

Carbon Taxes v. Cap-and-Trade: Can Market Mechanisms Combat Emissions Effectively?

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ABSTRACT

Climate change has become a topic of international importance as more scientists are recognizing the danger that greenhouse gases are posing for the future. Most countries and most individuals are not willing to alter their lifestyles to meet developing environmental needs, so it has become necessary to target environmental degradation with tools that take into account these lifestyles. The carbon market in the form of carbon taxes and cap-and-trade are currently being used in a number of different countries as a mechanism to reduce emissions levels. While both approaches have their advantages, neither is perfect as can be seen in their international failures. The Kyoto Protocol also offers three market mechanisms to reduce emissions in which is included a cap-and-trade system. The problem is that none of the mechanisms on their own is able to target all the potential emitters and without this overall targeting, the long term results will not be at the requisite levels. The correct way to deal with climate change and emissions is to institute a sectoral hybrid that brings together carbon taxes, cap-and-trade, and energy efficiency standards. Carbon taxes can be implemented on households, cap-and-trade will be available for the industrial and energy sectors, while energy efficiency standards will be implemented on producers of household goods. In this manner, all the players in an economy will have an incentive to conserve and reduce emissions.

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Introduction to the Climate Change Problem and Possible Solutions

Within the past couple of decades, climate change has become a hot button issue that is on everybody's mind. Politicians are having to consider climate change issues more and more to receive support from many voters. While some consensus exists upon climate change becoming a problem, there is not much consensus as far as solutions go. The difficulty in reaching a consensus is in part due to a lack of information and understanding. Even some of the solutions that seem plausible have many fatal flaws that have not been considered thoroughly enough.

In discussions about climate change, it is typical to hear carbon being mentioned as the main culprit. While carbon is not the only greenhouse gas that is responsible for global warming, it is one of the gases that is being emitted with the highest frequency by humans. Also, it takes between 50 to 200 years for carbon to leave the atmosphere.¹ This means that even if there is a global effort to reduce the levels of carbon being emitted the process of global warming would not be stopped, just merely slowed.² If there was a complete stop of all carbon emissions global warming would start to decrease, but the carbon will still be trapped in the atmosphere for years.

In addition to carbon being stored in the atmosphere for centuries, there is also the problem of carbon sink oversaturation. The ocean is a natural carbon sink but with carbon sequestration programs the ocean is basically filled to capacity. Plants are another naturally occurring carbon sink which trap and store 45 percent of terrestrial carbon.³ Burning forests to clear land for agriculture is turning areas that have traditionally been sinks into sources of carbon emissions.⁴

¹ Lakshman Guruswamy, *Energy Justice and Sustainable Development*, 21 COLO. J. INT'L ENVTL. L. & POL'Y 231, 238 (2010).

² *Id.*

³ Max G. Bronstein, *Readily Deployable Approaches to Geoengineering: Cool Materials and Aggressive Reforestation*, 10 SUSTAINABLE DEV. L. & POL'Y 44, 46 (2010).

⁴ Lakshman, *supra* note 1, at 239.

The most common sense solution to the problem of climate change is to appeal to the sensitivities of the public. Clearly, having a safe environment is in everyone's best interest. The problem is most clearly explained as the Tragedy of the Commons. In this scenario, if there is an open pasture which everyone could use to graze their animals it is almost incentivized for people to graze their animals as much as they can instead of preserving the pasture. The logic is that even if one person decides to preserve the pasture, other people will seize this opportunity to bring more of their own animals to feed on the pasture.⁵ The lack of regulation will eventually lead to the depletion of the commons. Along the same lines, there is the problem of the free-rider who will benefit from any positive effort toward improving the environment but will actually take no part in the improvement. Those who are actually furthering the effort tend to become frustrated and end up abandoning their efforts out of anger for free-riders. Finally, asking people to make changes on their own to help stop climate change does not attach any kind of accountability. Climate change in the international spectrum is a tragedy of the commons because all actors have to share the environment, but all actors want to exploit the environment to its full potential.⁶

The solution to climate change is inevitably going to require some regulation and the most promising prospects seem to be based on market approaches. By allowing the market to deal with climate change it will allow for the development of the most innovative and cost effective carbon reductions and for faster implementation.⁷ While the market has already failed in the sense that it has not accounted for the consequences of irresponsible environmental decisions,

⁵ Jay Michaelson, *Geoengineering: A Climate Change Manhattan Project*, 17 STAN. ENVTL. L.J. 73, 99 (1998).

⁶ *Id.*

⁷ Eleanor Weston Brown, *A Common Morality: Toward a Framework for Designing Fiscal Instruments to Respond to Global Climate Change*, 15 WIDENER L. REV. 391, 406 (2010).

somewhere between cap-and-trade and carbon taxing there is a market solution for climate change.

This article is going to provide an in-depth analysis of carbon taxing and cap-and-trade, alongside with a review of some of the countries that have implemented these systems. The goal is to highlight the main advantages and disadvantages of each system to ultimately suggest that the real solution will be a sectoral hybrid that combines both approaches.

