REPORT OF THE CLIMATE CHANGE & EMISSIONS COMMITTEE

This report summarizes key developments in environmental policy, regulation, caselaw, and legislation relating to climate change and emissions. The time frame covered by this report includes activities from June 2009 to August 2010.*

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I. FEDERAL DEVELOPMENTS IN THE UNITED STATES

A. Developments at the Environmental Protection Agency

1. Endangerment Finding & Greenhouse Gas Emissions Standards for Light-Duty and Heavy-Duty Trucks

On December 15, 2009, the Environmental Protection Agency (EPA) published a final rule entitled "Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act" (the Endangerment Finding).[1] The final rule was based on the proposed rule issued on April 17, 2009,[2] in response to the U.S. Supreme Court's decision in *Massachusetts v. EPA*. That decision mandated the EPA to consider whether greenhouse gases emitted by new motor vehicles endangered the public health or welfare.[3]

The final rule is comprised of two distinct determinations. The first is that a mix of six long-lived greenhouse gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) may be reasonably anticipated to endanger the public health and welfare.[4] In arriving at this determination, the EPA Administrator identifies a variety of areas in which human-induced climate change poses a threat to public welfare, including increases in extreme weather events, changes in ambient ozone concentrations,

1. Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496 (Dec. 15, 2009) (to be codified at 40 C.F.R. ch. I).

2. Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 18,886 (Apr. 24, 2009) (to be codified at 40 C.F.R. ch. I).

3. Massachusetts v. EPA, 549 U.S. 497, 533 (2007).

4. 74 Fed. Reg. 66,496, at 66,497.

increases in airborne and waterborne pathogens, sea level rise, and increased strain on water resources.[5] The Administrator places particular emphasis on the risks associated with water resources and stronger storm surges occurring in coastal areas.[6] Although the scope of the Endangerment Finding is limited to adverse effects occurring within the U.S., the Administrator also acknowledges that the international effects of global warming may have indirect impacts on the welfare of the U.S. population, and gives some consideration to these effects as well.[7]

The second determination presented by the final rule is the causal connection between certain motor vehicles[8] and the dangers of climate change. Finding that emissions of the six long-lived gases from motor vehicles constitute 4% of global greenhouse gas emissions, and 23% of U.S. greenhouse gas emissions, the Administrator concludes that emissions from these sources contribute to global warming, and thus present a threat to public health and welfare.[9]

The EPA has acted on the Endangerment Finding by promulgating a suite of new greenhouse gas regulations for motor vehicles in conjunction with the Department of Transportation (DOT). The first component of this new regulatory regime was issued as a final rule on May 7, 2010,[10] and applies to passenger cars, light-duty trucks, and medium-duty passenger vehicles built in model years 2012-2016. It combines regulation of greenhouse gas emissions per mile by the EPA with the implementation of new fuel economy standards by the DOT.[11] Taken together, these new regulations will result in average emissions of 250 grams/mile and an average fuel economy of 34.1 mpg by 2016,[12] representing an estimated reduction of 960 million metric tons of greenhouse gases and 1.8 billion barrels of oil.[13] In addition to reductions arising from improvements in fuel economy, the EPA greenhouse gas reduction targets may also be met by reducing emissions of hydrofluorocarbons and carbon dioxide through improvement to air conditioning systems.[14] The joint program represents an important step towards the development of a uniform national emissions policy for automobile manufacturers, as it is harmonized among the EPA, the DOT, and the State of California, which has agreed to accept compliance with the new program in satisfaction of its own greenhouse gas standards.[15]

Building on the framework established by the May 7, 2010, final rule, the EPA and the DOT are also developing rules that would apply to passenger

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5. *Id.* at 66,498.

6. *Id.*

7. *Id.* at 66,514.

8. Passenger cars, light and heavy-duty trucks, buses, and motorcycles. *Id.* at 66,499.

9. *Id.*

10. Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, 75 Fed. Reg. 25,324 (May 7, 2010) (to be codified at 40 C.F.R. pts. 85, 86, & 600).

11. *Id.* at 25,330.

12. *Id.*

13. EPA, *Transportation and Climate Regulations and Standards*, http://www.epa.gov/oms/climate/regulations.htm#prez (last visited Oct. 5,2010).

14. 75 Fed. Reg. 25,324, at 25,330.

15. *Id.* at 25,329.

vehicles from model years 2017 and beyond, as well as new rules for heavy-duty trucks.[16] The EPA intends to issue a Notice of Intent for the new light-duty vehicle standards by September 30, 2010, and will also begin the rulemaking process with respect to heavy-duty vehicles by fall 2010.[17]

2. EPA Tailoring Rule

On May 13, 2010, the EPA issued the Prevention of Significant Deterioriation and Title V Greenhouse Gas Tailoring Rule (Tailoring Rule), a final rule addressing greenhouse gas emissions from stationary sources under the Clean Air Act (CAA).[18] The Tailoring Rule follows from the U.S. Supreme Court decision in *Massachusetts v. EPA*,[19] and from the Endangerment Finding relating to regulation of greenhouse gases under the CAA.[20] The Tailoring Rule was passed to tailor the requirements of existing CAA programs for regulation of greenhouse gases, and to phase-in such regulations, thereby minimizing the regulatory and administrative burden of regulating greenhouse gases.

The Tailoring Rule modifies for CO_2, and other greenhouse gases, the thresholds at which permits are required for emissions under the CAA Prevention of Significant Deterioration (PSD) and Title V permitting programs. Under the existing PSD program, a pre-construction permitting program, new sources, and major modifications to existing sources that fall within one of twenty-eight specified source categories, and that emit or have the potential to emit 100 tons per year (tpy) of a regulated pollutant, or any stationary source that emits, or has the potential to emit, 250 tpy of a regulated pollutant, are required to obtain a permit.[21] Similarly, stationary sources that emit, or have the potential to emit, 100 tpy are required to obtain an operating permit under the Title V program.[22] If greenhouse gases were to be regulated under the existing PSD and Title V emissions thresholds, over six million sources would be subject to regulation, with an estimated total annual cost of implementing the programs around $22.5 billion.[23] The Tailoring Rule establishes progressive emissions thresholds for greenhouse gases, implemented in multiple phases over time, as set forth below, to minimize this regulatory burden.[24]

The PSD and Title V programs also require use of Best Available Control Technology (BACT),[25] which will be applied to regulated sources of greenhouse gases.[26] The EPA has not issued guidance on determining BACT for greenhouse

16. EPA, *supra* note 13.

17. OFFICE OF TRANSP. & AIR QUALITY, SheetEPA, EPA and NHTSA to Propose Greenhouse Gas and Fuel Efficiency Standards for Heavy-Duty Trucks; Begin Process for Further Light-Duty Standards (May 2010), *available at* http://www.epa.gov/oms/climate/regulations/420f10038.pdf.

18. Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 Fed. Reg. 31,514 (June 3, 2010) (to be codified at 40 C.F.R. pts. 51, 52, 70, & 71).

19. Massachusetts v. EPA, 549 U.S. 497 (2007).

20. 74 Fed. Reg. 66,496, at 66,505.

21. 40 C.F.R. § 52.21 (2009).

22. *Id.* §§ 70.2–70.3, 71.2–71.3.

23. 75 Fed. Reg. 31,514, at 31,540.

24. *Id.* at 31,516.

25. 40 C.F.R. § 52.21(b)(12).

26. 75 Fed. Reg. 31,514, at 31,526.

gases, but is in the process of developing such guidance.[27] The EPA guidance on BACT for greenhouse gases is expected to be released prior to greenhouse gas regulations under the CAA taking effect on January 2, 2011.[28]

Phase I under the Tailoring Rule begins on January 2, 2011 – the date on which control requirements for greenhouse gases under the CAA are triggered by the light-duty vehicle regulations taking effect.[29] Under Phase I, PSD and Title V the requirements will apply to stationary sources' greenhouse gas emissions only if the source is subject to PSD and Title V programs based on its non-greenhouse gas emissions.[30] PSD requirements, including BACT, will apply to new sources and major modifications to sources that result in a net greenhouse gas emissions increase of 75,000 tpy of carbon dioxide equivalents (CO_2e), but only if the project also results in a significant increase in a non-greenhouse gas pollutant.[31] Stationary sources are required to address greenhouse gases under Title V only if the source is subject to Title V requirements for non-greenhouse gas emissions.[32]

Under Phase II, which commences on July 1, 2011, new and existing sources not subject to Title V, that emit or have the potential to emit at least 100,000 tpy CO_2e will be subject to both PSD and Title V requirements.[33] Sources that emit or have the potential to emit at least 100,000 tpy CO_2e, and that undergo a major modification resulting in a net increase of greenhouse gas emissions of at least 75,000 tpy CO_2e, will be subject to PSD requirements.[34]

Phase III, which will begin on July 1, 2013, will subject additional sources to regulation, although standards for this phase have not yet been developed.[35] The EPA will complete an additional rulemaking to establish standards for Phase III by July 1, 2012.[36] The EPA has, however, committed that sources with greenhouse gas emissions below 50,000 tpy CO_2e, and modifications resulting in a net increase of less than 50,000 tpy CO_2e, will not be subject to regulation under the PSD or Title V programs before April 30, 2016.[37]

3. Legal Challenges to the Endangerment Finding and the Tailoring Rule

Both the Endangerment Finding and the Tailoring Rule have been subject to challenges in the courts. On February 16, 2010, the States of Alabama, Virginia, and Texas, along with a variety of industry groups, petitioned the D.C. Circuit Court of Appeals to review the Endangerment Finding.[38] The primary claim

27. *Id.*

28. *Id.*

29. *Id.* at 31,516.

30. *Id.*

31. *Id.*

32. *Id.*

33. *Id.*

34. *Id.*

35. *Id.*

36. OFFICE OF AIR QUALITY PLANNING AND STANDARDS, EPA, *Phase-In Steps: Step 3* (May 2010), *available at* http://seechange.businessroundtable.org/Media/PDF/EPA%20Tailoring%20Rule.pdf.

37. 75 Fed. Reg. 31,514, at 31,516.

38. Robert Bravender, *Alabama, Virginia File Petitions, Join 'Endangerment' Foes in U.S. Court*, E&E NEWS (Feb. 16, 2010), http://www.eenews.net/public/eenewspm/2010/02/16/3.

underlying the various petitions is that the EPA acted in an arbitrary and capricious fashion by relying on the report of the Intergovernmental Panel on Climate Change, thus delegating its responsibility for scientific evaluation to an international body.[39] The D.C. Circuit ordered the lawsuits to be held in abeyance pending the resolution of petitions submitted directly to the EPA by many of the same parties urging reconsideration of the Endangerment Finding.[40] The EPA's decision on July 29, 2010, to reject these petitions has now cleared the way for the lawsuits to proceed.[41]

The PSD and Title V permitting programs under the CAA are administered in large part by the states under the EPA-approved State Implementation Plans.[42] The Tailoring Rule requests that states review their current regulatory framework and indicate what modifications will be required to comply with the new permitting thresholds established by the Tailoring Rule.[43] The failure by states to adjust their existing State Implementation Plans to accommodate the requirements of the Tailoring Rule may result in those states becoming subject to a federally administered implementation plan.[44] Eight states,[45] however, have filed suit to avoid compliance with the Tailoring Rule.[46] These cases are now pending before the D.C. Circuit Court of Appeals.[47]

4. Greenhouse Gas Emissions Reporting Rules

On September 28, 2009, the EPA released final regulations requiring the monitoring and reporting of certain greenhouse gas emissions[48] (the Reporting Rule). On June 28, 2010, the EPA released a final rule expanding the greenhouse gas emissions reporting requirements to four other source categories (the Supplement).[49] The Reporting Rule identifies twenty-nine categories of

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39. Petition for Reconsideration of Endangerment and Cause or Contribute Finding for Greenhouse Gases Under Section 202(A) of the Clean Air Act by the Commonwealth of Virginia, Docket No. EPA-HQ-QAR 2009-0171, *available at* http://www.oag.state.va.us/LEGAL_LEGIS/CourtFilings/Comm%20v%20EPA%20-%20Pet%20for%20Reconsideration%202_16_10.pdf.

40. Regina Griffin, *EPA Rejects Challenges on GHG Finding*, PLATTS ENERGY WEEK, July 30, 2010, http://www.plattsenergyweektv.com/story.aspx?storyid=105906&catid=293.

41. *Id.*

42. 75 Fed. Reg. 31,514, at 31,521.

43. EPA, *Final Rule: Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule* (May 13, 2010), *available at* http://www.epa.gov/NSR/documents/20100413fs.pdf.

44. 75 Fed. Reg. 31,514, at 31,526.

45. Alabama, Nebraska, North Dakota, South Dakota, Mississippi, Louisiana, and Texas.

46. Steven Cook, *EPA Tailoring Rule Prompts 24 Lawsuits*, BUREAU OF NAT'L AFFAIRS DAILY ENV'T REPORT (Aug. 5, 2010); s*ee also* Gabriel Nelson, *Texas Joins Challengers to EPA's Greenhouse Gas 'Tailoring' Rule*, N.Y.TIMES (Aug. 5, 2010), *available at* http://www.nytimes.com/gwire/2010/08/05/05greenwire-texas-joins-challengers-to-epas-greenhouse-gas-25612.html.

47. Cook, *supra* note 46.

48. Mandatory Reporting of Greenhouse Gases, 74 Fed. Reg. 56,260 (Oct. 30, 2009) (to be codified at 40 C.F.R. pts. 86, 87, 89, 90, 94, 98, 1033, 1039, 1042, 1045, 1048, 1051, 1054, & 1065).

49. Mandatory Reporting of Greenhouse Gases From Magnesium Production, Underground Coal Mines, Industrial Wastewater Treatment, and Industrial Waste Landfills, 75 Fed. Reg. 39,736 (July 12, 2010) (to be codified at 40 C.F.R. pt. 98).

emission sources ranging from oil refineries to manure management.[50] Affected facilities must begin monitoring January 1, 2010, and initial annual reports must be filed by March 31, 2011.[51] In many cases, reporting is limited to facilities that emit more than 25,000 tons of CO_2e per year.[52] However, fifteen of the twenty-nine sources identified in the Reporting Rule must report even if they do not exceed the 25,000 ton threshold.[53]

a. Background

The Reporting Rule originates from the fiscal year 2008 Consolidated Appropriations Act which authorized funding for the EPA to develop a rule "to require mandatory reporting of greenhouse gas emissions above appropriate thresholds in all sectors of the economy of the United States."[54] On April 10, 2009, the EPA proposed the initial greenhouse gas emissions reporting rule.[55] Notwithstanding the direction that it took from the FY 2008 Appropriations Act, the EPA promulgated the Reporting Rule pursuant to its existing CAA authority, specifically pursuant to sections 114 and 208 of the CAA.[56] Those sections provide the EPA broad authority to require the filing of the information mandated by the Reporting Rule, as the EPA asserts the information is relevant to the implementation of numerous provisions of the CAA.[57]

b. Covered Sources

The Reporting Rule identifies three general types of sources that are required to report greenhouse gas emissions. These general categories are the so-called "downstream," "upstream," and "mobile" sources.[58] "Downstream" sources are those facilities that directly emit greenhouse gases above the applicable threshold from the combustion of fuel or other industrial processes. Downstream sources consist primarily of electric generating facilities and industrial plants.[59] "Upstream" sources are suppliers of fossil fuels and industrial greenhouse gases.[60] Those sources are required to report the greenhouse gas emissions that could be emitted from the combustion or use of the fuels or industrial gases they supply.[61]

Many of the comments received by the EPA agreed that including both resulted in a double counting of some emissions. While acknowledging the possibility, if not certainty, that some double counting would occur, the EPA justified the inclusion of both types of emission sources in the final Reporting

50. 40 C.F.R. § 98 (2009).

