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Carbon Cap-and-Trade Programs: European and Domestic Designs Provide Insight for New Administration

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Introduction[1]

Based on pronouncements throughout this past year, Barack Obama and members of his designated environmental and energy teams are committed to implementing a cap-and-trade mechanism as a component of future climate change regulations.[2] The goal of a cap-and-trade mechanism is to control and lower greenhouse gas (GHG) emissions in a both cost-effective and environmentally protective manner. In a cap-and-trade program, the government sets a limitation, *i.e.*, a cap, on emissions, and dispenses permits to emit, *i.e.*, allowances, to regulated sources in an aggregate amount equal to the cap. The regulated sources choose how they are going to limit themselves to their allowed emissions cap — by either lowering emissions in an amount equal to their allowances or by purchasing emission allowances or credits from other entities who, for a variety of reasons, may have emission allowances or credits to sell. If the price of allowances is higher than the cost of reducing emissions, sources will choose to reduce emissions. Under an effective cap-and-trade program, allowances have value because they are scarce resources, and a market develops whereby allowances, and credits against allowances, are traded. A cap-and-trade mechanism is a departure from traditional "command and control" regulation that specifies the technology by which emissions will be controlled. In a well-designed cap-and-trade program, the regulated facility can choose the most cost-effective manner of reducing emissions to its permitted amount and the government meets its goal of reducing emissions with a limited amount of ongoing administrative costs.[3]

As the new President and the new Congress begin shaping their federal climate change legislative proposals and regulatory initiatives, they can obtain guidance from the do-

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1. In the drafting of this article, Ms. Sigel greatly appreciates the insight and assistance provided by her colleague at Jenner & Block, Jennifer L. Cassel.

2. *See, e.g.*, President-Elect Obama's statement from his presentation at the Nov. 18, 2008, Governors' Global Climate Summit in Los Angeles, CA, available at: http://dotearth.blogs.nytimes.com/2008/11/18/obama-climate-message-amid-economic-woes/; a March 5, 2008 statement by Carol Browner regarding cap-and-trade can be found at: http://www.youtube.com/watch?v=vXVNa2n5nsA.

3. All of the GHG cap-and-trade programs currently in operation or design spring from the successful use of this mechanism by U.S. EPA for control of sulfur dioxide emissions in the Acid Rain Program under Title IV the 1990 Clean Air Act Amendments. 42 U.S.C. § 7651 *et seq.*; *see also* http://www.epa.gov/airmarkt/progsreg/arp/index.html. The Acid Rain program reportedly reduced emissions below required levels and at greatly reduced costs to both regulated entities and the government. *See, e.g.*, U.S. EPA, "Acid Rain Program Benefits Exceed Expectations," available at: http://www.epa.gov/airmarkets/cap-trade/docs/benefits.pdf.

mestic and international government organizations that have already designed and, in the case of the European Union, operated a carbon cap-and-trade program. This experience demonstrates that there are significant challenges and uncertainties regarding the economic impact and environmental effectiveness of a cap-and-trade program, but that this regulatory structure can be made to operate on a wide scale. The complexities involved in program design are daunting, but they have been tackled by both U.S. and non-U.S. governments who are committed to using this approach to address GHG emission reductions. This article highlights the key features of carbon cap-and-trade programs by discussing and comparing the basic design elements of the only multinational, fully operational cap-and-trade program — the European Union GHG Emissions Trading Scheme — with the designs to date of the three U.S. regional groups addressing climate change.

European and U.S. Regional Cap-and-Trade Programs

European Union Program. The most useful source of guidance regarding the operation of a carbon cap-and-trade program is the European Union (EU) GHG Emissions Trading Scheme (ETS). ETS is the largest mandatory GHG cap-and-trade program in the world. First proposed formally in 2001, and approved by the European Parliament and the Council of the European Union by 2003, ETS currently allows 27 EU countries and 3 other European states to use a trading mechanism to address primarily carbon dioxide (CO_2) emissions.[4] ETS has been in operation since 2005.

ETS's first phase of operation, a 2005-2007 trading period ("Phase I"), was a self-described "learning by doing" phase. Because this was the first time a large-scale, active, mandatory carbon market had been created, ETS Phase I has been, and will continue to be, the subject of scrutiny.[5] In a memo issued in December 2008, the European Commission concluded that:

- Phase I "proved that trading in greenhouse gas emissions works." Phase I established free trading of emission allowances on multiple exchanges and created the "necessary infrastructure."