Part I of this article will discuss carbon taxing and its implications. Part II will provide a review of the carbon taxing scheme in the Netherlands, Norway, and Sweden. Part III will define and analyze cap-and-trade. Part IV will provide a discussion of why Australia's cap-and-trade plan failed and of the proposed cap-and-trade plan in the United States. Part V will explore the market mechanisms proposed by the Kyoto Protocol. Part VI provides an alternative to the previously discussed market mechanisms and instead opts for a sectoral hybrid that could potentially be the future solution for climate change.⁸

I. What are Carbon Taxes?

A carbon tax is a tax charged upon the emission of a physical unit of carbon. The most common framework for carbon taxation implements the tax upon oil, coal, and natural gas producers. It is much easier to monitor and collect the taxes from the producers of the carbon than to account for all the carbon users. The rate of the carbon taxed is set in such a way as to account for the social costs brought about by the carbon emission.⁹ The carbon tax places a fixed

⁸ While it is beyond the scope of this paper, it is important to keep in mind game theory and the prisoner's dilemma in considering the rationale behind cooperation or lack of cooperation in the international spectrum. Some countries may benefit more from seeking international climate change arrangements, while others more greatly benefit from not adopting any of these changes themselves.

⁹ Christina K. Harper, *Climate Change and Tax Policy*, 30 B.C. INT'L & COMP. L. REV. 411, 438 (2007).

cost on the emission per ton of carbon. The main premise behind a carbon tax is that the increased cost of carbon emissions will cause the demand to decrease.

In order for a carbon tax to be effective, it has to be set high enough to actually achieve the goal of decreasing carbon consumption, but it cannot be too high as to make business implausible. As the carbon taxes increase consumers will seek cheaper, alternative ways to meet their needs forcing producers to invest in more environmentally responsible technologies.

Lawmakers are charged with designing a tax rate that accounts for most externalities and this is uncertain at best. The Intergovernmental Panel on Climate Change (IPCC) concluded in 2005 that the ideal rate per ton of carbon would be \$12, and this was based on an analysis of 100 studies on the optimal tax rate. Still, there was a wide range of variation on the tax starting from \$3 per metric ton of carbon, all the way to \$95 per metric ton of carbon.¹⁰ Because of the wide range of optimal tax rates, some analysts have recommending setting a tax in a way that aims to reduce emissions by a certain percentage in an allotted amount of time.

The second issue that needs to be considered with carbon taxes is what use the revenue will have. One of the primary propositions is to use the revenue to aid in moving economies toward low-carbon energy alternatives.¹¹ The federal government can use the revenue to invest in research to develop cleaner energy. Along with the tax revenues, the government can remove subsidies from industries that are using counter-productive methods of energy production. The previously used subsidy amounts can also be used to develop energy sources. The revenue made from the carbon tax can also be used to help transition laborers that will be displaced from jobs involving carbon intensive energy sources.

¹⁰ Gilbert E. Metcalf, *The Design of a Carbon Tax*, 33 HARV. ENVTL. L. REV. 499, 511 (2009).

¹¹ *Id.* at 512.

Carbon taxes provide many advantages that make it attractive to a wide range of groups. The main advantage that a carbon tax provides is cost certainty.¹² Because the tax provides a fixed rate for carbon emissions, then producers will always know ahead of time what their costs will be. Also, because taxes are a common scheme it is simple to implement and enforce. People understand how taxes are supposed to work which will make the system more transparent and free from manipulation. The revenue generated by carbon taxes is another important advantage. The revenue from a carbon tax is going to the government instead of to a private party.¹³ This money can be used to improve the economy, improve technology, and overall improve the environment. Other taxes can also be reduced to account for the revenue made through carbon taxes.

A final benefit that carbon taxes provide is signaling.¹⁴ Carbon taxes aim to decrease the undesirable activity of emitting carbon into the atmosphere. With an increasing tax on carbon consumers and producers alike will understand that this is not a cost-effective activity and that they need to seek alternatives to fulfill their needs.

Even though carbon taxes are attractive due to their simplicity and familiarity, they are plagued with disadvantages that make them nearly impossible to market to many countries including the United States. The first of the disadvantages is the political resistance that is evoked by the word “tax”. Previous experiences with taxation where the money is misused or where certain groups are exempted due to their status have caused cynicism towards any kind of

¹² Tax vs. Cap-and-Trade, Carbon Center website, [http:// www.carbontax.org/issues/carbon-taxes-vs-cap-and-trade](http://www.carbontax.org/issues/carbon-taxes-vs-cap-and-trade) (last visited Nov. 1, 2010).

¹³ Tax vs. Cap-and-Trade, *supra* note 11.

¹⁴ *Id.*

tax. Because it is politically unpopular it is unlikely that any politician would try to sell the idea to their constituents.¹⁵

Carbon taxes could also place manufacturers within a country that uses them at a competitive disadvantage to the manufacturers in other countries where there is no such regime.¹⁶ With different economies around the world it would be very difficult to coordinate carbon taxes internationally. It would be necessary for there to be a high level of internal cooperation and again every country would try to maximize their gains without truly cooperating to the extent necessary to achieve the required changes in the environment.

