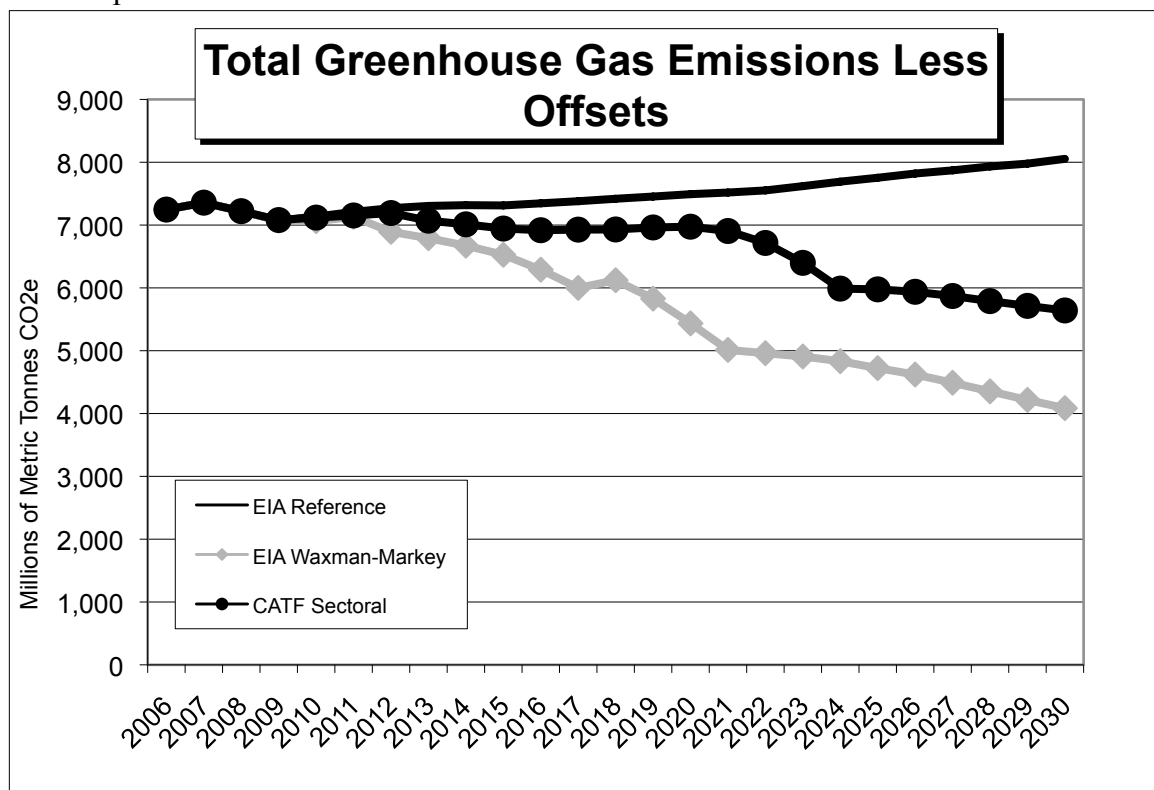


Figure 2. From CATF modeling of sectoral policies and EIA modeling of HR 2454

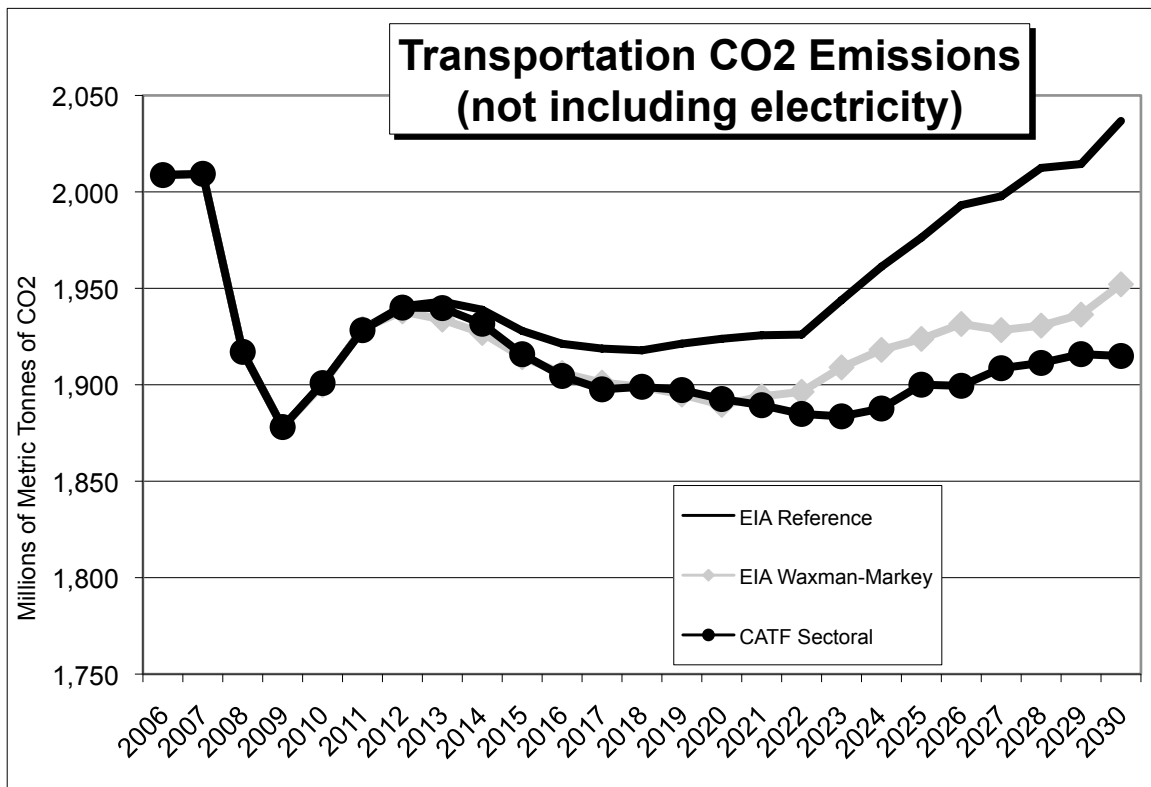


Figure 3. From CATF modeling of sectoral policies and EIA modeling of HR 2454

On the other hand, transportation sector emissions are lower than Waxman-Markey due simply to the accelerated CAFE program (see figure 3 above). The incorporation of the suite of additional transportation policies we are developing, may allow us to achieve full comparability (for total GHG emissions) with the current economy wide cap and trade policies. These additional policies would go beyond the light duty CAFE increases we have already modeled, and likely include:

- Establishment of CAFE for commercial vehicles with annual increases
- Requiring anti-idling technologies for all commercial vehicles
- Funding/credits for hybrid commercial vehicles
- A feebate program for low mileage/high mileage cars
- Incentives or rebates as well as funding for light duty electric vehicle development and deployment.

Additional results show that under our sectoral approach coal continues to remain the dominant source of power through 2030 (45% of generation) and renewable generation jumps up to 20%. However, natural gas power generation drops, and nuclear power stays roughly at today's levels (see figure 4), with only about 4GWs of new nuclear generation being built by 2030.