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4. *See generally* http://rc.europe.eu/environment/climat/emision/index_en.htm.

5. *See, e.g.*, documents cited in notes 6, 7, and 22, below.

- However, the environmental benefit of Phase I "may be limited," primarily due to insufficient verified data regarding baseline emissions at program start-up.

- "Greater harmonisation" between the approaches used by the individual ETS member countries is "imperative" for ETS to achieve both environmental and economic goals.

- ETS has implemented some changes applicable to its Phase II trading period, 2008-2012, but more significant design changes, including greater centralization of procedures, will occur in the Phase III trading period, 2012-2020.[6]

In November 2008, the U.S. Government Accountability Office (GAO) completed a report for Congress analyzing ETS and providing initial "lessons learned."[7] Previewing many of the conclusions subsequently published by the European Commission in its December memo, the GAO advised Congress that legislators designing a GHG cap-and-trade program may consider three key programmatic issues:

1. The importance of ensuring that there is reliable historic emissions data for all regulated entities prior to program start-up;

2. The need for long-term certainty to encourage investments in technology; and

3. The importance of understanding how allowance distribution "may create and redistribute substantial wealth."[8]

Three U.S. Regional Programs. To date, in the absence of comprehensive federal global warming regulation, almost half of the U.S. states have organized themselves into one of three regional initiatives to propose and adopt climate change regulations

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6. "Questions and Answers on the Revised EU Emissions Trading System," Memo/08/796, Brussels, Dec. 17, 2008, available at: http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/796&format=HTML&aged=0&language=EN&guiLanguage=en.

7. U.S. GAO, "International Climate Change Programs: Lessons Learned for the European Union's Emission Trading Scheme and the Kyoto Protocol's Clean Development Mechanism," GAO-09-151, Nov. 18, 2008.

8. *Id.* at 56.

and policies. All three of these regional groups have included a regional cap-and-trade system as part of their proposed regulatory approach. These three regional initiatives, organized through signed agreements, are:

1. Regional Greenhouse Gas Initiative (RGGI);

2. Western Climate Initiative (WCI); and

3. Midwest Greenhouse Gas Reduction Accord (MRA).

Formed in 2005, RGGI is a group of 10 Northeastern and Mid-Atlantic states committed to using a cap-and-trade program to control and reduce CO_2 from fossil fuel-fired electrical power plants operating in its area.[9] In early 2007, RGGI published a Model Rule, to be modified and adopted by each member state, addressing the operation of the cap-and-trade mechanism. Its cap-and-trade program is to begin operating in 2009, and in September and December 2008, it held its first two auctions of allowances for purchase by power plants and others interested in creating the market.[10]

WCI is a group of seven West Coast states and four Canadian provinces.[11] In September 2008, WCI issued its comprehensive design recommendations for a regional GHG emissions reduction cap-and-trade program.[12] Each WCI member will propose and finalize regulations to allow each of them to participate in the regional trading program. This article relies on the WCI's September 2008 recommendations to describe the elements of this region's cap-and-trade program.

MRA is a group of six Midwestern states and one Canadian province, who in 2007, signed an accord to address GHG emissions reductions in their region.[13] The MRA

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9. The 10 RGGI member states are: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont. Pennsylvania is an "observer" state.

10. Information and foundational documents on RGGI and its auctions can be found on its website, www.rggi.org, including "Auction Design for Selling CO_2 Emission Allowances Under the RGGI," Final Report, Oct. 2007.

11. The WCI members are: Arizona, California, Montana, New Mexico, Oregon, Utah, and Washington, and Canadian provinces of British Columbia, Manitoba, Ontario, and Quebec. Information and documents on WCI can be found at www.westernclimateinitiative.org.

