The Climate Crisis, the Renewable Energy Revolution, and Tribal Sovereignty

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Chapter 3 in the book

TRIBES, LAND, AND THE ENVIRONMENT

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Introduction

Like the other indigenous peoples of the world, American Indian and Alaska Native tribes will suffer, and are suffering, from the impacts of climate change in ways that are different from the cosmopolitan peoples that inhabit most of the centers of political and economic power. Impacts will be experienced differently, in large part, because the material cultures of indigenous peoples tend to be woven into the ecosystems where they live and because their religious cultures also tend to be rooted in the particular places where they live. The roots of their cultural identities reach back into mythic time, with countless generations of traditional ecological knowledge. The kinds of impacts that we expect global warming to bring, the kinds of impacts that we are already witnessing, will stress indigenous cultures in ways that will threaten their survival as distinct peoples.[1] As the plant and animal communities on which indigenous cultures depend drastically change, it will be increasingly difficult for indigenous peoples to maintain their ways of life. The traditional knowledge of the elders will seem less and less relevant in the lives of children and younger adults.

Have these kinds of impacts become inevitable? If there is still hope for avoiding the worst, is such hope beyond the control of the tribes? Is the fate of indigenous peoples in the hands, so to speak, of the industrialized countries? Are there strategies that Indian tribes in the United States themselves could undertake to, in effect, participate in changing the course of world history?

Global warming is being caused, for the most part, by human activities that consume fossil fuels, releasing carbon dioxide (CO_2) into the atmosphere.[2] Since roughly 1850, the early

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[**] Ashgate: www.ashgate.com/default.aspx?page=637&calcTitle=1&isbn=9781409420620&lang=cy-GB.

[1] Rebecca A. Tsosie, *Indigenous People and Environmental Justice: The Impact of Climate Change*, 78 U. COLO. L. REV. 1625, 1628 (2007); Daniel Cordalis & Dean B. Suagee, *The Effects of Climate Change on American Indian and Alaska Native Tribes*, 22 NAT. RES. & ENV'T 45 (2007-2008); NATIONAL WILDLIFE FEDERATION, FACING THE STORM: INDIAN TRIBES, CLIMATE-INDUCED WEATHER EXTREMES, AND THE FUTURE FOR INDIAN COUNTRY (2011).

[2] *See generally* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS; SUMMARY FOR POLICYMAKERS (2007), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf [hereinafter IPCC Physical Science Summary]. In addition to burning fossil fuels, another significant source of increased

part of the industrial revolution, the CO_2 level in the atmosphere has increased from about 280 parts per million (ppm) to about 380 ppm, a 36% increase; in that same time frame, the mean surface temperature of the Earth has risen 0.7˚C (1.3˚F), and, if we stopped burning fossil fuels today, the Earth's surface temperature would continue to rise another 0.5˚ C (0.9˚F) until it reaches a state of thermal equilibrium.[3] Climate scientist James Hansen warned in December 2005 that if we do not start changing the trend, we may pass a tipping point beyond which "it will be impossible to avoid climate change with far ranging undesirable consequences."[4] Dr. Hansen predicted that continuing on a "Business-as-usual" scenario would yield "additional warming of 2 or 3ºC this century and *imply changes that constitute practically a different planet*."[5]

Strategies to cope with the impacts of climate change—commonly referred to as "adaptation"—are necessary, and Indian tribes will need to be engaged in adaptation programs. This chapter, however, is not about adaptation. Rather, this chapter is about strategies for reducing emissions of carbon dioxide. If we are to have any hope for avoiding the more catastrophic impacts of climate change, we need to start reducing emissions of carbon dioxide and other greenhouse gases. In the lexicon of climate change, such strategies are often referred to as "mitigation." Given that global warming is mostly driven by emissions of carbon dioxide from combustion of fossil fuels, reducing carbon dioxide emissions will require us to achieve much greater efficiency in our use of energy and replace much of our consumption of fossils fuels with renewable energy resources (including solar, wind, biomass, and geothermal).[6] Of course, we are not going to stop burning fossil fuels tomorrow or next year, but we do need to start changing our ways. Soon. And dramatically.

To achieve reductions in carbon dioxide emissions on the scale needed will require action at all levels of government: federal, state, local, and tribal. Although we are now in the fourth decade of the Self-Determination era of federal Indian policy, when most people talk about "all levels of government," they typically include federal, state, and local and overlook Indian tribes.[7] This may help to explain why the literature on governmental actions to address climate change generally overlooks possible roles for tribal governments. This chapter offers a step toward

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concentrations of carbon dioxide (CO_2) in the atmosphere is the pattern of land use changes that take trees and other kinds of plants out of ecosystems, thus eliminating their capacity for capturing CO_2 from the atmosphere. *Id*. at 2. In addition to CO_2, there are also greenhouse effects associated with other anthropogenic gases, including methane and nitrous oxide. *Id*. at 3

[3] AMERICAN SOLAR ENERGY SOCIETY, TACKLING CLIMATE CHANGE IN THE U.S.: POTENTIAL CARBON EMISSIONS REDUCTIONS FROM ENERGY EFFICIENCY AND RENEWABLE ENERGY BY 2030, at 166 (Charles F. Kutscher ed. 2007), *available at* http://www.ases.org/images/stories/file/ASES/climate_change.pdf [hereinafter ASES Report].

[4] James E. Hansen, *Is There Still Time to Avoid 'Dangerous Anthropogenic Interference' with Global Climate?: A Tribute to Charles David Keeling*, Presentation on Dec. 6, 2005 at the American Geophysical Union, San Francisco, CA., *available at* http://www.columbia.edu/~jeh1/2005/Keeling_20051206.pdf [hereinafter Hansen, *Dangerous Anthropogenic Interference*]. In a more recent publication, Dr. Hansen has concluded that an initial objective of reducing atmospheric CO_2 to 350 ppm must be pursued within decades because "today's CO_2, about 385 ppm, is already too high to maintain the climate to which humanity, wildlife, and the rest of the biosphere are adapted." James E. Hansen et al., *Target Atmospheric CO_2: Where Should Humanity Aim?*, 2 OPEN ATMOS. SCI. J. 217, 230 (2008) [hereinafter Hansen, *Target Atmospheric CO_2*].

[5] Hansen, *Dangerous Anthropogenic Interference*, *supra* note 4, at 1 (emphasis added).

[6] INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, IPCC SPECIAL REPORT ON RENEWABLE ENERGY SOURCES AND CLIMATE CHANGE MITIGATION: SUMMARY FOR POLICYMAKERS (2011), *available at* http://www.ipcc.ch/news_and_events/docs/ipcc33/SRREN_FD_SPM_final.pdf [hereinafter IPCC, IPCC SPECIAL REPORT ON RENEWABLE ENERGY SOURCES AND CLIMATE CHANGE MITIGATION].

[7] *See*, *e.g*., GLOBAL CLIMATE CHANGE AND U.S. LAW (Michael B. Gerrard ed. 2007) (including chapters on regional, state, and local government initiatives, but no discussion of tribal governments).

rectifying this oversight, offering suggestions on what tribes might do rather than examples of what particular tribes are doing.

This chapter focuses on how Indian tribal governments can help to bring about the transition to the energy economy of the future, an economic order in which energy will be used efficiently and most of our needs will be met with renewable resources. The emphasis is on strategies that tribes can employ through the use of their sovereign powers as governments. There is also some discussion of how tribes can participate in programs created by the federal government and the states. A number of states are already providing leadership in making this transition happen, and tribes can become engaged in state programs. There may eventually be a comprehensive federal program—while prospects for action by Congress seem unlikely at present, the Executive Branch is moving ahead under existing authority. Tribes are engaged in many federal programs, and should be involved in many others, but this chapter does not attempt to catalogue relevant federal programs. Rather, the objective of this chapter is to suggest some strategies that tribal governments can pursue on their own, as sovereigns. Another objective of this chapter is to offer tribal leaders a source for talking points that they can draw upon in their contributions to the national dialogue on the climate crisis and energy policy.

Toward a Post Fossil Fuels Economy

The global climate crisis provides a compelling reason to shift to an economic order that uses energy efficiently and meets most of our needs for energy services with renewable resources.[8] There are other good reasons, as well. Meeting our energy demands through efficiency and renewables will also reduce our dependence on imported oil, reduce the demand for energy resources that cause major environmental impacts other than global warming,[9] and create the kinds of jobs that are not readily outsourced to other countries.[10] We will have "cleaner air and water, more efficient products, more workers trained in the next great global industry, higher energy prices but lower bills, greater productivity, healthier people, and an export industry in clean power products that people across the world will want to buy."[11] We might also help ourselves to many kinds of amenities that add up to an enhanced quality of life—sunspaces in passive solar homes, daylighting in public buildings, more bike paths, walkable mixed-use neighborhoods clustered in transit-oriented development, organic vegetables from

[8] *See*, *e.g.*, IPCC, IPCC SPECIAL REPORT ON RENEWABLE ENERGY SOURCES AND CLIMATE CHANGE MITIGATION, *supra* note 6; PEW CENTER ON GLOBAL CLIMATE CHANGE, CLIMATE CHANGE 101: UNDERSTANDING AND RESPONDING TO GLOBAL CLIMATE CHANGE 4 (2011), *available at* http://www.pewclimate.org/docUploads/climate101-fullbook_0.pdf; UNION OF CONCERNED SCIENTISTS , CLIMATE 2030: A NATIONAL BLUEPRINT FOR A CLEAN ENERGY ECONOMY (2009), *available at* http://www.ucsusa.org/publications.

[9] *See generally* NATIONAL ACADEMY OF SCIENCES, HIDDEN COSTS OF ENERGY: UNPRICED CONSEQUENCES OF ENERGY PRODUCTION AND USE (2010) [hereinafter NAS, HIDDEN COSTS OF ENERGY]. As stated in this report, "In aggregate, the damage estimates presented in this report for various external effects are substantial. Just the damages from external effects the committee was able to quantify add up to more than $120 billion for the year 2005." *Id*. at 15. These are the costs of environmental and health impacts, not including climate change impacts. The two major categories of sources are coal-fired power plants, at $62 billion annually, and motor vehicles, at $56 billion annually. *Id*. at 6, 12.

