GLOBAL WARMING AND ITS IMPACT ON WATER SUPPLY

THE ENERGY IMPLICATIONS OF CLIMATE CHANGE AND THE EFFECTS OF OUR ENERGY CHOICES

MICHAEL W. GRAINEY†

I. INTRODUCTION

Our energy choices have a direct impact on the supply and availability of water. Many forms of energy use large amounts of water, either for energy production or for cooling of energy equipment. Further, electric generation impacts climate change. For example, cooling towers for coal, natural gas and nuclear power plants consume millions of gallons of water each year through evaporation.

In addition, generation plants, which are powered with coal or natural gas, emit millions of pounds of carbon dioxide (CO2) each year. Use of oil for vehicles and industry creates even more CO2. Failure to reduce the amount of CO2 released into the atmosphere has raised increasing concern that climate change will occur. Among the adverse impacts of climate change is the likelihood that less water will be available, because of reduced snowpack and other impacts.[1]

Energy is the primary cause of greenhouse gas emissions in the United States and in most other countries. The United States, for many years the most industrialized, energy intensive country in the world, was also the leader in greenhouse emissions. With just

† Renewable Energy Advisor, Oregon Business Development Department, Salem, Oregon. Member of the bar of Oregon, Washington, and the District of Columbia; J.D., New York University; B.A., Gonzaga University. The author served as Director of the Oregon Department of Energy from 2002 through 2009.

1. *See* OREGON STATE UNIVERSITY, SCIENTIFIC CONSENSUS STATEMENT ON THE LIKELY IMPACTS OF CLIMATE CHANGE ON THE PACIFIC NORTHWEST 1–2 (2003), *available at* http://oregonstate.edu/inr/osu-2004.

5% of the world's population, the United States produces nearly 20% of the world's greenhouse gasses.[2] The United States also consumes over 20% of the world's oil, and 20% of the world's natural resources. It is no accident that as China and India have increased the pace of industrializing their economies, their rate of emitting greenhouse gasses has risen as well.

In fact, China recently displaced the United States as the largest total emitter of greenhouse gasses in the world, although the United States still has the dubious distinction of having the world's largest per capita rate of greenhouse gas emissions.[3] China also recently displaced the United States as the world's largest energy consumer.[4] However, China is also increasing the amount of green energy it is producing to meet its growing energy needs. China now spends nearly double what the United States spends and nearly as much as all European countries combined spend on clean energy.[5]

Because most greenhouse gasses are the direct result of energy use, including energy for vehicles, electricity, factories, homes and other uses, our energy choices are important if we are to make meaningful progress in reducing greenhouse gas emissions. Progress in reducing the amount of greenhouse gasses and in curbing climate change impacts is essential if the human right to water is going to be meaningful in our state and in our region.

Oregon's experience with climate change and energy policy choices shows how a state can develop a systematic response over time, the value of citizen panels to gain broad public acceptance on policy choices, and the degree to which a state can be successful in reducing greenhouse gas emissions. The Oregon experience also shows how a single state can make decisions that benefit its

2. PEW CENTER ON GLOBAL CLIMATE CHANGE, CLIMATE CHANGE 101: UNDERSTANDING & RESPONDING TO GLOBAL CLIMATE CHANGE, International Action, 1 (2011), *available at* http://www.pewclimate.org/docUploads/climate101-fullbook_0.pdf.

3. *Id*. at 6.

4. *China Overtakes U.S. as Biggest Energy Consumer: IEA*, GOVERNORS' BIOFUELS COALITION EMAIL NEWSLETTER, (Governors' Biofuels Coalition), Oct. 12, 2010 (on file with author).

5. European investment in clean energy exceeds $40 billion per year, while China alone spends over $34 billion. THE PEW CHARITABLE TRUSTS, WHO'S WINNING THE ENERGY RACE: GROWTH, COMPETITION AND OPPORTUNITY IN THE WORLD'S LARGEST ECONOMIES 7 fig. 4 (2010), *available at* http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Global_warming/G-20%20Report.pdf?n=5939.

citizens, even with a problem as complex and globally far–reaching as climate change. It also shows the impact of multiple state and regional governments working in cooperation, and how, in turn, these efforts may prompt an otherwise reluctant federal government to take action.

II. OREGON ACTION'S TO LIMIT GREENHOUSE GASSES: THE STRATEGIC FRAMEWORK

In Oregon, vehicles cause 40% of greenhouse gas emissions and power plants another 40%. All other uses, including industrial, residential and commercial uses account for the remaining 20%.[6] Oregon has issued a number of reports on climate change over the years. These reports and the public processes to develop and to adopt them have led to significant legislation and policy actions to address climate change.

A. Oregon Task Force on Global Warming

Oregon's first report on climate change was a study conducted more than twenty years ago by the Oregon Department of Energy (ODOE).[7] The study, nearly 120 pages long, consisted of Part One: Possible Impacts on Oregon from Global Warming, and Part Two: State Agency Recommendations and Proposed Actions. Part One discusses the causes of global warming, the potential impacts of global warming on water supply, water quality, wetlands and estuaries, coastal communities, forests, agriculture, air quality, and economy. The study also discusses the state of the science at the time and the degree of confidence that scientists had about the likelihood of climate change damage from greenhouse gases.

Part Two contains recommendations for eleven major agencies as diverse as the Department of Transportation and the Department of Agriculture. While the study contains over 100 recommendations ranging from recycling pollutants to reforestation, a consistent theme is that agencies should use energy and water more efficiently and make their consumption more

6. GOVERNOR'S ADVISORY GROUP ON GLOBAL WARMING, OREGON STRATEGY FOR GREENHOUSE GAS REDUCTION, pt. 1 at 30 fig. 5 (2004), *available at* http://www.oregon.gov /ENERGY/GBLWRM/docs/Global-Part1.pdf.

7. *See* OREGON TASK FORCE ON GLOBAL WARMING, REPORT TO THE GOVERNOR AND THE LEGISLATURE (1990), *available at* http://www.oregon.gov/ENERGY/GBLWRM /Portal .shtml.

sustainable by increasing their use of recycling and renewable energy resources.

B. Oregon Progress Board Benchmark

Largely as a result of that report, the Oregon Progress Board in 1992 adopted a benchmark to stabilize the State's CO2 emissions at 1990 levels. The Oregon Progress Board was established to create benchmarks for evaluating and monitoring progress by state agencies in achieving measurable objectives.[8]

Over the next decade, in spite of energy efficiency and renewable energy efforts that made Oregon one of the leading states in the nation for energy efficiency policies,[9] the rate of emissions varied between 116% and 126% of the 1990 levels. Only the years between 2002 and 2004 showed declines, dropping from 125% to 120% of 1990 levels.[10] It was not clear how much of the change was due to the general economic recession at that time or to measures to reduce carbon emissions. Emissions began increasing again in 2004.[11] Because of the difficulty in achieving progress in reducing CO2 emissions, by 2003, the benchmark was revised to 106% of 1990 levels.[12]

C. 1995 Oregon Department of Energy Report

In 1995 the ODOE issued a detailed 200 page report including a seventy page appendix containing an inventory of Oregon's principle greenhouse gasses: carbon dioxide, methane, nitrous oxide, and perfluorocarbons.[13] The report concluded that Oregon's CO2 emissions would increase by 32% from 1990 levels by 2015 in spite of the state's programs to conserve and use renewable

8. Information on the Oregon Progress Board and its benchmarks may be found at OREGON PROGRESS BOARD, http://www.oregon.gov/DAS/OPB/index.shtml.

9. *ACEEE 2010 State Energy Efficiency Scorecard*, AMERICAN COUNCIL FOR ENERGY EFFICIENT ECONOMY, (Oct. 13, 2010), http://www.aceee.org/sector/state-policy/scorecard.

10. OREGON PROGRESS BOARD, 2009 BENCHMARK HIGHLIGHTS REPORT (Updated Dec. 6, 2008), http://benchmarks.oregon.gov/Default.aspx (click on box 77, Carbon Dioxide Emissions; then select "Generate Report" at bottom of page).

11. *Id.*

12. OREGON PROGRESS BOARD, THE 2003 BENCHMARK PERFORMANCE REPORT 46, 54 (2003), *available at* http://www.oregon.gov/DAS/OPB/obm_pubs.shtml# 2009_ Benchmark _Report.