12. "Design Recommendations for the WCI Regional Cap-and-Trade Program," Sept. 23, 2008, available at http://www.westernclimateinitiative.org/ewebitpro/items/O104F20433.PDF.

members assigned the task of developing detailed recommendations for a cap-and-trade program to an Advisory Group of public, private, and government representatives. As of the end of 2008, the Advisory Group's recommendations are scheduled to be published in 2009. However, a December 2008 draft of the Advisory Group's "Preliminary Recommendations" for a cap-and-trade program has been circulated and is publicly available.[14] The December 2008 draft is the basis for this article's description of MRA's approach to cap-and-trade program design, to date. It is important to recognize that these Advisory Group proposals are preliminary, represent consensus but not unanimity, and are still in draft, and that the MRA members have not formally received these recommendations.

Comparison of Key Program Elements

While all three U.S. regional groups seek to design a cap-and-trade program that is both cost-effective and environmentally-protective, their cap-and-trade program designs are significantly different from each other and from the ETS. These differences in key program elements may profoundly affect these cap-and-trade programs' environmental success and their economic impact on the regulated community and consumers. The key elements that must be addressed by all cap-and-trade programs are:

- Cap structure, including scope and quantification of emissions
- Allowance structure, including distribution of allowances
- Offsets and credits, including whether and how to allow them
- Other administrative elements, including emissions monitoring, reporting, verification, and program enforcement

Each of these design elements triggers multiple policy issues and can be addressed at length.[15] However, a brief overview of these elements and how they can affect carbon mar-

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13. The MRA members are: Illinois, Iowa, Kansas, Minnesota, Wisconsin, and the Canadian province of Manitoba. Observers are: Indiana, Ohio, Ontario and South Dakota. Information on MRA can be found on its website: www.midwesternaccord.org.

14. The MRA's Preliminary Recommendations December 2008 draft used in this article, which were prepared for use at the Advisory Group's January 2009 meeting, can be found at: http://www.midwesternaccord.org/Meeting%20material%20pages/GHG-meeting-8/Accord_Draft_Recs_Dec08.pdf.

kets' operation provide insight into some of the complex policy issues the new President and Congress will face for the design of a federal GHG cap-and-trade program.[16]

Cap Structure. One of the most fundamental elements of any cap-and-trade system is the emissions cap itself. Establishing the cap on GHG emissions involves crucial inquiries such as which gases and emissions sources to regulate, how to quantify the cap for those sources, and how the cap will be reduced. To date, ETS and RGGI cap only CO_2, but they credit benefits from the reduction of other GHGs by calculating the global warming potential of those gases to determine their CO_2 equivalent (CO_2e). By limiting the cap to CO_2 emissions, ETS and RGGI benefit from simpler quantification, monitoring, and reporting. However, by including more GHGs, a cap-and-trade program could have a broader environmental impact. Notably, both WCI and MRA intend to include in their cap all six Kyoto Protocol GHGs[17] by relying upon CO_2e calculations.

Another important design aspect of the cap structure is establishing which GHG sources will be subject to the cap-and-trade program. Both ETS and the U.S. regional programs include a cap on emissions from fossil fuel-fired electricity generating plants. However, all of the programs except RGGI cap additional GHG sources. RGGI is the only regional program which limits its focus to just one source — fossil fuel-fired power plants. In addition to power plants, ETS caps emissions from large, energy-intensive industrial sources, and beginning in Phase III, ETS will include aviation fuel as the first source of transportation fuel to be included in the trading program.

The West Coast and Midwestern regional organizations currently plan a broader scope of regulated sources than RGGI or ETS. WCI recommends including virtually all significant GHG emission sources in its cap, from electricity generators and importers, to in-

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15. Detailed analyses of program elements can be found in several publications by the Pew Center on Global Climate Change (the "Pew Center"), www.pewclimate.org, including its Congressional Policy Brief Series on cap-and-trade program design, published in Fall 2008, available at: http://www.pewclimate.org/press-release/ddcf-series; and three U.S. GAO reports: "Carbon Offsets: The U.S. Voluntary Market Is Growing, but Quality Assurance Poses Challenges for Market Participants," GAO-08-1048, August 2008; "Climate Change: Expert Opinion on the Economics of Policy Options to Address Climate Change," GAO-08-605, May 2008; and the previously referenced report, GAO-09-151, *supra* note 7.