As recently as 2008, United States' congressman Pete Stark introduced a carbon tax bill which would have attempted to impose a tax of \$10 per ton on the carbon content of fuels. The tax would be increased by \$10 per ton every year until the carbon emissions in the United States were reduced by 80%. The problem arises when these numbers are analyzed more thoroughly. This tax would translate into gas prices rising by 3 cents the first year. The first decade gas prices would rise by 30 cents. After two decades, gas prices would only have increased by 60 cents. When inflation is taken into account, this rise in gas prices would be barely noticeable and would not affect in the desired manner the demand for gas.¹⁷

Overall, carbon taxes seem like a simple way to affect carbon emissions through the free market and it is favored by many scholars.¹⁸ Unfortunately, environmental issues are linked to

¹⁵ *Id.*

¹⁶ Kevin M. Dempsey, *The Intersection of Climate Change Policy and International Trade Law: Potential Conflicts and Solutions*, Aspapore, 3 (2009).

¹⁷ Cap and Trade vs. Carbon Tax, Carbon Share website, <http://carbonshare.org/docs/capvscarbontax.pdf> (last visited Nov. 1, 2010).

¹⁸ See Reuven S. Avi-Yonah, *Combating Global Climate Change: Why a Carbon Tax is a Better Response to Global Warming than Cap and Trade*, 28 STAN. ENVTL. L.J. 3 (2009); See also Mikael Skou

politics and because of its lack of popularity it is unlikely to be successful in the future. There are a few countries who are already experimenting with carbon taxation, but its difficulty in being coordinated internationally makes it an unlikely vehicle for international cooperation.

II. Carbon Tax Systems

a. Sweden

Sweden has been a leading example of the use of energy taxes and specifically a carbon tax. Beginning in the 1980s, Sweden became concerned with their levels of oil consumption so their tax system was designed to discourage the use of oil. Then, in 1991 the Swedish government restructured their tax system introducing a carbon tax, a value added tax on energy consumption, and reduced general energy taxes by approximately 50%.¹⁹ Their carbon tax was hefty charging a rate of \$150 USD per ton of carbon.

Although Sweden has been successful in its implementation of the energy taxes, critics are always ready to point out all the exemptions that are granted. First of all, the tax is not imposed upon the electricity industry. Also, 50% of the general level on fuels used in industry are exempted from the tax.²⁰ Because of these tax exemptions, there has not been a great decrease of emissions by big industry consumers.

Still, the tax system as imposed in Sweden has led to increased use of bioenergy throughout Sweden, and also cities are using biomass more and more as an alternative to coal and oil. This has allowed Sweden to create a biomass market which has allowed more biomass producers to start supplying to the heating district plants. Very importantly, Sweden has

Andersen, *Environmental and Economic Implications of Taxing and Trading Carbon: Some European Experiences*, 10 VT. J. ENVTL. L. 61 (2008).

¹⁹ Bengt Johansson, *Economic Instruments in Practice 1: Carbon Tax in Sweden*, Swedish Environmental Protection Agency, available at <http://www.oecd.org/dataoecd/25/0/2108273.pdf> (last visited Nov. 2, 2010).

²⁰ *Id.* at 4.

managed to keep the price of biomass stable since the 1980s, so although demand has increased the price has stayed accessible.²¹ Some major cities in Sweden have also converted their public transportation system to biogas making them more efficient.

Sweden's energy tax system is used as an example of a remarkable energy tax because it accomplished decreased emissions while also achieving economic growth. In the period between 1990-2006, Sweden managed to reduce their carbon emissions by 9%. In the same period of time, Sweden was estimated to have had 44% economic growth.²² Even though some criticize the 9% reduction as too small an accomplishment to celebrate, it is a step in the right direction and has been largely due to the effects of their energy tax regime.

b. Norway

Norway imposed a carbon tax at the same time as Sweden in 1991, but their efforts have not been nearly as successful. In the decades following the implementation of the carbon tax in Sweden, instead of GHG emissions dropping, they have increased by 15%. There are some analysts who believe that the 15% increase would have been worse without the carbon tax, and their economy has experienced a growth of 70%.²³ In essence, a 15% increase in emissions when coupled with 70% economic growth is a small price to pay for some.

Offshore drilling around Norway has also increased dramatically in the decades following the carbon tax. StatoilHydro, which is one of Norway's largest oil conglomerates has nearly quadrupled its emissions during the time after the implementation of the carbon tax. The \$53 per ton of carbon proved to not be a hurdle in Statoil's plans to drill. In order to ameliorate

²¹ *Id.* at 10.

²² Daniel E. Kwak, *Civilizing Society: The Need for a Carbon Tax in Light of Recent Changes to U.S. Energy Taxation Policy*, 88 OR. L. REV. 547, 568 (2009).

²³ Kwak, *supra* note 21, at 569.

the impact of their increasing emissions, Statoil is investing in ocean carbon sequestration technology so as to not emit into earth's atmosphere. Norway's biggest success story involves the main aluminum producing companies in the country. The three largest aluminum producers have managed to reduce their industry emissions to 55% below the 1990 levels.²⁴

Norway has tried to reduce the amounts of fuel used by their population by taxing high rates on gasoline. A gallon of gasoline typically costs somewhere between \$9 and \$10. Of that amount, \$6 is for the carbon tax, yet the demand for gas has not decreased and people continue to drive.²⁵

It is still questionable whether or not Norway could have done more to make their carbon tax more efficient. While the aluminum industry has definitely made headway, it seems that the oil industry is backtracking and the country may need to reconsider its objectives in going forward with carbon taxes as they currently stand.

c. Netherlands

On January 1st, 1996, a regulatory energy tax came into effect in the Netherlands. The tax targeted primarily small energy consumers like office buildings, schools, and private residences.²⁶ The government was offsetting the tax burden brought about by the energy tax by reducing direct taxes. Also, the revenue that is collected from these energy taxes is being channeled toward providing incentives for energy conservation.