13. OREGON DEPARTMENT OF ENERGY, REPORT ON REDUCING OREGON'S GREENHOUSE GAS EMISSIONS app. D (1995), *available at* http://www.oregon.gov/ENERGY /GBLWRM/docs/1995_Reducing_OR_GHG_Emissions_Appendix_D.pdf.

energy.[14] The report also predicted that electric and natural gas utilities, implementing their least-cost plans, would increase their CO2 emissions by 50%.[15] In addition, transportation emissions would rise by 44% with the measures then in place to save energy and use renewable energy.[16]

Given the challenge to arrest the growth of CO2, the report contained both a long-term Climate Change Strategy and a Five Year Action Plan to implement the strategy. The Five Year Action Plan included recommendations for energy efficiency and renewable energy generally, actions in the utility and transportation sectors, offsets, measures for economic development and actions by local governments and federal actions.[17]

D. Carbon Dioxide Emission Siting Standard

One of the actions taken after this report was issued was the adoption of a new siting standard for large energy facilities. The 1997 Legislature passed House Bill 3283, which established the first carbon dioxide emission standard for power plants in the United States.[18] The legislation created a standard for emissions of carbon dioxide from new natural gas base load electric power plants. In addition, the Energy Facility Siting Council, which sites and regulates large energy facilities in Oregon, was authorized to establish standards for other fossil fuel power plants and to increase the stringency of the standards for natural gas plants and for other fossil fuel plants as technology improved.[19]

The current standard for a baseload natural gas power plant is a net maximum emissions rate of six hundred seventy-five one-thousandths of a pound of carbon dioxide per kilowatt hour (0.675 lb CO2/kwh).[20] The standard is designed 17% below the most efficient base-load gas plant currently operating in the United

14. OREGON DEPARTMENT OF ENERGY, REPORT ON REDUCING OREGON'S GREENHOUSE GAS EMISSIONS v (1995), *available at* http://www.oregon.gov/ENERGY/GBLWRM/docs/1995_Reducing_OR_GHG_Emissions.pdf.

15. *Id.*

16. *Id.*

17. *Id.* at vii-viii.

18. H.B. 3283, 69th Leg. Assemb., Reg. Sess. (Or. 1997).

19. OR. REV. STAT. § 469.503(2)(b) (2009).

20. *See Energy Facility Siting Standards*, OR. DEPT. OF ENERGY (July 8, 2010), http://www.oregon.gov/ENERGY/SITING/standards.shtml#Carbon_Dioxide_Emissions; *See also* OR. ADMIN. R. 345-024-0050 (2011) (current rules for the Or. CO2 standards).

States.[21] This provides an incentive to use the most efficient technologies available, including waste heat recovery, co-generation and other measures.

Failure to meet the standard requires the applicant to either directly undertake measures that will offset the amount of CO2 in excess of the standard or to make a payment of $1.27 per short ton of CO2 emissions in excess of the standard to the Oregon Climate Trust.[22] Payment to the Climate Trust relieves the applicant of further liability under the statute, even if the offset measures undertaken by the Climate Trust do not offset all the CO2 emitted in excess of the standard, whereas the owner who undertakes the measures directly must prove that the measures are effective in offsetting the CO2 emissions in excess of the standard.[23] All of the owners of energy facilities subject to this standard have chosen the "monetary path" rather than undertake offset measures directly.

The Climate Trust is a non-profit organization created by law to spend funding received under this provision to offset CO2 emissions.[24] Projects have included various measures for energy efficiency, renewable energy, cogeneration, transportation efficiency, reforestation, and other measures to reduce CO2.[25] The Climate Trust spent over $20 million on offset projects, with most of the funding from energy facilities subject to the CO2 emission standard.[26] The offset projects will save over 2.6 million metric tons over the life of the projects.[27]

Depending on the size of the power plant, under the current standard a natural gas plant pays between $5 million and $8 million, whereas a new coal plant pays substantially more. In fact, Oregon has seen no new coal plants since the Boardman coal plant was approved in 1975, whereas the Energy Facility Siting Council has approved eight natural gas facilities with more than 3,200

21. OR. ADMIN. R. 345-024-0570.

22. *Id.* at 345–024–0580, 345–024–0680(4).

23. *Id.* at 345–024–0560.

24. *History*, THE CLIMATE TRUST, http://www.climatetrust.org/history.html (last visited Mar. 29, 2011).

25. THE CLIMATE TRUST, 2009 ANNUAL REPORT 6–8 (2010), *available at* http://www.climatetrust.org/documents/CT_FINAL_web.pdf.

26. *Id.* at 8.

27. *Id.* at 6.

megawatts of energy, most of which were approved after the CO2 standard took effect.[28]

E. Advisory Group on Global Warming

In 2004 the Governor's Advisory Group on Global Warming issued the most comprehensive set of recommendations yet on Climate Change.[29] The broad–based group included nearly thirty high–level members from a wide variety of interests and was co–chaired by Dr. Jane Lubchenko, then a Distinguished Professor of Zoology and Marine Biology at Oregon State University, now the Administrator of the National Oceanic and Atmospheric Administration, and by Mark Dodson, then CEO of Northwest Natural, Oregon's largest natural gas utility.[30] Members included farmers, environmentalists, the faith community, businesses that use energy, utilities, scientists, local and state governments, and other stakeholders. The Advisory Group received the active support of multiple state agencies, including the Department of Energy, the Department of Environmental Quality, and the Public Utility Commission.

The Advisory Group unanimously passed a series of recommendations, over 790 in all, which covered a wide range of actions to reduce greenhouse gasses in the utility, transportation and other sectors. Among the most important recommendations were the following:

• Oregon should adopt cleaner automobile tailpipe emission standards,

• Increase the use of renewable energy statewide in Oregon, especially in state government,

• Oregon should establish the following greenhouse gas reduction goals:

° Arrest increased emissions and levelize emissions by 2010;

° Reduce greenhouse gasses to 10% below 1990 levels by the year 2020;

28. *Site Certificates, Energy Facility Siting*, OR. DEPT. OF ENERGY, (Dec. 29, 2010), http://www.oregon.gov/ENERGY/SITING/certificates.shtml.

29. *See* GOVERNOR'S ADVISORY GROUP ON GLOBAL WARMING, *supra* note 6.

30. *Id.* at *Introduction*.

° Reduce emission levels by 75% below 1990 levels by 2050.[31]

These goals were subsequently passed into law by the 2007 Legislature and are discussed below. The Advisory Group also endorsed the energy efficiency target set for Oregon by the Northwest Power and Conservation Council, which set a goal of 960 average megawatts of electricity savings by the year 2020 and comparable conservation of natural gas and oil.[32]

F. Renewable Energy Working Group

The Renewable Energy Working Group was another large stakeholder group, consisting of nearly 30 members from all interested sectors. The Renewable Energy Working Group issued a Final Report in April of 2005.[33] The Final Report recommended short and long term goals, legislation and administrative actions that could be taken to increase renewable energy development. The report focused on each of the renewable energy technologies. Its legislative recommendations became the basis for the major renewable energy legislative package that was passed in 2007. That package is discussed below.

G. Carbon Allocation Task Force

Two other citizen task forces contributed to Oregon's efforts to address climate change. The first was the Carbon Allocation Task Force. The focus of this group was on a cap–and–trade structure for Oregon. After much discussion, the Task Force focused on the electric utility sector, rather than a broader cap–and–trade program for all sectors. The Task Force examined a number of scenarios using a cap–and–trade system and concluded that a cap on greenhouse gas emissions was feasible. While electricity rates would likely rise, electricity bills would likely be reduced through increased energy efficiency and renewable energy.

Reflecting the complexity and controversial nature of the cap–and–trade issue were eight letters from members of the Task Force

31. *Id.* at ii, 8–9.

32. *Id.* at 57.

33. OREGON DEPARTMENT OF ENERGY, OREGON'S RENEWABLE ENERGY ACTION PLAN (Apr. 12, 2005), *available at* http://www.oregon.gov/ENERGY/RENEW/docs/FinalREAP.pdf.

explaining their positions or containing reservations to aspects of the Task Force's conclusions that accompanied the Task Force's final report.[34] The Task Force's work became the basis for cap–and–trade legislation proposed in both 2007 and in 2009, but which were not successfully passed in either session. Other legislation on carbon emissions was passed and is discussed below.