[10] AMERICAN SOLAR ENERGY SOCIETY, ESTIMATING THE JOBS IMPACTS OF TACKLING CLIMATE CHANGE 2 (2009), *available at* http://www.ases.org/pdf/ASES_TCCJobs_FullReport.pdf; Presidential Remarks on the Economy and Clean Energy, DAILY COMP. PRES. DOCS., 2010 DCPD No. 12 (Jan. 8, 2010) ("Building a robust clean energy sector is how we will create the jobs of the future, jobs that pay well and can't be outsourced.").

[11] THOMAS L. FRIEDMAN, HOT, FLAT, AND CROWDED: WHY WE NEED A GREEN REVOLUTION AND HOW IT CAN RENEW AMERICA 174 (2008).

local farms and greenhouses attached to homes, less land paved over, more land left for the plants and other creatures that make up the web of life.

For reasons such as these, the Obama Administration has promoted energy efficiency and renewable energy in legislation and administrative initiatives, including more that $90 billion appropriated for existing programs through the American Recovery and Reinvestment Act (Recovery Act)[12] and an Executive order.[13] The Obama Administration has put forth the proposition that America should step up and lead the world in the revolution to an energy future that emphasizes efficiency and renewables and other low-carbon sources of energy.[14]

While President Obama and some leaders in Congress use the term "clean" energy[15] to describe low carbon forms of energy, I prefer the term "green" energy, which means energy efficiency and environmentally acceptable renewable energy facilities.[16] We can call it "clean" or "green" or get somewhat more specific and use the term "renewable," but whatever words we use, some fundamental changes are coming as we move toward a post-fossil fuels economy. American Indian and Alaska Native tribes need to be part of making the transition to a green energy future happen.

Global Warming and the Wedges Strategy

While there is consensus that we need to change course, there is some uncertainty regarding what the target should be for atmospheric CO_2 levels. Many analysts have proposed that if we can stabilize CO_2 levels in a range from 450 to 500 ppm, followed by actual reductions in CO_2 levels over the long term, we might be able to escape the more catastrophic impacts of global warming.[17] More recently, Dr. Hansen has argued that for long-term stabilization of the

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[12] *Securing American Energy*, THE WHITE HOUSE, http://www.whitehouse.gov/energy/securing-american-energy (last visited July 7, 2011).

[13] Exec. Order No. 13,514, 74 Fed. Reg. 52117 (Oct. 8, 2009) (requiring Federal agencies to set a 2020 greenhouse gas emissions reduction target within 90 days; increase energy efficiency; reduce fleet petroleum consumption; conserve water; reduce waste; support sustainable communities; and leverage Federal purchasing power to promote environmentally-responsible products and technologies); Presidential Memorandum on Federal Fleet Performance, DAILY COMP. PRES. DOCS., 2011 DCPD No. 386 (May 24, 2011) (encouraging agencies to "leverag[e] Federal purchasing dollars to build manufacturing capacity for more alternative fueled vehicles"); Presidential Memorandum on Improving Energy Security, American Competitiveness and Job Creation, and Environmental Protection Through a Transformation of Our Nation's Fleet of Cars and Trucks, DAILY COMP. PRES. DOCS., 2010 DCPD No. 409 (May 21, 2010).

[14] Presidential Remarks on Energy, DAILY COMP. PRES. DOCS., 2009 DCPD No. 517 (June 29, 2009) (" We can remain the world's leading importer of oil, or we can become the world's leading exporter of clean energy. We can allow climate change to wreak unnatural havoc, or we can create jobs utilizing low-carbon technologies to prevent its worst effects. We can cede the race for the 21st century, or we can embrace the reality that our competitors already have: The nation that leads the world in creating a new clean energy economy will be the nation that leads the 21st century global economy.")

[15] *E.g.*, American Clean Energy and Security Act, H.R. 2998, passed by the House, June 26, 2009; Cong. Rec. H7471 (June 26, 2009).

[16] As I understand it, the word "clean" is intended to emphasize the reduction or avoidance of carbon dioxide emissions, but even if carbon dioxide can successfully be captured and sequestered from coal-fired power plants, unless one overlooks the impacts of mining, it strikes me as a misnomer to call coal "clean" or "green." Much the same could be said of mining uranium for nuclear power, which also produces waste that will remain toxic for a span of time comparable to the time span that human beings have been the species that we are today.

[17] ASES Report, *supra* note 3, at 169 (noting Hansen's recommendation of stabilizing CO_2 at 475 ppm, and the Pacala and Sacalow recommended target of 500 ppm). A report published by the World Wildlife Fund (WWF) says that we should be working toward keeping the overall increase in average global temperature to no more than 2ºC over pre-industrial levels, and that if we can stabilize the concentrations of greenhouses gases in the atmosphere at 400 ppm by about 2100 after hitting a peak of 475 ppm toward the middle of this century, we would bring the probability of exceeding the 2ºC average global increase down

climate our target should be 350 ppm,[18] a concentration level that we have already exceeded. While we may not yet have consensus on what the target should be,[19] we have a good idea of the scale of the needed emissions reductions, and we know that we have no time to waste.

Stabilization Wedges

In order to stabilize CO_2 levels in the atmosphere, we need to dramatically reduce our emissions. In 2004, two Princeton University professors, Robert Socolow and Stephen Pacala, published an article in which they proposed the concept of "stabilization wedges" as a strategy for changing the trend.[20] The concept of wedges is based on the graph that is used to show the increasing amounts of CO_2 emissions worldwide over time, with time on the *x* axis and CO_2 emissions on the *y* axis. Worldwide CO_2 emissions in 2006 amounted to seven billion tons per year, which, under a business as usual scenario would double to 14 billion tons by 2056; the corresponding amounts for the United States are about 1.6 billion tons and 2.7 billion tons.[21] The basic idea is that first we need to stop the line on the graph from going up and then start bringing it down. The "wedges" are the various ways in which reductions in CO_2 emissions can be achieved. Socolow and Pacala call for holding the curve flat over the next 50 years using existing technologies, and then bringing it down.

To hold the curve flat, Socolow and Pacala divide up the reductions in emissions needed into seven wedges, each of which represents one billion tons of CO_2 that would otherwise be emitted 50 years from now. Assuming a straight-line increase under the business as usual scenario, each wedge represents a total of 25 billion tons of CO_2 (that is, zero per year at present, 0.5 billion tons per year in 25 years, 1 billion tons per year in 50 years).

One of the key points that the wedges concept conveys is that there is no single solution to the problem; rather, the solution must consist of a mix of solutions. Socolow and Pacala divide up the aggregate reduction needed into seven wedges for the convenience of using the one billion tons per year reduction target figure, in order to "make the task of reducing emissions vivid."[22] They also identify fifteen different ways of accomplishing one of the seven wedges, divided into five categories: end user efficiency and conservation; power generation; carbon capture and storage (CCS); alternative energy sources; and agriculture and forestry.[23]

While Socolow and Pacala's wedges strategy features energy efficiency and renewable energy, their list of options also includes measures such as expanding nuclear power and carbon

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to where it would be "unlikely." KARL MALLON, GREG BOURNE & RICHARD MOTT, CLIMATE SOLUTIONS: WWF'S VISION FOR 2050, at 3-4 (2007), *available at* http://www.worldwildlife.org/climate/Publications/WWFBinaryitem4911.pdf.

[18] Hansen, *Target Atmospheric CO_2*, *supra* note 4.

[19] *See generally* NATIONAL RESEARCH COUNCIL, CLIMATE STABILIZATION TARGETS: EMISSIONS, CONCENTRATIONS, AND IMPACTS OVER DECADES TO MILLENNIA (2011).

[20] Stephen W. Pacala & Robert H. Socolow, *Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies*, 305 SCIENCE 968 (2004); *see also* Robert H. Socolow & Stephen W. Pacala, *A Plan to Keep Carbon in Check*, Scientific American, Sept. 2006, at 50 [hereinafter Socolow & Pacala, *A Plan to Keep Carbon in Check*].

[21] Socolow & Pacala, *A Plan to Keep Carbon in Check*, *supra* note 20, at 52, 57.

[22] *Id*. at 52-53.

[23] *Id*. at 54.

sequestration. Is it possible that we could get all the wedges that we need from energy efficiency and renewable energy?

Renewable Energy and Energy Efficiency Wedges

To what extent can we rely on efficiency and renewables to provide for our energy needs and achieve reductions of CO_2 emissions on the scale needed? One of the more detailed sets of answers is set out in a collection of studies commissioned by the American Solar Energy Society (ASES), captioned TACKLING CLIMATE CHANGE IN THE U.S. (hereinafter "*ASES Report*").[24] The studies indicate that it is possible for us to get the reductions in CO_2 emissions that we need by choosing energy efficiency and renewable energy technologies.

The ASES Report adopts the wedges approach, analyzing the potential contributions of energy efficiency and a variety of renewable energy technologies for reducing carbon emissions in the United States by 2030, to put us on a path to achieve emissions reductions by mid-century in the range of 60% to 80% below 2005 levels.[25] The ASES Report focuses on what can be accomplished now and in the mid-term, relying on existing technologies, rather than assuming there will be technological breakthroughs. The nine wedges in the ASES Report are: overall energy efficiency, buildings, plug-in hybrid electric vehicles, concentrating solar power, photovoltaics, wind power, biomass, biofuels, and geothermal power.[26]

The ASES Report suggests that we can get there from here. Or at least it is a realistic possibility. By moving ahead with energy efficiency and renewables we can change the trend line on the graph from an upward slope to a downward slope. Whether we can change the trend fast enough to stabilize the atmosphere before climate related catastrophes become commonplace, time will tell.