²⁴ *Id.*

²⁵ Leila Aboud, *Norway's Efforts to Contain Greenhouse Gases Move Forward and Backfire*, *The Wall Street Journal*, Sept. 20, 2008, at A15, also available at <http://online.wsj.com/article/SB122272533893187737.html#articleTabs%3Darticle> (last visited Nov. 2, 2010).

²⁶ Kwak, *supra* note 21, at 570.

From the start, the government in the Netherlands understood the challenges an energy tax would bring, particularly how difficult it would be to rally support for such a measure. In order to gain support special committees were developed.²⁷ These committees consisted of scientists, interest groups, and some government representatives. They were charged with the task of making the tax policy as efficient as possible while also trying to gain supporters.

It is interesting that the government chose to impose the tax on small scale consumers. The reasoning was that imposing the tax on large industry energy users would place them at a disadvantage internationally with countries who do not impose these kinds of environmental taxes.²⁸ Also, government officials realize that these small scale consumers are more difficult to address using long term agreements or environmental permits. Large producers constantly have to engage in discussions with government officials and have to meet certain standards, while small scale consumers are rarely placed in that position.

The Netherlands have already experienced success in dealing with environmental taxes. In the 1970s, the country began to experience problems with water pollution and they instituted a water pollution tax. Small companies and residences paid a fix amount, and large business were charged based upon the amount of their discharge. Between 1976 to the mid-1990s, they were able to reduce water pollutants by 72%-99%.²⁹ The Netherlands continue to be a great example of how energy taxes should be implemented.

²⁷ *Id.*

²⁸ The Netherlands' Tax on Energy, Ministry of Housing, Spatial Planning and Environment Directorate-General for Environmental Protection, *available at* <http://www.windworks.org/FeedLaws/Netherlands/NLEnergytax2004.pdf> (last visited Nov. 2, 2010).

²⁹ David M. Roodman, *The Natural Wealth of Nations: Harnessing the Market for the Environment* (New York, N.Y.: W.W. Norton and Company, 1998, p.177); <http://iisd1.iisd.ca/greenbud/nether.htm> (last visited Nov. 3, 2010).

III. What is Cap-and-Trade?

An alternative to carbon taxes that is already being implemented in some countries is cap-and-trade. Cap-and-trade adopts a free market approach, while capping carbon levels. The first, and most important step in the cap-and-trade process is deciding what industries are going to be targeted and what emissions are going to be targeted. As mentioned earlier, because carbon seems to be an overwhelming concern, cap-and-trade programs tend to focus on carbon emissions. After policy-makers have chosen the scope of the program, then an overall emission target must be set.³⁰ This emission target is the sum-total of all the emissions that will be allotted to the covered industry. The final and most controversial step of cap-and-trade is the allocation of the tradable permits. The permits can be distributed without charge, they can be auctioned off, or a combination of both methods can be employed.³¹ Each permit would typically be for one ton of carbon. Each company within the industry would be responsible for producing enough permits to cover their total amount of emissions for the year.

Cap-and-trade systems are said to foster efficiency because those companies who can decrease their emissions most cost-effectively will do so. Meanwhile, those companies who could only decrease their emissions through extremely costly methods have the opportunity to buy the permits off of the companies who did not use up all of the allocated emissions.

Essentially, companies have an economic incentive to decrease their emissions but they do not

³⁰ Jason Schaefer, *A Market Based Approach: The Best Way to Transition to a New Energy Economy While Meeting the Responsibility to Address Global Climate Change- A North Dakota Perspective*, 85 N.D. L. REV. 849, 853 (2009).

³¹ *Id.*

need to stop conducting business as usual because they can purchase additional permits. It adopts a “polluter pays” approach to encourage innovation.³²

There are two basic assumptions underlying a cap-and-trade system. The first assumption is that there is a certain level of emissions that is not harmful to the environment. The second assumption is that the market for pollution allowances is cost-effective. Whether these assumptions are true or not is difficult to gage, but cap-and-trade has been the preferred method of the European Union, and in 2008 alone they managed to reduce emissions by 3% from 2007 levels.³³ One of the factors that may have aided the EU’s cap-and-trade program is that they have a compliance mechanism in place. At the end of the year when companies report their emissions and turn over their permits, those companies who do not have enough permits to cover their emissions are charged a fine. These fines amount to about 100 Euros per ton of excess carbon. Additionally, the company must purchase permits to cover their surplus emissions and turn these over to the government.³⁴

The most obvious benefit of cap-and-trade, and one of the attributes that makes it particularly attractive is the benefit certainty. Because cap-and-trade programs provide an absolute cap on emissions in the given industries, then there is a guarantee that emissions will be reduced.³⁵ With a carbon tax this benefit does not exist because so long as people are willing to pay the rate of the tax, there will be no decrease in emissions.

³² The “polluter pays” principle holds the company that pollutes accountable for the effects of their emissions. It is a useful principle to consider in regulatory schemes.; Candice Stevens, *Interpreting the Polluter Pays Principle in the Trade and Environment Context*, 27 Cornell Int’l L.J. 577, 578 (1994).