51. *Id.*

52. *Id.*

53. *Id.* § 98.2(a).

54. Consolidated Appropriations Act of 2008, H.R. 2764, 110th Cong. (1st Sess. 2007).

55. Mandatory Reporting of Greenhouse Gases, 74 Fed. Reg. 16,448 (Apr. 10, 2009) (to be codified at 40 C.F.R. pts. 86, 87, 89, 90, 94, 98, 600, 1033, 1039, 1042, 1045, 1048, 1051, 1054, & 1065).

56. Clean Air Act, 42 U.S.C. §§ 7414-7542 (2006).

57. *Id.*

58. 40 C.F.R. § 98.30 (2009).

59. *Id.* § 98.4.

60. *Id.* § 98.42.

61. *Id.*

Rule by asserting that frequently the fossil fuels and industrial greenhouse gases supplied by producers are used (and emitted) by hundreds of thousands of individual sources, such as individual consumers. Rather than place a reporting burden on such minimal users, the EPA opted to use the upstream source reporting as a proxy for the emissions of those users.[62]

"Mobile" sources are vehicles and engines that do not qualify as "light-duty." Consequently, they include off-road, construction, and other similar equipment, and any vehicles and engines other than cars and light trucks. Manufacturers and importers of the included vehicles and engines must report the emissions of those vehicles and engines.

The Reporting Rule identifies seven gases, or categories of gases, for which reports must be made if emitted in the applicable quantities: CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, and other fluorinated compounds.[63] Despite comments encouraging the expansion of the Reporting Rule to other greenhouse gases, the Reporting Rule did not expand the categories beyond the emissions set out in the proposed rule. As noted above, certain types of facilities are required to report emissions regardless of the quantity.[64] Other types of facilities need only report their emissions if they emit 25,000 metric tons of CO_2e or more per year in combined emissions from stationary fuel combustion units and certain other sources.[65]

On the upstream side, reporting is required of any supplier of any fossil fuel and gas products, such as coal-based liquid fuels with annual imports or exports equivalent to 25,000 metric tons of CO_2e per year, and petroleum products with annual imports or exports equivalent to 25,000 metric tons of CO_2e per year. Natural gas and natural liquids, including all natural gas fractionators and all natural gas distribution facilities, are also included.[66]

Once a facility or emitter was required to report under the proposed rule, there was no mechanism to terminate the reporting requirement in the event of subsequent changes in emission levels. In response to comments received, the EPA added provisions in 40 C.F.R. section 98.2, allowing facilities and suppliers reporting less than 25,000 metric tons of CO_2e for five consecutive years, or less than 15,000 metric tons for three consecutive years, to cease reporting. In addition, facilities and suppliers that stop operating all greenhouse gas-emitting

62. *Id.* § 98.

63. *Id.* § 98.1.

64. Such facilities include: Electricity generating facilities that are subject to acid rain program, or otherwise report CO_2 mass emissions year round through 40 C.F.R., pt. 75; adipic aid production; aluminum production; ammonia manufacturing; cement production; HCFC-22 production; HFC-23 destruction processes that are not co-located with HCFC-22 production facilities and that destroy more than 2.14 metric tons of HFC-23 per year; lime manufacturing; nitric acid production; petro-chemical production; petroleum refineries; phosphoric acid production; silicon carbide production; soda ash production; titanium dioxide production; municipal solid waste landfills that generate CH4 in amounts equivalent to 25,000 metric tons of carbon dioxide equivalent or more per year; and manure management systems that emit CH_4 and N_2O (combined) in amounts equivalent to 25,000 metric CO_2e or more per year. 40 C.F.R. § 98 (2009).

65. Such facilities are generally: ferroalloy production; glass production; hydrogen production; iron and steel production; lead production; pulp and paper manufacturing; and zinc production. 40 C.F.R. § 98.2 (2009).

66. Also included are industrial GHGs to the extent annual bulk imports or exports of N_2O, fluorinated GHGs, and CO_2 (in combination) are equivalent to 25,000 metric tons or more CO_2e per year; and CO_2 to the extent that annual bulk imports of N_2O, fluorinated GHGs, and CO_2 (in combination) are equivalent to 25,000 metric tons or more CO_2e per year. *Id.*

processes and operations covered by the Reporting Rule are permitted to terminate their reporting.[67]

c. Monitoring Requirements

The Reporting Rule provides specific monitoring and emission estimating methods for many of the individual source categories.[68] Certain facilities, such as power plants that are subject to the Federal Acid Rain Program, must directly measure and record their greenhouse gas emissions. Other categories of emission sources can use facility-specific calculations to estimate their annual emissions. Upstream emitters, such as oil, natural gas, and industrial suppliers, are required to calculate estimated emissions based on the amount, type, and volume of products imported, exported, or produced. Notwithstanding the specific monitoring and measuring requirements of the Reporting Rule, in response to comments and requests for modification, the Reporting Rule permits covered facilities to use "best available monitoring methods" for the first quarter of 2010.[69] The Reporting Rule provides a mechanism for requesting extension of the use of this best available monitoring methods for a longer period.

d. Subsequent Source Addition

On June 28, 2010, the EPA added four source categories to the reporting requirements of the Reporting Rule.[70] Industrial waste landfills must report annual methane generation and destruction if they accepted organic waste on or after January 1, 1980, have a total capacity of at least 300,000 metric tons and is part of a facility with aggregate covered emissions of at least 25,000 metric tons of CO_2e per year.[71] Among the industries potentially affected by the addition of this reporting category are plastic and resin manufacturers, food processors, petroleum refineries, and leather product facilities. However, some of those facilities were already required to report their emissions, and the Supplement means those facilities must also include emissions from their onsite industrial waste landfills.

Industrial waste-water treatment facilities are required to report if their emissions exceed 25,000 tons per year of CO_2e and if they use anaerobic processes to treat industrial water.[72] Emissions from magnesium production are required only if the facility emits 25,000 tons or more per year of CO_2e.[73] All active underground coal mines, and those currently in development, are covered by the Supplement regardless of the level of their CO_2e emissions. In the Supplement, however, the EPA finalized its decision not to include coal suppliers.

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67. *Id.*

68. 40 C.F.R. § 98, subpts. A-PP.

69. *Id.* at § 98.3(d).

70. Such additional sources are: industrial waste landfills; industrial waste water treatment facilities; magnesium production faculties; and underground coal mines. *Id.* § 98.3.

71. *Id.*

72. *Id.*

73. *Id.*

B. Comprehensive Energy Legislation in Congress

Following over a year of off-and-on debate regarding comprehensive energy legislation that would include limits on greenhouse gas emissions, the Senate never voted on an energy bill, and prospects for any federal legislation aimed at climate change appear dim.[74]

1. Background

In June 2009, the House of Representatives approved a comprehensive energy bill that included a "cap-and-trade" regime, and was commonly known as Waxman-Markey (H.R. 2454).[75] Waxman-Markey mandated a 17% reduction in U.S. greenhouse gas emissions from 2005 levels by 2020, and an 83% reduction by 2050.[76] A similar bill, known as Kerry-Boxer (S. 1733), passed out of the Senate Environment and Public Works Committee, but never made it to the Senate floor.[77]

A year later, the Senate again failed to bring comprehensive energy legislation to a vote even as the issue has received renewed attention from the Obama Administration following the largest offshore oil spill in U.S. history. The proposed Kerry-Lieberman bill, titled the American Power Act (APA), included reductions in greenhouse gas emissions that roughly paralleled those in Waxman-Markey.[78] Other bills were also revived, including a limited emissions cap program known as the Cantwell-Collins bill (S. 2877), which would have focused on fossil fuel providers and limited allowance trading to entities covered by the cap, thus barring financial institutions, such as hedge funds, from trading.[79] Others argued for an "energy-only" bill, like the Bingaman bill (S. 1462) that was approved by the Senate Energy and Natural Resources Committee in June 2010 with some bipartisan support.[80] That bill encouraged investment in alternative energy technologies and mandated a renewable portfolio for electric utilities. Similarly, in June 2010, Senators Richard Lugar (R-IN), Lindsey Graham (R-SC), and Lisa Murkowski (R-AK) introduced a bill that did not include emissions caps, but would have provided incentives for fuel-efficient cars and nuclear power, established new energy efficiency standards, and required electric utilities to meet at least 50% of demand by 2050 with non-fossil fuel sources.[81]

While comprehensive energy reform failed to pass the Senate, pieces of the stalled bills may reappear in subsequent energy legislative efforts, or even in certain regulatory activities, as discussed above. Accordingly, key bills from the past year's debate are discussed in greater detail below.

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74. *See* David Herszenhorn, *Democrats Abandon Sweeping Energy Plan*, N.Y. TIMES (July 22, 2010), *available at* http://thecaucus.blogs.nytimes.com/2010/07/22/democrats-pull-plug-on-sweeping-energy-bill.

75. American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. (2009).

76. H.R. 2454 § 311.

77. Clean Energy Jobs and American Power Act, S. 1733, 111th Cong. (2009).

78. *Id.*

79. S. 2877, 111th Cong. (2009).

80. S. 1462, 111th Cong. (2009).

81. S. 3464, 111th Cong. (2010).

2. Highlighting Differences in Proposed Cap-and-Trade Legislation

On June 26, 2009, the U.S. House of Representatives narrowly approved H.R. 2454, the American Clean Energy and Security Act (Waxman-Markey).[82] A companion bill in the Senate, named the Clean Energy Jobs and American Power Act (Kerry-Boxer) sponsored by Senators John Kerry (D-MA) and Barbara Boxer (D-CA), passed the Senate's Environment and Public Works Committee on November 5, 2009, despite a Republican boycott.[83] Kerry-Boxer proposed a stricter target than Waxman-Markey in the form of a 20% reduction of greenhouse gas emissions below 2005 levels by year 2020.[84]

Failing to get Kerry-Boxer to the floor of the Senate for a vote, Sen. Kerry joined with Sen. Joseph Lieberman (I-CT) and Sen. Graham to work on an amended bill that would win the sixty votes needed to pass the Senate.[85] On May 12, 2010, Senators Kerry and Lieberman introduced their draft of the American Power Act (APA).[86] While negotiations continue, and numerous changes are proposed, the current version of the APA is substantially similar to Waxman-Markey, but contains distinctions that may broaden support and win approval from both parties.

Both bills create comprehensive national climate and energy legislation that includes economy-wide greenhouse gas emissions cap-and-trade systems and other measures designed to build energy efficiency, address climate change, and foster a clean energy economy.[87] Both bills target emissions reductions of 17% from 2005 levels by 2020 and 80% by 2050.[88] Waxman-Markey scheduled its cap-and-trade compliance to start in 2012. The APA used a sector-based approach where utilities, transportation fuels, and petroleum refineries will begin compliance in 2013. Manufacturing/industrial stationary sources and natural gas local distributors would be phased in by 2016.

While both bills contain measures to ensure against price volatility, the APA's version arguably could produce greater price stability.[89] The APA sets an allowance price ceiling at $25, and allocates four billion allowances to a Cost-Containment Reserve from 2013-2050. If allowance prices reach the reserve price, the allowances will be sold, and the revenues will be used to purchase

82. H.R. 2454, 111th Cong. (2009).

83. S. 1733, 111th Cong. (2009).

84. *Id.*

85. Senator Graham, who was instrumental in crafting the bill, withdrew his support following an unrelated political row with Senate Democrats.

86. Office of S. Legis. Counsel, 111th Cong., Discussion Draft of American Power Act (Sens. Kerry and Lieberman), *available at* http://kerry.senate.gov/imo/media/doc/APAbill3.pdf.

87. *Id.*; *see also* PEW CTR. ON GLOBAL CLIMATE CHANGE, *Climate Policy Memo #9 Comparison of Major Climate and Energy Proposals in the 111th Congress*, July 2010, *available at* http://www.pewclimate.org/federal/policy-solutions/climate-policy-memo/major-climate-and-energy-proposals-111th-congress; [hereinafter *PEW July 2010*]; PEW CTR. ON GLOBAL CLIMATE CHANGE, *Comparison Chart of Waxman-Markey and Kerry-Lieberman*, June 2010, *available at* http://www.pewclimate.org/federal/analysis/congress/111/comparison-waxman-markey-and-kerry-lieberman; [hereinafter *PEW June 2010*].

88. H.R. 2454; S. 1773.

89. OFFICE OF ATMOSPHERIC PROGRAMS, EPA, *EPA Analysis of the American Power Act in the 111th Congress* (June 14, 2010), *available at* http://www.epa.gov/climatechange/economics/pdfs/EPA_APA_Analysis_6-14-10.pdf.

offsets. If no offsets can be found, the reserve will remain empty, and prices will rise above the ceiling. The APA also sets a price floor of $12. Waxman-Markey, however, puts 2.8 billion allowances into a Strategic Reserve and sets an initial ceiling of $28. In 2015, the reserve price will be determined as 60% above a three-year average. This plan would only trigger the reserve during a price spike but would not do so during a period of sustained high prices. Waxman-Markey's price floor is $10.

Under Waxman-Markey, all covered entities must obtain their allowances by auction or the secondary market.[90] The APA allows covered entities that supply transportation fuels and oil refining to purchase allowances directly from the EPA at a fixed price.

Although both bills allow offsets for two billion tons of emissions, the APA limits offsets sourced from international programs to 500 million while Waxman-Markey limits foreign offsets to one billion.[91] If sources of domestic offsets are unavailable, both bills allow the ratio to be adjusted upward by 500 million. Waxman-Markey mandates performance standards for certain un-capped sources such as landfills, coal mines, and natural gas systems. The APA does away with such performance standards, and allows offset credits to be generated from any reduction in emissions.[92]

Both bills address renewable energy generation, but Waxman-Markey creates a set of standards whereby electric utilities will generate 6% of their electricity from renewable energy sources in 2012, and will increase that amount to 20% by 2020.[93] The APA does not include renewable energy standards, but does provide financial incentives for renewable energy projects. Waxman-Markey contains a detailed set of provisions for energy efficiency programs, such as upgrading building codes and appliance standards.[94] The APA program is less detailed, but includes a number of provisions such as the establishment of a National Industrial Innovation Institute to carry out research and development in energy efficient technology.

The APA creates measures that support offshore drilling and nuclear energy, which include loan guarantees and tax credits.[95] In response to the oil spill in the Gulf of Mexico, the APA gives states the right to prohibit offshore drilling within 75 miles of their coastlines. If, however, a state does pursue drilling, it will be compensated 37.5% of government revenue to protect its coastlines.

The Congressional Budget Office has analyzed both bills and estimated that Waxman-Markey will increase federal revenue by $846 billion over ten years, increase direct spending by $821 billion, and render a $24 billion reduction in the federal budget deficit.[96] The analysis estimates that the APA will increase

90. *PEW June 2010*, *supra* note 87.

91. *Id.*

92. *See* OFFICE OF ATMOSPHERIC PROGRAMS, *supra* note 89.

93. *PEW July 2010*, *supra* note 87.

94. *PEW June 2010*, *supra* note 87.

95. American Power Act, S. 1733, 111th Cong. §§ 1001, 1201-1205 (2009).

96. CONG. BUDGET OFFICE, CBO Analysis of APA (July 7, 2010), *available at* http://www.cbo.gov/ftpdocs/115xx/doc11565/AmericanPowerActKerryLtr.pdf.

federal revenue by $751 billion, spend $732 billion, and reduce the federal deficit by $19 billion.

3. Energy Only Legislation: The Bingaman Bill

Several Senators tried to continue the energy debate by resurrecting "energy only" bills such as the American Clean Energy Leadership Act of 2009.[97] Sponsored by Senator Jeff Bingaman (D-NM), Senate Bill 1462 (Bingaman) seeks to promote the development of clean energy technologies, enhance energy efficiency, improve energy security, and facilitate energy innovation and workforce development.[98]

a. No Cap-and-Trade

In contrast to Waxman-Markey, Kerry-Boxer, and the APA, Bingaman does not contain any provisions designed to control greenhouse gas emissions through a cap-and-trade system.