Energy Marketplaces and Governmental Policies

The kinds of markets in which energy is bought and sold can be described in different ways. For electricity, there are both retail and wholesale markets. At the retail level, consumers generally buy from utilities and at the wholesale level, utilities trade among themselves, or buy from independent producers. For energy consumed in operating buildings, many of the energy choices are made by developers within frameworks set by building codes. Energy consumption choices for appliances, motors, heating and cooling equipment, are made in a wide range of settings; to some extent the range of choices has been limited by energy efficiency standards imposed through regulations. Energy for motor vehicles is generally sold in filling stations, but

[24] ASES Report, *supra* note 3.
[25] ASES report, *supra* note 3, at 170. The scope and time frame of the ASES Report are different from the scope and time frame of the Socolow and Pacala articles—the U.S. over 25 years versus the world over 50 years. Given these differences, comparison of the projections in the ASES report to the needed reductions as set out by Socolow and Pacala requires some attention to detail, and only a few points of comparison are offered here. Since the ASES reductions are projected to be achieved in a 25 year time frame, over a 50 year time frame their projected carbon reductions can be estimated to be about (or at least) twice that much, or about 2.4 billion tons. So, the ASES projection of carbon reductions for the U.S. from a range of energy efficiency and renewable energy technologies amount to about one-third of what Socolow and Pacala say we need to achieve worldwide to stabilize the climate. It is probably a reasonable assumption that, through a similar combination of energy efficiency and renewable energy technologies, the rest of the world could achieve twice the carbon reductions that we achieve in the United States.
[26] ASES Report, *supra* note 3, at 33.

the consumption choices are framed by fuel economy standards, land use planning, public investments in roads, and the relative lack of public investment in public transportation. For the wide range of investments that can be generically categorized as energy efficiency improvements, there is no single market and no single way of tracking these kinds of investments. (The term "investment" seems generally more accurate than "expenditure" since money spent on energy efficiency yields returns in the form of recurrent reductions in operating costs.)

In the markets in which energy goods and services are bought and sold, there are many factors that contribute to decisions that keep us moving along the status quo, the upward trend of carbon dioxide emissions. In many ways, regulatory policies and governmental subsidies send price signals to consumers that are contrary to the public interest in reducing emissions. Many decisions reflect short-term costs rather than life-cycle costs, sometimes because the person who makes the choice is someone other than the person who pays the operating costs and sometimes because the person paying out the money cannot afford the up-front cost of the investment and financing is either not available or is not convenient. Many decisions are made based on factors that have nothing to do with energy, such as style, convenience, habit. Some decisions reflect the fact that having a grasp on the choices available and how to evaluate them requires information and knowledge that most consumers just don't have or are too busy to seek. Programs like Energy Star labeling on appliances help consumers in this regard by providing at least enough information to evaluate the projected operating costs.

Given the many ways in which energy from fossil fuels is imbedded in our national economy, there are many ways in which governmental policy tools can be brought to bear to facilitate the transition to the energy economy of the future. In a general sense, these policy tools establish the rules for various energy marketplaces or provide incentives or subsidies for certain kinds of investments. Some policy tools can be wielded at the federal level, some at the state level, and some the local level.

In the American system of government, tribal governments are conceptually similar to states, in that they are distinct from the federal government and exercise their own inherent sovereignty, and may also exercise delegated federal authority.[27] Tribes are generally not subject to the lawmaking authority of the states, and so, the kinds of laws that are typically enacted by states, or by local governments acting pursuant to state sovereignty, are not presumptively valid on trust lands in Indian country.[28] But in a lot of ways, the attributes of tribal sovereignty differ from the attributes of state sovereignty. Some of the differences include limits on the exercise of tribal powers imposed by federal courts applying the approach often called "implicit divestiture."[29] On a practical level, implicit divestiture means that when tribal governments enact laws that apply to lands that are no longer in federal Indian trust or restricted status, or to persons who are not tribal members, they may well have to defend their tribal laws in federal court.

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[27] *See generally* COHEN'S HANDBOOK OF FEDERAL INDIAN LAW §§ 4.01, 4.03 (2005 ed.).
[28] *See generally* COHEN'S HANDBOOK OF FEDERAL INDIAN LAW § 6.02[1] (2005 ed.). State laws may be valid on non-trust lands and with respect to the conduct of non-members. *Id*. at § 6.02[2].
[29] *See* COHEN'S HANDBOOK OF FEDERAL INDIAN LAW § 4.02[3] (2005 ed.).

Though conceptually like states, as a practical matter, most tribes tend to be more comparable to local governments in the range of governmental programs and services that they administer, as well as in the relative size of their service populations. In the transition to the renewable energy future, some policy tools wielded at the state or federal level are largely beyond the reach of most tribal governments. Nevertheless, it is important for tribal leaders to be aware of how these policy tools are shaping energy marketplaces, among other reasons, so that tribal enterprises can participate in those marketplaces.

In using governmental policy tools for reducing CO_2 emissions, it warrants emphasis that consumers do not shop for units of energy in the abstract, but rather they shop for the services that various forms of energy provide, and for goods that require energy to make and/or to operate. As Amory Lovins has said, "Customers don't want lumps of coal, raw kilowatt-hours, or barrels of sticky goo. Rather, they want the services that energy provides: hot showers and cold beer, mobility and comfort, spinning shafts and energized microchips, baked bread and smelted aluminum."[30] If one form of energy can be replaced with another, the end user may not really care, or, if concerned about global warming, the end user may care a great deal.

Legacies of Historic Policies and Market Distortions

Governmental strategies to reduce GHG emissions cannot be written on a blank slate but, rather, must take into account the legacy of more than a century of laws and regulations, at federal, state, and local levels. While some hold the view that energy purchases and investments take place in "free" markets with decisions made by people acting rationally in their own self-interests, in fact, governmental policies have been distorting these marketplaces over many decades, and many of the policy-driven distortions operate counter to what we need to be doing to cope with global warming.[31]

As professor David Hodas has said, "Climate change presents the classic problem of externalities and the global commons."[32] Law and economics theory suggests that, as long as the global, long-term harms of climate change are not internalized into present-day transactions, rational actors can be expected to maximize their own self interest, by burning fossil fuels and dumping greenhouse gases into the atmosphere, at least until the other costs associated with the price of fossil fuels rise enough to make the alternatives cost-effective.[33] As the British government's Stern Review Report on the Economics of Climate Change succinctly states, "Climate change presents a unique challenge for economics: it is the greatest and widest-ranging market failure ever seen."[34]

Externalities can be internalized through a variety of governmental policy tools, including command-and-control regulation (requiring sources of emissions to adopt reduction measures, the costs of which can be passed on to consumers of goods and services) and tax policies (which

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[30] Amory B. Lovins & L. Hunter Lovins, *Mobilizing Energy Solutions*, American Prospect, Jan. 2002, at 18.
[31] *See generally* Roberta Mann, *Subsidies, Tax Policy, and Technological Innovation*, in GLOBAL CLIMATE CHANGE AND U.S. LAW, *supra* note 7, at 576-83.
[32] David Hodas, *State Initiatives*, *in* GLOBAL CLIMATE CHANGE AND U.S. LAW, *supra* note 7, at 344.
[33] *Id.*
[34] Nicholas Stern, The Economics of Climate Change: The Stern Review, at Exec. Summary 1 (2007), *available at* www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm.

can provide both incentives and disincentives). At a macroeconomic level, a basic step in the transition to a low-carbon future could be to make the prices paid in energy marketplaces incorporate the costs associated with global warming, or at least drive the prices of fossil fuel inputs high enough that purchasers and investors choose efficiency and renewables on a grand scale. A tax on carbon would be one way to accomplish that. A "cap-and-trade" regime is another approach, in which there is an overall regulatory limit on greenhouse gas emissions, with a limited number of "allowances" or permits to pollute, and a market is created in which allowances are traded. As the cap is ratcheted down over time, market forces drive the transition to efficiency and renewables.[35] In the current political climate, raising the price of fossil fuels to internalize the costs of carbon emissions seems unlikely, but there are other tools that can be used.

Federal and State Level Policy Tools

Governmental policies to internalize the externalities of greenhouse gas emissions would be adopted against a background of two bodies of existing law: environmental law and energy law.[36] Each of these bodies of law includes a variety of statutes and regulations at federal and state levels. Some aspects of our energy economy are regulated by federal agencies, and some aspects of our energy economy are regulated at the state or local level. Federal and state tax policies are also major factors in shaping energy marketplaces.[37] A number of states have enacted laws or otherwise launched initiatives that address aspects of the climate crisis. [38] The electric utility industry is largely regulated at the state level,[39] and one of the main regulatory drivers for the deployment of utility-scale renewable energy projects has been renewable portfolio standards adopted by a majority of the states.[40] While historically, the reservations of many of tribes have been sources of fossil fuels for the national economy, tribes as law-making sovereigns have not had much direct influence on the system of laws that regulate energy marketplaces.

Macroeconomic issues, and governmental policy tools designed to work at the macroeconomic level, are mostly beyond the reach of tribal governments. While the scope of this chapter is the range of actions that tribal governments can take through the exercise of tribal sovereignty and in delivering governmental services, tribal policy-makers must be aware of the

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[35] One such cap-and-trade regime is set out in the American Clean Energy and Security Act, which the U.S. House of Representatives passed in 2009 but which died in the Senate. H.R. 2998, as passed by the House, June 26, 2009; Cong. Rec. H7471 (June 26, 2009). This bill was designated H.R. 2454 when it was introduced; and is commonly referred to as the "Waxman-Markey" bill, after the names of its main sponsors.

[36] *See generally* John C. Dernbach, *U.S. Policy*, in GLOBAL CLIMATE CHANGE AND U.S. LAW, *supra* note 7, at 61, 65-72.

[37] *See* Jerome L. Garciano, *Green Energy Tax Policies: State and Federal Tax Policies for Renewable Energy and Energy Efficiency*, 25:4 NAT. RES & ENV'T 12 (Spring 2011); Roberta Mann, *Subsidies, Tax Policy, and Technological Innovation*, in GLOBAL CLIMATE CHANGE AND U.S. LAW, *supra* note 7, at 565.

[38] Hodas, *supra* note 32, at 344-45.

[39] *See generally* Walter R. Hall II, *et al*, *History, Objectives, and Mechanics of Competitive Electricity Markets*, *in* CAPTURING THE POWER OF ELECTRIC RESTRUCTURING 1 (Joey Lee Miranda, ed, 2009).