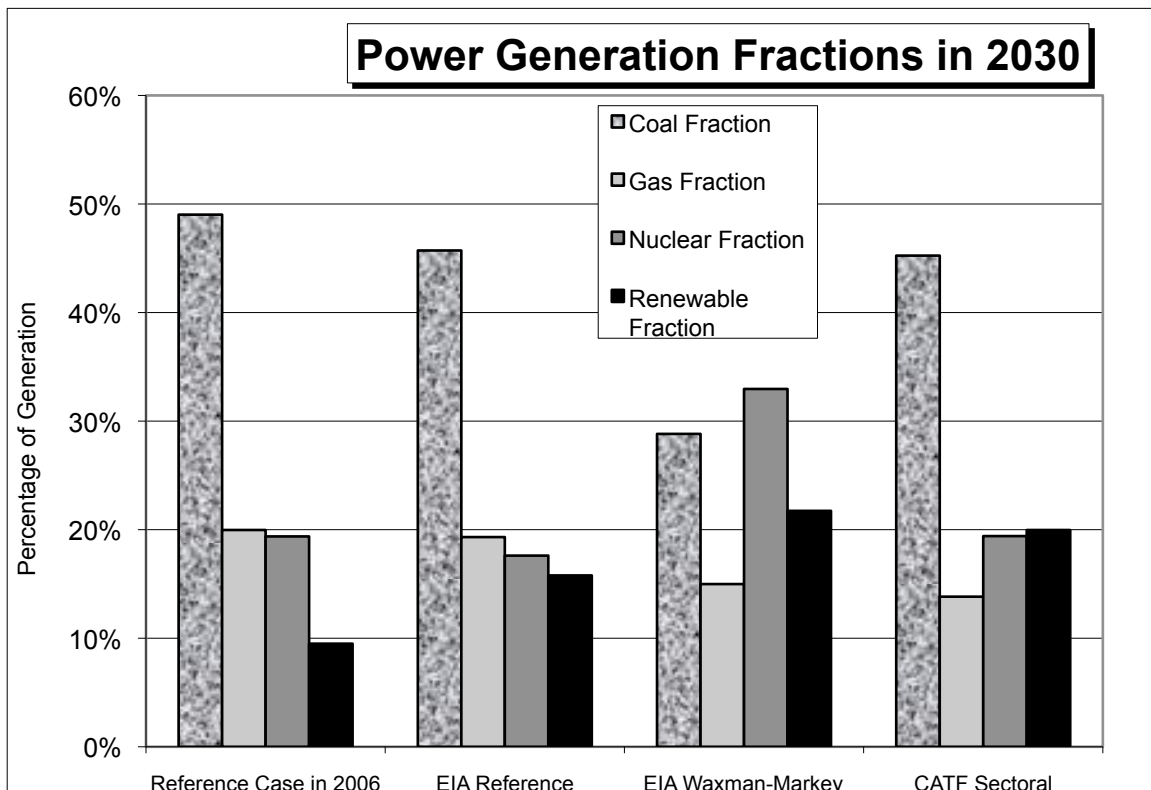


Figure 4. From CATF modeling of sectoral policies and EIA modeling of HR 2454

We expect that in the real world, the amount of CCS built would be less than the 63GWs we show in our work, that the nuclear industry will be successful in building a number of new reactors, and that any remaining gap will be filled by natural gas generation as a bridge fuel for later carbon reductions through increased efficiency, renewables, CCS, and nuclear. We are currently developing a modeling run that would place realistic constraints on CCS, nuclear and renewables development to test this idea.

Coal production in the sectoral case remains roughly even with levels in EIA's reference case (although coal power is producing 23% less CO₂ per megawatt hour as compared to the reference case). There are several factors at play. First the sectoral policy builds 63GWs of new CCS power. It retires about 33GWs of coal vs. HR 2454, which retires 130GWs. While some coal-powered units would be running less frequently, taken all together, coal production stays relatively stable as compared to the Waxman-Markey economy wide cap. The big piece is the difference in the number of retirements.

Gasoline prices are actually slightly lower than BAU due to decreased demand from the accelerated CAFE program, and almost 50 cents lower than HR 2454. For electricity prices, the sectoral policy shows lower prices to all end users, but mostly after 2025 when HR 2454's cap declines considerably. For natural gas, there is no upstream cap. When we combine that with the efficiency gains and less demand for natural gas in the power sector, prices of natural gas are lower than HR 2454 as well as lower than BAU.