H. Climate Change Integration Group

The Climate Change Integration Group focused more broadly on climate change issues, as the successor to the Governor's Advisory Group on Global Warming. The Group was co–chaired by Dr. Mark Abbott, Dean of the College of Oceanic & Atmospheric Sciences, Oregon State University, and Ned Dempsey, President of Century West Engineering. Again, it was broadly based with more than twenty stakeholders, and it was provided technical support by more than ten state agencies. The Climate Change Integration Group met for nearly two years before issuing its final report of over 120 pages in January 2008.[35]

Whereas prior committees and working groups focused on the need for actions to reduce greenhouse gas emissions, the Climate Change Integration Group emphasized a number of immediate actions to respond to the effects of climate change. These included the following:

° begin preparing now for climate change;
° act now to expand mitigation efforts;
° determine how climate change will affect Oregon's regions;
° assist Oregonians to respond to climate change;
° incorporate the public health implications of climate change;

34. *See* Letter from David Stewart–Smith, Chairman, The Carbon Allocation Task Force (Jan. 9, 2007) *available at* http://www.oregon.gov/ENERGY/GBLWRM/docs/CATF_Rpt-to-Governor12-14-clean.pdf; Summary of the Median Proposal for an Or. Carbon Allocation Standard (Dec. 15, 2006) *available at* http://www.oregon.gov/ENERGY/GBLWRM /docs/CATF_Proposal.pdf; Memorandum from Hal. T. Nelson, Ph. D., Research Fellow, Portland State Univ., Cost and Design Considerations for Reducing Carbon Dioxide from Oregon's Power Sector: A Report to the Carbon Allocation Task Force (Dec. 2006) *available at* http://www.oregon.gov/ENERGY/GBLWRM/docs/CATF_Report-HalNelson-Final.pdf.

35. THE GOVERNOR'S CLIMATE CHANGE INTEGRATION GRP., FINAL REPORT TO THE GOVERNOR: A FRAMEWORK FOR ADDRESSING RAPID CLIMATE CHANGE (Or. 2008), *available at* http://www.oregon.gov/ENERGY/GBLWRM/CCIG.shtml.

° look for the economic development opportunities of climate change.[36]

III. OREGON'S ACTIONS TO REDUCE GREENHOUSE GASSES: STATE LEGISLATION ON CLIMATE CHANGE

The recommendations of the various reports have had significant impact on state legislation and on state agency actions. The 2007 Legislative Session passed a series of bills to directly address climate change and also passed measures to increase energy efficiency and renewable energy. Subsequent legislatures also passed important legislation.

A. 2007 Legislation

In 2007, the Legislature passed House Bill 3543 and House Bill 2272. House Bill 3543[37] codified the greenhouse gas reduction goals recommended by prior advisory committees. Oregon law now provides the following goals:

• by 2010, arrest the growth and begin to reduce greenhouse gas emissions,

• by 2020, reduce greenhouse gas levels 10% below 1990 levels, and

• by 2050 reduce greenhouse gasses 75% below 1990 levels.[38]

The 2020 goals are about double the reduction of the goals President Obama announced for the nation at Copenhagen a year ago, of 17% below 2005 levels.[39]

The bill also establishes a new Global Warming Commission. The Commission is a permanent body of 25 members and is patterned after the prior advisory committees and task forces. Eleven of the members are voting members from various professional disciplines and 14 are non–voting state agency directors and legislators, to provide technical expertise and support.[40] The Commission is given broad authority to monitor progress toward achieving the greenhouse gas reduction goals and

36. *E.g.*, *id.* at 7–10.

37. H.B. 3543, 74th Leg. Assemb., Reg. Sess., 2007 Or. Laws 907 (enrolled).

38. *See id.* § 2(1)(a)–(c).

39. President Barack Obama, Address at the Copenhagen Summit (Dec. 18, 2009) (transcript *available at* http://www.copenhagenclimatecouncil.com/get-informed/news/cop15-remarks-of-president-barack-obama.html.)

40. H.B. 3543, § 4.

must report every two years on Oregon's progress toward achieving those goals.[41]

While House Bill 3543 expressly provides that the greenhouse gas reduction goals by themselves give no added regulatory authority,[42] the bill does provide that the Global Warming Commission may recommend legislation, changes in rules, and other measures that can be taken to achieve those goals. The Commission is also responsible for developing an outreach strategy to educate Oregonians on the impacts of climate change and ways to reduce greenhouse gas emissions.[43]

House Bill 3543 also establishes the Oregon Climate Change Institute in the Oregon University System.[44] The Institute is housed at Oregon State University and is operated in cooperation with the other universities in the Oregon University System. The Institute is to facilitate research on climate change and its effects on Oregon, provide climate change information to the public, support the Global Warming Commission in developing strategies to prepare for and to mitigate the effects of climate change on Oregon and provide technical assistance to local governments to assist them in developing climate change policies and programs. The Institute must issue a report to the Legislature every two years on the state of climate change science as it relates to Oregon.[45]

The 2007 Legislature also passed House Bill 2272.[46] That bill provides that new vehicles, beginning with model year 2009, must comply with low emission standards of the Environmental Quality Commission in order to be registered.[47] In addition, the bill authorizes the Oregon Department of Transportation to deny registration to 2009 or later model year vehicles that do not comply with the new standards.[48] This bill provides additional enforcement for the tailpipe emissions rules for carbon dioxide that the Commission adopted in 2006, requiring that new vehicles meet

41. *See id.* § 14; *see also* OREGON GLOBAL WARMING COMMISSION, REPORT TO THE LEGISLATURE (2009), *available at* http://www.keeporegoncool.org/.

42. *See* H.B. 3543 §§ 2, 10.

43. *Id.* § 11.

44. *Id.* § 15.

45. *See id.* § 15.

46. H.B. 2272, 74th Leg. Assemb., Reg. Sess., 2007 Or. Laws 366 (enrolled).

47. *Id.* §1(8).

48. *See id.* § 1.

California's auto emission standards.[49] These standards are discussed below.

B. 2009 Legislation

House Bill 2186, Senate Bill 38, and Senate Bill 101, each related to climate change, were passed in 2009. The Legislature also considered, but did not pass, a cap–and–trade bill.

House Bill 2186[50] provides a number of measures to address vehicle emissions of greenhouse gasses. The bill directs the Department of Environmental Quality to study potential requirements regarding the maintenance or retrofitting of medium–duty and heavy–duty trucks in order to reduce aerodynamic drag and otherwise reduce greenhouse gas emissions.[51] The bill also authorizes the Commission to adopt requirements to prevent tampering with vehicle pollution control systems and requirements for motor vehicle service providers to check tire inflation.[52] The Commission may also adopt restrictions on engine use by commercial ships in port and impose requirements that ports provide cleaner power alternatives, such as electric power.[53]

House Bill 2186 also authorizes the Commission to adopt low carbon fuel standards for vehicle fuels to help meet the statutory greenhouse gas reduction targets.[54] Finally, the bill creates a Task Force to evaluate alternative land use and transportation scenarios that accommodate planned population and employment growth while achieving greenhouse gas emissions caused by motor vehicles.[55]

Senate Bill 38[56] imposes greenhouse gas reporting requirements on electric utilities and others who sell, import or distribute electricity that emits greenhouse gasses at its point of generation. The rules also apply to anyone who imports, sells or distributes fossil fuels that generate greenhouse gasses when

49. *Id.*; *see also,* OR. REV. STAT. § 468A.360 (adopting the California motor vehicle emissions standard).

50. H.B. 2186, 75th Leg. Assemb., Reg. Sess., 2009 Or. Laws 754 (enrolled).

51. *Id.* § 1(2)(a).

52. *Id.* § 1(2)(a).

53. *Id.* § 3.

54. *Id.* § 6.

55. *Id.* § 10(2)(a).

56. S.B. 38, 75th Leg. Assemb., Reg. Sess., 2009 Or. Laws 749 (enrolled).

combusted.[57] In addition to electric and natural gas utilities, the reporting requirements apply to suppliers of petroleum products and to certain industries including the producers of aluminum, ammonia, cement, glass, iron, steel, lead, lime, and petrochemicals, among others.[58]

Perhaps the most important bill for affecting long–term energy and CO2 emissions was Senate Bill 101.[59] That bill limits the emissions of greenhouse gasses from new power plants located in Oregon or serving Oregon load from out of state.[60] The bill requires that emissions from new power plants not exceed the greenhouse gas emissions of a modern natural gas power plant.[61] It also limits new contracts from existing power plants that fail to meet the emission limits.[62] This effectively restricts new coal plants from being built in Oregon or serving Oregon loads from out of state until and unless carbon sequestration for power plants becomes commercially viable and cost-effective.[63]

The United States Department of Energy's National Energy Technology Laboratory, which is leading the United States carbon sequestration research efforts, estimates that carbon sequestration is at least a decade away.[64] Others believe that carbon sequestration could take much longer, if sequestration proves viable at all, because of the complex issues and environmental impacts posed by large–scale sequestration for power plants.[65]

57. *Id.* § 2(1)(b).

58. For more details on the rules and other reporting requirements of Senate Bill 38 adopted by the Department of Environmental Quality *see* http://www.deq.state.or.us/aq/climate/reporting.htm.

59. S.B. 101, 75th Leg. Assemb.. Reg. Sess., 2009 Or. Laws 751 (enrolled).

60. *Id.*

61. *Id.*

62. *Id.*

63. *See id.*

64. *See Technologies: Carbon Sequestration*, U.S. DEP'T OF ENERGY, http://www.netl.doe.gov/technologies/carbon_seq/index.html (last visited March 23, 2011) (information on the federal government's efforts to develop carbon sequestration for power plants through geologic storage and other technologies).