[40] Some 32 states have enacted a renewable portfolio standard or target of some kind. Information is available the Department of Energy website including the Database of State Energy Incentives for Renewables and Efficiency (DSIRE) at www.dsireusa.org. *See also* Stephen C. Braverman, *State Renewable Portfolio Standards and the Commerce Clause*, 25:4 NAT. RES. & ENV'T 15 (Spring 2011); Hodas, *supra* note 32, at 355-59. A national renewable energy standard could be enacted through federal legislation, but to date this is a policy tool that has only been used at the state level.

ways in which federal and state policies shape the markets in which reservation economies operate. It should also be noted that, in our current energy marketplaces, prices for fossil fuels, and for energy goods and services with fossil fuels imbedded in them, generally do not reflect the full costs of adverse impacts on the environment and public health, or the costs associated with global warming.[41] How long will the failure to internalize such costs continue? I hesitate to speculate. National political leaders who have a sense of responsibility to future generations might succeed in changing at least some of the rules that govern energy marketplaces. Some tribal political leaders might contribute to making such changes happen. In the meantime, there are policy tools available to tribal governments that operate at a scale below the macroeconomic level.

Policy Tools That Tribal Governments Can Use

Tribal governments could step up and assume leadership roles in moving us toward an efficient and renewable energy future, by using their sovereign powers to enact and implement various kinds of policy tools. Some of the governmental policy tools that can be brought to bear on greenhouse gas emissions operate at the national or international level and, as such, are largely beyond the control of tribes, except in the sense that tribal governments can engage in advocacy when these tools are being formulated and can learn how to work within the frameworks that are put in place. Some policy tools are available to state and local governments, and some of these could also be used by tribal governments. Advocates of energy efficiency and renewables tend to overlook how tribes could fit into the policy development framework, which should not be surprising, given the general lack of awareness in the American public regarding the status of tribes as sovereign governments. Tribal governments could emerge in leadership roles, but it looks like it will take some initiative from Indian country for this to happen.

This section looks at some of the options that tribes could pursue. One starting point is to look at the big picture of carbon dioxide emissions. The ASES Report uses a three part break-down for end use energy consumption, for which it allocates CO_2 emissions as follows: buildings—43%; transportation—32%; and industry—25%.[42] In light of this breakdown, the discussion that follows emphasizes reducing emissions associated with buildings and transportation. Since renewable energy will largely be brought to market in the form of electricity, there is also some discussion of the electric power industry.

The range of actions that tribes can pursue is framed, at least in part, by federal statutes, regulations, the ways in which federal agencies administer assistance programs, and rulings by federal courts. So some discussion of federal law is included. Within this scope, this chapter is by no means comprehensive. The list of options suggested here is not intended to be exhaustive. Comprehensive analysis would require book-length treatment.

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[41] *See* NAS, HIDDEN COSTS OF ENERGY, *supra* note 9.

[42] ASES Report, *supra* note 3, at 53. The 43% buildings slice is divided into three parts, as follows: 21% residential; 17% commercial; and 5% industrial.

Showcase Communities and Climate Action Plans

The U.S. Environmental Protection Agency administers a Climate Showcase Communities program,[43] and a few tribes have received grants through this program.[44] Each of these tribal programs includes measures to reduce greenhouse gas emissions through energy efficiency and renewable energy. As such, these tribal programs could serve as models for other tribes.

If a tribal government wants to take a comprehensive approach to analyzing options and setting priorities, and to engage the tribal community in the project, it could develop a Tribal Climate Action Plan. How would a tribe develop such a plan? A guidance document for cities, the CLIMATE ACTION HANDBOOK ("HANDBOOK"),[45] was developed for the U.S. Conference of Mayors. There is, as yet, no guidance document for tribal governments. The HANDBOOK starts with the question, "What can local governments do?" The short answer is quite a lot. Local governments have substantial power over some of the main sources of greenhouse gas emissions, including energy consumption in buildings and transportation. Local government operations and capital investments are themselves typically substantial sources of emissions and, as such, offer opportunities for reductions through implementing improvements or "best practices." Such changes in operations and capital investments also provide opportunities to lead by example.

The HANDBOOK suggests that one of the first steps should be to adopt a resolution affirming the city's commitment to reducing global warming pollution. Tribal governments, of course, are familiar with the practice of adopting resolutions. A resolution could set out the process for developing a tribal climate action plan, which should include opportunities for the tribal community to become engaged in the process. Community education should be seen as of vital importance in developing and carrying out the plan. After all, most transactions involving the purchase of energy good and services take place in the private sector.

As envisioned by the HANDBOOK, there are five milestones in a local government climate action campaign: (1) conduct a baseline inventory of global warming pollutants; (2) establish a target for emissions reductions; (3) develop a local climate action plan that includes actions to reduce emissions; (4) implement the climate action plan; and (5) measure, verify, and report the performance. The HANDBOOK suggests that the climate action plan (milestone 3) should include eight categories of actions: (1) land use management and urban forestry; (2) transportation planning; (3) green (renewable) electric power; (4) energy efficiency; (5) green building; (6) water and waste management; (7) recycling and waste reduction; and (8) education and outreach. Within each of these categories, the HANDBOOK suggests measures for the government and measures for the community (some of which would be voluntary, educational measures and

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[43] *See* U.S. Envtl. Prot. Agency's Climate Showcase Communities Program webpage, www.epa.gov/statelocalclimate/local/showcase/.

[44] Climate showcase tribes include Choctaw Nation of Oklahoma, Confederated Tribes of Siletz Indians, Gila River Indian Community, Northern Cheyenne Tribe, and Santa Ynez Band of Chumash Indians. The intertribal organization Tanana Chiefs Conference, which represents a number of Alaska Native tribes, has also received assistance through this program. *Id*.

[45] ICLEI – LOCAL GOVERNMENTS FOR SUSTAINABILITY, U.S. MAYORS' CLIMATE ACTION HANDBOOK (2008), *available at* http://www.iclei.org/documents/USA/documents/CCP/Climate_Action_Handbook-0906.pdf. *See also* Natural Capitalism Solutions , CLIMATE PROTECTION MANUAL FOR CITIES (2007), *available at* http://www.climatemanual.org/Cities/downloads/ClimateProtectionManual_Cities.pdf.

some of which would be enacted as local laws). Measures are also categorized as short-term or long-term.

The HANDBOOK also offers a wide range of examples of "best practices" that have been adopted by particular municipalities, organized according to the eight categories of actions. As an alternative or short-cut version of developing a tribal climate action plan, tribes could take actions drawn from these examples. If there were a handbook tailored to tribes, it should include such examples of leadership by particular tribes. Tribes need not wait for a handbook, of course, to start taking action to reduce greenhouse gas emissions. A tribal program could emphasize energy efficiency and renewables as a strategy for community development, without trying to establish a baseline and measuring reductions. The Department of Energy offers training for tribes on this approach for community development.[46] Another step that tribes can take short of a climate action plan would be to consistently raise climate change issues in the review of proposed federal actions pursuant to the National Environmental Policy Act[47] and National Historic Preservation Act.[48] Tribes can also take a case-by-case approach to proposed projects that involve emissions above thresholds subject to regulation under the Clean Air Act.[49]

The Building Sector

More than 40 percent of greenhouse gas emissions in America are associated with energy consumption in buildings.[50] We know how to design buildings so that their consumption of nonrenewable energy is net zero, and so the building sector offers an enormous opportunity for reducing emissions. The organization Architecture 2030 has issued a challenge to make net-zero energy the standard practice in new construction and major renovations by 2030.[51]

In Indian country, the built environment is largely financed by the federal government, with most residential units funded by the Department of Housing and Urban Development. Much of the existing housing stock is inadequate (e.g. about one-fifth of homes lack indoor plumbing), and the estimated need for housing is 200,000 units.[52] Given the large unmet needs for decent homes in much of Indian country, one might think that the federal government would have a strong interest in helping tribal housing programs build energy efficient homes, which would be

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[46] *Tribal Energy Program: Tribal Community Development and Project Development*, U.S. DEP'T OF ENERGY, http://apps1.eere.energy.gov/tribalenergy/community.cfm (last visited July 12, 2011).

[47] 42 U.S.C. § 4332; 40 C.F.R. parts 1500 – 1508; *see* Council on Environmental Quality, *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions* (Feb. 18, 2010), *available at* http://ceq.hss.doe.gov/current_developments/new_ceq_nepa_guidance.html.

[48] 16 U.S.C. § 470f; 36 C.F.R. part 800; *see* Dean B. Suagee, *Consulting with Tribes for Off-Reservation Projects*, 25:1 NAT. RES. & ENV'T 54 (2010).

[49] 42 U.S.C. §§ 7401 to 7671q. As amended in 1990, the Act authorizes the Environmental Protection Agency to treat tribes like states. Pub. L. No. 101-549, §§ 107(d), 108(j) (codified at 42 U.S.C. §§ 7601(d), 7410(o)). *See generally* Dean B. Suagee, *Indian Country Environmental Law*, Ch. 15A, §§ 15A.02[2][c], 15A.05[1][b], in ENVIRONMENTAL LAW PRACTICE GUIDE (Michael B. Gerrard, general ed., 2008 ed.). Tribes that do not choose to be treated like states can nevertheless influence Clean Air Act permits, including a range of options under the Federal Implementation Plan for Indian country. *See* Environmental Protection Agency, Review of New Sources and Modifications in Indian Country: Final Rule, 76 Fed. Reg, 38,748 (July 1, 2011) (to be coifed in various provisions of 40 C.F.R. parts 49 and 51).

[50] *See* Architecture 2030 website at http://www.architecture2030.org/current_situation/building_sector.html.

[51] Architecture 2030 website at http://www.architecture2030.org/2030_challenge/the_2030_challenge.

[52] Roberta Youmans, *Federal Housing Finance Board, Native American Housing Needs & Proposed Recommendations*, Background Paper for the Millennial Housing Commission (April 2000).

more affordable for Indian families to heat and cool. The Energy Independence and Security Act of 2007 requires that most federally subsidized new housing conform to the standards in the 2006 version of the International Energy Conservation Code,[53] but this requirement does not apply to federally-subsidized Indian housing funded by the Department of Housing and Urban Development pursuant to the Native American Housing and Self-Determination Act (NAHASDA).[54] For housing built with NAHASDA, while energy efficiency investments are allowable, there is a countervailing regulatory requirement to keep the construction coats within a prescribed limit.[55] With a long waiting list for new homes, there may be local political pressure not to exceed the assigned cost limit, since doing so would likely mean fewer new homes.