³³ Schaefer, *supra* note 29, at 856.

³⁴ James Chapman, Linking a United States Greenhouse Gas Cap-and-Trade System and the European Union’s Emissions Trading Scheme, 11 VT. ENVTL. L.J. 45, 56 (2009).

³⁵ John M. Volkman, *Making Change in a New Currency: Incentives and the Carbon Economy*, 29 Pub. LAND & RESOURCES L. REV. 1, 8 (2008).

Another important benefit of cap-and-trade is the idea that there is an already existing carbon market. Different countries can link up their carbon trade systems and potentially one day there will be a global cap-and-trade system.³⁶ If countries begin to cooperate on this basis then it will nearly eliminate the possibility of leakage. This means that companies who believe that they will surpass the emissions that they are allowed by their permits may try to conduct their business in a different jurisdiction to prevent any penalties. This could translate into overseas activities that are deleterious to a host country. Cooperation is the best solution for this problem.

Cap-and-trade also provides a way for revenue to be collected to later invest in clean energy projects. This is particularly true of programs which auction off the permits. The money that is collected at the auctions can be used on research for cleaner technology. Also, cap-and-trade forces companies to internalize their externalities. Companies have to pay for the damage being caused by their emissions up front. They will be held responsible for every ton of carbon that is emitted from their facilities. Additionally, cap-and-trade systems have the potential of being very flexible and offering options that carbon taxes would not be able to meet.³⁷ For example, in cap-and-trade permits can be banked and used during some other year. Permits can also be borrowed in advance. This flexibility may work against the ultimate goal of decreasing emissions but it makes the program attractive.

Cap-and-trade is also plagued with its share of disadvantages and criticisms. The most obvious problem is that while there is a benefit certainty built into the cap-and-trade system,

³⁶ *Id.* at 18.

³⁷ Robert N. Stavins, *A Meaningful U.S. Cap-and-Trade System to Address Climate Change*, 32 HARV. ENVTL. L. REV. 293, 298 (2008).

there is inherent cost uncertainty.³⁸ Companies having excess permits are free to price the permits however they deem appropriate. At first, this attribute may seem unattractive to most administrations considering cap-and-trade.

An additional problem with cap-and-trade which makes it difficult to implement and enforce is the complexity.³⁹ There are so many steps involved in creating the system which makes it burdensome. First of all, it will be difficult to gage what the appropriate cap will be. This will involve scientists, government officials, and representatives from different industries. It will be an overall tug of war with scientists crying out for lower caps, while businesses will claim the impossibility of doing business with overly restrictive caps. Then, the government officials will be charged with weighing the political implications of the decision. After the cap decision is made, then there needs to be a decision on how permits will be allocated. This can have a serious impact on the efficiency of the system because if permits are given away for free, then profits from selling them may go into the wrong hands.

It also seems that the key to cap-and-trade which is to make sure to administer the permits, collect the permits, and keep track of how many permits each company is using will involve an intricate accounting system that will take years to coordinate. In that sense, it is clear that carbon taxes would be much faster and simple to implement. Cap-and-trade is a potentially promising system that is politically more popular than carbon taxes. There are still many kinks in the system that regulators need to work through and eventually it can become a feasible system.

³⁸ Avi-Yonah, *supra* note 17, at 5.

³⁹ *Id.* at 38.

IV. Cap-and-Trade Systems

a. Australia's Failed Cap-and-Trade System

In December 2007, Australia demonstrated their commitment to aiding in the global fight against climate change by ratifying the Kyoto Protocol. Still, the only mandatory measure that was born from this ratification was the Mandatory Renewable Energy Target (MRET).⁴⁰ This requires wholesale purchasers of electricity to contribute to a certain amount of renewable energy per year. This meager requirement sparked criticism because it did not seem ambitious enough to truly reduce emissions nationally.

Prime Minister Kevin Rudd wanted to push the country towards emissions trading by 2010. His desire for implementing a cap-and-trade system was primarily driven by wanting to engage in an international cap-and-trade system. On July 16, 2008, the federal government released the *Carbon Pollution Reduction Scheme: Green Paper* ('Green Paper') which provided a design for the cap-and-trade system. The 'Green Paper' was followed up by a 'White Paper' which provided a national goal. CPR was to be implemented in 2010 and they were going to strive for a 60% reduction from 1990 levels by 2050. The short term goal was to reduce emissions by 5% of 2000 levels by 2020.⁴¹

On December 2nd, 2009, the Australian Senate voted against CPRS 41-33. It is believed that the reason the bill was defeated was due to a divided Parliament.⁴² Also, environmental advocates criticized the plan because the targets were inadequate. Others criticized the costs of CPRS because it would add \$7 billion USD to business costs annually. Finally, the agriculture

⁴⁰ Jacqueline Peel, *Climate Change Law: The Emergence of a New Legal Discipline*, 32 MELB. U. L. REV. 922, 933 (2008).

⁴¹ *Id.* at 936.