16. The last Congress considered several bills designing a cap-and-trade program, each of which addressed basic program elements differently. Those bills included: Lieberman-Warner Climate Security Act of 2008, S. 3036; Low Carbon Economy Act, S. 1766; Global Warming Pollution Reduction Act, S. 309; Safe Climate Act of 2007, H.R. 1590; and Climate Matters Act of 2008, H.R. 6316. For analyses of these bills' cap-and-trade design elements, see Pew Center, "Economy-Wide Cap & Trade Proposals in the 110th Congress," Dec. 1, 2008, available at: http://www.pewclimate.org/federal/analysis/congress/110/cap-trade-bills.

17. The six GHGs addressed by the Kyoto Protocol are: CO_2, sulfur hexafluoride (SF_6), methane, nitrous oxide (N_2O), hydroflourocarbons, and perflourocarbons.

dustrial process emissions, to transportation and residential heating fuels. The stated goal of MRA is to include under its cap the vast majority — up to 95% — of GHG emissions in its region, within each regulated sector.[18] However, MRA's commitment to this broad scope of regulated sources is more tentative.

The U.S. regional organizations' designs also illustrate the need to determine at which point in the energy delivery system the GHG will be regulated. Deciding whether to regulate "upstream" or "downstream" involves weighing issues such as administrative cost-effectiveness, political acceptance, and environmental protectiveness. By regulating "downstream," the regulated entity whose emissions are tracked and limited is the source of the emissions into the environment. By regulating "upstream," *e.g.*, at the first point at which a fuel enters commerce, fewer locations are identified as regulated sources, and the system can be administered more easily. However, focusing solely on the most "upstream" sources could limit the potential technological innovations to be spurred by an effective cap-and-trade system and, because it is different from past environmental regulatory approaches (such as the Acid Raid program), it may be more politically difficult to enact. ETS and RGGI largely use a "downstream" approach, regulating primarily the industrial emitters of GHGs at the point of emission. MRA and WCI intend to use a combination of "upstream" and "downstream" points of regulation, depending upon the sector being capped. For example, WCI and MRA intend to regulate "upstream" by capping electricity importers and transportation fuels at the point of "first delivery" into their respective regions.

The government also must decide how the cap is quantified and then reduced. The quantification of the cap is one of the most important design issues affecting the success of a program's early years. If the cap is too high, then scarcity, hence tradable allowance value, cannot be created. Indeed, much of the criticism of ETS Phase I centers on its over-allocation of allowances in its first year because, in part, when basing the cap on total *expected* CO_2 emissions from regulated sources in 2005, it did not have verified or reliable data on which to base that expectation. Once it was learned, in mid-2006, that the 2005 cap was higher than actual emissions in 2005, the over-allocation of allowances led to Phase I allowances becoming essentially worthless on the traded exchanges.[19]

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18. To avoid the costs of regulating minor sources, both the European and all the U.S. regional programs apply a threshold level of emission (or other factor) which must be triggered before a facility is subject to being capped.

19. Over-allocation was exacerbated by a Phase I design element that prohibited use of Phase I allocations in any future trading period. The impact of over-allocation was mitigated for Phase II allowances, in part, because Phase II allowances can be used in all future trading periods. *See*, *e.g.*, GAO-09-151, *supra* note 7.

ETS also had difficulty establishing scarcity for Phase I allowances, because there was no required cap reduction and each European country used different approaches for its calculation of the cap for its sources. In general, the bottom-up nature of the cap's development and the lack of a region-wide reduction requirement resulted in ETS Phase I, and potentially Phase II, having little quantifiable environmental impact region-wide.[20]

The U.S. regional organizations expect to have more reliable emissions data and a region-wide, predictable downward trajectory for their respective caps. RGGI, which has the least complex set of emission sources, relied on known historical CO_2 emission data to allow states to develop their respective 2009 emission budgets, which will be decreased by 2.5% per year starting in 2015. The WCI and MRA also expect to base their caps on historical emissions, adjusted by other factors, such as economic circumstances and population growth, but the MRA draft is transparent about its concern for data uncertainties. For example, it explicitly states that MRA states should include within the cap industrial process emissions (as opposed to industrial *combustion* emissions) only if there are reliable data for measuring those emissions. Both WCI and MRA are committed to downward trajectories from the cap, which will be determined before program commencement, but details remain to be announced. The European Parliament has decided that Phase III will involve a clear downward trajectory for emission reductions, with the rate of reduction imposed by a centralized process and with ETS-wide application.