Building Codes One governmental policy tool that could be used by tribes to make new homes energy efficient would be to enact and enforce building codes that include energy efficiency standards. Since the Energy Policy Act of 1992,[56] the Department of Energy has been authorized to provide assistance to states and local governments to ratchet up the energy efficiency standards in their building codes, but this assistance program has never been available to tribal governments. The existing law[57] provides that, whenever the International Code Council revises its International Energy Conservation Code (IECC) for residential buildings, and whenever the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) revises its commercial building standards, the Secretary of Energy will make a determination as to whether the code revisions will improve the energy efficiency of buildings. If the Secretary makes such a determination, then each state shall review its buildings codes in light of the revised standards and determine whether or not to revise its codes accordingly. The current law provides for the Department of Energy to provide technical assistance to states and incentive funding for states to implement the enhanced codes. In states without a statewide building code, local governments are eligible for the incentive funding.

The existing statutory language does not mention tribal governments, and tribes have been left out for most of the two decades that this federal assistance program has been authorized. While this has not been a large federal assistance program there never has been any justification for leaving tribal governments out. Most likely, the drafters of the original legislative language just did not think about Indian tribes as governments with the authority to enact and enforce building codes. Under traditional principles of federal Indian law, on lands within tribal jurisdiction, tribal governments have the inherent sovereign authority to enact and enforce building codes, and the existing statutory language does not affect this aspect of tribal sovereignty, nor does it grant authority to states to impose their building codes on lands within tribal jurisdiction. Fortunately, there have been some indications that this program is beginning to reach out to include tribal governments.[58]

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[53] Pub. L. No. 110-140, § 481 (codified at 42 U.S.C. § 12709).
[54] 25 U.S.C. §§ 4101 – 4243.
[55] The NAHASDA regulations emphasize the upfront costs of home construction by establishing a "total development cost" for each tribe, 24 C.F.R. § 1000.158, not the lower operating costs that could be achieved through energy efficiency.
[56] Pub. L. No. 102-486, § 101(a)(2); 106 Stat. 2783 (codified at 42 U.S.C. § 6833).
[57] The existing statutory language, sometimes referred to as section 304 of the Energy Conservation and Production Act [of 1976], was enacted by the Energy Policy Act of 1992 and was substantially amended by the Energy Policy Act of 2005. Pub. L. No. 109-58, § 128.
[58] Presentation by staff of Pacific Northwest National Laboratory at the national workshop "Renewable Energy for Tribal Community Development," Denver, CO, June 28-30, 2011. For information on the DOE Energy Codes program, see U.S. Dep't of Energy's Building Energy Codes Program webpage, http://www.energycodes.gov.

The climate change bill that was passed by the House in June 2009[59] would have replaced the statutory language[60] with new language intended to put us on path so that by 2030, the net energy consumption of new residential and commercial buildings would be close to zero.[61] In other words, the bill endorsed the Architecture 2030 challenge. If there eventually is federal legislation to move toward a net-zero energy standard for new construction, tribes should be included, but even without federal legislation, tribes could endorse the Architecture 2030 challenge.[62]

Passive Solar Design Realistically, how do we get to net-zero energy? In addition to energy efficiency, we should be promoting much wider adoption of the collection of techniques known as passive solar design. "Passive" solar heating systems generally capture sunlight, store it as heat, and move the heat to where it is needed without mechanical inputs such as pumps and fans.[63] Passive solar is sometimes distinguished from "active" solar, in which fans and pumps are used, although this distinction may not be not all that significant; "hybrid" solar heating systems use both passive and active features.

Passive solar design techniques can meet a substantial part of the space heating load in most regions, although passive design has not been prominently featured in the green building movement.[64] In all passive solar space heating systems, there are two essential elements: aperture (south-facing glass or some other glazing material) to let the sunlight in, and thermal mass (e.g., masonry, concrete) to absorb sunlight and store it as heat. These two elements are relatively easy to incorporate into new construction without adding much to cost, but generally not so easy to do in retrofit. Orientation has to be done correctly from the start—south-facing glass requires a south-facing wall. (And west-facing windows should be kept to a minimum—by adding to cooling loads, they increase the demand for power and can be said to cause power plants.) Similarly, if you do not have enough mass on the inside of a building, adding some later presents a challenge. There are many nuances in passive design. Design options can be evaluated with software such as "Energy 10" (for buildings of 10,000 square feet or less), which was developed by the National Renewable Energy Laboratory (NREL).[65]

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[59] American Clean Energy and Security Act, H.R. 2998, § 201, *supra* note 35. Section 201 as passed by the House did include some references to tribes, but the treatment of tribes was not really consistent with their sovereign status.

[60] Currently codified at 42 U.S.C. § 6833.

[61] This basic concept was incorporated into the House-passed American Clean Energy and Security Act, H.R. 2998, § 201, *supra* note 35. That bill used the 2006 version of the International Code Council (ICC) Residential Energy Code (REC) as the baseline for homes, with incremental reductions in energy consumption pegged to that baseline, moving toward net-zero energy by 2030.

[62] A list of states, local governments, and others that have endorsed the Architecture 2030 challenge is available at http://architecture2030.org/2030_challenge/adopters.

[63] *See generally* EDWARD MAZRIA, THE PASSIVE SOLAR ENERGY BOOK (Rodale Press, 1979). *See also* U.S. Department of Energy's Passive Solar Home Design webpage, http://www.energysavers.gov/your_home/designing_remodeling/index.cfm/mytopic=10250.

[64] *E.g*,, THE LAW OF GREEN BUILDINGS: REGULATORY AND LEGAL ISSUES IN DESIGN, CONSTRUCTION, OPERATIONS, AND FINANCING (J. Cullen Howe & Michael B. Gerrard eds. 2010)¸ contains but a single reference to passive solar, in Michael J. Zimmer and Jennifer M. Rohlender, *Green Building Financing*, *id.* at 103, 106 (noting that the installation of active and passive solar technologies is eligible for the energy efficient mortgage program administered by the Federal Housing Administration).

[65] Energy 10 is available from the Sustainable Buildings Industries Council, *see* http://www.sbicouncil.org/energy-10-software. Energy 10 can be used to analyze and choose among the various options, including daylighting, passive cooling and ventilation, solar hot water, and photovoltaics.

What can be done to rectify the neglect of passive solar? One step would be to re-tool land use planning laws to facilitate building orientation for solar design. The other obvious governmental policy tool is building codes. Here is one idea about how to incorporate passive solar into building codes. Consider the Architecture 2030 challenge. To achieve net-zero energy as the standard practice for new construction and major renovations by 2030, Architecture 2030 calls for a set of interim targets: all new buildings should be designed to consume 60% less fossil fuel energy than the current regional average for that building type. The targets are ratcheted to 70% less in 2015, 80% less in 2020, 90% less in 2025, and carbon neutral by 2030.

Building codes could include a performance-based standard that makes incremental targets such as those specified in by Architecture 2030 legal requirements. For each building permit, a similar building that conforms to the IECC could be the baseline or reference case. A design tool such as the Energy 10 software could be used to refine the proposed building design, adding passive and other energy saving features, until it achieves the required target for energy consumption. Under this approach, no specific passive techniques would be required; rather, the permit applicant could choose the mix of techniques. Tribal governments could enact such codes. A variation on this idea would be for the governmental agency charged with administering the building code to help applicants for building permits meet the prescribed energy savings increments, in effect, treating code compliance as providing a public service. Tribal housing authorities, and tribally designated housing entities, could also provide such assistance. Passive design features could be integrated into new community buildings such as schools, clinics, and government offices. Showcasing passive solar in this way could build demand for passive solar in homes and other private buildings.

Retrofitting Existing Buildings Energy efficiency in new buildings is a big part of the solution, but we also need to be sure that federal assistance programs for retrofitting existing homes include tribal governments in appropriate ways. What should a program to retrofit existing buildings in Indian country look like and how much federal funding would be needed? There are a few existing models, but the best plan would be for the federal government to fund a network of regional assistance programs, designed in consultation with tribal governments, inter-tribal organizations, and tribal colleges, with engagement of all the relevant federal agencies and with input from the State Energy Program offices, national laboratories, and interested institutions of higher education.

One of the existing home retrofit programs, the Department of Energy's Weatherization Assistance Program, which is administered by the states, includes a mandate that low-income members of Indian tribes receive assistance equal to that provided to other low-income persons in each state.[66] In practice, the process in the regulations for tribes to receive direct funding has not worked—only a few tribes administer this program. In addition to making the Weatherization program work better in Indian country, there is a need for a retrofit program with a broader scope. One existing authorized program that could be useful in developing a broader building retrofit program is the Energy Efficiency and Conservation Block Grant (EECBG), which was

[66] 42 U.S.C. § 6863(d); *see also* 10 C.F.R. §§ 440.12, 440.13.

authorized in 2007.[67] The tribal part of this program ought to be funded on a recurrent basis to help tribes maintain energy efficiency offices.

Transportation and Land Use Planning

Transportation accounts for about 28% of energy consumption in America, and contributes 33% of our current CO_2 emissions.[68] There are essentially three main ways of reducing CO_2 emissions associated with transportation: make motor vehicles more efficient (thus reducing emissions per mile traveled); shifting from petroleum to renewable energy (biofuels and/or electric and hybrid electric cars powered by renewable energy); and reducing the amount of travel we do in private motor vehicles. The third option includes making public transportation more widely available and reducing the need to use our cars by changing our approach to land use regulation.