65. *See e.g.*, Michael Graham Richard, *Important! Why Carbon Sequestration Won't Help Us* (July 31, 2006), http://www.treehugger.com/files/2006/07/carbon_sequestration.php; *Coal Power in a Warming World*, UNION OF CONCERNED SCIENTISTS, http://www.ucsusa.org/clean_energy/technology_and_impacts/energy_technologies/coal-power-in-a-warming-world.html (last revised Oct. 1, 2008) (general discussion of carbon sequestration efforts); *In Brief: Update on the 10-50 Solution: Progress Toward a Low-Carbon Future*, PEW CENTER ON GLOBAL CLIMATE CHANGE, 5–7 (Jan. 2010), http://www.pewclimate.org/docUploads/10-50-brief-update.pdf.

Senate Bill 101 precludes reliance on new coal plants in Oregon's foreseeable future. With great uncertainty about the cost and time it will take to make carbon sequestration commercially viable, Oregon's future load growth must be met either by natural gas or renewable resources.[66] Senate Bill 101, combined with the mandates of the Renewable Portfolio Standard, passed in 2007, put increasing pressure on electric utilities to acquire more renewable energy to serve their growing energy loads.

In 2009, the Legislature also considered, but did not pass, Senate Bill 80.[67] Senate Bill 80 would have directed the Environmental Quality Commission to adopt by rule a cap–and–trade system by January 1, 2011 to achieve the State's greenhouse gas reduction goals.[68] The cap–and–trade system would have applied to all energy facilities subject to the jurisdiction of the Energy Facility Siting Council.[69] These include most electric power plants 25 megawatts or larger, most natural gas storage facilities and pipelines, and other large energy facilities.[70]

The bill included the authority for the Commission to set registration and reporting requirements and to establish fees to fund the program. The bill authorized creation of a Climate Improvement Fund for measures to reduce or mitigate greenhouse gas emissions. Senate Bill 80 also provided that if a federal cap–and–trade system were adopted the Commission could suspend the cap–and–trade system. To make such a suspension the Commission must determine that the federal system either reduces greenhouse gasses as much as Oregon's system or allows the State to implement additional programs to achieve those goals.

Senate Bill 80 met significant opposition from utilities and other industries because of potential cost impacts, especially with Oregon acting in the absence of a federal system. Concerns were raised about the cost to businesses and to ratepayers generally and

66. *See* OR. REV. STAT. § 469.595 (2009) (new nuclear power plants are not an option under Oregon law until the Energy Facility Siting Council finds that an adequate repository for the disposal of high level radioactive waste has been licensed to operate by the federal government); OR. REV. STAT. § 469.597 (2009) (determination must also be ratified by a vote of the people).

67. S.B. 80, 75th Leg. Assemb., Reg. Sess. (Or. 2009) (a-engrossed).

68. *See id.*

69. *See id.*

70. *See generally* OR. REV. STAT. § 469.300 (2009) (complete definition of energy facilities subject to the Siting Council's jurisdiction and would have been subject to the Cap & Trade requirements of Senate Bill 80).

about the competitive disadvantage Oregon would have had with other states that did not impose a cap–and–trade system. Senate Bill 80 did pass the Senate Environment & Natural Resources Committee in an amended form. The amendments replaced the cap–and–trade system with a number of provisions imposed on state agencies and the Global Warming Commission to coordinate state agency policies and actions in response to climate change.[71] Senate Bill 80 failed to pass the Joint Ways & Means Committee when the Legislature adjourned.

C. 2010 Legislation

The 2010 Legislature passed Senate Bill 1059,[72] which directs the Oregon Transportation Commission to adopt a statewide transportation strategy on greenhouse gas emissions to aid in achieving the statutory greenhouse gas reduction goals.[73] The bill also directs the Land Conservation & Development Commission to adopt rules to reduce vehicle greenhouse emission targets for each region served by a metropolitan planning organization.[74] The bill directs the two agencies to coordinate their efforts[75] and provides for the involvement and assistance of the Department of Energy and Department of Environmental Quality.[76]

IV. OREGON'S ACTIONS TO REDUCE GREENHOUSE GASSES: STATE ENERGY LEGISLATION

Recent legislatures passed a number of important bills to increase renewable energy and energy efficiency. While they were passed primarily for energy policy reasons, these bills directly impact the reduction of greenhouse gasses released in the energy sector.

71. *Compare* S.B. 80, 75th Leg. Assemb., Reg. Sess. (Or. 2009*) available at* http://www.leg.state.or.us/09reg/measpdf/sb0001.dir/sb0080.intro.pdf (as introduced*), with* S.B. 80, 75th Leg. Assemb., Reg. Sess. (Or. 2009*) available at* http://www.leg.state.or.us /09reg/measpdf/sb0001.dir/sb0080.a.pdf (A-Engrossed).

72. S.B. 1059, 75th Leg., Assemb., Spec., 2010 Or. Laws 85 (enrolled).

73. *Id.* § 2.

74. *Id.* § 5.

75. *See id.* §§ 3–6, 8–9.

76. *See id*. § 5.

A. 2007 Legislation

In 2007 the Legislature passed three major bills. These included creation of a Renewable Portfolio Standard, Senate Bill 838; major changes to two important tax credit programs for individuals and businesses, House Bill 3201; and a major biofuels package, House Bill 2210.

Senate Bill 838 establishes a Renewable Portfolio Standard (RPS) for all of Oregon's electric utilities.[77] Oregon's three largest electric utilities, Portland General Electric (PGE), Pacificorp and the Eugene Water & Electric Board (EWEB), must meet 25% of their electric load with qualifying renewable energy by the year 2025.[78] There are interim targets of 5% by 2011, 15% by 2015 and 20% by 2020.[79] The effect of this standard is to require that virtually all of the electric load growth of these utilities must be met by renewable energy. These utilities represent about 80% of Oregon's electric load.

Smaller electric utilities, mostly publicly–owned utilities, including municipal utilities, peoples' utility districts (PUDs), and rural electric cooperatives, must meet either 10% or 5% of their electric load with qualifying renewable energy by 2025.[80] The lower standard for Oregon's smaller utilities reflects two considerations: first, that most of these utilities acquire most or all of their power from the Bonneville Power Administration and have limited ability to acquire their own resources; second, that most of the resources provided to these utilities historically consisted of hydroelectric power, which is one of the eligible forms of renewable energy for compliance with the standard.[81]

The bill provides that qualifying renewable resources include wind, solar, wave/tidal, geothermal, biomass, and certain hydroelectric resources that meet environmental certification.[82] The Oregon Department of Energy may approve other energy sources not listed in the statute, so long as they do not involve

77. S.B. 838, 74th Leg. Assemb., Reg. Sess., 2007 Or. Laws 301 (enrolled).

78. *Id.* § 6(1).

79. *Id.*

80. *Id.* § 7.

81. *See id.* § 2 (acknowledging hydroelectric energy as a qualifying resource and designating power certified by the Bonneville Power Administration as meeting the standard).

82. *Id.* § 4.

petroleum, natural gas, coal, or nuclear fission.[83] A cost cap assures that the Renewable Portfolio Standard does not cause undue economic harm on utility ratepayers. The bill does not require electric utilities to comply with the standard in a year where the incremental cost of compliance with the standard would exceed 4% of the utility's annual revenue requirement for that year.[84]

Additionally, the bill provides for cost recovery in rates to comply with the standard,[85] creation of Renewable Energy Certificates (RECs) to determine compliance with the standard,[86] and requiring annual compliance reports by the utilities.[87] Senate Bill 838 also establishes a path of alternative compliance payments for a utility that cannot meet the targets; the compliance payments must be used for renewable energy or energy efficiency.[88]

Finally, the bill amends Oregon's public purpose charge by imposing a 3% public purpose charge on Oregon's investor-owned electric utilities to fund energy efficiency and renewable energy.[89] Senate Bill 838 provides that the renewable energy portion of that charge must focus exclusively on projects that are twenty megawatts or less in size. The bill also extends the expiration date of the public purpose charge from January 1, 2012 to January 1, 2026.[90]

The Oregon House made important changes to two popular tax credit programs in House Bill 3201.[91] Those changes were to the Business Energy Tax Credit (BETC) and the Residential Energy Tax Credit (RETC).[92] The changes to each program were introduced as separate bills, House Bill 2211 for the BETC, and House Bill 2212 for the RETC. However, the changes to both programs were combined into one bill with other tax code changes, House Bill 3201, at the end of the Legislative Session.