Allowance Structure. Once the cap structure is set, the program's designers must decide how emission allowances are going to be issued to the regulated sources. The two principal distributional mechanisms used to date are free distribution and auction. Most of the cap-and-trade systems in place or planned involve a combination of both mechanisms.

If free distribution occurs, there are complex decisions regarding which sources get what quantity. If regulators base distribution solely on historical data, depending upon the time period considered as the relevant history, there are concerns about how to accommodate those sources who attempted to get an early start on emission reduction. In addition, there must be a determination of which historical data to use, *e.g.*, emissions or production output or input.[21] Moreover, use of historical calculations, without account-

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20. *See*, *e.g.*, the European Commission's December 2008 Memo, *supra* note 6.

ing for changes in market demand, can lead to unintended consequences, such as barriers to new source entrants who may plan to use new, environmentally protective technologies but have no prior history of emissions. In the case of market contraction, a distribution approach based solely on past performance could result in an over-distribution of allowances causing a collapse of prices for carbon credits. The recent economic upheavals, including higher, then lower, oil and coal prices, and the expanded use of renewable energy sources, could undercut the legitimacy of emission estimates.

Under ETS, as in the U.S. Acid Rain program, emission allowances were largely distributed without charge to individual sources within each country. Although each EU country was allowed to auction up to 5% of available allowances, the ETS countries decided not to auction any significant number of allowances. Under the ETS Phase I and II distribution approaches, because each country decided how to internally distribute their allocations, there were additional tensions because the same types of sources received different rates of allowances in different countries. Moreover, in part because of the unreliability of the historical data used to distribute allowances, allowance distribution did little to encourage technology investment. Finally, ETS Phase I demonstrated that, even if distributed for free, regulated entities that could pass on their costs of the allowances to consumers did so. Thus, ETS has been criticized for allowing certain GHG sources to obtain "windfall profits" from their allowance distributions.[22] Whether sources are able to pass on their allowance costs can be influenced by the amount of price regulation to which those sources are subject; therefore, regulatory control of product prices, particularly in the electrical power industry, is an important factor affecting the economic impact of free allowances.

The principal mechanism suggested to address the lessons learned from the ETS Phase I and II allocation issues, including the difficulties of reliance on historical performance data, is to allow distribution through an allowance auction. Under an auction distribution system, the regulated source must purchase its allowances by auction and/or by trading in the established market. In addition to avoiding some of the quantification problems associated with free allowance distribution, an auction allows the regulator to generate revenue, which, *inter alia*, can be used to address other climate

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21. Under the Acid Rain program, U.S. EPA generally used an allocation distribution method that relied on a 3-year average of fossil fuel consumption multiplied by an environmental performance-based emission rate. U.S. EPA also had a small auction for purposes of price discovery; only approximately 3% of allowances were auctioned.

22. *See*, *e.g.*, GAO-09-151, *supra* note 7; A. Ellerman & P. Joskow, "The European Union's Emissions Trading System In Perspective," Pew Center, May 2008.

change initiatives or the economic impact of GHG reductions. However, auction purchases may favor cash-rich sources, may disrupt a smooth, continued supply of energy or products to downstream users, and may not necessarily force technological innovation relating to emission reduction. Moreover, concerns about market manipulation and fluctuations, particularly given the recent lack of confidence in financial markets, may interfere with both initial and future auction prices. These issues could be addressed by regulators imposing some control of auction prices at the auction start (*e.g.*, by requiring minimum bids) or during subsequent program operation (*e.g.*, a safety valve).

To date, the U.S. regional organizations have more enthusiastically embraced auction distribution than did the ETS member countries in Phases I and II. In 2008, although the RGGI states had the flexibility to do otherwise, almost all of the RGGI allowances will be distributed through auction. Similarly, WCI and MRA require a minimum amount of allowances to be distributed by auction, but they currently plan to allow up to 100% of allowances to be auctioned, with participating states setting their own design on the distributional process. The success of the RGGI full auction approach will provide valuable lessons to the West Coast and Midwest regulators currently working on their program designs. Moreover, it will be watched keenly by the European Commission, as Phase III requires increasing levels of auction distribution, including using an auction as the sole distributional mechanism for the electrical power industry.