However, title VI of Bingaman includes a number of additional reporting requirements relating to greenhouse gas emissions and climate change.[99] In particular, it would require the establishment of an interagency task force to examine the steps that China and India are taking to reduce greenhouse gas emissions.[100] It would also require the Department of Energy (DOE) to examine the impact of the implementation of a cap-and-trade program in the United States, including an assessment of the risks of "carbon leakage," which refers to any substantial increase in greenhouse gas emissions from manufacturing facilities abroad or that results from an increase in the cost of production domestically.[101] Finally, it would also require the DOE to analyze and quantify the emissions from electric generating facilities, and to evaluate the emissions from the use of alternative transportation fuels.[102]

b. Federal Renewable Electricity Standard

Bingaman would establish a federal renewable electricity standard (RES) in hopes of accomplishing a number of policy goals, including the reduction of greenhouse gas emissions.[103] Section 132 of the bill would amend Title VI of the Public Utility Regulatory Policies Act of 1978[104] to add a new section, section 610. Under section 610, public utilities selling more than four million megawatt hours of electricity to retail customers, except those located in Hawaii, would be required to obtain the following percentages of their energy from renewable energy or energy efficiency during the specified calendar years: 3%

97. American Clean Energy Leadership Act of 2009, S. 1462, 111th Cong. (2009).

98. *Id.*

99. *Id.*

100. *Id.* § 604.

101. *Id.* § 605.

102. *Id.* §§ 608-609.

103. *Id.* § 131.

104. Public Utility Regulatory Policies Act of 1978, Pub L. No. 95-617, 92 Stat. 3117 (1978) (codified as amended primarily at 16 U.S.C. §§ 824-825 (2006)).

(2011-2013); 6% (2014-2016); 9% (2017-2018); 12% (2019-2020); and 15% (2021-2039).[105]

Each utility would have several ways of complying with the RES. It could submit renewable energy credits, and federal energy efficiency credits, obtained under programs established by the Secretary of Energy.[106] A utility could obtain renewable energy credits by producing renewable energy itself, purchasing credits from qualifying generators, or purchasing excess credits through a national market for renewable energy credits established pursuant to the section.[107] It would be eligible to obtain energy efficiency credits for saving energy, after the governor of the state in which the utility is located, petitions the Secretary to allow up to 26.67% of the RES to be met by submitting efficiency credits. As with energy credits, utilities could purchase federal energy efficiency credits through a market established under the section. Finally, utilities would have the option of satisfying the RES by making alternative compliance payments to the Secretary at the rate of 2.1 cents per kilowatt hour.[108] Electric utilities that fail to comply with the RES would be subject to civil penalties.[109]

c. Clean Energy Financing

Section 103 of Bingaman would revamp the DOE's Loan Guarantee Program,[110] which was established under the Energy Policy Act of 2005 (EPAct 2005).[111] Under EPAct 2005, the DOE is authorized to provide loan guarantees to projects that avoid air pollution, or anthropogenic emissions of greenhouse gases, and employ technologies that are new or significantly improved when compared to currently existing commercial technologies.[112] Section 103 would establish a Clean Energy Investment Fund, a revolving fund in the Treasury, with the purpose of facilitating the development of clean energy technologies by ensuring the long-term stability of the Loan Guarantee Program.[113] In addition, the section would amend the definition of commercial technology in EPAct 2005 to make clear that the use of a particular technology in a demonstration project, or in a commercial project that has received a loan guarantee, does not preclude granting other projects, or similar technologies, loan guarantees in the future.[114]

d. Vehicle Technology Deployment and Energy Efficiency

Subtitle E of Bingaman seeks to speed the deployment of vehicles employing advanced technologies in order to reduce petroleum consumption and greenhouse gas emissions.[115] To this end, it directs the Secretary of Energy to

105. S. 1462 § 132.

106. *Id.*

107. *Id.*

108. *Id.*

109. *Id.*

110. *See* DEP'T OF ENERGY, *Loan Guarantee Programs Office*, http://www.lgprogram.energy.gov/ (last visited July 18, 2010).

111. Energy Policy Act of 2005, 42 U.S.C. §§ 16511-14 (2006).

112. *Id.* §16513.

113. S. 1462 §§ 102-103.

114. *Id.* § 103(b); *see* S. REP. NO. 111-48, at 11 (2009).

115. S. REP. NO. 111-48, at 2.

work with the National Academy of Sciences to conduct a comprehensive study of energy use by light-duty vehicles, and to use the results of the study as the basis for further research into alternative fuels.[116] Section 152 instructs the DOE, the EPA, and the DOT to identify those issues that must be addressed in order to promote the widespread use of electricity, and authorizes the Secretary of Energy to establish a program to provide financial support to states, local governments, and other entities for the purpose of developing a national recharging infrastructure.[117] Finally, subtitle E also includes provisions directing the Secretary of Energy to produce a report detailing standards for electric drive transportation,[118] establish a pilot program for electric vehicles for the federal fleet,[119] and initiate a study into options for the disposal of motor vehicle batteries.[120]

With respect to manufacturing, Subtitle A of Title II includes provisions providing grants and other funding to support the implementation of clean energy technologies in industry, coordinating and directing research initiatives, and directing further study of the potential benefits associated with the use of clean energy technologies in manufacturing and impediments to their widespread implementation.[121]

Subtitle B concerns the efficiency of appliances and some types of industrial equipment. It includes provisions designed to improve the Energy Star Program run by the DOE and the EPA by facilitating agency cooperation, clarifying the respective responsibilities of the agencies, requiring products to demonstrate compliance with program standards, and requiring periodic reassessment of product categories.[122] In addition, it sets minimum standards for portable light fixtures, certain types of lamps, and furnaces. It also directs the DOE to assess compliance with energy standards, ways to increase the use of energy efficient motors, and the possibility of creating an Energy Superstar designation under the Energy Star Program, which would recognize the top 5% of efficient products and buildings in a particular market.[123]

Subtitle C includes measures intended to tighten building codes respecting energy efficiency in buildings, enhance the efficiency of existing structures, and encourage the development of energy efficient buildings. Notably, it would establish a "Residential High-Performance Zero-Net-Energy Building Initiative" within the DOE, designed to encourage the development of residential buildings that reduce consumption through energy efficiency, employ renewable technologies, and produce no net emissions of greenhouse gases.[124] It would also result in the establishment of targets for saving energy in residential and

116. S. 1462 § 151.
117. *Id.* § 152.
118. *Id.* § 153.
119. *Id.* § 154.
120. *Id.* § 155.
121. *Id.* §§ 201-209; S. REP. NO. 111-48, at 23-25. (2009).
122. S. 1462 § 222.
123. *Id.* §§ 224-232.
124. *Id.* § 291.

commercial national model building codes,[125] the provision of grants and other financing to states to assist with retrofitting existing structures, the development of standards for the evaluation and measurement of efficiency programs, and the establishment of a voluntary energy efficiency labeling program.[126] It also sets a goal of increasing the overall energy productivity of the U.S. by 2.5% per year by 2012 and to maintain that annual rate of improvement each year through 2030.[127]

e. Nuclear Energy and Alternative Fuels

Bingaman recognizes nuclear energy as a technology that can simultaneously increase the energy security of the U.S., and reduce the emission of greenhouse gases.[128] To promote the further development of nuclear energy, it establishes a National Commission on Nuclear Waste to examine alternative ways to dispose and manage spent nuclear fuel and high-level radioactive waste.[129]

Section 356 of Bingaman would amend section 526 of the Energy Independence and Security Act of 2007.[130] Currently, section 526 bars federal agencies from entering into contracts for the purchase of alternative or synthetic fuels, including non-conventional petroleum sources (e.g., from the Canadian oil sands), if the greenhouse gas emissions associated with their use exceed those associated with the use of conventional fuels.[131] Section 356 would create an exception to this general requirement for "generally available" unconventional petroleum sources if the contract of sale neither calls for their use nor provides incentives for the use of such fuels in refineries.[132]

C. Federal Cases Arising out of Efforts to Control Greenhouse Gas Emissions

While Congress continues to debate federal legislation regulating greenhouse gas emissions, many states and environmental organizations have pursued greenhouse gas emissions reduction through litigation.

1. Statutory Claims v. Common Law Nuisance Claims

According to a recent Environmental Law Institute publication,[133] most climate change cases brought to date are based on statutory causes of action - with over one-third of the claims arising under the National Environmental

125. For more information on national model building energy codes, see DEP'T OF ENERGY, *Building Energy Codes Program*, http://www.energycodes.gov/status/ (last visited Oct. 5, 2010).

126. *See* S. 1462 §§ 241-266.

127. *Id.* § 275.

128. *Id.* § 312.

129. *Id.* § 311.

130. Energy Independence and Security Act of 2001, Pub. L. No. 110-140, § 526, 121 Stat. 1492, 1663 (2007).

131. *Id*.

132. S. 1462 § 356.

133. David Markell & J.B. Ruhl, *An Empirical Survey of Climate Change Litigation in the United States*, 40 ENVTL. L. REP. NEWS & ANALYSIS 10,644 (July 2010).

Policy Act (NEPA) and similar state statutes[134] - rather than constitutional or common law claims. Recent federal agency actions, such as the EPA's issuance of its final Endangerment Finding,[135] or the Council on Environmental Quality's publication of draft guidance on consideration of the effects of climate change under NEPA,[136] are likely to continue to impact such statutory climate change litigation. Climate change case law arising under federal or state public nuisance claims also continues to develop. Most recently, in *North Carolina v. Tennessee Valley Authority (TVA)*,[137] the U.S. Court of Appeals for the Fourth Circuit reversed an injunction that required immediate installation of emissions controls at four TVA coal-fired electric plants. The Fourth Circuit held that the plants' emissions were not public nuisances under Alabama or Tennessee laws and that state public nuisance actions are preempted by the CAA and EPA regulations.[138] With regard to cases applying federal nuisance law, procedural review of a leading federal nuisance case, *Connecticut v. American Electric Power Co. (AEP)*,[139] also continued this year. In *Connecticut v. AEP*, the U.S. Court of Appeals for the Second Circuit held that a group of states could sue an electric company to abate climate change under a theory of public nuisance.[140] On March 5, 2010, the Second Circuit denied defendants' petition for rehearing en banc in that case.[141] Defendants filed a petition for writ of certiorari with the U.S. Supreme Court on August 2, 2010 (Docket No. 10-174).

2. Justiciability/Political Question Doctrine

In May 2010, after recusal of the eighth of its sixteen judges, the Fifth Circuit dismissed an appeal due to loss of a quorum in *Comer v. Murphy Oil USA*.[142] As a result of this unusual dismissal and vacatur of the three-judge panel's decision, the district's court's prior decision[143] - dismissing as a non-justiciable political question the private plaintiffs' seven state law claims (e.g., public nuisance, private nuisance, trespass, and negligence) that the greenhouse gas emissions of oil, coal, and chemical companies amplified property damage

134. *See, e.g.*, Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin., 538 F.3d 1172 (9th Cir. 2008) (environmental assessment deficient for failing to address GHG emissions); Natural Res. Def. Council v. U.S. Army Corp of Eng'rs, 1:09 CV 588, 2010 WL 1416681, at *1 (N.D. Ohio 2010) (denying NEPA challenge to issuance of Clean Water Act section 404 permit for coal-to-liquid fuel plant). At the state level, similar suits are brought under state "mini-NEPA" statutes, such as the California Environmental Quality Act. *See, e.g.*, Ctr. for Biological Diversity v. Cnty. of San Bernardino, 184 Cal. App. 4th 1342 (Cal. Dist. Ct. May 2010).

135. Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act , 74 Fed. Reg. 66,496 (Dec. 15, 2009) (to be codified at 40 C.F.R. ch. I).

136. National Environmental Policy Act (NEPA) Draft Guidance, "Consideration of the Effects of Climate Change and Greenhouse Gas Emissions," 75 Fed. Reg. 8,046 (Feb. 23, 2010).

137. North Carolina v. Tenn. Valley Auth., 615 F.3d 291 (4th Cir. 2010).

138. *Id.*

139. Connecticut v. Am. Elec. Power Co., 582 F.3d 309 (2nd Cir. 2009), *petition denied en banc*, No. 05-5104-cv, 2009 WL 3756471, at *1 (Nov. 5, 2009).

140. *Id.*

141. *Id.*

142. Comer v. Murphy Oil USA, 607 F.3d 1049 (5th Cir. 2010). The period for plaintiffs to file a petition for certiorari with the U.S. Supreme Court remains open as of the writing of this report.

143. Comer v. Murphy Oil USA, 585 F.3d 855 (5th Cir. 2009).

caused by Hurricane Katrina - remains good law.[144] *Comer* stands in contrast to the Second Circuit's opinion in *Connecticut v. AEP* finding that tort litigation over climate change was not barred by the political question doctrine. To the extent this *Comer* dismissal constitutes a substantive decision, a conflict exists between the Second and Fifth Circuits on political question (particularly with respect to application of the justiciability factors set forth in *Baker v. Carr*).[145] In addition, review of the District Court for the Northern District of California's 2009 decision in *Native Village of Kivalina v. ExxonMobil Corp.*,[146] which dismissed as a non-justiciable political question the public nuisance suit of an Alaskan Eskimo village and a city against oil, energy, and utility companies claiming damages and relocation expenses caused by erosion of Arctic sea ice, also contrasts with *Connecticut v. AEP*, and is currently being briefed for review before the Ninth Circuit Court of Appeals (Cause No. 09-17490).

3. Standing

Due to the Fifth Circuit's dismissal in *Comer v. Murphy Oil USA*, the district court's earlier determination that plaintiffs' tort claims for money damages easily satisfied Mississippi's liberal standing requirements also stands.

D. Other Federal Developments: Carbon Capture and Sequestration

The DOE has been operating a nationwide program for carbon capture and sequestration (CCS) since 1997, and that program was discussed in this Committee's 2009 report.[147] That program identifies five separate CCS functions: (1) capture of CO_2 gases; (2) identification of sequestration sites; (3) transportation of captured CO_2; (4) injection of CO_2; and (5) monitoring of sequestration sites.[148] The DOE has set a goal of developing systems that offer 90% CO_2 capture with 99% storage permanence at less than a 10% increase in energy cost by 2012.[149] While CCS adds approximately 36% to the cost of electric generation using existing technology, the DOE intends to drive that cost down to its 10% goal through demonstration projects.[150] To implement this goal, the DOE has entered into seven regional partnerships for identification of

144. *See also* California v. Gen. Motors Corp., No. C06-05755MJJ, 2007 WL 2726871, at *1 (N.D. Cal. Sept. 17, 2007) (dismissing State of California suit in federal district court against leading automakers claiming a public nuisance in violation of federal common law and the California Civil Code relating to public nuisance on the grounds it raised a non-justiciable political question).

145. Baker v. Carr, 369 U.S. 186 (1962).

146. Native Vill. Of Kivalina v. ExxonMobil Corp., 663 F. Supp. 2d 863 (N.D. Cal. 2009).

147. CLIMATE CHANGE & EMISSIONS COMM., *Report of the Climate Change & Emissions Committee*, 30 ENERGY L.J. 563, 581-585 (2009).

148. The DOE program addresses all forms of greenhouse gas emissions, including industrial, agricultural, and transportation emissions, and all means of reducing greenhouse gas emissions, including absorption though biological means (terrestrial sequestration) and the fostering of offsets. The primary CCS program focuses on the 36% of greenhouse gas emissions generated as CO_2 from electric power generating plants. In addition to funding sequestration initiatives, DOE also provides funding of efforts to recycle and reuse captured CO_2. DEP'T OF ENERGY NAT'L ENERGY TECH. LAB, *Carbon Sequestration FAQ*, http://www.netl.doe.gov/technologies/carbon_seq/FAQs/carbon-seq.html#Terrestrial (last visited Oct. 8, 2010).