Setting efficiency standards for motor vehicles has been treated as a matter of federal law[69] and is a matter that is largely beyond the reach of tribes as governments, as are the ultimate technology choices we make in shifting away from petroleum as our main fuel source for motor vehicles. Tribes can, of course, demonstrate leadership in the choices they make for their own vehicle fleets, and tribal leaders could become engaged in public discourse about these policy issues. If the next great technology for automobiles turns out to be plug-in hybrid electric vehicles (PHEVs) that are increasingly powered with renewable electricity, then tribal governments should be part of making that happen. This would include making sure that Indian country is not left out of the deployment of the smart grid for distribution of electric power, since it is the smart grid that enables PHEVs to become "rolling energy storage units," to use a term coined by Thomas Friedman.[70]

We need not wait for the next great transport technology, however, to reduce emissions from the transportation sector. We can start by reducing the need for motor vehicle travel through land use planning. This involves a set of policy tools that are within the realm of state and local governments. As a matter of principle, this should be within the scope of authority of tribal governments, although as a matter of case law, there are some impediments to land use planning by tribes on reservations in which lands have been removed from Indian trust or restricted title status.[71]

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[67] Energy Independence and Security Act, Pub. L. No. 110-140, §§ 542 - 545 (42 U.S.C. §§ 17152 – 17155) (including a 2% set-aside for Indian tribes). The range of activities that tribes can carry out under the EECBG program makes it somewhat comparable to the State Energy Program, 10 C.F.R. part 420, through which states provide a wide range of energy assistance. The State Energy Program has been authorized for more than 30 years. 42 U.S.C. § 6321. There has never been a comparable program for tribal governments.

[68] *U.S. Energy Consumption by the Transportation Sector*, BUREAU OF TRANSP. STATISTICS, U.S. DEP'T OF TRANSP. (Oct. 2010), http://www.bts.gov/publications/national_transportation_statistics/html/table_04_04.html; *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2009* at ES-8, U.S. ENVTL. PROT. AGENCY (April 2011), http://www.epa.gov/climatechange/emissions/downloads10/US-GHGInventory-2010_Report.pdf.

[69] 49 U.S.C. 32901 et seq.; 49 C.F.R. parts 531 (automobiles) and 533 (light trucks).

[70] FRIEDMAN, *supra* note 11, at 225.

[71] Brendale v. Confederated Tribes & Bands of Yakima Nation, 492 U.S. 408 (1989) (holding that the Tribe had authority to impose its zoning law on fee lands within the so-called "closed" area of the Reservation but not on fee lands within the "open" area). *See* COHEN'S HANDBOOK OF FEDERAL INDIAN LAW § 4.02[3][c][1] (2005 ed.).

Unfortunately, land use regulation as it has been practiced in the United States throughout most of the twentieth is a big part of the problem. The basic approach of "zoning"—separating industrial, commercial, and residential districts from each other—made a certain amount of sense when industrial zones were dominated by smokestack industries. When combined with federal and state subsidies for road construction, federal tax incentives for single family housing, the traditional zoning approach to land use regulation has promoted sprawl.[72] Sprawl has been described as consisting of five basic components: housing subdivisions that are exclusively residential, shopping centers, office and business parks, civic institutions, and roadways.[73] The net effect of having four components for different daily activities connected by roadways is that people spend an inordinate amount of time and money moving from one component to another, emitting CO_2 all the way.

In response to a host of problems associated with sprawl, new approaches to land use planning have emerged, including "smart growth"[74] and "new urbanism."[75] These terms are not mutually exclusive but, rather, overlap quite a bit in content. Smart growth is a term with roots in land use regulation that generally emphasizes restoring center cities and older suburbs. New urbanism is a term that describes a school of thought among professionals of various disciplines, a school of thought that emphasizes mixed-use (residential and commercial), walkable neighborhoods in which basic daily needs can be satisfied without automobile trips, and in which civic buildings (schools, government offices) and public spaces are convenient and contribute to a sense of community.[76]

Recognizing sprawl as a problem is a necessary step in curbing our greenhouse gas emissions. An important step in controlling sprawl is to become aware that there are alternative approaches to land use planning, approaches that, in addition to reducing the need for motor vehicle travel also render communities more enjoyable places in which to live.

In their efforts to engage in land use planning, tribal government officials could draw upon the lessons of the smart growth movement and new urbanism. Although these approaches to planning arose in the context of urban and suburban America and the challenges of planning are different in rural settings common to many Indian reservations, some aspects of these new approaches are nevertheless transferable. After all, reliance on motor vehicles is at least as problematic in Indian country as in suburbia. Although there are limits, to be sure, on tribal regulatory authority over fee lands, tribes do have quite a lot of practical authority for land use planning, including their ability to decide where to locate major community buildings such as schools, clinics, and government offices. Such location decisions can serve to promote walking and bicycling as practical alternatives to driving. Land use planning can also facilitate net-zero energy in buildings by designing subdivisions and lots so as to maximize orientation for solar design.

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[72] ANDRES DUANEY ET AL., SUBURBAN NATION: THE RISE OF SPRAWL AND THE DECLINE OF THE AMERICAN DREAM 5-12(2000); ROBERT H. FREILICH, FROM SPRAWL TO SMART GROWTH: SUCCESSFUL LEGAL, PLANNING, AND ENVIRONMENTAL SYSTEMS 3-9 (1999).
[73] DUANEY ET AL., *supra* note 72 at 5-7.
[74] *See* FREILICH, *supra* note 72. *See also* Smart Growth Network's website, http://www.smartgrowth.org.
[75] *See* DUANEY ET AL., *supra* note 72. *See also* New Urbanism website, http://www.newurbanism.org/.
[76] DUANEY ET AL., *supra* note 72, at 183-212.

Electric Power

The electric utility industry is especially important in making the transition to the renewable energy future, because to a large extent, renewable energy will be brought to market in the form of electricity. As it currently exists, this industry is a big part of the problem of global warming. Generating electricity accounts for 42% of the U.S. share of CO_2 emissions, and the U.S., with 5% of the world's population, is responsible for 23% of the world's CO_2 emissions.[77] This means that 10% of all the CO_2 emissions worldwide come from electric power plants in the United States. This hopefully will change as the electric power industry evolves into a big part of the solution to global warming.

The electric utility industry has historically been a highly regulated industry, subject to a complex mix of federal and state laws.[78] Tribes as sovereign governments have the power to create and regulate electric utilities to serve lands under their jurisdiction, and a small number of tribes have done so.[79] For most tribes, it will probably be more likely for them to interact with the electric power industry as owners of, or joint venture partners in, utility scale renewable energy projects. Doing so will require detailed knowledge of the regulatory framework governing the utilities with which the tribe has dealings.

Much of the basic regulatory framework for the electric power industry was fashioned in the early twentieth century, long before the self-determination era of federal Indian policy, when the sovereign status of Indian tribes was not given much thought in the national consciousness. The regulatory framework has evolved quite a lot in the past three decades. There are two broad trends in this evolution.[80] One trend has been restructuring, with movement toward more competition, and the other trend is a growing role for the federal government.[81] This section provides an overview of the regulatory framework and the trends in its evolution.

Overview of the Electric Utility Industry The electric power industry has existed for more than a century, and a number different models have evolved for how electric utilities can be created, operated, and regulated. The range of models includes: investor-owned utilities (IOUs); publicly owned utilities (municipal power companies, public power districts, state power authorities); rural electric cooperatives; and federal power authorities.[82] According to the Energy

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[77] ASES Report, *supra* note 3, at 168-69. *See also* Chuck Kutscher, *Confronting the Climate Change Crisis: What is the Evidence, and What Can We Do About It?*, *in* Solar Today, July/Aug. 2006, at 28, 31 (with attribution to the U.S. Energy Information Administration).

[78] U.S. Energy Information Administration, Electric Power Industry Overview, http://www.eia.doe.gov/cneaf/electricity/page/prim2/toc2.html [hereinafter EIA Overview].

[79] A non-exhaustive list of tribes that have established electric utilities includes the Confederated Salish and Kootenai Tribes, Fort Mojave Indian Tribe, Gila River Indian Community, Metlakatla Indian Community, Navajo Nation, Tohono O'odham Nation, and Yakama Nation.

[80] Jeffery S. Dennis, *Twenty-Five Years of Electricity Law, Policy, and Regulation: A Look Back*, 25:1 NAT. RES. & ENV'T 33 (2010).

[81] *Id.*

[82] *See generally* STEVEN FERREY, LAW OF INDEPENDENT POWER: DEVELOPMENT COGENERATION UTILITY REGULATION §§ 5:1 to 5:3 (1989). It should be noted that the terms used in this paper to describe these categories of utilities, while widely used, are not universal. Investor owned utilities, for example, are sometimes referred to as "public" utilities, in part because their stock is publicly traded, and many IOUs have the words "public service" in their company name. This usage of the word "public," however, should be distinguished from utilities created and operated by cities and other units of local government, which are owned not by shareholders but rather by the citizens living and voting within the jurisdiction of a local government. The term

Information Administration (EIA), an agency within the U.S. Department of Energy (DOE), there are more than 3,170 electric utilities in the United States, including 210 IOUs, 2,009 publicly-owned utilities, 883 consumer-owned rural cooperatives, and 9 federal utilities.[83] There are also a small number of electric utilities that have been created by tribal governments, although these tend to be ignored in federal and industry statistics.[84]

In some ways the industry still reflects some of the basic public policy decisions that were made nearly a century ago. Some of those historic policy decisions involve the fundamental issue of whether electric power is a commodity to be sold for profit or as a public service to promote community development. As the industry has evolved in the United States, the resolution of this basic policy issue is that electricity is *both* a commodity and a public service, with some models for operating in this industry emphasizing one view over the other. The IOUs tend to emphasize profits while publicly-owned utilities tend to put more emphasis on service.

Historically, the electric utility industry has been seen as performing three basic functions: generation of electric power, transmission of power over high-voltage lines, and distribution of power to consumers.[85] Throughout most of the 20th century, many electric utilities were vertically integrated, in that they performed all three of these functions. In the early decades of the 20th century, federal and state laws were enacted that treated the retail distribution of electricity as a "natural monopoly." In the absence of a competitive marketplace, investor-owned utilities (IOUs) were made subject to regulation by state regulatory agencies commonly known as "public utility commissions" (PUCs),[86] which set the rates that IOUs charge their retail customers. The federal government regulates the transmission of power in interstate commerce through the Federal Energy Regulatory Commission (FERC).[87] The involvement of the federal government in the electric power industry has continued to grow.[88]

Non-Utility Generation Some of the most dramatic changes in the electric power industry over the last three decades or so have to do with the development of generating facilities that are not owned by electric utilities.[89] The rise of non-utility generation has resulted from a number of factors, including federal support for technological development using renewable resources. In

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"publicly-owned" is sometimes used to describe both municipals and state power authorities. Sometimes the rural coops are also included in this term, although that is not really accurate since they are private, non-profit membership organizations.