Offsets continue to play a prominent role in GHG abatement under the sectoral policy. Under both HR 2454 and the sectoral policy, offsets make up a nearly identical fraction (45%) of the total greenhouse gas reductions in 2030. However, the year-to-year

fractions are quite different with HR 2454 compensating with offsets to a much higher degree in the early years (see figure 5). Importantly, the sectoral policy uses far fewer total offsets but that is because of the cap differences. International offsets make up identical percentages in both cases but there is slower ramp up of total offset demand that could help allay some concerns about the speed with which an international offset market could develop (see figure 6).

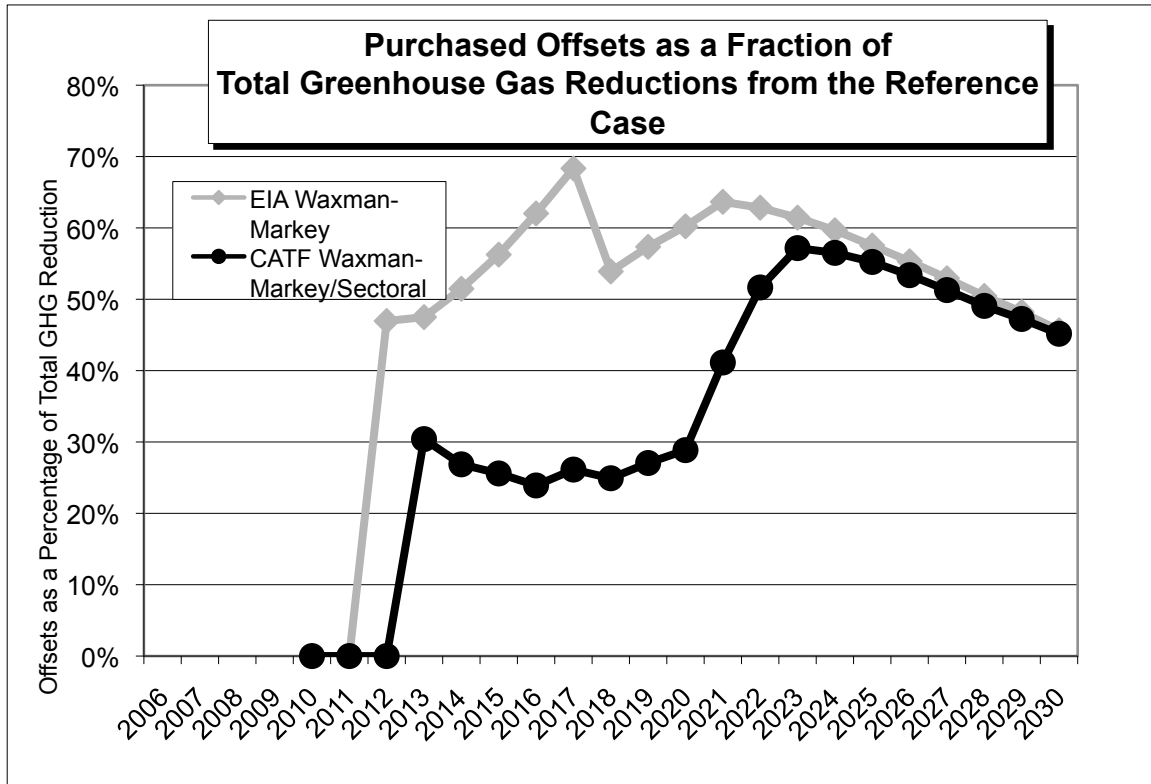


Figure 5. From CATF modeling of sectoral policies and EIA modeling of HR 2454

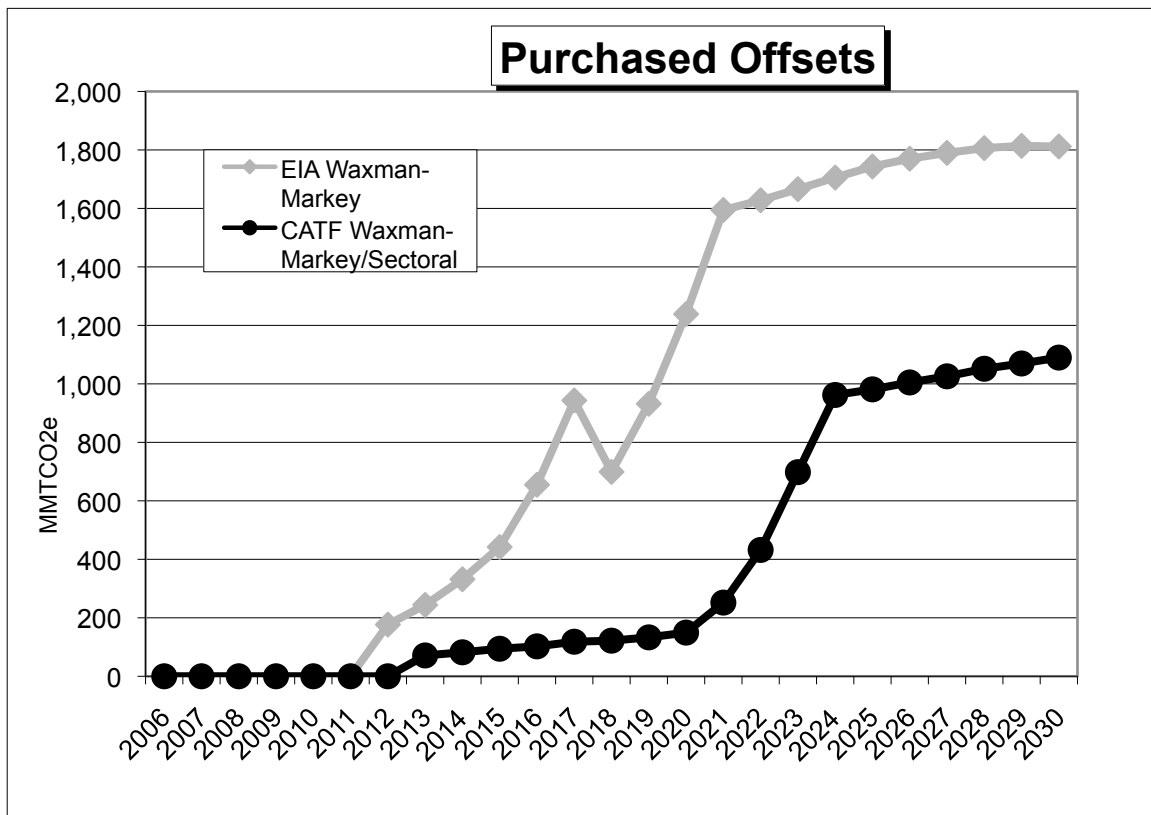


Figure 6. From CATF modeling of sectoral policies and EIA modeling of HR 2454

What modeling does not show is the complexity (both political and technological) of creating and enacting any climate policy, including a sectoral-based approach. For sectoral, some of this complexity could be managed by passing multiple pieces of legislation or sectoral titles. This would allow for fine-tuning of the program, and could provide a more adaptable policy framework over the long haul. This would also narrow the number of key stakeholders to a more manageable set of groups that need to come to the table on each piece of the policy.

Currently many in the power and industrial sector have publicly stated that they do not want a sectoral climate policy. What exactly drives this, we do not know with certainty. It could be the fear of potentially being the only industry regulated. It may also be simply that economy wide policy is the devil we know. It has been the subject of the legislative process for the last 8 years. Industry and members of Congress have engaged and have staked out positions and voiced their concerns. Of course, the launch pad for the last eight years was actually a sectoral approach known as the Clean Smokestacks Act.

What you and your colleagues have to decide is whether the concerns expressed regarding the current proposals in the Senate are best dealt with through further refinement of the overall economy wide proposal, or in the end whether it will be necessary to look to policy alternatives. Regardless of the answer to that question, the imperative to take the first step forward on climate remains. I would be happy to answer any questions you might have.

For more information and additional charts, please visit our website:
www.catf.us/advocacy/legal/