83. *Id.*
84. *Id.* § 12.
85. *Id.* § 13.
86. *See id.* §§ 14–18.
87. *Id.* § 19.
88. *See id.*§§ 20–22.
89. *See* OR. REV. STAT. § 757.612 (2009).
90. S.B. 838 § 27.
91. H.B. 3201, 74th Leg. Assemb., Reg. Sess., 2007 Or. Laws 843 (enrolled).
92. *Id.*

House Bill 3201 makes the following changes in the Business Energy Tax Credit:

• increases the percentage of eligible cost for the credit from 35% to 50 %;[93]

• increases the eligible cost from $10 million to $20 million per project;[94]

• provides that renewable manufacturing plants are eligible for the increased tax credit.[95]

The changes to the Business Energy Tax Credit tripled the amount of the credit, from a maximum credit of $3.5 million to a maximum credit of $10 million.[96] These changes and the changes making renewable manufacturing facilities eligible for the credit had a dramatic impact on the pace of renewable energy development in Oregon, as will be discussed below.

House Bill 3201 makes the following changes to the Residential Energy Tax Credit:

• increases the amount of the tax credit for wind and fuel cells to be equal to solar energy, from $1,500 to a maximum of $6,000 over four years;[97]

• allows individuals to receive separate tax credits for more than one solar device in the same year, such as a system for hot water heating and a PV system to generate electricity; individuals can also receive separate tax credits for multiple qualifying energy–efficient appliances acquired in the same year;[98]

• makes high efficiency wood stoves eligible for the tax credit.[99]

The Legislature also passed House Bill 2210, a comprehensive biofuels bill that helps address greenhouse gasses in the transportation sector.[100] A number of factors led to support

93. *Id.* § 14.
94. *Id.* § 17.
95. *Id.* § 14.
96. *Id.* § 14(4)(a).
97. *See id.* § 28.
98. *See id.* § 29.
99. *See id.* § 32.
100. H.B. 2210, 74th Leg. Assemb., Gen. Sess., 2007 Or. Laws 739 (enrolled).

of the bill, including environmental, energy, farming and business reasons.[101] Among other provisions, the bill includes the following:

• establishes a new tax credit for producers and collectors of biofuel raw materials;[102]

• expands the use of property tax exemptions for biofuels through "rural renewable energy development zones;"[103]

establishes a Renewable Fuel Standard for biodiesel that requires all diesel fuel sold in Oregon to contain either 2% (B–2) or 5% (B–5) of diesel fuel sold in Oregon, based on the production level of biodiesel in Oregon, Washington, Idaho and Montana;[104]

• establishes a Renewable Fuel Standard for ethanol: all gasoline sold in Oregon must be at least 10% ethanol when production capacity in Oregon is at least 40 million gallons;[105]

• prohibits use of certain fuel additives, including methyl tertiary butyl ether (MTBE);[106]

• creates an income tax credit for consumer use of biofuel;[107]

• modifies the criteria for exemption from certain energy facility siting requirements for ethanol and biodiesel production facilities to preclude coal–fired facilities from the exemption by imposing a carbon dioxide emission standard;[108] and

• allows farm biofuel production facilities which meet certain criteria to be sited on land zoned for exclusive farm use (EFU).[109]

The 2007 Legislature also passed nearly twenty other bills to discourage the increased use of fossil fuels and to encourage increased energy efficiency and renewable energy including the following:

• Senate Bill 790, which prohibits offshore leasing for any form of exploration, development or production of oil, natural gas

101. *See generally*, Besty Hammond, *Biofuel Gets Green Light From Senate Panel*, THE OREGONIAN, June 19, 2007, http://blog.oregonlive.com/politics/2007/06/biofuel_bill_gets_ green _light.html.

102. *Id.* §§ 1–8b.

103. *See id.* §§ 9–9a.

104. *Id.* §§ 11–16.

105. *Id.* §§ 17–19.

106. *Id.* §§ 20–24.

107. *Id.* §§ 26–32.

108. *Id.* § 33.

109. *Id.*§§ 34 – 38.

or sulfur.[110] The ban was subsequently extended by the 2010 Special Session through the year 2020;[111]

• Senate Bill 375[112] and House Bill 2565,[113] which establish energy efficiency standards for certain appliances, lighting fixtures and other electrical equipment based on California's stringent energy efficiency standards;

• House Bill 2620, which requires that all new or renovated public buildings must devote at least 1.5% of the cost of the building to solar energy technologies if the building receives any state funds;[114]

• House Bill 3488, which expands the property tax exemption for the value of solar energy systems for residential property to apply to commercial property and authorizes the Public Utility Commission to establish tariffs and rules to further encourage investor–owned utilities to invest in renewable energy beyond what is provided by utilities through the public purpose charge.[115]

B. 2008 Legislation

Two important energy–related bills were passed in the Special Session in 2008, House Bill 3612 and House Bill 3619. House Bill 3612 authorizes state agencies to enter into energy savings performance contracts for energy efficiency and renewable energy improvements in state buildings, subject to standards established by the Oregon Department of Energy.[116] Energy savings performance contracts, commonly offered by energy service companies, known as ESCOs, are a valuable tool for customers to invest in energy efficiency and renewable energy with little or no upfront costs. Instead, the ESCO carries most or all of the cost and is paid back over time by the customer.

However, prior to 2008 it was unclear whether state agencies had the authority to enter into such contracts. House Bill 3612 provides clear authority for state agencies to enter into these contracts. This is important because the governmental sector is a

110. S.B. 790, 74th Leg. Assemb., Reg. Sess. 2007 Or. Laws 521(enrolled).
111. H.B. 3613, 75th Leg. Assemb., Spec. Sess., 2010 Or. Laws 11 (enrolled).
112. S.B. 375, 74th Leg. Assemb., Reg. Sess., 2007 Or. Laws 649 (enrolled).
113. H.B. 2565, 74th Leg. Assemb., Reg. Sess., 2007 Or. Laws 375 (enrolled).
114. H.B. 2620, 74th Leg. Assemb., Reg. Sess., 2007 Or. Laws 310 (enrolled).
115. H.B. 3488, 74th Leg. Assemb., Reg. Sess., 2007 Or. Laws 885 (enrolled).
116. H.B. 3612, 74th Leg. Assemb., Spec. Sess. §3 (Or. 2008).

significant user of energy. Reducing state agency energy consumption can reduce state agency expenses, saving taxpayer dollars.

For example, by the end of 2005 under a program run for five years by the Oregon Department of Energy, nearly 100 buildings had been built or renovated with energy efficiency measures beyond those required by code. Average energy savings exceeded 20% better than the energy building code, resulting in a savings of $3 million a year.[117]

There are thousands of state buildings, including those of the state universities, state agencies, state prisons and other state facilities. House Bill 3612 is an important tool in reducing state agency use of fossil fuels.

The 2008 Legislature also passed House Bill 3619.[118] This bill increased the Business Energy Tax Credit for manufacturing facilities that produce renewable energy components, such as solar cells, wind turbines and other equipment.[119] The amount of eligible cost was increased from 35% to 50%; this doubled the maximum amount of tax credit each manufacturing facility could receive, up to $20 million.[120] The bill also imposed standards that must be met, including the number of jobs created, financial viability of the applicant and other economic standards to assure that the state receives economic benefit for the large amount of state tax credit provided.[121] This bill was an important tool in the effort to expand solar manufacturing in Oregon, discussed below.

C. 2009 Legislation

The 2009 Legislature built on the foundation of the 2007 and 2008 Legislatures in three areas, energy building codes, residential weatherization, and solar energy.

Senate Bill 79 directs the Department of Consumer & Business Services to adopt by the year 2012 updated building codes which save 10–15% more energy than residential buildings

117. OREGON DEP'T OF ENERGY, STATE OF OREGON ENERGY PLAN 2007–09 55 (Mar. 2008) [hereinafter *Energy Plan*] *available at* http://www.oregon.gov/ENERGY /docs/ EnergyPlan07-09.pdf.

118. H.B. 3619, 74th Leg. Assemb., Spec. Sess., 2008 Or. Laws 29 (enrolled).

119. *Id.* § 2.

120. *Id.*

121. *Id.* § 1.

using the current code and which save 15–25% more energy than commercial buildings.[122] The bill also directs the adoption of an optional "Reach Code" to maximize achievable energy efficiency, and that the residential and commercial building codes be periodically upgraded to achieve as much energy savings as economically practical.[123]

House Bill 2626 establishes a major initiative for weatherizing existing homes. It uses existing delivery vehicles, including the Department of Energy's Small Scale Energy Loan Program and the Energy Trust of Oregon, combined with utility on–bill financing for funding the program.[124]

Finally, the Legislature established one of the first statewide feed–in tariffs in the country for solar photovoltaic systems in House Bill 3039.[125] The feed–in tariff provides a guaranteed payment to utility customers installing solar energy on their homes and commercial buildings. House Bill 3039 provides that these payments run for 15 years.[126] The program is a pilot program and is limited in scope.