149. CLIMATE CHANGE & EMISSIONS COMM., *supra* note 147, at 582.

150. *Id.* at 582 & n.113.

sequestration sites throughout the country and the creation of partnerships with industry to demonstrate CCS technology.[151]

In Phases I and II of the regional partnership program, which ran from 2003 to 2010, the DOE identified geologic storage sites and industrial partners and validated regional CCS opportunities through field tests designed to demonstrate that regional reservoirs have the capability to store captured CO_2. Phase III, the development phase, which extends from 2010 through 2017, involves the funding of partnership projects designed to demonstrate CCS technology located at different sequestration sites. Phase III builds on the information generated in the previous phases, and involves the injection of one million tons or more of CO_2 by each Regional Carbon Sequestration Partnership (RCSP) into regional geologic formations of different depositional environments.[152]

Nine Phase III projects are underway to demonstrate large scale CCS in each of the seven regions. In the Plains CO_2 Reduction Partnership, which includes parts of the Midwest, the Dakotas, and adjacent Canadian provinces, four evaluation phase projects were completed and two development phase projects are underway. The Weyburn Project, an evaluation project, captured CO_2 produced in coal gasification in North Dakota and used it for enhanced oil recovery in Saskatchewan, Canada. In Phase III, the Western Canadian Basin Demonstration will inject one million tons of CO_2 captured from a gas processing facility in British Columbia into saline water entrained in carbonate rocks at a depth of 6,500 feet. The Williston Basin Demonstration, the first large scale CCS utilizing CO_2 from an existing coal fired plant, will capture CO_2 from a plant operated by Basin Electric Cooperative, combine it with liquefied CO_2 from the Great Plains Synfuels Plant, transport the CO_2 150 miles, and inject it into an oil reservoir in North Dakota at a depth of 10,000 feet. The project is designed to emplace one million tons of CO_2 per year.[153]

For the Midwest Geological Sequestration Consortium, a region including Illinois and parts of Kentucky and Indiana, the DOE is funding the Illinois Basin-Decatur Project, which captures CO_2 produced in the production of ethanol, transports the CO_2 through a 3,200 foot pipeline, and injects it into water-bearing sandstone at a depth of 8,000 feet. The rate of sequestration is 1,000 tons of CO_2 per day.[154] The Illinois State Geological Survey is working with the Archer Daniels Midland Corporation on the Phase III project, which will inject one million tons of CO_2 over three years into the Mount Simon sandstone formation. The Mount Simon formation, which covers the entire region, is an ideal storage formation in that it has relatively high permeability, porosity, and thickness.[155]

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151. *Id.* at 583.

152. DEP'T OF ENERGY, NAT'L ENERGY TECH LAB., *Regional Carbon Sequestration Partnerships*, http://www.netl.doe.gov/technologies/carbon_seq/partnerships/development-phase.html (last visited Oct. 8, 2010).

153. UNIV. OF N. D. ENERGY AND ENVTL. RESEARCH CTR., http://www.undeerc.org/pcor/newsandpubs/pdf/factsheet14.pdf (last visited Sept. 30, 2010).

154. MIDWEST GEOLOGICAL SEQUESTRATION CONSORTIUM, http://www.sequestration.org/ (last visited Sept. 30, 2010).

155. DEP'T OF ENERGY, http://www.fossil.energy.gov/programs/sequestration/partnerships/index.html (last visited Sept. 30, 2010).

In the Midwest Regional Carbon Sequestration Partnership, which includes Kentucky, part of Indiana, and Pennsylvania, Ohio, West Virginia, New York, New Jersey, and Maryland, three separate validation projects were completed by 2009.[156] Led by Battelle Memorial Laboratories, the region is planning to conduct a large-volume CO2 storage test. The originally planned large-scale test site became unavailable, and a proposal for a new test site location has been prepared.[157]

In the SECARB Region, which includes twelve southeastern states, two Phase III projects are underway. The Early Test, begun in Phase II, will be continued, and involves the injection into sandstone deposits in Mississippi of 40,000 tons of CO_2 per month at a depth of 10,700 feet. The Anthropogenic Test will be conducted in South Alabama, with the injection at the Citronelle Oil Field of CO_2 sourced from Alabama Power's Barry Electric Generating Plant. The project is intended to sequester between 100,000 and 150,000 tons of CO_2 per year.[158]

In the Southwest Region (eastern Arizona, Colorado, Oklahoma, New Mexico, Utah, Kansas, Nevada, and western Texas) three projects are underway - two involving enhanced oil recovery, and one involving coal bed methane gas. The region is injecting 75,000 tons of CO_2 over a one year period into coal beds in the San Juan Basin. In the Permian Basin, Texas, and the Paradox Basin, Utah, the region is monitoring the injection of CO_2 used for enhanced oil recovery to determine whether the CO_2 remains trapped in the reservoirs.[159] The New Mexico Institute of Mining and Technology is working to demonstrate the storage of CO_2 into the Jurassic Age sandstone formations, which are present throughout the region from Wyoming to northern New Mexico. These formations have relatively high porosity and permeability, and exhibit thicknesses near 200 feet. The project will be injecting up to one million tons per year and monitoring the CO_2.[160]

In the Big Sky Region, which includes Montana, Wyoming, Idaho, eastern Washington, and eastern Oregon, the Big Sky Partnership, led by Montana State University-Bozeman, is planning a large-volume test to demonstrate the entire CO_2 injection process - pre-injection characterization, injection process monitoring, and post-injection monitoring - and provide the foundation for the future development of CO_2 capture and storage opportunities in the region. Big Sky plans to inject up to one million tons per year of CO_2 into a sandstone formation at a depth of approximately 11,000 feet. These eolian sandstone formations are present throughout the region and present the opportunity to store more than 100 years of CO_2 emissions from point sources in the region.[161]

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156. MIDWEST REG'L CARBON SEQUESTRATION P'SHIP, http://216.109.210.162/RegionalPartnerships.aspx (last visited Sept. 30, 2010).

157. DEP'T OF ENERGY, *supra* note 155.

158. SE. REG'L CARBON SEQUESTRATION P'SHIP, *available at* http://www.secarbon.org/value/nonpublic/secarbfactsheetssebIII.pdf (last visited Oct. 5, 2010).

159. SW. CARBON P'SHIP, http://www.southwestcarbonpartnership.org/CurrProj.aspx (last visited Oct. 5, 2010).

160. DEP'T OF ENERGY, *supra* note 155.

161. *Id.*

In the WESTCARB Region, which includes Alaska, western Arizona, California, Hawaii, western Oregon, Nevada, western Washington, and British Columbia, two projects are underway, with a third planned for 2012. During Phase II, the Arizona Utility project sought to demonstrate successful injection of CO_2 into limestone at the Cholla site in Arizona, but was unsuccessful. As a result, WESTCARB redirected the pilot project's third phase to drilling and characterization of an alternate site in the Colorado Plateau of northeastern Arizona, where it is hoped that the project will prove useful to the West's largest concentration of baseload coal-fired power plants.[162] WESTCARB, led by the California Energy Commission, is planning a large-scale geologic CO_2 storage project in northern California. Before proceeding, a small-scale project will be conducted to confirm that CO_2 geologic storage in the selected area is viable. This work will be a collaborative undertaking between WESTCARB and C6 Resources, an affiliate of Shell Oil Company.[163]

II. REGIONAL DEVELOPMENTS IN THE UNITED STATES

Regional initiatives continue to develop. The Regional Greenhouse Gas Initiative held eight auctions since January 2009, but prices have dropped steadily. The Chicago Climate Exchange remains active, and its recent purchase by the Intercontinental Exchange (ICE) suggests confidence in climate derivatives despite the uncertain regulatory and legislative landscape.[164] Other systems are in the process of designing or launching cap-and-trade programs. The Western Climate Initiative released an updated economic analysis and a detailed program design in 2010 in preparation for its planned 2012 commencement. The Midwestern Greenhouse Gas Reduction Accord also released design recommendations in 2010. Finally, the California Air Resources Board submitted draft regulations for the implementation of a cap-and-trade program as required by Assembly Bill 32.

A. Chicago Climate Exchange

Launched in 2003, the Chicago Climate Exchange (CCX) is a cap-and-trade system where members voluntarily bind themselves contractually to a Baseline Emissions Reduction Schedule of greenhouse gases.[165] Six greenhouse gases listed in the Kyoto Protocol are included in the reductions schedule.[166] More than 400 entities, ranging from blue-chip corporations, universities, municipalities, and states, populate the CCX, and membership is categorized into the following: Members who directly emit greenhouse gases; Associate Members who are institutions that emit nominal amounts of greenhouse gases, but nevertheless commit to reporting and offsetting 100% of their emissions;

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162. W. COAST REG'L CARBON SEQUESTRATION P'SHIP, http://www.westcarb.org/largevolume.html (last visited Oct. 5, 2010).

163. DEP'T OF ENERGY, *supra* note 155.

164. Christine Birkner & Daniel Collins, *ICE Buys Climate Exchange*, FUTURESMAG.COM (June 1, 2010), http://www.futuresmag.com/Issues/2010/June-2010/Pages/Climate-Exchange-on-ICE.aspx.

165. CHI. CLIMATE EXCHANGE, *Overview Brochure*, *available at* http://chicagoclimatex.com/about/pdf/CCX_Overview_Brochure.pdf (last visited July 16, 2010) [hereinafter *CHI. CLIMATE EXCHANGE BROCHURE*].

166. *Id.*

Offset Providers; Offset Aggregators who represent offset project owners; and Liquidity Providers and Exchange Participants who trade carbon contracts on the Exchange.[167]

Allocation of emissions allowances is established by a standardized baseline and the CCX Emissions Reduction Schedule for a particular year.[168] The baseline was determined by the average annual emissions from 1998 to 2001, and the Emissions Reduction Schedule was divided into two phases: Phase I from 2003 to 2006, and Phase II from 2006 to 2010.[169] By 2010, all members are required to reduce emissions to 6% below the baseline.[170] Members who exceed their emission-reduction goals can sell or bank surplus allowances, while those that emit above their targets can comply by purchasing Carbon Financial Instrument (CFI) contracts.[171]

One CFI contract represents 100 tCO2e, and CFIs are comprised of exchange allowances and offsets.[172] The CCX has adopted an extensive assortment of offset projects that include categories such as agricultural methane, landfill methane, coal mine methane, agricultural soil carbon, rangeland soil carbon management, forestry, renewable energy, energy efficiency, and fuel switching.[173] For example, the Delta Carbon Program enrolls multiple sets of projects dedicated to reforesting degraded or agricultural land, which improves air quality, reduces runoff, protects wildlife habitats, and sequesters carbon.[174] All offset projects are required to obtain verification from an independent, CCX-approved verifier, whose reports are reviewed by the Financial Industry Regulatory Authority.[175]

The CFI contracts are traded on the CCX, and the Chicago Climate Futures Exchange (CCFI), which is a subsidiary of the CCX and is a CFTC-designated market.[176] While membership in the CCX has grown, CFI contract prices are depressed, and trading is bearish due to the economic downturn and uncertainty about US legislation regarding a national cap-and-trade program.[177]

On July 8, 2010, in a deal for approximately $607 million, the Intercontinental Exchange (ICE) completed its purchase of the CCX and the

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167. CHI. CLIMATE EXCHANGE, *Members of CCX*, http://chicagoclimatex.com/content.jsf?id=64 (last visited July 16, 2010).

168. *CHI. CLIMATE EXCHANGE BROCHURE*, *supra* note 165.

169. *Id.*

170. *Id.*

171. *Id.*

172. CHI. CLIMATE EXCHANGE, *Trading Carbon Financial Instrument Contracts on CCX and CCFE: Cash, Futures and Options*, http://www.theccx.com/images/content/File/Trading_CFIs.pdf (last visited July 16, 2010) [hereinafter *CHI. CLIMATE EXCHANGE TRADING*].

173. *Id.*

174. DELTA CARBON, *About Delta Offsets*, http://www.deltacarbon.org/offsets/deltaoffsets.php (last visited Aug. 5, 2010).

175. CHI. CLIMATE EXCHANGE, *CCX Offsets Program*, http://www.chicagoclimateex.com/content.jsf?id=23 (last visited Aug. 5, 2010).

176. *CHI. CLIMATE EXCHANGE TRADING*, *supra* note 172.

177. Press Release, CLIMATE EXCHANGE PLC, Preliminary Results for the Year Ended 31 Dec. 2008, Mar. 12, 2009, *available at* http://www.marketwire.com//mw/rel_us_print.jsp?id=960290.

affiliated entities CCFI and the European Climate Exchange.[178] The move was aimed at creating a single trading platform for environmental contracts combining CCX's emissions markets with ICE's energy markets. [179]

B. Regional Greenhouse Gas Initiative

The Regional Greenhouse Gas Initiative (RGGI) is the nation's first market-based mandatory cap-and-trade system designed to reduce greenhouse gas emissions.[180] Ten Northeastern and Mid-Atlantic states have begun efforts to cap and then reduce CO_2 emissions by 10% by 2018.[181] Participating states include: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.[182] Guided by RGGI's Model Rules, each participating state developed its own legislation or regulations that capped CO_2 emissions from power plants, created and allocated CO_2 allowances between the public and market actors, and mandated participation in a single, region-wide auction regime.[183]

RGGI's program has five general components. First, power sector emissions are currently capped at 188 million short tons per year until 2014.[184] The cap will then be reduced by 2.5% each year from 2015 to 2018, for a total reduction of 10%.[185] Second, the Initiative requires all fossil fuel-fired electric power generators producing twenty megawatts or greater to hold allowances equal to their CO_2 emissions over a five-year period.[186] Next, RGGI establishes an auction regime where allowances will be distributed by the states, and a secondary market where entities can buy or sell allowances as needed.[187] One allowance permits a holder to emit up to one ton of CO_2. Participating states have committed to use the auction proceeds to finance state initiatives to reduce greenhouse gas emissions, generate reduced-carbon power, and adopt energy-efficiency practices.[188] Finally, in order to provide flexibility in compliance, RGGI allows the use of offsets, i.e., greenhouse gas emissions reduction or sequestration projects outside of the electricity sector.[189] Offsets must be located within the participating states, must reduce emissions of methane, carbon

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178. Press Release, INTERCONTINENTAL EXCHANGE, INC., *Intercontinental Exchange Announces Acquisition of Climate Exchange* (Apr. 30, 2010), *available at* http://ir.theice.com/releasedetail.cfm?ReleaseID=465267.

179. *Id*.

180. REGIONAL GREENHOUSE GAS INITIATIVE, http://www.rggi.org/home (last visited July 10, 2010).

181. *Id*.

182. *Id.*

183. REGIONAL GREENHOUSE GAS INITIATIVE, *State Regulations*, http://www.rggi.org/design/regulationsstates (follow the "key documents" hyperlink; then follow the "state regulations" hyperlink).

184. REGIONAL GREENHOUSE GAS INITIATIVE, *RGGI Fact Sheet*, *available at* http://www.rggi.org/docs/RGGI_Fact_Sheet.pdf (last visited Apr. 22, 2009).

185. *Id.*

186. *Id.*

187. *Id.*

188. *Id.* at 2.