Offset Project and Credit Structure. All mandatory and voluntary carbon trading programs allow for a mechanism by which sources can control their compliance costs by purchasing credits issued by "offset projects." A carbon offset is defined as "a measureable reduction of GHG emissions from an activity or project in one location that is used to compensate for emissions occurring elsewhere."[23] Offsets can have multiple purposes, including to encourage GHG emission reductions from sources outside the cap-and-trade regulatory program. An example of an offset is a methane capture project at a landfill. The landfill is not a source regulated under the cap-and-trade program. The owner of the landfill measures the amount of methane captured per year, that amount is converted into tons of CO_2e, and the resulting tons of CO_2e are sold to be used as a credit by a regulated source, such as a cement manufacturer. If purchasing offsets is less expensive than emission reduction at the source, sources will purchase offsets. The downside of offsets, even if they are properly verified and managed, is that it allows

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23. GAO-08-1048, *supra* note 15, at 1.

major sources to delay further their investment in emission-reduction technology at those sources.

Offset project credits can be used without undermining the environmental protective aspects of a cap-and-trade program only if they are legitimate "currency." The criteria generally used to establish the legitimacy of offset projects is that their emission reductions be real, additional, measurable, and permanent.[24] Establishing that each of these criteria is met is typically very difficult and administratively burdensome. Some projects, such as reforestation in the developing world, may not come to fruition or be sustained as real GHG emission reducers for many years into the future, and the controlling owner or government at that time may not be willing to participate. For many projects, it is difficult to determine if the project is "additional" because the project owner may have planned the project in any case, regardless of the financial inducement of being a certified offset project.

Offset projects are created through mechanisms found in the Kyoto Protocol and credits for them are included in the design of ETS. To help address the problem of establishing that offset projects are legitimate enhancements to GHG emission reduction, the United Nations administers two offset project approval mechanisms. The Clean Development Mechanism (CDM) evaluates projects located in developing countries and financed by developed (Kyoto Protocol Annex B) countries. The Kyoto Protocol also instituted the Joint Implementation (JI) program for certification of offset projects in countries subject to a Kyoto Protocol reduction goal, these projects typically would be financed by the more economically advanced (Kyoto Protocol Annex II), developed countries. United Nations-approved CDM projects generate Certified Emission Reductions (CERs) and JI projects generate Emission Reduction Units (ERUs). Both CERs and ERUs can be used as credits against allowance requirements of the ETS and can be traded on the carbon exchanges.[25]

To mitigate the concerns about the environmental legitimacy of offset projects, cap-and-trade programs typically set a limit on the types of offset projects that can be recognized for credit and the amount of credits that can be used to reduce compliance obligations. Under RGGI, for example, offsets can account for no more than 10% of emission reductions, if allowances are priced above $10 per ton. However, if allowance prices are lower, offsets credits cannot amount to more than 3.3%-5% of reductions. RGGI will al-

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24. *See*, *e.g.*, GAO-08-10482, *supra* note 15, at 2.

25. As of the end of 2008, because JI is a newer program, no ERUs had yet been finalized.

low offsets located in the U.S. and for CDM projects only in limited circumstances. As a further restriction, RGGI only allows offsets for certain types of projects: landfill gas destruction, animal methane capture, forest sequestration, SF_6 leak prevention, and oil and gas efficiency improvements.

WCI also limits the use of offset project credits. WCI provides that offset credits cannot exceed 49% of the total emission reductions anticipated by 2020. WCI prioritizes agricultural, forestry and waste management offset projects and will approve any such projects which otherwise meet the WCI standards, if they are located in Canada, the U.S., or Mexico, or approved through the CDM process.

Although an earlier draft of the MRA recommendations considered a limit of offset credits to no more than 50% of emissions,[26] the December 2008 Advisory Group draft deferred recommending any specific numerical limit on offset credits pending receipt of further studies of their effects. MRA recommends agricultural and forestry projects, but limits approval to projects located in MRA states or states which have signed agreements with MRA states. MRA also envisions eventually using credits approved through the CDM and JI process, but MRA does not suggest using those foreign offsets in the initial years of its program.

Other Miscellaneous Provisions. The European and U.S. regional programs have other common elements necessary to the cap-and-trade program's function. Those elements include how the program's requirements will be enforced and how program carbon emissions will be monitored, verified, and reported.