⁴² Rohan Sullivan, *Australia's Carbon-Trading Legislation Fails*, The Huffington Post, Dec. 2, 2009, available at http://www.huffingtonpost.com/2009/12/02/australias-carbon-trading_n_376671.html (last visited Nov. 6, 2010).

sector was against the plan because there were no reductions for non-energy sectors.⁴³ Rudd was hoping to join the ranks of the EU and to provide an example to the rest of the world but instead was left with a defeat. While in scholarly discussion cap-and-trade may seem politically attractive, this is a prime example of the factors that can cause political opposition.

b. U.S. Attempt at Cap-and-Trade

In 2009, the U.S. House of Representatives passed the American Clean Energy and Security Act. The bill is designed to cover seven different greenhouse gases: carbon dioxide, methane, hydrofluorocarbons, sulfur hexafluoride, nitrous oxide, nitrogen trifluoride, and perfluorocarbons. The structures that are going to be affected by the bill are distributors of natural gas, large stationary sources emitting more than 25,000 tons per year of GHGs, importers and producers of all petroleum fuels, and some other identified sources.⁴⁴

The goals of the cap-and-trade program would be to reduce emissions by 3% of 2005 levels by 2012, reduce 17% of 2005 levels by 2020, and by 2050 have an 83% reduction from 2005 levels.⁴⁵ The allowances will be distributed through an auction system. Also, in order to protect consumers from having to pay exorbitant energy prices the government will be providing permits to natural gas and electricity distributors under the condition that they will use the sale of the allowances to benefit their consumers.

The American plan also caps offsets at 2 billion tons. As the plan is currently written, 1 billion tons of offsets are set for domestic projects, and 1 billion tons of offsets are allocated to

⁴³ Sullivan, *supra* note 41.

⁴⁴ Waxman-Markey Short Summary, Pew Center on Climate Change website <http://www.pewclimate.org/federal/analysis/congress/111/acesa/waxman-markey-short-summary> (last visited Nov. 6, 2010).

⁴⁵ *Id.*

international projects.⁴⁶ These numbers can be altered but the 2 billion ton cap on offsets cannot be raised. The Federal Energy Regulatory Commission would be charged with regulating the market of allowances and offsets.

While the Waxman-Markey bill is not perfect, it would be a good opportunity for the United States to send out a message to the world that they take responsibility for the environment. The United States is a major polluter and a major advocate for other countries to change their bad habits, but unfortunately there is a tendency to straggle with real changes in the domestic arena. The United States can be a leading example to the rest of the world. In the international arena, signing the Waxman-Markey bill into law would be greatly beneficial to the United States.⁴⁷

In order for Waxman-Markey to be passed and be successful, governmental leaders need to address the problems it presents. A big criticism of Waxman-Markey is that it over-allocates emissions permits.⁴⁸ Critics have said that over-allocation is a common problem in cap-and-trade systems. In some cases, countries have set their cap at a level above actual emissions. While emission levels were still reduced with the over-allocation, it is counter-productive because it keeps permit prices low and people are uncomfortable to invest. Also, some people are uncomfortable with the effect Waxman-Markey will have on the Clean Air Act. In essence, if the bill passes into law the Clean Air Act will be preempted in most capacities except to manage small stationary sources not covered under Waxman-Markey.⁴⁹ Because the Clean Air Act has been a successful program there is a concern that preempting it may undo its positive impact.

⁴⁶ Waxman, *supra* note 43.

⁴⁷ Melissa Powers, *Integrating the Clean Air Act With Cap-and-Trade*, 37 RUTGERS L. REC. 150, 152 (2010).

⁴⁸ *Id.* at 154.

⁴⁹ *Id.*

The United States needs to transition into a “carbon free” economy and Waxman-Markey is a step in the right direction. The bill has strengths and weaknesses that can be corrected with time and through trial and error. Once the U.S. begins to make environmentally sound policies, then the nation will be able to reduce greenhouse gas emissions and gain respect from other countries.

V. Kyoto Protocol’s Approach

The Kyoto Protocol is an international agreement through which a number of countries agreed to reduce their national emissions. It was adopted on December 11th, 1997 and it came into force on February 16, 2005. One of the underlying concepts of the Kyoto Protocol is the concept of “common but differentiated responsibilities”.⁵⁰ Basically, this concept requires the acceptance that developed countries account for most historical and current emissions. Also, per capita emissions in developing countries are still low. Finally, developed countries need to understand that the amount of emissions in developing countries will inevitably increase to meet the needs of development.⁵¹ The Protocol places the ultimate responsibility for decreasing emissions among developed countries.

While the Kyoto Protocol suggests that developed countries need to reduce emissions, it also provides a number of possible ways to use market mechanisms to reduce emissions. The three mechanisms that are suggested by the Protocol are Flexible Emissions Trading, Joint Implementation, and the Clean Development Mechanism.⁵² The following sections will provide a brief description of each of the prescribed mechanisms under the Kyoto Protocol.

a. Flexible Emissions Trading

⁵⁰ Albert Mumma, *Designing a Global Post-Kyoto Climate Change Protocol That Advances Human Development*, 20 GEO. INT’L ENVTL. L. REV. 619, 625 (2008).

⁵¹ *Id.*

⁵² Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 11, 1997, U.N. Doc. FCCC/CP/1997/L.7/Add.1 (entered into force Feb. 16, 2005), *available at* <http://unfccc.int/resource/docs/convkp/kpeng.pdf> [hereinafter Kyoto Protocol].