V. OREGON'S ACTIONS TO LIMIT GREENHOUSE GASSES: STATE VEHICLE EMISSION STANDARDS

As noted before, in Oregon the largest causes of greenhouse gasses come from two sources in almost equal amounts, vehicles and electric power plants, each with about 40% of Oregon's carbon dioxide emissions.[127] The Oregon Environmental Quality Commission in December of 2005 adopted California's low carbon emission standards for light and medium duty vehicles through temporary rules.[128] These standards are substantially more stringent than current federal standards.[129] The rules were made permanent in June of 2006. The new requirements take effect with the 2009 model year.

122. S.B. 79, 75th Leg. Assemb., Reg. Sess. § 9, 2009 Or. Laws 750 (enrolled).

123. *Id.* § 7.

124. H.B. 2626, 75th Leg. Assemb., Reg. Sess., 2009 Or. Laws 753 (enrolled).

125. H.B. 3039, 75th Leg. Assemb., Reg. Sess., 2009 Or. Laws 748 (enrolled).

126. *Id.* § 2.

127. *See* GOVERNOR'S ADVISORY GROUP ON GLOBAL WARMING, *supra* note 6.

128. Or. Envtl. Quality Comm'n Minutes of the 329th Meeting (Dec. 2005), http://www.deq.state.or.us/about/eqc/minutes/2005/2005decEQCMinutes.htm.

129. *Compare* 42 U.S.C. § 7521(b) *with* CAL. CODE REGS. tit. 13, § 1960.1(2010).

The new standards reduce greenhouse gas emissions and also reduce other environmental pollutants. The Oregon Department of Environmental Quality (DEQ), which urged its Commission to adopt these rules, estimates that these standards reduce greenhouse gasses for new vehicles by 30% by the year 2016, reduce smog–forming emissions by12% to 33% by 2020 and reduce hazardous pollutants by 22% to 38% by 2020.[130] DEQ recognizes that the new standards increase the cost of new vehicles by up to $1,200 in 2016.[131] However, the standards save consumers money through reduced fuel and other operating costs, because the vehicles must be more efficient to meet them.[132]

VI. OREGON'S ACTIONS TO LIMIT GREENHOUSE GASSES: THE IMPACT OF STATE PROGRAMS TO SAVE ENERGY AND TO DEVELOP RENEWABLE ENERGY

Energy efficiency and renewable energy are essential to meet Oregon's greenhouse gas reduction goals. Some of Oregon's programs to save energy and develop renewable energy have been in effect for many years. Others were given a strong boost by the changes listed above made by recent Legislatures. This section highlights some of Oregon's successes and gages the overall impact of the efforts to promote energy efficiency and renewable energy.

A. Energy Efficiency

Oregon has a public purpose charge of 3% of the gross operating revenues of the large utilities[133] which raises over $100 million yearly. Twelve percent of the funds go to the Department of Housing and Community Services for low–income weatherization; 5% goes to energy–efficient housing; 10% goes to schools for energy saving measures.[134] The remainder, about $80 million each year, is spent by the Energy Trust of Oregon, a non–

130. OR. DEPT. OF ENVTL. QUALITY, FACT SHEET, OR. LOW EMISSION VEHICLES, DEQ NO. 05-AQ-001 (2007).

131. *Id.*

132. *See generally Air Quality: Low Emission Vehicle Info*, OR. DEP'T. OF ENV'T QUALITY, http://www.deq.state.or.us/aq/orlev/index.htm (last visited Apr. 6, 2011).

133. OR. REV. STAT. §757.612(2)(a) (2010).

134. *Id.*.

profit organization.[135] The Energy Trust uses these funds for investments in energy savings in homes, businesses and industry.[136]

Oregon businesses have invested heavily in energy efficiency with the help of the state Business Energy Tax Credit run by the Oregon Department of Energy. The tax credit is 35% of eligible costs for energy efficiency and 50% of eligible costs for renewable energy.[137] There is a $10 million limit for project costs for energy efficiency and $20 million for renewable energy.[138] The tax credit is transferable for all energy projects, so that the credit can be used by non-profits, local housing authorities and others involved in low–income housing and other energy projects.[139] Sixteen thousand Oregon businesses have invested over $1.6 billion in energy savings measures with the help of the tax credit; they are saving $500 million a year in energy costs.[140]

The State also offers a tax credit to homeowners and renters for energy–saving appliances, like dishwashers, clothes washers and refrigerators.[141] The tax credit helps residents buy more than 200,000 energy-efficient appliances.[142] Besides saving energy, they are saving millions of gallons of water each year.[143]

Oregon has some of the strongest energy codes in the country. The residential code is saving homeowners over $160 million a year in energy costs; the commercial code is saving businesses over $120 million more.[144]

Oregon also requires its own buildings to exceed state building codes. Since 2001 new state buildings and major renovations must be designed to save 20% more energy than

135. *See, e.g.,* Energy Trust of Oregon, *Energy Trust of Oregon Annual Report,* Apr. 2009, at 7.

136. *See generally* ENERGY TRUST OF OREGON http://energytrust.org/ (last visited Apr. 6, 2011) (provides more information on how the public purpose funds are spent).

137. *Energy Plan, supra* note 117, at 51.

138. *Id.* at 40.72.

139. *Id.* at 51–52.

140. *See id.* at 51–64.

141. *Id.* at 53.

142. *Id.*

143. *Energy Plan, supra* note 117 at 52–53.

144. *Id.* at 55.

required by the building code.[145] One hundred state buildings built or renovated since then save $3 million annually.[146]

B. Renewable Energy

There is considerable renewable energy development as well. Using state tax credits, 20,000 individuals have installed more than $90 million worth of solar systems on their homes.[147] The Oregon Department of Energy's Small Scale Energy Loan Program provides low interest loans for renewable energy.[148] The program has issued over $400 million in loans, yielding nearly $100 million a year in energy savings.[149]

Over 2,000 megawatts of wind generation are now operating in Oregon.[150] Two thousand megawatts more are under construction.[151] One of these is the 900 megawatt Shepherd's Flat, the largest wind farm in the entire world.[152] Another 2,000 megawatts are under review and more are pending.[153] These produce as much energy as six fossil fuel plants, even factoring in wind's intermittent nature. That means the impacts on air, water, and greenhouse gasses of six fossil fuel plants have been avoided. Oregon is fourth in terms of operating wind farm capacity in the United States.[154]

Oregon has significant investment in other renewables. Biomass plants produce energy and help reduce forest fire danger by removing excess, decaying material from the forests. Oregon's biomass plants provide industrial heat and produce 340 megawatts

145. *Id.*

146. *Id.*

147. *Id*. at 52–53.

148. OREGON DEPARTMENT OF ENERGY: STATE ENERGY LOAN PROGRAM (SELP), *available at* http://www.oregon.gov/ENERGY/LOANS/selphm.shtml (2011).

149. *Id*. at 57–58.

150. For a list of wind projects operating and under construction see OREGON DEP'T OF ENERGY, SITE CERTIFICATES (2010), *available at* www.oregon.gov/ENERGY/SITING/certificates.shtml.

151. *Id.*

152. *Energy Plan*, *supra* note 117, at 59; Andrew Couts, *Google Invests $100 Million in World's Largest Wind Farm Project*, DIGITAL TRENDS (Apr. 19, 2011).

153. For a list of wind projects under review see OREGON DEP'T OF ENERGY, ENERGY FACILITIES UNDER REVIEW (2011), *available at* http://www.oregon.gov/ENERGY/SITING/review.shtml.

154. American Wind Energy Ass'n, *Third Quarter 2010 Market Report*, at 5 (Oct. 2010), http://www.awea.org/_cs_upload/learnabout/publications/5084_1.pdf.

of electricity, as much energy as another fossil fuel plant. Four sites in Oregon under review for geothermal energy may yield over 200 megawatts.[155]

Oregon also has the largest number of sites in the country under review for wave energy. While a number of issues must be resolved, the potential is huge. Estimates of the potential energy from Oregon's coast have ranged from 500 megawatts up to 5,000 megawatts–as much energy as Oregon's current load.[156] Oregon's two large utilities, Pacificorp and Portland General Electric, are consistently among the top investor–owned utilities every year in green power sales.[157]

C. Economic Benefits

Oregonians spend over $14 billion on energy a year.[158] Half of that figure is for oil.[159] This money goes out of state and much of it goes out of the country.[160] However, our energy bills would be at least $1 billion higher if Oregonians had not taken these measures to save energy and use renewable energy.[161] That is $1 billion staying in the local communities and helping to build the state's economy.