189. *Id.*

dioxide, or sulfur hexafluoride, and are generally limited to just over 3% of a company's allowed emissions.[190]

Since operations began on January 1, 2009, eight auctions have been held and have generated approximately $729 million in revenue for member states.[191] Clearing prices for allowances have run as high as $3.38, but prices have declined and at the most recent auction, held on June 9, 2010, allowances sold for $1.88 current vintage and $1.86 futures, just pennies above the reserve price.[192] While over 805 $MtCO_2e$ worth of RGGI emissions allowances have been traded for a value in excess of $2.2 billion, analysts warn that the sluggish prices are due to an over allocation of allowances and that prices will remain depressed unless the cap is adjusted.[193] Due to the low price of allowances, activity in the offset market has been negligible.[194]

In 2009, emissions fell an estimated 25% to 30 % below the RGGI cap of 188 million tons of CO_2, and emissions for 2010 are expected to range between 120-130 million tons, or approximately 25-30% below the cap.[195] These low emissions are likely caused by decreased economic activity, successful energy-efficiency programs, and increased utilization of low-emitting natural gas.[196] It is estimated that through funding energy-efficiency programs, provided by RGGI auction proceeds, the Initiative has saved electricity consumers more than $800 million and led to the creation of thousands of jobs.[197] However, the RGGI program has been criticized for lacking enforcement powers.[198] New York transferred $90 million from RGGI auction proceeds for its budget needs on December 9, 2009, [199] and New Jersey announced on March 18, 2010, that it would remove $65 million from its energy efficiency programs.[200]

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190. REGIONAL GREENHOUSE GAS INITIATIVE, *CO_2 Offsets*, http://www.rggi.org/market/offsets (last visited July 10, 2010).

191. REGIONAL GREENHOUSE GAS INITIATIVE, *Auction Results*, http://rggi.org/market/co2_auctions/resultsco2 (follow the "CO_2 Auctions, Tracking & Offsets" hyperlink; then follow the "CO2 Auction" hyperlink; then follow the " Auction Results" hyperlink).

192. Press Release, Potomac Economics, Regional Greenhouse Gas Initiative, *Market Monitor Report Auction 9* (Sept. 10, 2010), http://rggi.org/docs/Auction_News_Release_MM_Report.pdf (follow the News and Updates hyperlink; then follow the "News Release" hyperlink).

193. World Bank Report, State and Trends of the Carbon Market 2010, at 30 (2010), *available at* http://siteresources.worldbank.org/INTCARBONFINANCE/Resources/State_and_Trends_of_the_Carbon_Market_2010_low_res.pdf.

194. *Id.*

195. ENV'T NE., *RGGI At One Year: An Evaluation of the Design and Implementation of the Regional Greenhouse Gas Initiative*, 4, available at http://www.env-ne.org/public/resources/pdf/ENE_2009_RGGI_Evaluation_20100223_FINAL.pdf (Feb. 2010).

196. *Id.*

197. Christa Marshall, *Regional Carbon Gap Gets Second Look as 'Template' for National Plan*, CLIMATEWIRE (July 14, 2010), *available at* http://www.nytimes.com/cwire/2010/07/14/14climatewire-regional-carbon-cap-gets-second-look-as-temp-89444.html.

198. Tseming Yang, *The Problem of Maintaining Emission 'Caps' in Carbon Trading Programs Without Federal Government Involvement: A Brief Examination of The Chicago Climate Exchange and the Northeast Regional Greenhouse Gas Initiative*, 17 FORDHAM ENVTL. L. REV. 271, 284-285 (2005-2006) (discussing reasons for not expressly imposing penalties on state governments for noncompliance with RGGI obligations).

199. N.Y. STATE ENERGY RESEARCH AND DEV. AUTH., Status Report: Quarter Ending September 30, 2009, 1-1 (Jan. 2010), *available at* http://www.nyserda.org/RGGI/3rdquarter2009report.pdf.

200. N.J. OFFICE OF CLEAN ENERGY, Straw Proposal Related to NJCEP 2010 Budget Modifications (Mar. 18, 2010), *available at*

An additional concern among RGGI market participants is that the legislation under consideration in the Senate for a nation-wide cap-and-trade program may preempt state and regional greenhouse gas emissions efforts.[201]

C. Western Climate Initiative

Formed in February 2007,[202] the Western Climate Initiative (WCI) provides a framework for a regional cap-and-trade program intended to reduce greenhouse gas emissions from its participating jurisdictions in 2020 by 15% compared to 2005 levels.[203] Currently, there are seven U.S. states and four Canadian provinces: Arizona, British Columbia, California, Manitoba, Montana, New Mexico, Ontario, Oregon, Quebec, Utah, and Washington acting as partners.[204] An additional 14 jurisdictions participate as observers, including the U.S. states of Alaska, Colorado, Idaho, Kansas, Nevada, and Wyoming; the Canadian provinces of Nova Scotia and Saskatchewan; and the Mexican border states of Baja California, Chihuahua, Coahuila, Nuevo Leon, Sonora, and Tamaulipas.[205]

On September 23, 2008, the WCI released its design recommendations for the cap-and-trade program.[206] The WCI partners have agreed to begin reporting emissions in 2011 for emissions that occur in 2010.[207] The first phase of the cap-and-trade program will begin on January 1, 2012, with a three-year compliance period.[208] The second phase will begin in 2015, when the program will be expanded to include transportation fuels and residential, commercial and industrial fuels not already covered in the first phase.[209] The allowance of each jurisdiction will initially be set at the level of expected actual emissions for the relevant year, and will decline in a straight-line fashion in order to reach the ultimate emissions goal by 2020.[210] When fully implemented in 2015, the multi-sector program will cover 90% of emissions of the six main greenhouse gases.[211] The design recommendations seek to ensure compliance flexibility and allow

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http://www.njcleanenergy.com/files/file/Library/OCE%20budget%20meeting%20notice%203%2025%2010.pdf.

201. ENV'T NE., Federal Preemption of RGGI: State Impacts and Policy Solutions 1 (Apr. 2010), *available at* http://www.env-ne.org/public/resources/pdf/ENE_Memo_on_RGGI_Preemption_20100415.pdf.

202. W. CLIMATE INITIATIVE, http://www.westernclimateinitiative.org/history (last visited July 8, 2010).

203. W. CLIMATE INITIATIVE, *WCI Cap-and-Trade Program, Frequently Asked Questions*, http://www.westernclimateinitiative.org/the-wci-cap-and-trade-program/faq (last visited July 8, 2010).

204. W. CLIMATE INITIATIVE, *WCI Provincial and State Partner Contacts*, http://www.westernclimateinitiative.org/wci-partners (last visited July 8, 2010).

205. W. CLIMATE INITIATIVE, *WCI Partners and Observers Map*, http://www.westernclimateinitiative.org/wci-partners-and-observers-map (last visited Oct. 2, 2010).

206. W. CLIMATE INITIATIVE, *Design Recommendations for the WCI Regional Cap-and-Trade Program* 1 (Mar. 13, 2009) http://www.westernclimateinitiative.org/component/remository/generalthe-wci-cap-and-trade-program/design-recommendations/Design-Recommendations-for-the-WCI-Regional-Cap-and-Trade-Program/ (follow the "Documents and Resources" hyperlink; then follow the "Document Library" hyperlink; tehn follow the "General Documents" hyperlink; then follow the Design Recommendations (2008)" hyperlink; then follow the Design Recommendations for the WCI Regional Cap-and-Trade-Program" hyperlink).

207. *Id.* at 12.

208. *Id.* at 9, 12.

209. *Id.* at 1, app. C, 6.

210. *Id.* at 4, 29, 30.

211. *Id.* at 15-17.

states discretion in implementation.[212] Entities covered by the rules will be able to purchase allowances at auction, buy and sell them on secondary markets, or bank them for future use.[213] Other design features include the use of offset credits that reflect reduced carbon emissions elsewhere, early reduction allowances, and the ability to purchase allowances from other comparable cap-and-trade programs approved in the future.[214]

A recent economic analysis by the WCI indicates that the plan to reduce greenhouse gas emissions is not only environmentally achievable, but is economically practical.[215] The report states that WCI partners can meet the goal of reducing emissions to 15% below 2005 levels by 2020, and realize net cost savings of approximately "US $100 billion between 2012 and 2020" from increased energy efficiency practices and decreased fuel consumption.[216]

Several members have withdrawn from the WCI. On February 2, 2010, Governor Jan Brewer issued an Executive Order withdrawing Arizona from the cap-and-trade market.[217] Citing economic concerns, Utah has signaled its withdrawal from the cap-and-trade program, and Oregon, Washington, and Montana have also announced they will not be prepared for the 2012 start.[218] California, New Mexico, British Columbia, Ontario, and Quebec (which account for approximately 70% of the region's emissions) are the only jurisdictions currently prepared to begin trading.[219]

D. Midwestern Greenhouse Gas Reduction Accord

The Midwestern Greenhouse Gas Reduction Accord advisory group issued its final recommendations on May 7, 2010, in connection with its goal of creating proposals for the establishment of targets for emissions reductions in the region, and for the design of a regional cap-and-trade program.[220] In conjunction with its analysis, the advisory group also issued its final model rule for cap-and-trade programs to reduce "greenhouse gases from the covered sources 20% below 2005 levels by . . . 2020 and 80% below 2005 levels by . . . 2050."[221] The advisory group stated in its final recommendations that it prefers that its

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212. *Id.*

213. *Id*. at 36.

214. *Id.* at 34-42.

215. W. CLIMATE INITIATIVE, *Updated Economic Analysis of the WCI Regional Cap-and-Trade Program* (July 7, 2010), http://www.westernclimateinitiative.org/component/remository/Economic-Modeling-Team-Documents/Updated-Economic-Analysis-of-the-WCI-Regional-Cap-and-Trade-Program.

216. *Id.* at 1.

217. Ariz. Exec. Order No. 2010-06, *Governor's Policy on Climate Change* (Feb. 2, 2010), http://azmemory.lib.az.us/cdm4/item_viewer.php?CISOROOT=/execorders&CISOPTR=690&CISOBOX=1&REC=7.

218. Debra Kahn, *MARKETS: Utah Pulls Out of WCI Cap-and-Trade Program, and 3 Other States Lag*, CLIMATEWIRE, Apr. 21, 2010.

219. *Id*.; *see also*, POINT CARBON, *New Mexico Makes Cap-and-Trade Push*, POINT CARBON NEWS, CARBON MARKET NORTH AMERICA (Mar. 19, 2010).

220. Midwestern Greenhouse Gas Reduction Accord, Final Recommendations of the Advisory Group, at 2 (May 2010), http://www.midwesternaccord.org/Accord_Final_Recommendations.pdf.

221. Final Rule for the Midwestern Greenhouse Gas Reduction Accord, at 3 (Apr. 2010), *available at* http://www.midwesternaccord.org/Final_Model_Rule.pdf [hereinafter *Midwestern Greenhouse Gas Reduction Accord*].

proposals be utilized for the purpose of legislating a greenhouse gas cap-and-trade program at the federal level rather than a regional program.[222]

E. Joint Whitepaper on Regional Climate Change Initiatives

In May of 2010, three North American greenhouse gas emissions cap-and-trade initiatives – The Midwestern Greenhouse Gas Reduction Accord, The Northeastern and Mid-Atlantic Regional Greenhouse Gas Initiative, and the Western Climate Initiative – released a whitepaper providing a standardized policy consensus on a greenhouse gas cap-and-trade regulatory regime.[223] The whitepaper is intended to serve both as an internal guideline for the three member greenhouse gas emissions initiatives and a broader policy document to assist in shaping North American climate change laws.[224]

The whitepaper concludes that in order to achieve an appropriate and successful greenhouse gas emissions cap-and-trade program, reductions or removals must be real, additional, verifiable, enforceable, and permanent.[225] Although the above-referenced characteristics have been utilized throughout the industry in a typically generic fashion, the whitepaper provides a set of specific guidelines for how to achieve the necessary reductions.[226] In summary, the whitepaper concludes that an offset program is: 1) *real* if the compliance unit "represent[s] one ton of CO_2e greenhouse gas emissions reduction or removal[;]" 2) *additional* if the offset would not have happened without a specified program; 3) *verifiable* if robust monitoring programs by independent parties are in place to ensure greenhouse gas emissions reductions are recorded through a standardized approach; 4) *enforceable* if the regulatory regime is sufficiently strong to ensure compliance; and 5) *permanent* if there is a system in place to ensure that greenhouse gas emissions reductions are not reversible.[227] The paper concludes that if all five canons specified above are not met, "the exchange of an emissions reduction elsewhere for an expansion of the emissions cap for regulated emissions sources[,]" otherwise known as the one-to-one relationship, will be compromised.[228]

If the federal government does not include a cap-and-trade element in an energy bill, the three regional initiatives have indicated their support for state-based greenhouse gas emissions trading programs.[229]

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222. *Id.* at 3.

223. Reg'l Greenhouse Gas Initiative, Midwestern Greenhouse Gas Reduction Accord & Western Climate Initiative, Ensuring Offset Quality: Design and Implementation Criteria for a High Quality Offset Program (May 2010), http://www.westernclimateinitiative.org/component/remository/general/Ensuring-Offset-Quality-Design-and-Implementation-Criteria-for-a-High-Quality-Offset-Program/ (follow the "Download" hyperlink).

224. *Id.* at 6.

225. *Id.* at 10.

226. *Id.*

227. *Id.* at 10-15.

228. *Id.* at 8; s*ee also Midwestern Greenhouse Gas Reduction Accord*, *supra* note 221.

229. Patrick Hogan, *Regional Initiatives March Forward*, CLIMATE COMPASS: PEW CENTER ON GLOBAL CLIMATE CHANGE BLOG (Nov. 11, 2009, 6:45 PM), http://www.pewclimate.org/blog/hoganp/regional-initiatives-march-forward.

F. California AB 32 Implementation

California's Global Warming Solutions Act of 2006 established a comprehensive program of regulatory and market mechanisms to reduce greenhouse gas emissions.[230] The California State Legislature passed, and Governor Schwarzenegger signed, Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006,[231] which seeks to reduce greenhouse gas emissions to 1990 levels by 2020. It directed the California Air Resources Board (ARB) to develop discrete early actions to reduce greenhouse gas emissions while also preparing a scoping plan to identify how to reach the 2020 limit, including mandatory reporting and cap and trade regulations.[232] The reduction measures to meet the 2020 target are to be adopted by the start of 2011 with the program starting in 2012.[233]

In November 2009, ARB approved a regulation implementing the Low Carbon Fuel Standard (LCFS)[234] which calls for the reduction of greenhouse gas emissions from California's transportation fuels by 10% by 2020.[235] This new regulation diversifies the variety of fuels used for transportation.[236] The ARB found that California's transportation sector is a leading source of greenhouse gas emissions in the state and the LCFS will also assist California's cap-and trade-program.[237] The new regulations will require providers, refiners, importers, and blenders of fuel to ensure that fuels for the California market meet a declining average carbon intensity standard.[238]

In May 2009, the California Environmental Protection Agency and ARB announced a 16 member Economic Allocation Advisory Committee to give recommendations on the implementation of AB 32 and associated cap-and-trade system.[239] The committee has provided its recommendations on the allocation of allowances and use of their value as well as informing ARB on its revised economic analysis.[240] The committee recommended that the system should primarily use auctioning as a mechanism for distributing allowance, which is a different approach to most federal proposals.[241]

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230. CAL. STATE ENVIRONMENTAL L. § 22:6 (West 2006).

231. *Id.*

232. CAL. HEALTH & SAFETY CODE § 38561 (West 2010).

233. CAL. HEALTH & SAFETY CODE § 38562(a) (West 2010).

234. CAL. AIR RES. BD., *Preliminary Draft Regulation for a California Cap-and-Trade Program* (proposed Nov. 24, 2009) (codified at CAL. CODE REGS. tit. 17, §§ 95480-95490 (2009)), *available at* http://www.leginfo.ca.gov/pub/05-06/bill/asm/ab_0001-0050/ab_32_bill_20060927_chaptered.pdf.