Flexible Emissions Trading as explained in the Kyoto Protocol is basically a cap-and-trade system. Once a country that is a party to the United Nations Framework Convention on Climate Change ratifies the Kyoto Protocol and establishes some of its domestic goals, then it can participate in emissions trading.⁵³ The government would set an overall emissions limit that would legally bind certain companies in the targeted industries. Then, the companies that cannot lower their emissions are able to purchase excess permits from some of the other companies that are able to meet the targets. The best quality of the emissions trading is that permits can be bought from different countries.⁵⁴ If the United States became a party to the Kyoto Protocol and were unable to reach their emission reduction goals, then they could purchase additional permits from Russia or the United Kingdom. A system akin to a stock exchange would be set up so that people could easily trade emissions permits. United States participation in the emissions trading system could be a business opportunity that is currently being missed.

b. Clean Development Mechanism

The Clean Development Mechanism (CDM) under Article 12 of the Kyoto Protocol is a system which encourages cooperation between developed and developing countries.⁵⁵ This mechanism recognizes the possibility that it may be difficult for developed countries to alter their business structures to accomplish emissions reductions.⁵⁶ Developed countries, companies, and other organizations can undertake emissions reductions projects in developing countries and use these reductions to offset their actual emissions.

⁵³ Eric Shaffner, *Repudiation and Regret: Is the United States Sitting out the Kyoto Protocol to its Economic Detriment*, 37 ENVTL. L. 441, 453 (2007).

⁵⁴ *Id.*

⁵⁵ See Kyoto Protocol, *supra* note 51.

⁵⁶ *Id.* at 457.

One of the most important requirements of the CDM is the “additionality” requirement. Basically, this requires the entity which wishes to participate in the project to undertake new emissions reduction projects and not just use previously planned projects to meet their goals.⁵⁷ CDM projects are great business opportunities because organizations can complete certain projects in an economically efficient way without affecting business domestically. Also, CDM complies with the “common but differentiated responsibilities” principle because it allows developing countries to continue developing just in a more efficient way with help from the countries and companies that have the means to do so.

c. Joint implementation

Joint Implementation is defined in article 6 of the Kyoto Protocol. It is very similar to CDM in that it allows countries, companies, and organizations to invest in emissions reduction programs in other countries to reduce emissions there. The main difference is that unlike the CDM mechanism which involves the exchange between a developed country and a developing country, joint implementation is a project jointly undertaken between two or more developed countries in another developed country.⁵⁸ Joint Implementation has had a small impact in comparison to emissions trading and CDM but it is slowly gaining popularity. In 2006, 21 million tons of carbon were transacted using Joint Implementation, while 520 million tons were transacted using the CDM mechanism.⁵⁹ It is still difficult to verify the impacts of Joint Implementation projects and to ensure that the emissions reduction units are truthful but verification systems are being worked on.

⁵⁷ Shaffner, *supra* note 52, at 459.

⁵⁸ Joint Implementation, UNFCCC website, *available at* http://unfccc.int/kyoto_protocol/mechanisms/joint_implementation/items/1674.php (last visited Nov. 8, 2010).

⁵⁹ Questions and Answers: Joint Implementation, World Bank website, *available at* siteresources.worldbank.org/.../Resources/Q&AJI.doc (last visited Nov. 8, 2010).

VI. WTO Implications of Carbon Taxing and Cap-and-Trade

Free trade and environmental protection concerns are not necessarily compatible goals. The World Trade Organization seeks to eliminate all barriers to trade, but the flexible mechanisms under the Kyoto Protocol require domestic protection of the environment and this may come into conflict with the goals of the WTO.⁶⁰ The conflicts arise because environmental protection instruments do not indicate the appropriate mechanism by which to achieve harmony among trade and environmental protection. Agenda 21 in particular seeks to encourage sustainable development through trade liberalization.⁶¹ Again, it does not specify how this goal is to be accomplished.

Under the General Agreements on Tariffs and Trade, member States are required to treat all products originating in any of the member States with the same favor.⁶² A second important obligation is the national treatment principle which requires that products from all member States be treated the same as domestic products.⁶³ The remaining relevant obligation is the requirement that there will be no quantitative restrictions on the products from other member States.⁶⁴ Clearly, these three obligations can come into conflict with the obligations under the Kyoto Protocol. Countries may prefer products from some countries that employ cleaner technology, or they may favor domestic products that they know have been made with environmentally friendly materials.

⁶⁰ Cinnamon Carlarne, *The Kyoto Protocol and the WTO: Reconciling Tensions Between Free Trade and Environmental Objectives*, 17 *COLOL. J. INT'L ENVTL. L. & POL'Y* 45, 50 (2006).

⁶¹ *Id.* at 51.

⁶² Tsung-Sheng Liao, *Surviving by "Eating Coins" or Breathing with no Carbon Dioxide: The Dynamic Balance Model to Resolve the Potential Conflicts Between the WTO and the Kyoto Protocol*, 16 *CURRENTS: INT'L TRADE L.J.* 28, 32 (2007).

⁶³ *Id.*

⁶⁴ *Id.* at 33.

The GATT also provides an exception through which member States can be exempted from the above mentioned obligations. Article XX(b) of the GATT provides member States the flexibility to go against their obligations if it is: necessary to protect human, animal or plant life or health; and Article XX(g) provides that member States can adopt any measures: relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption.⁶⁵ Basically, member countries can pursue whatever course of action that they deem necessary to protect their environment so long as it is not arbitrary. For example, a member State cannot claim that they will not accept products from one country because they use environmentally irresponsible methods, and later accept products from another country that use the same methods.⁶⁶ There needs to be a good faith desire on behalf of the member State to protect the environment.