Renewable energy creates other economic benefits. Wind farms in the four Pacific Northwest states, half of which are in Oregon, have generated over $6 billion of capital investment in rural counties.[162] These are counties with high unemployment rates where the economy has been especially hard hit during the

155. *Testimony before the H. Comm. On Energy & Env't*, 2008 Leg., 74th Sess. (Or. 2008) (statement by Or. Dep't of Energy).

156. Michael W. Grainey, Remarks at 3rd Annual Global Marine Renewable Energy Conference, in Seattle, Wa. (Apr. 14–15, 2010).

157. *Energy Plan*, *supra* note 117, at 10, 51. States that in 2007 Oregonians spent nearly $10 billion on energy annually and saved $733 million in higher energy bills through energy savings efforts. The numbers have since risen in 2010 to $14 billion spend annually and $1 billion in savings. Telephone Interview with Diana Enright, Assistant Director of Oregon Dep't of Energy (Oct. 20, 2010).

158. *Energy Plan*,*supra* note 117, at 10.

159. *Id.*

160. *See id.* at 11.

161. Telephone Interview with Diana Enright, Assistant Director of Oregon Dep't of Energy (Oct. 20, 2010).

162. RENEWABLE NORTHWEST PROJECT, RENEWABLE ENERGY & ECONOMIC DEVELOPMENT: REAL EXAMPLES FROM THE PACIFIC NORTHWEST 2 (Aug. 27, 2010), *available at* http://www.rnp.org/sites/default/files/pdfs/NW%20Econ%20Dev%20Factsheet%2010Aug27.pdf.

recent recession. Wind farms have created 6,000 construction jobs in the region and over 400 permanent family–wage operation and maintenance jobs.[163] They also provide over $17 million in royalty payments to landowners and $30 million yearly in taxes.[164]

Wind has also brought benefits to urban areas. The region's many wind farms have attracted the US Headquarters of two international wind developers, Iberdrola and Vestas, resulting in nearly a thousand jobs in the Portland area. Vestas is beginning a major expansion in Portland, with hundreds more jobs expected.[165] Iberdrola is also looking for a larger building in Portland to consolidate its existing employees and to have space for future expansion.[166]

Oregon is one of the top states for solar energy, especially for solar energy manufacturing. Oregon's solar and fuel cell manufacturing plants are creating hundreds of jobs, utilizing our well–trained high–tech workforce.[167] SolarWorld, Sanyo, and other major solar manufacturers have located in Oregon. Nearly 1,000 employees are working in solar manufacturing plants, and the number of employees will double to 2,000 by 2012, with additional companies and planned expansions.[168]

Electric car and battery manufacturers may provide hundreds of additional jobs. Biomass energy creates many jobs in the collection of wood and agricultural waste and the shipment of those materials to energy facilities. Wave energy developers have indicated that if they develop energy facilities off the Oregon coast, they will likely build manufacturing plants here, because the size and weight of the equipment make shipping difficult.[169]

163. *Id.*

164. *Id.*

165. Erik Siemers, *Vestas Keeps HQ in Portland, Moving to the Pearl*, PORTLAND BUSINESS JOURNAL (Aug. 18, 2010, 10:07 AM), http://www.bizjournals.com/portland/stories/2010/08/16/daily22.html; *see also* Vestas Americas, *Vestas to Move North American Headquarters to Historic Meier & Frank Depot Building in 2012* http://www.vestas.com/en/media/news.aspx?M=News&PID=72165&NewsID=2363 (last visited Mar. 23, 2011).

166. Jeff Manning, *New downtown Portland office towers pitched to meet rising demand*, THE OREGONIAN (Nov. 3, 2010, 8:22 PM), *available at* http://www.oregonlive.com/business/index.ssf/2010/11/new_downtown_portland_office_t.html.

167. TEAM OREGON, GREENLIGHT GREATER PORTLAND'S SOLAR ENERGY BROCHURE (June 2010), *available at* http://www.oregon4biz.com/teamoregon/materials/GGP-solar_6-2010.pdf.

168. *See Solar Manufacturers in Oregon* ,Oct. 1, 2010 (on file with author).

169. *Energy Plan*, *supra* note 117, at 9.

Energy efficiency and renewable energy have created many jobs in Oregon and are an engine of our economic recovery. A Pew Charitable Trusts report states that Oregon has created over 19,000 jobs in green energy and is the #1 state per capita in clean energy jobs.[170]

However, Oregon is not alone in this effort. The Pew study also indicated that green jobs grew faster than the economy as a whole in 38 states in the last ten years.[171] Every part of the country has renewable energy of one kind or another. All states can benefit from a green economy by keeping more people employed and creating new jobs.

Oregon's two tax credit programs, the Business Energy Tax Credit and the Residential Energy Tax Credit, have been particularly important in the state's progress on renewable energy and also for economic development. A 2009 study produced for the Oregon Department of Energy by the independent consulting firm ECONorthwest reported that the two tax credits helped Oregonians reduce energy costs by nearly $300 million in 2007 and 2008, the last years for which data was available; savings continue to accrue in subsequent years from the measures installed.[172]

The tax credits also delivered nearly a 3–to–1 return on the state's investment during that time, creating more than $616 million in economic investments and wages, and more than 1,700 jobs in the same two years.[173] The taxes created by the energy projects through increased productivity from energy efficiency projects, new revenues from renewable energy projects, and revenues from sale of energy equipment created a net revenue *increase* of $22 million in the same time period for state and local governments, after taking into account the cost of the tax credits.[174]

170. PEW CHARITABLE TRUSTS, THE CLEAN ENERGY ECONOMY: REPOWERING JOBS, BUSINESSES AND INVESTMENTS ACROSS AMERICA 32 (June 2009), *available at* http://www.pewcenteronthestates.org/uploadedFiles/Clean_Economy_Report_Web.pdf.

171. *Id.* at 4.

172. ECONORTHWEST, ECONOMIC IMPACTS OF OREGON ENERGY TAX CREDIT PROGRAMS IN 2007 AND 2008 (BETC/RETC) FINAL REPORT 36 (Feb. 2, 2009), *available at* http://www.oregon.gov/ENERGY/CONS/docs/BETC_RETC_Impacts-020209_FINAL.pdf?ga=t.

173. *Id.* at 32–33.

174. *See id.*; *See also* Renewable Northwest Project, *Powering Our Future, Creating Jobs*, (last visited Mar. 23, 2011); *see also supra* note 156.

However, both programs are scheduled to sunset at the end of 2011, because of concern about the potential impacts of revenues foregone by the tax credits, especially the Business Energy Tax Credit,[175] in spite of the tax revenues produced by the increased economic activity from these projects. Oregon's efforts to meet the Oregon targets to reduce greenhouse gasses through increasing reliance on renewable energy and energy efficiency are much more difficult if these important programs are not continued.

VI. PROGRESS IN MEETING OREGON'S GREENHOUSE GAS REDUCTION GOALS

Oregon is making some progress in achieving the benchmarks and targets of CO2 reduction standard contained in state law. But the course has not been steady or easy, in spite of the programs and efforts listed above. For example, Oregon's per capita emissions declined each year from 2000 to 2003, then increased in 2004 and 2005.[176] Total emissions increased each year, in part because of the growth in population.[177] As noted earlier, because of the difficulty in achieving progress in reducing CO2 emissions, the benchmark was later revised to 106% of 1990 levels.[178]

The Global Warming Commission has found that progress is being made in achieving the 2010 goal of arresting the growth of greenhouse gas emissions. However, the Commission does not believe that the State is on pace to meet the 2020 goal of 10% below 1990 levels.[179] The Commission has recommended a series of actions in utility, transportation, agricultural, and other sectors as well as increasing efforts for energy efficiency and renewable energy to reduce greenhouse gasses.[180] The Commission recently

175. H.B. 2009, 75th Leg. Assemb., Reg. Sess., 2009 Or. Laws 913 §§ 12, 13, 15 (enrolled) (relating to sunset of tax credits).

176. 2007–2008 OR. DEP'T OF ENERGY ANNUAL PERFORMANCE PROGRESS REP.BIENNIAL REP. at 25 (2008) *available at* http://www.oregon.gov/DAS/OPB/docs/APPR08/ Energy.pdf?ga=t.

177. *Id.*

178. *See supra* note 11 and accompanying text.

179. OR. GLOBING WARMING COMM., REP. TO THE LEG. 17 (Jan. 2009), *available at* http://www.oregon.gov/ENERGY/GBLWRM/GWC/docs/OGWC_2009Leg_Report.pdf.