235. Cal. Exec. Order S-1-07 (Jan. 18, 2007), http://gov.ca.gov/executive-order/5172/.

236. CAL. CODE REGS. tit. 17, § 95480.1 (2009).

237. CAL. AIR RES. BD., *supra* note 234, at 38-41.

238. CAL. CODE REGS. tit. 17, § 9548 (2009).

239. Press Release, CAL. OFFICE OF THE GOVERNOR, Gov. Schwarzenegger Sends Letter to AB 32 Economic and Allocation Advisory committee (May 22, 2009), *available at* http://gov.ca.gov/index.php?/print-version/press-release/12363/.

240. ECON. AND ALLOCATION ADVISORY COMM., *Allocating Emissions Allowances Under a California Cap-and-Trade Program: Recommendations to the California Air Resources Board and California Environmental Protection Agency* (Mar. 2010), *available at* http://www.climatechange.ca.gov/eaac/documents/eaac_reports/2010-03-22_EAAC_Allocation_Report_Final.pdf.

241. *Id.* at 3.

On November 24, 2009, ARB released a preliminary draft version of the cap-and-trade regulation with the final cap-and-trade rules to be in effect by January 1, 2012.[242] ARB's focus is for the cap-and-trade program to "include a stringent declining emissions cap. Emissions trading and the limited use of offsets would provide flexibility for covered entities to comply."[243] The preliminary draft regulation emulated the approach established in the scoping plan, including: "[r]equiring a minimum number of allowances to be auctioned at program start," "[a]llowing limited use of high quality" emissions offsets, and establishing rules for carbon trading, emissions monitoring and enforcement.[244] The proposed cap-and-trade program would impose a limit on the amount of pollutants that can be emitted by a covered entity for each compliance period, the first of which would begin on January 1, 2012, and continue for three years.[245] The program would phase in sectors starting with "[e]lectricity generation, including imports [and] [l]arge industrial sources and processes at above 25,000 [metric tons of CO_2 equivalent]."[246]

The program's emissions cap would decline every year, with fewer allowances issued each year.[247] "At the end of a compliance period, each covered entity would be required to surrender allowances and . . . offsets, equal to its total [greenhouse gas] emissions during that compliance period."[248] "[C]overed entities could buy offset credits in lieu of buying allowances or reducing their emissions. . . ."[249] Offsets would have to "meet rigorous criteria that demonstrate that the emissions reductions are real, permanent, verifiable, enforceable, and quantifiable."[250] "The [preliminary draft regulations] include[d] a proposal that a covered entity be allowed to use offsets for up to [4%]" of its compliance obligation. [251] ARB announced in March 2010 that it was considering revising its Mandatory Greenhouse Gas Reporting Regulations, which would include aligning California's requirements with the U.S. EPA's program; requiring facilities with greenhouse gas emissions above 10,000 metric tons of CO2 equivalent to report, rather than the current threshold of 25,000 metric tons, revising reporting requirements for producers and importers of electricity, and harmonizing requirements to the extent compatible with cap and trade.[252] The revisions would apply to reports due in 2012 covering 2011 greenhouse gas emissions.[253] ARB intends to bring before the ARB Board revised greenhouse gas emissions reporting requirements for consideration

242. CAL. AIR RES. BD., *supra* note 234.

243. *Id.* at 3.

244. *Id.*

245. *Id.* at 5.

246. *Id*.

247. *Id.* at 6.

248. *Id.*

249. *Id.* at 7.

250. *Id.*

251. *Id*.

252. Cal. Air Res. Bd., Regulation Revision Workshop, *Workshop on Mandatory GHG Reporting Rules* (Mar. 23, 2010), *available at* http://www.arb.ca.gov/cc/reporting/ghg-rep/generalmarch2010.pdf.

253. *Id.*

concurrent with consideration of a proposed cap-and-trade regulation in October 2010.[254]

In November 2010 California voters will decide whether to suspend AB 32, and all AB 32 regulations adopted by ARB, until the unemployment rate in California rate drops to 5.5% or less for four consecutive calendar quarters pursuant to Initiative 1454.[255] Initiative 1454 would also prohibit state agencies from "propos[ing], promulgat[ing], or adopt[ing] any regulation implementing" AB 32 and "any regulation adopted prior to the effective date of this measure [would] be void and unenforceable until such time as the suspension is lifted."[256]

III. INTERNATIONAL DEVELOPMENTS

A. The United Nations Framework Convention on Climate Change: The Road to Copenhagen and Beyond

1. The Copenhagen Climate Conference

On December 7, 2009, delegations from nearly 200 countries met in Copenhagen, Denmark, for the 15th Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC).[257] They met in hopes of finishing the work that had begun with the Bali Action Plan, which had launched a comprehensive process to establish "[a] shared vision for long-term cooperative action, including a long-term global goal for emission reductions" to achieve the "full, effective, and sustained implementation of the [UNFCCC]."[258]

From the beginning, parties disagreed over the form that any new agreement should take. Early in the meeting, the nation of Tuvalu and some of the poorest countries called for a legally binding amendment to the Kyoto Protocol that would limit the emissions of developing and developed countries alike - a proposal that was resisted by China and larger developing countries.[259] China sought to amend Kyoto to impose additional binding commitments on developed countries while limiting its support for reducing emissions from

254. *Id.*

255. Memorandum from Katherin Montgomerty, Ass. Elections Analyst, on Initiative 1454, Related to Global Warming (Feb. 18, 2010), *available at* http://www.sos.ca.gov/elections/ccrov/pdf/2010/february/10070km.pdf.

256. *Id*.

257. U.N. Framework Convention on Climate Change, May 9, 1992, 1771 U.N.T.S. 107, *available at* http://unfccc.int/resource/docs/convkp/conveng.pdf [hereinafter *UNFCCC*].

258. Conference of the Parties to the United Nations Framework Convention on Climate Change, Bali, Dec. 3-15, 2008, *Report of the Conference of the Parties in its Thirteen Session - Addendum, Part Two: Action Taken by the Conference of the Parties at its Thirteen Session, Bali Action Plan*, U.N. Doc. FCCC/CP/2007/6/Add.1 (Mar. 14, 2008), *available at* http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=3 [hereinafter *Bali Action Plan*].

259. John Vidal, *Copenhagen Talks Break Down as Developing Nations Split Over 'Tuvalu' Protocol*, THE GUARDIAN, Dec. 9, 2009, *available at* http://www.guardian.co.uk/environment/2009/dec/09/copenhagen-tuvalu-protocol-split.

developing countries to nonbinding actions.[260] Other countries, such as the United States, pushed for a nonbinding political agreement.[261]

Initially, industrial nations proposed to establish a fund to provide short-term funding of $10 billion annually for three to four years.[262] Developing nations, led by the Group of 77 and the Alliance of Small Island States, decried the proposal as woefully inadequate and even temporarily walked out of negotiations in order to express their displeasure.[263] A breakthrough was made towards the end of the second week when Secretary of State Hillary Rodham Clinton announced that the United States would contribute its share of $100 billion a year in long term financing on the condition that the climate talks produced a comprehensive political agreement that included verification measures designed to ensure that each nation meets its environmental commitments.[264]

China refused to agree to any international monitoring and verification of its emissions levels, arguing that such measures would impinge upon its national sovereignty and maintained that domestic laws would ensure compliance with any international commitments.[265] The United States stated that it would not support any agreement that did not include such measures.[266]

Developing countries also disagreed with the developed world over the depth of cuts required to achieve the UNFCCC's goal of preventing "dangerous anthropogenic interference with the climate system."[267] Developed countries generally embraced the goal set by the Intergovernmental Panel on Climate Change of limiting global temperature increases to 2 degrees Celsius.[268] Small island states and other developing nations, sought a limit of 0.5 degrees Celsius over pre-industrial levels.[269]

One issue where there seemed to be a certain level of consensus was the need to promote REDD-plus.[270] REDD-plus refers to the Bali Action Plan's call to consider policy approaches and incentives designed to promote reducing emissions from deforestation and forest degradation, the role of conservation,

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260. David Hunter, *Implications of the Copenhagen Accord for Global Climate Governance*, 10 SUSTAINABLE DEV. L. & POL'Y 4, at 7 (2010) [hereinafter *Hunter*].

261. Suzanne Goldenberg, *Barack Obama Ready to Offer Target for Cutting Greenhouse Gas Emissions*, THE OBSERVER, Nov. 22, 2009, *available at* http://www.guardian.co.uk/environment/2009/nov/22/obama-greenhouse-gas-cut-target.

262. *Seeking Compromise: Slow, if Any, Progress Is Being Made at the Copenhagen Climate-Change Talks*, ECONOMIST, Dec. 15, 2009, *available at* http://www.economistcom/node/15106331.

263. *Id.*

264. John M. Broder & Elisabeth Rosenthal, *Obama Has Goal to Wrest a Deal in Climate Talks*, N.Y. TIMES, Dec. 17, 2009, *available at* http://www.nytimes.com/2009/12/18/science/earth/18climate.html.

265. *Id.*; *see also* John M. Broder & James Kanter, *China and U.S. Hit Strident Impasse at Climate Talks*, N.Y. TIMES, Dec. 14, 2009, *available at* http://www.nytimes.com/2009/12/15/science/earth/15climate.html [hereinafter *Broder & Kanter*].

266. *Id.*

267. *UNFCCC*, *supra* note 257, at art. 2.

268. Richard L. Ottinger, *Copenhagen Climate Conference - Success or Failure?*, 27 PACE ENVTL. L. REV. 411, 415 (2010) [hereinafter *Ottinger*]; James Kanter & Andrew C. Revkin, *Europe Pledges Billions in Climate Funding*, N.Y. TIMES, Dec. 11, 2009, *available at* http://www.nytimes.com/2009/12/12/science/earth/12climate.html [hereinafter *Kanter & Revkin*].

269. *Kanter & Revkin*, *supra* note 268.

270. *Bali Action Plan*, *supra* note 258.

sustainable management of forests, and enhancements of forest carbon stock in developing countries.[271] Both developing and developed countries alike seemed to recognize the benefits of REDD-plus: developing countries tended to view it as an opportunity to attract foreign investment and assistance, while developed nations recognized that it provides a relatively inexpensive way of meeting their international commitments.[272] Negotiations over REDD-plus produced a relatively detailed draft text, although the text was superseded by the Copenhagen Accord.[273]

2. The Copenhagen Accord

The Copenhagen Accord[274] - characterized as a failure by some and an important step forward by others[275] - was crafted during the final hours of the conference by President Obama and the leaders of China, Brazil, India, and South Africa.[276] The following sections summarize the key features of the Copenhagen Accord.

a. Legal Effect

Technically, the Conference of the Parties did not adopt the Copenhagen Accord.[277] A number of countries objected to the fact that the agreement had been crafted by a small group of countries and therefore blocked its adoption.[278] UNFCCC Executive Secretary Yvo de Boer explained that taking note of the Accord "is a way of recognizing that something is there, but not going so far as to associate yourself with it."[279] The accord is not legally binding, but is "politically binding" on those countries that choose to associate themselves with it, which means that breach of the agreement may result in a diplomatic response from other countries.[280]

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271. *Id.* ¶ 1(b)(iii).

272. *Hunter*, *supra* note 260, at 11.

273. Florence Daviet, World Res. Inst., *From Copenhagen to Cancun: Forests and REDD* (May 17, 2010), http://www.wri.org/stories/2010/05/copenhagen-cancun-forests-and-redd.

274. Conference of the Parties to the United Nations Framework Convention on Climate Change, Copenhagen, Dec. 7-19, 2009, *Report of the Conference of the Parties in its Fifteenth Session - Addendum, Part Two: Action Taken by the Conference of the Parties at its Fifteenth Session, Copenhagen Accord*, U.N. Doc. FCCC/CP/2007/6/Add.1 (Mar. 30, 2010), *available at* http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf [hereinafter *Copenhagen Accord*].

275. John Vidal, Allegra Stratton & Suzanne Goldenberg, *Low Targets, Goals Dropped: Copenhagen Ends in Failure*, THE GUARDIAN, Dec. 19, 2009, http://www.guardian.co.uk/environment/2009/dec/18/copenhagen-deal.

276. *Ottinger*, *supra* note 268, at 412-13.

277. *Id.* at 412.

278. PEW CTR. ON GLOBAL CLIMATE CHANGE, *Fifteenth Session of the Conference of the Parties to the U.N. Framework Convention on Climate Change and Fifth Session of the Meeting of the Parties to the Kyoto Protocol*, *available at* http://www.pewclimate.org/docUploads/copenhagen-cop15-summary.pdf.

279. Jacob Werksman, *"Taking Note" of the Copenhagen Accord: What It Means, World Resources Institute* (Dec. 20, 2009), http://www.wri.org/stories/2009/12/taking-note-copenhagen-accord-what-it-means (internal quotes omitted).

280. *Id.*

b. Objective

Paragraph two of the Accord states that parties should take action to "reduce global emissions so as to hold the increase in global temperature below two degrees Celsius . . . consistent with science and on the basis of equity."[281] But paragraph twelve, acknowledging the call for deeper cuts by many developing nations, explicitly calls for consideration of strengthening the long-term goal to limit the increase in global temperature to 1.5 degrees Celsius as part of an assessment of the implementation of the agreement that is to be completed by 2015.[282]

c. Mitigation

The Accord draws a distinction between the actions required by those countries listed in Annex I of the UNFCCC (Annex I Parties), consisting primarily of developed countries, and non-Annex I Parties, consisting primarily of developing countries.[283] Annex I Parties are required to implement "quantified economy-wide emissions targets' for 2020."[284] With respect to non-Annex I Parties, the Accord states that such parties are to implement "mitigation actions" in the context of sustainable development, leaving the meaning of "mitigation actions" largely undefined.[285] The Accord further provides that the least developed countries and small island states may undertake mitigation actions voluntarily and on the basis of support.[286] Both Annex I Parties and non-Annex I Parties were supposed to submit their commitments by January 31, 2010, to be listed in Appendix I and Appendix II of the Accord, respectively.[287]

d. Financing

The Accord states that developed countries are to provide "[s]caled up, new and additional, predictable and adequate funding" to support mitigation measures, including REDD-plus, adaptation, technology development and transfer, and capacity building.[288] It provides for a collective commitment by developed countries to provide "new and additional" resources of $30 billion dollars for the 2010-2012 period.[289] It states that the allocation of this funding should generally be balanced between adaptation and mitigation measures, except that funding for adaptation should be prioritized in the case of the least developed nations, small island developing nations, and Africa.[290] It also commits developed nations to collectively mobilize $100 billion a year by 2020 for developing countries "[i]n the context of meaningful mitigation actions and transparency [i]n implementation."[291] The Accord envisions that the funding to

281. *Copenhagen Accord*, *supra* note 274, ¶ 2.
282. *Id.* ¶ 12.
283. *Id.* ¶¶ 4-5, app. A.
284. *Id.* ¶ 4.
285. *Id.* ¶ 5.
286. *Id.*
287. *Id.* ¶¶ 4-5.
288. *Id.* ¶ 8.
289. *Id.*
290. *Id.*
291. *Id.*

meet its short-term and long-term funding goals will come from a variety of public and private sources, be provided bilaterally and multilaterally, and include "alternative sources of finance" - a phrase which is left undefined by the agreement.[292]