Unfortunately, there is still no clear cut answer as to the relationship that exists between the Kyoto Protocol and the GATT. Both of these instruments seem to be covering very divergent topics and yet they are so interconnected. Over time there have also been evolving questions about the relationship between the General Agreement on Trade in Services and the Clean Development Mechanism. CDM projects can clearly be defined as services but because they are not listed in the Schedules of the member countries, probably because of its novelty, it is not considered to be covered by GATS.⁶⁷

Throughout history there have been many treaties which have come into conflict with each other, and whether controversially or not, member States have found alternative routes of complying with both treaties. Similarly, as countries become more familiar with environmental

⁶⁵ General Agreement on Tariffs and Trade, Oct. 30, 1947, 61 Stat. A-11, T.I.A.S. 1700, 55 U.N.T.S. 194.[hereinafter GATT] *available at* http://www.wto.org/english/docs_e/legal_e/gatt47_e.pdf.

⁶⁶ *Id.*

⁶⁷ Liao, *supra* note 62, at 47.

impacts, there will be more willingness to find ways to read the GATT and the Kyoto Protocol together. After all, the drafters of the GATT must have realized the importance of the environment when they put in Article XX. This was a deliberate addition made probably in contemplating the future.

VII. Sectoral Hybrids as the Ultimate Solution

After analyzing carbon taxes and the cap-and-trade approach, it becomes obvious that neither approach is perfect and, also that neither approach manages to target all the major emitters that need to be regulated. A sectoral hybrid approach could manage to overcome both of these obstacles. Basically, a sectoral hybrid would combine any number of different approaches until all the emitters of interest have been targeted in some way.⁶⁸

The program that would likely be most effective would combine a cap-and-trade for large electrical and industrial sectors, a carbon tax for households, and application of stringent efficiency standards for consumer goods.⁶⁹ By putting to work all three of these mechanisms, everyone responsible for emissions would try to find ways to cut back. In the electrical and industrial sectors there will be incentives to reduce emissions so that they can later sell their emissions permits. This will require innovation and environmentally responsible decision-making. Heads of households will try to reduce their amount of waste in electricity. More families will be turning off lights, unplugging unused chargers, and choosing more efficient light bulbs. Finally, if the producers of consumer goods are also pushed towards greater efficiency then the whole cycle comes together. It will be easier for consumers to keep their tax levels low.

⁶⁸ Robert N. Nordhaus, *Assessing the Options for Designing a Mandatory U.S. Greenhouse Gas Reduction Program*, 32 B.C. ENVTL. AFF. L. REV. 97, 149 (2005).

⁶⁹ *Id.*

Cap-and-trade is a good system for big emitters, but it is more difficult to monitor with the smaller groups of emitters. Because there are already tax systems set up around the world, it will be easy to target households so that individuals will also adopt a sense of responsibility for the environment. Cap-and-trade systems can be linked up internationally and efficiency standards can be negotiated across borders.

A hybrid system would force everyone to join the effort to reduce emissions. Costs could not be funneled down to the point where the major emitters are barely being held accountable for their emission levels. Consumers need to realize their responsibility for emissions and they will also apply pressure to the energy and industrial suppliers to come up with energy efficient alternatives. This would be much more popular in a political sense also because businesses would not feel like they are being unfairly targeted. Everyone would have personal accountability.

The best way to achieve this sectoral hybrid in the United States would be for states to set up 3 different agencies that would organize and monitor the different sectors. Then, there can be 3 federal agencies to whom the state agencies would report to. By setting up this two-tiered system, it would allow for the states to have some freedom in implementation, while still allowing for uniformity across state lines. Because the U.S. has such a strong influence worldwide, they may be able to convince other countries to implement similar environmental protection measures. A sectoral hybrid would send the message that a single measure is not enough to stop environmental degradation. A worldwide effort needs to be implemented in order to reverse the damage that industrialization and globalization has exerted on the earth.

VIII. Conclusion

To many politicians and economists, the carbon market is the solution to environmental problems. The difficulty with market mechanisms is that sometimes they leave out of their scope the most important emitters. With millions of individuals driving cars, taking long hot showers, and owning dozens of electronics which are used on a daily basis, it is difficult to ignore that as an aggregate individuals are responsible for a fair share of emissions.

Carbon taxes while simple, are a politically unpopular alternative. Cap-and-trade is complex and can lead to many difficulties in implementation. Neither one of these mechanisms on their own can achieve the kind of results necessary to set back the environmental damage that has already been occasioned. The Kyoto Protocol also attempts to give various options for dealing with emissions reductions but upon further consideration it becomes amply clear that there is plenty of opportunity for falsification of results. On paper it might seem that emissions are being reduced to their full potential, but the actual projects may be a farce by a foreign company so that they may continue to emit at home.

The ultimate solution to climate change and environmental degradation will employ a variety of these mechanisms. Each mechanism will complement the other to reach the most cost-efficient result. A sectoral-hybrid like the one described above will combine carbon taxes, cap-and-trade, and energy efficiency standards to target all sectors that contribute to emissions. While it is a complex plan, it provides a functional approach which will allow businesses to continue to thrive and will give some hope for the improvement of the environment.