180. *Id.* at 23–36.

adopted a nearly two hundred page interim roadmap to 2020 with additional recommendations and choices to meet the 2020 goals.[181]

The Commission expects to refine the roadmap further over time based on public input and on further analysis of the proposed actions.[182] While the primary focus of the Commission's roadmap currently focuses on reducing carbon dioxide, which is the most common greenhouse gas, the statutory goals apply to the reduction of all greenhouse gasses. As the Commission continues its work, it will likely focus on other greenhouse gasses. For example, the Commission indicates that the reason it does not include other greenhouse gasses including methane, nitrous oxides, and other greenhouse gasses because less is known about the costs and reduction strategies for those emissions.[183]

VII. REGIONAL ACTIONS AND POTENTIAL FEDERAL ACTION

Oregon began working on a regional basis with the States of California and Washington on Climate Change issues in 2003. The three states issued a joint report in November 2004 with seven key recommendations for joint action. These included the following:

1. Set new targets for improvement in performance in average annual state fleet greenhouse gas emissions.

2. Collaborate on the purchase of hybrid vehicles.

3. Establish a plan for the deployment of electrification technologies at truck stops in each state on the I-5 corridor, on the outskirts of major urban areas and on other major interstate routes.

4. Set goals and implement strategies and incentives to increase retail energy sales from renewable resources by one percent or more annually in each state through 2015.

5. Adopt energy efficiency standards for 8 to 14 products not regulated by the federal government, establishing a cost–effective efficiency threshold for all products sold on the West Coast.

181. OR. GLOBING WARMING COMM., INTERIM ROADMAP TO 2020 (Oct. 29, 2010), *available at* http://www.keeporegoncool.org/content/roadmap-2020 (click on "Interim Roadmap to 2020 Report at bottom of page).

182. *Id.* at 4.

183. *Id.* at 77. *See also* App. C, Tier Two Recomm.; *Id.* at 151 (where legislative proposals may reduce greenhouse gasses, including methane and nitrous oxide, through non-energy pathways).

6. Incorporate aggressive energy efficiency measures into updates of state building energy codes, with a goal of achieving at least 15% cumulative savings by 2015 in each state.

7. Organize a West Coast Governors' conference in 2005 to inform policy–makers and the public of climate change research concerning the West Coast states. [184]

Actions on these measures have been underway since they were approved by the Governors in 2004.

Oregon has also been an active member of the Western Climate Initiative (WCI), which built upon the work of the West Coast Governor's Global Warming Initiative. The Western Climate Initiative began in February 2007 when the Governors of Arizona, California, New Mexico, Oregon and Washington agreed to develop a regional target for reducing greenhouse gas emissions, participate in a multi–state registry to track and manage greenhouse gas emissions in the region and develop a market based program to reach the target. The WCI is also evaluating a cap–and–trade system on a regional basis. Montana and Utah have subsequently joined the WCI, as have four Canadian provinces, British Columbia, Manitoba, Ontario and Quebec.[185]

Two other regions of the country are also approaching climate change on a regional basis, the Regional Gas Initiative in the Northeast, and the Midwest Greenhouse Gas Reduction Accord in the Upper Midwest.[186] These three regional organizations represent nearly half the states, with observer states bringing the total to more than 30 states working on climate change issues on a regional basis.

States have also undertaken action on their own to encourage clean energy. Twenty–one states have set quantitative greenhouse gas reduction targets or goals, twenty–nine states have adopted Renewable Portfolio Standards; other measures are being undertaken by states to promote low–emission vehicles and fuels.[187] The actions states are undertaking individually and

184. WEST COAST GOVERNORS' GLOBAL WARMING INITIATIVE, STAFF RECOMM. TO THE GOVERNORS 2 (Nov. 2004), *available at* http://www.oregon.gov/ENERGY/GBLWRM /docs/WCGGWINov04Report.pdf.

185. *See generally* WESTERN CLIMATE INITIATIVE, http://www.westernclimate initiative.org/.

186. PEW CENTER ON GLOBAL CLIMATE CHANGE, CLIMATE CHANGE 101: OVERVIEW 9 (Jan. 2011), *available at* http://www.pewclimate.org/docUploads/climate101-overview.pdf.

187. *Id.* at 9–10.

together have important implications for action on the federal level.

In recent years, Congress has found it difficult to pass major climate change legislation or even major energy legislation including a national Renewable Portfolio Standard. The recent Congressional election makes it less likely that there will be broad agreement on meaningful climate change legislation. Nevertheless, there is reason for optimism for federal action as long as the states are acting, especially when they are working together regionally.

There are several benefits to states working together to impact action on the federal level. First, action by the states can demonstrate what measures work successfully and where problems might occur. Second, states acting together and adopting the same product standards can affect large businesses selling products in those states if those states present a sufficient market share. Corporations that want to sell their products in those states must provide cleaner, more efficient products that release less greenhouse gasses, even if there are no federal standards.

Finally, the prospect of states adopting standards that are not identical can be less desirable to manufacturers and to regulated industries than federal legislation with a uniform standard for companies doing business in many states. In order to maintain uniformity, Congress may be more willing to act on a subject where it has previously been reluctant.

States have acted together for a number of years to adopt identical appliance efficiency standards and to adopt the California vehicle emissions standards in the absence of updated federal vehicle efficiency standards. The west coast states of Oregon, Washington and California frequently collaborated on the development of common energy standards for appliances and passed legislation and enacted rules to implement consistent standards. The appliance standards adopted by Oregon in 2007 in Senate Bill 375 and House Bill 2565 reflected this joint work.

Similarly, the adoption of the California vehicle emission standards by Oregon's Environmental Quality Commission in 2005 is another example of states acting together to achieve a common goal. Like so many other measures that reduce greenhouse gas emissions, vehicle emission standards bring added benefits in other areas, such as reduced emissions of other

traditional pollutants and vehicle mileage improvement. It is very important that the states continue their efforts, especially through the three regional organizations that are currently active, in order to make progress in the absence of federal legislation and to encourage Congress to act positively on climate change legislation.

VIII. CONCLUSION: WATER RIGHTS OR A RIGHT TO WATER?

Traditionally in the western United States, access to water has been defined by water rights. While each state law has its unique features, often the right has been based on the concept of "first in time, first in right." That doctrine was developed to address the fact that there often has not been enough water to serve all potential needs and users. Water rights determinations have often been contentious, accurately reflecting the old saying that "whiskey is for drinking; water is for fighting."

If we continue to rely excessively on fossil fuels and if we fail to develop less carbon–emitting alternatives to power our vehicles, factories and homes, climate change caused by our energy choices will make the water supply situation worse. Thus, if the International Human Right to Water is to be meaningful, our energy choices must not aggravate and worsen water supply options.

The UN General Assembly last summer unanimously passed a resolution in support of the human right to water and sanitation.[188] While forty–one nations, including the United States, abstained for various reasons, the will of the international community was clear. This action followed previous international actions that declare access to water a fundamental human right by all.[189]

If an International Human Right to Water is not only desirable, but required under American or International law, then our energy choices must be guided by considerations of the implications of that right. Do we only have a system of water rights, or do we also have a right to water? How does that question inform and affect our energy choices? Without progress on

188. Press Release, General Assembly, General Assembly adopts resolution recognizing access to clean water, sanitation as human right, by recorded vote of 122 in favor, none against, 41 abstentions, U.N. Press Release GA/10967 (July 28, 2010) *available at* http://www.un.org/News/Press/docs/2010/ga10967.doc.htm.

189. *See* WORLD HEALTH ORGANIZATION, THE RIGHT TO WATER 3 (Feb. 2003), *available at* http://www.who.int/water_sanitation_health/en/righttowater.pdf.

greenhouse gas emissions, the effects of climate change, combined with other increasing pressures on water use, will make the human right to water an empty promise, an obligation unfulfilled, and a legacy lost.

The choice is not between clean energy or affordable energy; we must not let the question be framed that way. We will continue to need traditional sources of energy for the foreseeable future; however, energy efficiency and renewable energy are viable sources of energy both technically and, increasingly, economically. State and federal policies can increase the pace at which energy efficiency and renewable energy are developed and installed. The absence of those policies can retard progress, and increase our reliance on fossil fuels. Increasing the use of fossil fuels will amplify the impacts of climate change, with unpredictable and potentially harmful consequences on the supply of water.

If we stay our course of increasing use of traditional energy sources, with increasing price volatility, damage to our economy, adverse environmental impact, and impacts on the public health of our communities, and we will undermine a very important factor in making the International Right to Water a meaningful right.

Or we can set a course that reduces our use of polluting resources, provides cleaner energy, keeps more of our energy dollars in our local economy, and creates more jobs for our communities, urban and rural alike. If we make the right decisions, our energy choices can help make the International Human Right to Water a reality for all citizens.