The Accord also seeks to establish an institutional framework for directing these funds to the developing world. It states that any new multilateral funding for adaptation is to be provided through a fund with a governance structure that ensures the equal representation of developed and developing nations.[293] It further states that a significant portion of any multilateral funding for adaptation should be provided through a fund established under the Accord, the Copenhagen Green Climate Fund, which shall operate under the UNFCCC to support activities in developing countries relating to adaptation, mitigation, capacity-building, and technology.[294] The Accord also calls for the establishment of a High Level Panel to study the potential contribution of different sources of revenue towards meeting these goals, including alternative sources of finance.[295]

e. International Measurement, Reporting, and Verification Requirements

While the Accord focuses primarily on the measurement, reporting and verification requirements (MRV) of the commitments of developed countries, it does provide a mechanism by which actions in developing countries can become subject to international scrutiny. As a general matter, mitigation measures taken by Non-Annex I parties are only subject to domestic MRV.[296] Non-Annex I Parties are required to submit a national communication to the Secretariat every two years identifying mitigation actions that they have taken or are planning to take and detailing the results of their domestic MRV.[297] The information contained therein is then subject to international consultation under clear guidelines that ensure that national sovereignty is respected.[298] To the extent that a Non-Annex I Party seeks international support for "[n]ationally appropriate mitigation actions," such actions become subject to international MRV under guidelines to be developed by the Conference of the Parties.[299] As far as Annex I Parties are concerned, the Accord provides that their commitments respecting emission reductions and financing to developing countries, shall be subject to international MRV in order to ensure that the recording, reporting, and analysis of their efforts to meet their targets is "rigorous, robust and transparent."[300]

292. *Id.*
293. *Id.*
294. *Id.* ¶¶ 8, 10.
295. *Id.* ¶ 9.
296. *Id.* ¶ 5.
297. *Id.*
298. *Id.*
299. *Id.* ¶ 5.
300. *Id.* ¶ 4.

f. REDD-plus and Technology

The Accord recognizes the importance of REDD-plus,[301] but it goes one step further in calling for the "immediate establishment of a mechanism . . . to enable the mobilization of financial resources from developed countries" to encourage such actions.[302] Further, as noted above, the parties agreed that some of the additional funding from developed countries, called for by the Accord, should be used to support REDD-plus and that the Copenhagen Green Climate Fund should work to support REDD-plus programs in developing countries.[303]

The Accord calls for the establishment of a Technology Mechanism to accelerate the development and transfer of technology to support adaptation and mitigation measures. It states that the development and transfer of technology will be country-driven and based on national circumstances and priorities.[304]

3. Developments Since Copenhagen

a. Country Commitments

As of July 15, 2010, one hundred thirty-six countries had expressed their intention to be listed as agreeing to the Accord.[305] As of July 17, 2010, approximately forty-three of those countries submitted economy-wide emissions targets for 2020 under Appendix I of the Accord and approximately forty have committed to mitigation actions under Appendix II.[306] Recent analyses indicates that the currently pledged reduction in emissions are not enough to accomplish the goal of limiting increases in global temperatures to two degrees Celsius.[307]

The United States has tentatively committed to reduce emissions by 17% below 2005 levels by 2020, although the final target will be revised in light of any legislation that is ultimately enacted by Congress.[308] Other countries, such as China and India, have committed to reduce energy intensity; that is, they have committed to reduce emissions per unit of output. For instance, China's submission under Appendix II sets a goal of reducing carbon dioxide emissions per unit of Gross Domestic Product by 40-45% from 2005 levels by 2020.[309] Still others have chosen to set sector specific goals as opposed to economy-wide targets.[310]

Since the conference, many countries have clarified their respective commitments to the Accord's funding goals and some elements of the institutional structure have taken shape. As of June 5, 2010, developed countries had pledged over $31 billion dollars of short-term funding for the 2010-2012

301. *Id.* ¶ 6.

302. *Id.*

303. *Id.* ¶¶ 6, 10.

304. *Id.* ¶ 11.

305. *Id.*

306. *UNFCCC*, *supra* note 257.

307. Org. for Econ. Cooperation and Dev., *Costs and Effectiveness of the Copenhagen Pledges: Assessing Global Greenhouse Gas Emissions Targets and Actions for 2020*, *available at* www.oecd.org/dataoecd/6/5/45441364.pdf.

308. *UNFCCC*, *supra* note 257, at app. I.

309. *UNFCCC*, *supra* note 257, at app. II.

310. *Hunter*, *supra* note 260, at 8.

period with the majority of the funds flowing bilaterally.[311] U.N. Secretary-General Ban Ki-moon announced the establishment of the High Level Panel called for by the Accord on February 12, 2010.[312] And it is expected that the High Level Panel will issue final recommendations before the next meeting of the Conference of the Parties scheduled to be held in Cancun, Mexico, in December of this year.[313] Yet, despite these developments, the delivery of this funding, and possible sources for meeting the long-term financing goals of the Accord remain uncertain.[314] Likewise, further details about the Copenhagen Green Climate Fund have not been provided and it is expected that it will not be formally established at least until the next meeting of the Conference of the Parties in Cancun, Mexico.[315]

4. Meetings Since Copenhagen

Two weeks of Bonn U.N. Climate Change Talks made some progress towards concluding what was left incomplete at the Copenhagen Climate Conference. The outcome is set to be presented at the U.N. Climate Change Conference in Cancun (COP 16) at the end of this year. From May 31 to June 11, representatives from 185 governments gathered in Bonn, Germany to discuss issues that were left unresolved at the Climate Change Conference (COP-15) held in Copenhagen in December 2009.[316] The meeting was intended to lay groundwork for a potential agreement at COP16.

The Bonn gathering was attended by more than 5,500 participants, including government delegates from 185 governments, along with representatives from business and industry, environmental organizations, and research institutions.[317]

The Ad Hoc Working Group on Long-Term Cooperative Action under the Convention (AWG-LCA) also undertook detailed discussions on reducing greenhouse gases, adapting to the effects of climate change, the transfer of clean technology, reducing emissions from deforestation and capacity building, in addition to dealing with finance and institutional arrangements.[318]

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311. ATHENA BALLESTEROS ET AL., World Res. Inst., *Summary of Climate Finance Pledges Put Forward by Developed Countries* (June 5, 2010), http://www.wri.org/stories/2010/02/summary-climate-finance-pledges-put-forward-developed-countries.

312. Secretary-General Ban Ki-moon, *Opening Remarks at Joint Press Conference with Prime Ministers Gordon Brown (UK) and Meles Zenawi (Ethiopia) to Launch High-Level Advisory Group on Climate Change Financing* (Feb. 12, 2010), *available at* http://www.un.org/apps/news/infocus/sgspeeches/statments_full.asp?statID=728.

313. *Id.*

314. ATHENA BALLESTEROS, World Res. Inst., *From Copenhagen to Cancun: Climate Finance* (June 4, 2010), *available at* http://www.wri.org/stories/2010/06/copenhagen-cancun-climate-finance.

315. *Hunter*, *supra* note 260, at 11.

316. Outgoing UN Climate Change Official Says Some Progress Made in Latest Talks, UN NEWS CENTRE, available at http://www.un.org/apps/news/story.asp?NewsID=35006.

317. *Id.*

318. U.N. Framework Convention on Climate Change, Bonn, *Report of the Ad Hoc Working Group on Long-term Cooperative Action Under the Convention on its Tenth Session, Held in Bonn from 1 to 11 June 2010*, U.N. Doc. FCCC/AWGLCA/2010/7 (June 28, 2010), *available at* http://unfccc.int/resource/docs/2010/awglca10/eng/07.pdf.

The Ad Hoc Working Group on Further Commitments for Annex I Parties Under the Kyoto Protocol (AWG-KP), a second working group on future climate action focusing on emissions reduction commitments for the 37 industrialized countries that have ratified the Kyoto Protocol, also met in Bonn.[319] In this group, countries started work on turning the emission reduction pledges that developed countries made since Copenhagen into targets that can be formally compared in a UN negotiating context. The next UNFCCC negotiating session was scheduled to take place in August, 2010 in Bonn, followed by a second one-week intercessional meeting before the UN Climate Change Conference scheduled for November 29th to December 10, 2010.

B. Developments in Climate Science: Climategate and its Aftermath

On November 17, 2009, an unknown hacker obtained over 1000 emails and other documents from a backup server of the United Kingdom's East Anglia University (UEA) and posted them upon a website frequented by those interested in climate change developments.[320] Over the following weeks and months, this material was reviewed and skeptics or opponents of climate change orthodoxy asserted in the media that these materials contradicted or refuted the conclusion (presented in IPCC Assessment Report 4) that "[w]arming of the climate system is unequivocal" over the past several decades and is caused in substantial part by human activities.[321] The emails and other documents were authored by climatologists at UAE's Climate Research Unit (CRU) whose principal functions were developing proxy temperature data from recorded tree ring sizes and from over 4000 20th century temperature measuring stations located throughout the World. This data, often adjusted to reflect special conditions affecting individual data sources, was combined to create a 1000 year history of temperature trends which, along with other data, provided support for the climate system warming believed by many to have occurred in the 20th Century. Based on the content of the emails, certain opponents of the IPCC conclusion asserted that 1) temperature or tree ring data had been manipulated to produce improperly the warming trend; 2) that such data streams had been improperly combined to produce the warming trend; 3) that a misleading "hockey stick" graph had been prepared and inserted in IPCC Assessment Reports in an effort to persuade policy-makers that the trend existed; and 4) that CRU and certain other U.S. scientists had used their influence as lead or contributing authors to the IPCC Assessment Reports, and with peer-reviewed scientific journals, to prevent opposing views (i.e., that global temperature was not trending upward, or if it were, this trend was not caused by human activity) from appearing in those

319. U.N. Framework Convention on Climate Change, Bonn, *Report of the Ad Hoc Working Group on Further Commitments for Annex I Parties Under the Kyoto Protocol on its Twelfth Session, Held in Bonn From 1 to 11 June 2010*, U.N. Doc. FCCC/KP/AWG/2010/7 (June 28, 2010), *available at* http://unfccc.int/resource/docs/2010/awg12/eng/07.pdf.

320. *See* House of Commons, Sci. and Tech. Comm., *The Disclosure of Climate Data from the Climatic Research Unit of East Anglia, Eighth Report of Session 2009-10* (Mar. 31, 2010), at 5-7, *available at* http://www.publications.parliament.uk/pa/cm200910/cmselect/cmsctech/387/387i.pdf [hereinafter *HC STC Report*].

321. IPCC, Fourth Assessment Synthesis Report (2007), *available at* http://www.ipcc.ch/.

reports or journals.[322] These assertions, and particularly the media controversy which they generated, were of potentially great significance, as they surfaced only two weeks before the Copenhagen Conference at which it was hoped a comprehensive, new international climate change agreement could be negotiated, and also because the IPCC 2007 Assessment Report provides in substantial part the factual basis for the EPA Endangerment Finding described above and the proposed adoption of comprehensive US legislation.

The Government of the United Kingdom, UEA, and Penn State University (the affiliation of a U.S. scientist implicated in the controversy) instituted independent examinations of the allegations of data manipulation and other improper conduct, but not of the substance of the scientific dispute as to whether the data, if properly developed, evidenced global warming caused by human activity or not.[323] The Science and Technology Committee of the UK House of Commons (UK STC), on January 22, 2010, announced an inquiry, including public legislative hearings, into the implications of these so-called "climategate" disclosures for the integrity of UK climate research and CRU databases affected, whether independent data sets exist that are not affected by any improper CRU related conduct to support the IPCC 4th Assessment conclusions (answered in the affirmative) and whether the two UAE commissioned investigations were sufficiently broad in scope and independent to resolve the controversies.[324] The UEA commissioned reviews sought to (i) determine whether "climatic data [has] been dishonestly selected, manipulated and/or presented to arrive at pre-determined conclusions" not compatible with its fair interpretation (Oxburgh Report) and (ii) examine the hacked email exchanges and other data to determine if there is "any evidence of the manipulation or suppression of data which is at odds with acceptable scientific practice," CRU's policies respecting research and peer review to determine if its actions comply with "best scientific practice," and its responses to UK Freedom of Information Act requests to determine compliance with legal requirements.[325]

These Reports rejected assertions of data manipulation or other intentional misconduct on the part of CRU scientists (including interference in peer review

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322. *HC STC Report*, *supra* note 320, at 5-9, 11-12; *Report of the International Panel Set Up by the University of East Anglia to Examine the Research of the Climate Research Unit* 1-2, ¶¶ 1 & 5 (Apr. 10, 2010), *available at* http://www.uea.ac.uk/mac/comm/media/press/CRUstatements/oxburgh [hereinafter *Oxburgh Report*]; *The Independent Climate Change E-mails Review* 1, 22-24 (July 7, 2010), http://www.cce-review.org/ [hereinafter *Russell Report*].

323. For example, the most comprehensive of these reviews, that conducted by Sir Muir Russell at the request of the UEA, stated:

> The Review examines the honesty, rigour and openness with which CRU scientists have acted. It is important to note that we offer no opinion on the validity of the scientific work. Such an outcome could only come through the normal processes of scientific debate and not from examination of e-mails or from a series of interviews about conduct. *Russell Report*, *supra* note 322, at 10 ¶ 86 (emphasis omitted).

Similarly, the Oxburgh Report on the validity of CRU research stated:

> The Panel was not concerned with the question of whether the conclusions of the published research were correct. Rather it was asked to come to a view on the integrity of the Unit's research and whether as far as could be determined the conclusions represented an honest and scientifically justified interpretation of the data. *Oxburgh Report*, *supra* note 322, at 1, ¶ 2.

324. *HC STC Report*, *supra* note 320.

325. *Russell Report*, *supra* note 322, at 1, 22-24.

and IPCC Assessment processes), but sharply criticized the "culture of withholding information" in response to FOIA requests, and found such conduct "prima facie evidence" of a violation of that statute.[326] Moreover, SCT further admonished as follows:

> A great responsibility rests on the shoulders of climate science: to provide the planet's decision makers with the knowledge they need to secure our future. The challenge that this poses is extensive and some of these decisions risk our standard of living. When the prices to pay are so large, the knowledge on which these . . . decisions are taken had better be right. The science must be irreproachable.[327]

And that:

> If the practices of CRU [i.e. respecting data transparency and disclosure] are found to be in line with the rest of climate science [as the SCT concluded it was], the question would arise whether climate science methods of operation need to change. In this event[,] we would recommend that the scientific community should consider changing those practices to ensure greater transparency.[328]

The UAE Russell Report also admonished on these matters:

> Climate science is a matter of such global importance that the highest standards of honesty, rigour and openness are needed in its conduct. On the specific allegations made against the behaviour of the CRU scientists, we find that their rigour and honesty as scientists are not in doubt. In addition, we do not find that their behaviour has prejudiced the balance of advice given to policy makers. In particular, we do not find any evidence of behaviour that might undermine the conclusions of the IPCC assessments. But we do find that there has been a consistent pattern of failing to display the proper degree of openness, both on the part of the CRU scientists and on the part of the UEA, who failed to recognize not only the significance of statutory requirements but also the risk to the reputation of the University and, indeed, to the credibility of UK climate science.[329]

Finally, the Oxburgh Report, while noting that the tree data selection process was highly judgmental and with a high potential for misleading results due to selection bias, concluded that "we are satisfied that the CRU tree-ring work has been carried out with integrity, and that allegations of deliberate misrepresentation and unjustified selection of data are not valid."[330] Similarly, as to development of measured temperature records from selected measuring stations, the Report concluded that "as far as we can judge the methods CRU has employed are fair and satisfactory," and "there was no hint of tailoring results to a particular agenda."[331] However, it further noted that development of each

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326. *HC STC Report*, *supra* note 320, at 12-23, 32, 34-35 & 46-51; *Russell Report*, *supra* note 322, at 11-16. The SCT found that CRU's failure to disclose data was consistent with the practice of other climate researchers though a prima facie violation of UK law, and that the data and CRU adjustment methods were substantially available from public sources available to all researchers. Indeed, the Russell Report further stated that its authors were able to replicate CRU analyses and data sets from publically available sources. As respects dishonesty, the SCT concluded that "there is no case to answer . . . . [T]he scientific reputation of . . . CRU remains intact", and it found appropriate the scope and assurances of independence of the UAE commissioned reviews. The Russell Report also criticized the "hockey stick" graph in IPCC Reports as "misleading" as its combination of separate data sets (i.e., tree ring derived temperatures and modern actual measurements was not properly explained in its presentation). *Russell Report*, *supra* note 322, at 13, ¶ 23.