ETS has benefited by centralized monitoring and reporting, but in Phase III intends to enhance and further require centralized enforcement, monitoring, and reporting. The U.S. regional programs are challenged more than a federal program will be, given that they must act within their individual state jurisdictional limits and reach agreements that do not violate U.S. Constitutional or other legal requirements. While each state must implement its own rules in order to regulate sources within its jurisdiction, each state also wishes to minimize administrative costs and benefit from regional cooperation. To make reporting and monitoring more cost-effective, the regional programs typically have recommended using versions of processes already developed. For example, RGGI has

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26. See page 17 of the MRA's Advisory Group's 11/17/08 draft, available at: http://www.midwesternaccord.org/Meeting%20material%20pages/GHG-meeting-7/MGGRA%20Draft%20Recs11_17_08.pdf.

adopted the reporting mechanisms of the Acid Rain program for its CO_2 trading program. MRA is recommending use of The Climate Registry for its reporting format.[27]

Each U.S. state also must be responsible for its own enforcement. However, to maximize the regional benefits, the regional programs typically provide general guidelines for penalties and non-compliance. While MRA's program design is too preliminary to contain specifics, both RGGI and WCI recommend that individual states' rules requires sources with excess emissions at the end of the surrender period to deduct allowances equal to three times the number of unpermitted emissions and to pay additional, albeit unspecified, penalties.

Conclusion

Although the federal government has been criticized for failing to implement a cap-and-trade program for GHGs, in the interim, several regional and national cap-and-trade programs have either been implemented or designed. Thus, the federal government now has the benefit of the efforts of these other groups. ETS has provided valuable "lessons learned" to which both the European Union and the U.S. regional initiatives have responded in their program designs. Whether affirmatively stating so or not, all of these programs, including the ETS itself, attempt to avoid the problems encountered by ETS in Phase I. However, there has been no extensive experience in how these other design approaches, such as a broader scope of regulated GHG emission sources or a reliance on auctioning as the sole allowance distributional mechanism, will play out in the "real world." Thus, the new Administration has the benefit of knowing that a carbon cap-and-trade program can be implemented, but faces significant uncertainties regarding how best to achieve a federal program's environmental, administrative, and cost effectiveness.

For an overview of cap-and-trade programs, including EU ETS and RGGI, *see* Environmental Law Practice Guide, Ch. 18B.

For additional information about the Regional Greenhouse Gas Initiative (RGGI), *see* Marten Law Group: Cap and Trade–Nation's First Carbon Auction Is Underway for RGGI; Marten Law Group: Lessons Are Learned From First U.S. Carbon Auction Held by RGGI.

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27. The Climate Registry is a voluntary GHG registration system in which almost all the states in the U.S. participate. *See* www.theclimateregistry.org.

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For additional information about the Western Climate Initiative (WCI), *see* Marten Law Group: Western Regional Cap-and-Trade System Takes Shape; Marten Law Group: Western Climate Initiative Issues Updated Scoping, Reporting Rules

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Ms. Sigel's national practice focuses primarily on environmental, safety and health litigation and counseling, toxic tort defense, and insurance coverage litigation and counseling. She recently concluded several toxic tort lawsuits concerning a contaminated site located in a residential area. A significant portion of Ms. Sigel's litigation practice involves representing employers in matters concerning work-related injuries, including OSHA proceedings, personal injury lawsuits, criminal investigations, workers' compensation hearings and insurance coverage claims.

In addition to her litigation practice, Ms. Sigel advises clients on a variety of counseling, regulatory, and transactional issues. For example, she currently is advising a multinational corporation on how to address climate change issues, including working to develop definitions, inventory, and programs for greenhouse gas emission reduction. Her transactional experience has included due diligence investigations of environmental, safety and health issues nationwide, in Europe, and in Canada, in preparation for both sales and acquisitions of manufacturing concerns.

Ms. Sigel has been an adjunct professor, teaching environmental law at Northwestern University School of Law. She is active in the American Bar Association, Sections of Litigation and Environment, Energy and Resources. The Illinois State Bar Association appointed her to its Environmental Law Section Council. Ms. Sigel began developing her diverse legal practice when she joined Jenner & Block in 1983, immediately after graduating *cum laude* from Boston University School of Law. Ms. Sigel is AV Peer Review Rated, Martindale-Hubbell's highest peer recognition for ethical standards and legal ability.