[83] EIA Overview, *supra* note 78. *See also* American Public Power Association (APPA)'s website, http://www.publicpower.org/; National Rural Electric Cooperative Association (NRECA)'s website, http://www.nreca.coop; Edison Electric Institute (EEI)'s website, http://www.eei.org/ (EEI is the association of IOUs).

[84] *E.g.*, the EIA Overview, *supra* note 78, does not expressly mention tribal electric utilities, although on close examination of the data on the EIA website it appears that tribal electric utilities are included in the publicly-owned category. FERREY, *supra* note 82, includes some discussion of tribal electric utilities, at § 5:4, and cites U.S. Department of Energy testimony before the Senate Committee on Indian Affairs on February 25, 2004, that there were, as of that date, four full service tribal utilities. *Id*. There are also a few Indian reservations where the U.S. Bureau of Indian Affairs operates an electric utility. *See* 25 C.F.R. part 175. The EIA Overview includes the BIA as one of ten federal electric utilities.

[85] A fourth basic kind of function might be considered to include billing, metering, administrative tasks, and customer service. Walter R. Hall II et al., *supra* note 39. This function will become more important as we implement the smart grid. *See infra* text accompanying notes 105-109.

[86] *See* FERREY, *supra* note 82, at § 5:2.

[87] Congress gave the FPC this authority in response to a U.S. Supreme Court ruling that it was contrary to the Commerce Clause of the Constitution for a state PUC to regulate of the sale of power from a utility in one state to a utility in another state. Public Utilities Commission of Rhode Island v. Attleboro Steam & Electric Co., 273 U.S. 83 (1927).

[88] *See* Dennis, *supra* note 80.

[89] As of 2007, there were some 1,730 non-utility generators. EIA Overview, *supra* note 78.

addition to direct federal funding, a range of federal and state tax credits have been enacted to encourage investments in renewable energy technologies.

One of the key regulatory developments that contributed to the rise of non-utility power was the enactment in 1978 of the Public Utilities Regulatory Policies Act (PURPA),[90] which included provisions relating to the interconnection of IOUs and "qualifying facilities" (QFs),[91] a term that includes small power producers using renewable resources (solar, wind, biomass, and geothermal) and co-generation facilities (which produce both electricity and heat that is put to use rather than wasted). Not all non-utility producers are QFs, because they are larger than the size limits specified in PURPA, because they do not use renewable resources, or because they are not co-generators in that they not make use of their waste heat. The term "independent power producers" (IPPs) is used to describe non-utility projects that use renewable energy but which are not QFs. The EIA uses the term "nonutility power producers" as a term that includes QFs, Cogenerators (whether or not they are QFs), IPPs, and Exempt Wholesale Generators (EWGs).[92] The growth of nonutility renewable energy in the last decade or so has been driven, in large part, by "renewable portfolio standards" (RPS) imposed at the state level.[93] An RPS requires each covered utility to include a certain amount of renewable electricity in its energy supply by a certain date.[94]

Competition and "Unbundling" Electric Utilities During the 1990s, many state legislatures and PUCs adopted policies to promote competition in retail markets for electricity, generally based on the rationale that such competition would help to hold down the prices charged to consumers.[95] The shift toward promoting competition was accompanied by relaxing or eliminating mandates that had previously been imposed on IOUs to establish programs to help

[90] Pub. L. No. 95-617, title II.

[91] Pub. L. No. 95-617, § 210 (codified as amended at 16 U.S.C. § 824a-3). The statutory mandate for interconnection of QFs was modified in the Energy Policy Act of 2005. Pub. L. No. 109-58, § 1253, 119 Stat. 594 (2005). FERC was directed to determine whether the marketplace is sufficiently competitive such that the QF is able to sell its power; if so, then utilities are relieved of the obligation to buy it. FERC issued a final rule to implement this amendment to PURPA. Federal Energy Regulatory Commission, New PURPA Section 210(m) Regulations Applicable to Small Power Production and Cogeneration Facilities, Final Rule, Order on Rehearing, Docket No. RM06-10-001, Order No. 688-A (June 22, 2007), revising Order No. 688, 71 Fed. Reg. 64,342 (Nov. 1, 2006), FERC Stats. & Regs. ¶ 31,233 (2006) (Final Rule) (to be codified at 18 C.F.R. part 292). Pursuant to this rule there is a rebuttable presumption in some regions that QFs do have nondiscriminatory access to markets, except that, for QFs of 20 MW or less, there is a rebuttable presumption that they do not. FERC has also published a final rule implementing related amendments to PURPA, including a change in the criteria for cogeneration facilities to be treated as QFs by requiring that the energy output be used in a beneficial and productive manner. Federal Energy Regulatory Commission, Revised Regulations Governing Small Power Production and Cogeneration Facilities: Final Rule, 71 Fed. Reg. 7,852 (Feb. 15, 2006); same, final order on rehearing, 71 Fed. Reg. 30,585 (May 30, 2006).

[92] The category of exempt wholesale generators (EWG) was authorized by the Energy Policy Act of 1992. Pub. L. No. 102-486, 106 Stat. 2776 (1993) (formerly codified at 15 U.S.C. § 79z-5a, but that section was repealed by The Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 974 (Aug. 8, 2005) and recodified at 42 U.S.C. § 16451). Unlike QFs, these EWGs are not required to use renewable fuels, and IOUs are not required to buy power from them. The main legal benefit given to them is that they are not regulated as electric utilities.

[93] *See* Hodas, *supra* note 32, at 355-59.; *see also* Donald S. McCauley, et al., *Renewable Portfolio Standards*, *in* CAPTURING THE POWER OF ELECTRIC RESTRUCTURING 175 (Joey Lee Miranda, ed, 2009).

[94] Stephen C. Braverman, *State Renewable Portfolio Standards and the Commerce Clause*, 25:4 NAT. RES. & ENV'T 15 (2011) (noting that as of September 2010, 32 states had adopted some type of RPS). The Database of State Energy Incentives for Renewables and Efficiency (DSIRE) provides information on state RPS policies at www.dsireusa.org.

[95] *See generally* Walter R. Hall II et al., *supra* note 39.

consumers adopt energy conservation measures,[96] though more recently IOUs are increasingly engaged in energy efficiency programs.

Competition in the utility industry has also been promoted through rules issued by FERC, including a rule to "unbundle" the sale of electricity at wholesale from the transmission of electricity,[97] and a rule to ensure open access to transmission facilities.[98] The unbundling of generation from transmission has led to the creation of independent system operators (ISOs), entities that manage transmission systems but have no financial stake in generating facilities.[99] In 1999, FERC issued an order on Regional Transmission Organizations (RTOs),[100] a term that includes both non-profit ISOs and for profit entities.[101] FERC has issued several other decisions and rules relevant to the restructuring of the electric utility industry including a rule codifying and revising its standards for "market-based rates" for wholesale sales of electric energy by public utilities.[102]

The Grid The "grid" is the network of transmission and distribution wires and other facilities that connect electric power generators and end users. The grid is currently evolving into the "smart grid," in which information technology is becoming integrated into the electric power infrastructure.[103] By integrating real-time, two-way communication with the delivery and use of electric power, the smart grid will yield a wide range of benefits. Of particular importance for renewable energy development, the smart grid will enable major improvements in the integration of distributed generation and storage options. For example, with the smart grid, a homeowner whose photovoltaic array helps a utility meet its peak demand could be paid accordingly. "Net metering" is a step in this direction, but the smart grid allows for much more precision in pricing. The smart grid will also enable plug-in hybrid electric vehicles to be used as "rolling energy storage units,"[104] in which their batteries provide storage and back-up capacity for intermittent wind and solar sources.

Of course, the smart grid is not really *evolving*. Rather this transition is being driven by proactive decisions and investments by many actors: utilities, regulators, lawmakers, and others. The extent to which Indian country helps lead the way or lags behind will turn, in large part, on the extent to which tribal leaders become engaged in making this transition happen.

As the grid becomes smarter, we must also deal with issues relating to the high-voltage transmission part of the grid, such as how to allocate the costs of upgrading existing lines and

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[96] *See* NATIONAL ACTION PLAN FOR ENERGY EFFICIENCY, at Ch. 2 (2006), *available at* http://www.epa.gov/cleanenergy/documents/suca/napee_report.pdf.

[97] FERC, Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities; Order No. 888, FERC Stats. & Regs. ¶ 31,036 (1996).

[98] Open Access Same-Time Information System and Standards of Conduct, Order No. 889, FERC Stats. & Regs. ¶ 31,035 (1996).

[99] *See generally* FERREY, *supra* note 82, at § 10:87.

[100] Regional Transmission Organizations, Docket No. RM99-2-000, 89 FERC ¶ 61,285 (12-20-99).

[101] *See generally* FERREY, *supra* note 82, at § 10:91.

[102] Market-Based Rates For Wholesale Sales of Electric Energy, Capacity and Ancillary Services, Docket No. RM. 04-7-000, Order No. 697 (June 21, 2007) (to be codified at 18 C.F.R. part 35).

[103] *See* U.S. DEPARTMENT OF ENERGY, SMART GRID SYSTEM REPORT (2009), *available at* http://www.oe.energy.gov/DocumentsandMedia/SGSRMain_090707_lowres.pdf.

[104] *See* FRIEDMAN, *supra* note 11, at 225.

building new ones, and how to decide where new lines will be built.[105] One of the issues is what to emphasize in the future for the transmission part of the grid. One camp in the debate advocates a "nationwide 'backbone' system of extra-high voltage (EHV) lines to move power over great distances" which would facilitate "large-scale renewable generators."[106] The other camp advocates an emphasis on "a more localized grid, aimed at facilitating the development of local generation sources."[107] The localized emphasis would facilitate rooftop photovoltaics and community-scale wind and biomass generators. This is not necessarily an "either-or" issue; rather, incremental decisions may seek to balance the recommendations of both camps. Different tribes may find their interests aligned with either side in this debate. For example, Great Plains tribes with wind resources[108] may favor the "backbone" approach, while others may emphasize the localized approach. In any case, tribes should be aware of and engage in discussions regarding these issues. It should be noted that tribes have authority to control the use of their trust lands for transmission lines.[109] This authority is not only the power to block transmission lines but also the power to facilitate them, depending on a range of issues relating to off-reservation routes.