327. *HC STC Report*, *supra* note 320, at 46.

328. *HC STC Report*, *supra* note 320, at 44.

329. *Russell Report*, *supra* note 322, at 11-12.

330. *Oxburgh Report*, *supra* note 322, at 2-3, ¶ 3, 6, 8.

331. *Id.* at 4, ¶ 4.

database was essentially an exercise in employing proper statistical methods and that those employed by CRU, while acceptable, were not the best available, though the latter would be unlikely to change the results obtained.[332]

Penn State University reviewed the propriety of the research and other actions of a climatologist within its organization under its Research Administration Policy No. 10 prohibiting Research Misconduct.[333] The investigative Panel concluded that this climatologist "did not engage in, nor did he participate in, directly or indirectly, any actions that seriously deviated from accept[able] practices within the academic community for proposing, conducting, or reporting research, or other scholarly activities."[334] In reaching this conclusion, the Panel sought guidance on the appropriate standards of conduct for academic research and the peer review process (as did the East Anglia reviews), measured the climatologist conduct against that standard and rejected the allegations of misconduct.[335] Skeptics have dismissed these Reports as not addressing relevant matters, noting as stated above that these Reports explicitly state that they do not resolve the scientific dispute over whether global warming is occurring or caused by human activity, that investigative Panel members are employed by the sponsoring University of the challenged research (and thus financially interested in its reputation and ability to obtain further grants), and that the Panels did not seek participation of prominent skeptics in defining acceptable standards of scientific research.[336] They have, moreover, continued to press their own interpretation of the materials examined.[337]

Immediately following release of the climategate materials, the Intergovernmental Panel on Climate Change (IPCC) issued a statement rejecting the assertions that the asserted improper conduct could have contributed to the principal conclusion of IPCC Assessment #4 (i.e., the presence of significant global warming caused by human activity), as no single contributing author had sufficient control over report content to be able to improperly influence its content (a position confirmed by the Russell Report).[338] However, several independent errors in the Working Group II contribution to the Assessment respecting the rate of melting of Himalayan glaciers and the extent that Holland sits below sea level, neither of which directly impacts the Assessment's principal conclusion as stated above, were discovered and publicized in connection with

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332. *Id.* at 3-5, ¶ 4.

333. RA-10 Final Investigation Report Involving Dr. Michael E. Mann (June 4, 2010), *available at* http://live.psu.edu/fullimg/userpics/10026/Final_Investigation_Report.pdf.

334. *Id.* at 19.

335. *Id.* at 14-19.

336. Patrick J. Michaels, *The Climate Whitewash Continues*, WALL STR. J., July 12, 2010, http://online.wsj.com/article/SB10001424052748704075604575356611173414140.html.

337. *Id.*; Dr. Fred Singer, *Climategate: the Muir-Russell Report: Some Initial Comments*, WHAT'S UP WITH THAT?, July 10, 2010, http://wattsupwiththat.com/2010/07/10/fred-singer-on-the-muir-russel-report/; s*ee also*, Op. Ed., *A Climate Absolution?*, WALL STR. J., July 19, 2010, http://online.wsj.com/article/SB10001424052748703394204575367483847033948.html; s*ee also*, Editorial, *A Climate Change Corrective*, N.Y. TIMES, July 25, 2010, http://www.nytimes.com/2010/07/11/opinion/11sun2.html.

338. IPCC, *Statements on Reports Regarding Hacking of the East Anglia University Email Communications* (Dec. 4, 2009), http://www.ipcc.ch/press_information/press_information.htm; *Russell Report*, *supra* note 322, at 11.

the climategate controversy.[339] To respond to these controversies, the IPCC requested that the Netherlands Environmental Assessment Agency conduct a review of the thirty-two most important 4th Assessment conclusions respecting the regional impacts of climate change, which review concluded that "all 32 [were] well founded and none were found to contain any significant errors."[340] Also, in March 2010, to assist in the preparation of its 5th Assessment Report, the IPCC (and the UN Secretary General) requested that the InterAcademy Council (IAC), an umbrella organization for national academies of science from around the world, conduct "an independent review of the IPCC's processes and procedures to further strengthen the quality of the Panel's reports on climate change," and most particularly the 5th Assessment due to be published in 2014.[341] The importance and objective of this review was explained as follows:

> [T]he IPCC was established in 1988 by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO), in accordance with General Assembly Resolution 43/53, to provide policymakers with a comprehensive and objective scientific risk assessment of the current status of climate change and its potential consequences for both people and the planet.
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> . . . .
>
> In recent months, a very small number of errors have been brought to light in the Fourth Assessment Report (AR4) of the IPCC, a document containing thousands of peer-reviewed and independent scientific studies.
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> . . . .
>
> Given the gravity of the global threat posed by climate change, it is vitally important to ensure full confidence in the scientific process underpinning the assessments of the IPCC. Governments and the public at large look to the IPCC as the world's most authoritative scientific body for assessing climate risk and informing climate policy.[342]
>
> We expect the recommendations from the IAC's review to inform how the IPCC prepares its fifth major assessment of global climate change, due to be published in 2013-2014. Meanwhile, the conclusions from the IPCC's 2007 report remain entirely valid: The climate is changing due to human activity, and the effects are

339. IPCC, *Statement on the Melting of Himalayan Glaciers* (Jan. 20, 2010), *available at* http://www.ipcc.ch/pdf/presentations/himalaya-statement-20january2010.pdf.

340. Press Release, IPCC, Review by Dutch Government Confirms IPCC's Core Conclusions on Impacts of Climate Change - Recommendations for Future Improvements Welcomed (July 5, 2010), *available at* http://www.ipcc.ch/pdf/press-releases/pr-pbl-05july2010.pdf (internal quotations omitted); PBLNETHERLANDS ENVIRONMENTAL ASSESSMENT AGENCY, ASSESSING AN IPCC ASSESSMENT. AN ANALYSIS OF STATEMENTS ON PROJECTED REGIONAL IMPACTS IN THE 2007 REPORT (July 5, 2010), http://www.pbl.nl/en/publications/2010/Assessing-an-IPCC-assessment.-An-analysis-of-statements-on-projected-regional-impacts-in-the-2007-report.html. The Netherlands Assessment did uncover two additional factual errors in the IPCC 4th Assessment respecting the number of Africans who would be exposed to water availability stress as the result of climate change and the extent of disruption of African fisheries, and recommended that greater attention be paid in future Assessment preparation to documenting generalized factual statements to their underlying scientific research base.

341. Press Release, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, Scientific Academy to Conduct Independent Review of the Intergovernmental Panel on Climate Change's Processes and Procedures at Request of United Nations and IPCC (Mar. 10, 2010), *available at* http://www.ipcc.ch/pdf/press/pr-1003210-UN.pdf [hereinafter *IPCC*].

342. Letter from BAN [sic] Ki-moon, Sec.-Gen. of U.N., and Dr. Rajendra K. Pachauri, Chairman of the IPCC, to Dr. Robert H. Dijkgraaf, Co-Chair, InterAcademy Council (Mar. 10, 2010), *available at* http://www.ipcc.ch/pdf/press/letter-un-ipcc-to-dr-dijkgraaf.pdf.

> already being felt around the globe. If anything, more recent data indicate that the IPCC's 2007 assessment underestimated the degree to which human activity is changing our climate.[343]

The IAC's Report was to be submitted by August 31, 2010, for consideration at the IPCC's 32nd Session in October 2010.[344] The structure and outline of the 5th Assessment Report have already been agreed to (i.e., in 2009), and 831 contributing authors have been selected after an extensive nomination process.[345] Drafting of the Report will begin this Fall.[346]

C. Other International Developments: China

The IEA reported that China consumed 2.252 billion tons of oil equivalent energy in 2009, mainly through oil and coal, surpassing the United States as the largest energy consumer in the world.[347]

China's National Development and Reform Commission (NDRC) delivered a Report of the State Council on Responding to Climate Change to the Standing Committee of the National People's Congress (NPC) on August 24, 2009.[348] The report reaffirmed China's position that "human activities, such as [the] combustion of fossil fuels, deforestation, and land use change, have caused a drastic rise [in] . . . greenhouse gas concentration[,]" and that China was "most vulnerable to the adverse impacts of climate change[.]"[349] But development

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343. *IPCC*, *supra* note 341, ¶ 6.

344. INTERACADEMY COUNCIL, Independent Review of the IPCC Assessment Process, Terms of Reference, at 3, *available at* http://www.ipcc.ch/pdf/press/tor_10_03_2010.pdf.

345. 831 Experts Selected for the Fifth Assessment Report (June 23, 2010), ¶ 4, *available at* http://www.ipcc.ch/pdf/press-releases/pr-23june2010.pdf.

346. The IPCC's Fifth Assessment Report (AR5) (May 2010), http://www.ipcc.ch/press_information/press_information.htm; IPCC, The Role of the IPCC and Key Elements of the IPCC Assessment Process (Feb. 2010), http://www.ipcc.ch/press_information/press_information.htm. The objectives of the IPCC and of its Assessment reports are described in its Statement of Principles and Procedures (Feb. 21, 2010) as follows:

> The IPCC is a unique partnership between the scientific community and the world's governments. Its goal is to provide policy-relevant but not policy-prescriptive information on key aspects of climate change, including the physical science basis, impacts of and vulnerability to climate change in human and natural systems, options for adapting to the climate changes that cannot be avoided, and options for mitigation to avoid climate change. The IPCC relies on a combination of broad participation, rigorous oversight, and transparent, thorough adherence to carefully designed procedures to produce assessment reports that have become over the last 20 years, the international gold standard in the scientific assessment of climate change.
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> . . . .
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> An IPCC assessment report is a massive undertaking, in which hundreds of volunteer scientists examine all of the available scientific literature on topics related to climate change and put that literature in context through a process of assessment. IPCC, Statement on IPCC Principles and Procedures (Feb. 2, 2010), *available at* http://www.ipcc.ch/pdf/press/ipcc-statement-principles-procedures-02-2010.pdf.

347. Spencer Swartz & Shai Oster, *China Tops U.S. in Energy Use*, WALL ST. J., July 18, 2010, http://online.wsj.com/article/SB10001424052748703720504575376712353150310.html.

348. Nat'l Dev. & Reform Comm'n, China's Policies and Actions for Addressing Climate Change - The Progress Report 2009, *available at* http://www.ccchina.gov.cn/WebSite/CCChina/UpFile/File571.pdf [hereinafter *State Council Report*].

349. *Id*. at 68.

remains its first priority,[350] and internationally, China continues to advocate the principle of "common but differentiated responsibilities."[351]

Domestically, the August 2009 Report outlined seven steps for addressing climate change: (1) strengthen the legal system by enforcing environmental and energy conservation laws currently on the books; (2) improve institutions that address environmental and energy issues and coordinate efforts between such national, regional, and local institutions; (3) formulate a national climate change program through the Five Year Plan; (4) enhance scientific research and technology development; (5) educational outreach throughout the country; (6) enhance adaptation capacity in agriculture, water management, costal management and construction; (7) control emissions by adjusting economic and industrial structures, optimizing the energy mix, conserving energy, improving energy efficiency, developing renewable energy and nuclear energy, and promoting afforestation.[352]

As noted above, China announced in November 2009 that it would reduce the intensity of carbon dioxide emissions by 40-45% by 2020, as compared with a 2005 baseline.[353] China reported its new goal to the UNFCC Secretariat on January 28, 2010.[354] By comparison, China's 11th Five-Year Plan targeted a 20% energy intensity reduction target between 2006 to 2010 as compared with 2005 emissions levels.[355] And for China, economic development remains its core objective even as it addresses climate change.[356]

In the past year, however, China has reported quantifiable strides in energy conservation and emissions reductions. For example, as part of China's 4-trillion-yuan (about US $588.24 billion) stimulus funding following the world economic meltdown, China has spent around 210 billion yuan on energy savings, carbon reductions, and ecological construction.[357] Another 370 billion yuan funded "green investment," which accounted for 14.5% of the stimulus plan.[358] New wind capacity was estimated at 25,100 megawatts (MW) in 2009, which is more than double the 12,100 MW of power reported in 2008.[359] Photovoltaic

350. *Id.* China addresses the risks associated with global warming in the context of its 14.79 million who are inadequately fed and clothed and another 30 million with low and unstable incomes. INFORMATION OFFICE OF THE STATE COUNCIL OF THE PEOPLE'S REPUBLIC OF CHINA, China's Policies and Actions for Addressing Climate Change, at 5 (Oct. 2008), http://www.gov.cn/english/2008-10/29/content_1134544.htm [hereinafter *2008 Policy Paper*].

351. *State Council Report*, *supra* note 348, at 69. This principle states that developed countries must take steps to reduce emissions and provide financial support and transfer technology to developing countries, while developing countries take proactive measures to adapt to and mitigate climate change while continuing to pursue economic development and poverty eradication.

352. *Id.* at 72-73.

353. Letter from SU [sic] Wei, Dir. Gen., Dep't Climate Change, Nat'l Dev. & Reform Comm'n, to Mr. Yvo de Boer, Exec. Sec'y, UNFCCC Secretariat (Jan. 28, 2010). Carbon intensity is the ratio of carbon dioxide emissions per unit of economic activity as measured by gross domestic product.

354. *Id.*

355. *Id.*

356. *2008 Policy Paper*, *supra* note 350, at 2; *State Council Report*, *supra* note 348.

357. *China Keeps Promise to Curb Carbon Emission*, CHINADAILY, July 4, 2010, http://www.chinadaily.com.cn/china/2010-07/04/content_10055621.htm [hereinafter *China Promise*].

358. *Id*.

359. Amy Wong, *Govt Policies Spur Green Energy Boom in China, iSuppli Says*, INT'L BUS. TIMES, Aug. 4, 2010, http://www.ibtimes.com/articles/40975/20100805/green-china.htm.

(PV) power installations surpassed the official forecasts of 300 MW by 2010 by reportedly generating 580 MW by summer 2010.[360]

From 2006 to 2009, China closed 6.06 million kilowatts of small coal fired power units,[361] and China's Minstry of Industry and Information Technology recently published a list of 2,087 steel mills, cement works and other energy-intensive factories that must close by September 30, 2010.[362]

NDRC's recently announced that 22 provinces must stop offering discounted electricity to energy-intensive industries demonstrates a subtler, more market-friendly approach to controlling emissions.[363] ChinaDaily reported in July 2010 that NDRC had plans for domestic carbon trading programs in its 12th Five-Year Plan.[364]China has had a "cap" in place on certain emissions through its "Total Load Control" program since 1994,[365] but any trading initiatives under such caps have been small and experimental.[366] As such, they have struggled with accurate emissions measuring, a relatively weak legal structure in this area, and a corresponding inability of regulators to enforce penalties against companies with strong political ties.[367]

360. *Id.*

361. *China Promise*, *supra* note 357.

362. Keith Bradsher, *In Crackdown on Energy Use, China to Shut 2,000 Factories*, N.Y. TIMES, Aug. 9, 2010, http://www.nytimes.com/2010/08/10/business/energy-environment/10yuan.html.

363. *Id.*

364. Li Jing, *Carbon Trading in Pipeline*, CHINADAILY, July 22, 2010, http://www.chinadaily.com.cn/china/2010-07/22/content_11033249.htm.

365. Yen-Chiang Chang & Nannan Wang, *Environmental Regulations and Emissions Tranding in China*, 38 ENERGY POLICY 3356, 3358 (2010).

366. *See, e.g.*, Hepeng Jia, *China Launches Carbon Trading Initiatives*, SCIDEV NET, Feb. 7, 2007, http://www.scidev.net/en/news/china-launches-carbon-trading-initiatives.html.

367. Chang & Wang, *supra* note 365, at 3363-3364.

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