What Can Tribal Governments Do? In a subject matter that has largely been regulated by states and in which possible roles for tribal governments have been largely overlooked, how should tribes fit into this picture? What roles should tribal governments perform in helping to shape the evolution of the industry? One approach is to create a tribal electric utility, as a small number of tribes have done.[110] This approach seems particularly useful if the tribal government is mostly concerned with the distribution part of electric power service. There are different ways that a tribal electric utility can be structured, a subject not discussed in this chapter, except to note that its governance structure should be somewhat insulated from politics and, if a governmental entity, it will need to have a limited waiver of the tribe's sovereign immunity so that it can enter into contracts. The municipal model in non-Indian America seems like a generally appropriate model to draw upon.

A tribal electric utility, of course, need not be limited to distribution but might also include other facets of the industry as well, such as providing energy efficiency services for customers or developing utility-scale renewable generating plants. A tribal utility could become innovative in providing energy-related services, perhaps looking to innovative utilities[111] for

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[105] *See* John R. Norris & Jeffery S. Dennis, *Electric Transmission Infrastructure: A Key Piece of the Energy Puzzle*, 25:4 NAT. RES. & ENV'T 3 (2011.)
[106] *Id*.
[107] *Id*. at 6.
[108] Robert Gough, *Tribal Wind Power Development in the Northern Great Plains*, 19:2 NAT. RES. & ENV'T 57 (2004). *See also* Michael L. Connolly, *Commercial Scale Wind Industry on the Campo Indian Reservation*, 23:1 NAT. RES. & ENV'T 25 (2008).
[109] 25 C.F.R. § 169.3. *See* U.S. DEPARTMENT OF ENERGY & U.S. DEPARTMENT OF THE INTERIOR, ENERGY POLICY ACT OF 2005,SECTION 1813 INDIAN LAND RIGHTS-OF-WAY STUDY: REPORT TO CONGRESS (2007), *available at* http://www.oe.energy.gov/DocumentsandMedia/EPAct_1813_Final.pdf.
[110] *See supra* note 82 and accompanying text.
[111] *E.g.*, Sacramento's municipal utility (known as SMUD) offers sub-meter installation and discounted rates for plug-in electric vehicle charging stations; a Cool Roof program which provides an incentive to homeowners to install roofing products that meet SMUD's solar reflectivity and emissivity standards; free shade trees for homes with eastern, western or southern exposures; a Carbon Offset program which funds local carbon-reduction projects like a methane-gas digester for a local dairy farm; and a Greenergy program, through which SMUD meets up to 100% of electricity usage with power generated from renewable resources, and uses Greenergy contributions to build more local, renewable energy sources. *Quick Guide to SMUD Programs and Services*, SACRAMENTO MUNICIPAL UTILITY DISTRICT, http://www.smud.org/en/about/Pages/programs-services.aspx (last visited July 26, 2011). Austin, TX's municipal utility, Austin Energy, offers a GreenChoice renewable energy program that provides

examples and perhaps being innovative in its own right. A few ideas for the kinds of services that might be provided include: providing solar design services for new and existing buildings; making the arrangements (technical and financial) to install photovoltaic arrays on rooftops and parking lot shade structures; implementing the smart grid in tribal communities, with the realm of possibilities that will open up; and promoting the deployment of plug-in hybrid electric vehicles such as by owning and servicing the battery packs in tribal government vehicle fleets. By providing services that customers want, a tribal utility might be able to establish unchallenged governmental authority through the "consensual relations" exception to the general proposition, as stated in *Montana v. United States*, that tribes have been implicitly divested of regulatory jurisdiction over non-Indians on fee lands within their reservations.[112]

A tribal electric utility could have a subsidiary charged with developing utility-scale renewable energy projects, including negotiating power purchase agreements and managing the complex venture structures that seem to be necessary to attract private investment capital. Given that tribal governments are non-taxable entities, they need taxable equity partners to be able to use tax credits, and one way of doing this is a "partnership flip" arrangement in which the tribal entity does not hold much equity until the tax benefits have been exhausted.[113] A tribal electric utility should also develop expertise in the full range of financing options that could be used, including different kinds of bonds and related mechanisms.[114]

Of course, a tribe need not establish an electric utility to become engaged in providing various kinds of energy-related services, or in developing renewable energy projects to serve tribal needs or to sell power to others. Many of these kinds of services can be provided through existing government institutions or tribal enterprises, or through new entities created for specific purposes. Schools and tribal colleges should be prominently featured, since they can play key roles in community education about energy and climate issues and since they can help educate tribal citizens for green energy jobs.

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customers with a fixed rate charge instead of a traditional fuel charge while buying energy produced from 100% renewable sources; rebates to customers who install solar water heaters, solar photovoltaics, and plug-in electric vehicle charging stations; and one of the nation's oldest Green Building programs, which is responsible for implementing the City of Austin's energy code and rating buildings for sustainability. *Environmental Initiatives*, AUSTIN ENERGY, http://www.austinenergy.com/About%20Us/Environmental%20Initiatives/index.htm (last visited July 26, 2011).

[112] Montana v. United States, 450 U.S. 544, 565-66 (1981). *See* COHEN'S HANDBOOK OF FEDERAL INDIAN LAW § 4.02[3][c] (2005 ed.). Yakama Power, the tribal utility serving the Yakama Reservation, has reportedly had some success with this approach by offering customers high-speed internet service. Presentation by Raymond Wiseman, General Manager, Yakama Power, at the national workshop "Renewable Energy for Tribal Community Development," Denver, CO, June 28-30, 2011.

[113] *See* DOUGLAS C. MACCOURT, RENEWABLE ENERGY DEVELOPMENT IN INDIAN COUNTRY: A HANDBOOK FOR TRIBES 80-83 (2010) available at http://www.nrel.gov/docs/fy10osti/48078.pdf. *See also* Donald M. Clary, *Commercial-Scale Renewable Energy Projects on Tribal Lands*, 25:4 NAT. RES. & ENV'. 19 (2011); Michael L. Connolly, *supra* note 108 (describing a farm developed through a lease of tribal land to a developer, in which the county derives as much revenue from taxes as the Tribe derives from the lease, even though the county provides no governmental services). It should be noted that, in meeting the requirement for federal agencies to purchase renewable electricity as provided in section 203 of the Energy Policy Act of 2005, tribal equity in a renewable energy facility is not required to qualify for the double credit a federal agency would receive for purchasing renewable energy that is produced on Indian lands. Pub. L. No. 109-58, § 203 (42 U.S.C. 15862). As of June 2010, however, this incentive had not been a factor in any renewable energy project on Indian lands. *See* DEPARTMENT OF ENERGY, ENERGY EFFICIENCY & RENEWABLE ENERGY: BIENNIAL REPORT TO CONGRESS ON THE PROGRESS OF THE FEDERAL GOVERNMENT IN MEETING THE RENEWABLE ENERGY GOALS OF THE ENERGY POLICY ACT OF 2005 (June 2010), available at http://www1.eere.energy.gov/femp/pdfs/2008_epact_sec203_report.pdf.

[114] *See* MACCOURT, *supra* note 113, at 65-88. *See also* John C. Dernbach et al., *Energy Efficiency and Conservation: New Legal Tools and Opportunities*, 25:4 NAT. RES. & ENV'T 7 (2011).

Tribes could join together to address unmet needs. One kind of need that sometimes goes unmet is the incremental cost of incorporating energy efficiency, renewable energy, and green building features into major community-scale buildings. Such buildings are typically built with funds from a variety of sources, some federal, some tribal, some other. Sometimes there is just not enough to actually build the project with all the green featured as designed. One approach to solving this problem would be to create a renewable energy development bank for Indian country. One model for such a development bank would be the Solar Energy and Energy Conservation Bank,[115] a federal agency that was authorized in 1980 and which went out of existence in 1988. A renewable energy development bank for Indian country could be chartered by federal legislation or it could be chartered by a collection of tribes. It could be capitalized, in part, with contributions from tribes with revenues from gaming or other sources. Tribes that contribute to such a development bank could reap substantial financial returns on their investments, as well as returns that cannot be quantified in monetary terms.

Conclusion

The climate crisis is real. The renewable energy revolution is just beginning. Whether it lives up to its potential to bring down CO_2 emissions on the order of magnitude we need is an open question. It surely will not happen without committed political leadership. Some of that leadership needs to come from American Indian and Alaska Native tribes and nations.

But political leadership by itself will not be enough. That leadership must be able to produce programs and projects that actually deliver emissions reductions by eliminating reliance on energy technologies that burn fossil fuels. The building sector offers enormous opportunities. From a technological perspective, buildings are the low-hanging fruit, which can be harvested with energy efficiency measures and passive solar design. This chapter has offered some ideas on how tribal governments could help lead in making net-zero energy the standard practice. Transportation and land use planning present challenges for tribes, especially for those in rural areas, but tribes do have some options, such as adopting land use policies that promote mixed-use walkable communities and that reduce reliance on motor vehicles. The electric power sector presents tribes with a wide range of challenges and opportunities. Tribal leaders should be proactive in bringing the smart grid to Indian country, which might entail creating tribal electric utilities. For tribes that have renewable resources with the potential to produce much more power than tribal communities need, utility-scale projects can deliver that power to off-reservation markets, if private investment capital can be tapped. Some changes in federal incentives would be helpful to promote tribal equity ownership of such projects.

Political leadership will also be needed to help articulate the reasons for pursuing the mix of programs and projects for moving toward a post-fossil fuels economy. Tribal leaders will surely want to draw attention to the short-term and local benefits of promoting energy efficiency and renewable energy, the lower operating costs, the jobs, the quality of life benefits. We also need them to draw attention to the big picture. If ever there was an environmental crisis calling us to action with the welfare of the seventh generation in our minds and in our hearts, this is it.

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[115] Solar Energy and Energy Conservation Bank was authorized by Title V of the Energy Security Act of 1980, Pub. L. No. 96-294, 94 Stat. 719 (12 U.S.C. §§ 3601-3620).