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Exploring How Today's Development Affects Future Generations Around the Globe

In This Issue: Sustainable Energy

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American University Washington College of Law

Editors' Note

At the heart of *Sustainable Development Law & Policy's* mission is the promotion of sound development practices, and at the heart of all sound development practices is a forward thinking energy policy. Very few subjects permeate through other areas of sustainable development as much as the impacts from traditional energy exploration, production, trade, and use.

Climate change is recognized as an international issue necessitating action from the global community. However, energy issues must be examined at the forefront of any effective climate agenda. For example, within the United States, energy-related carbon dioxide emissions resulting from fossil fuel combustion make up approximately 82 percent of our anthropogenic greenhouse gas ("GHG") emissions and 25 percent of all global emissions.[1] As the legal community tackles global warming, a reevaluation of energy consumption and production must occur because these activities are the largest contributor of GHG and the resultant climate problem.

In short, our energy dependencies have resulted in the need to increase regulation and decrease consumption. As one of the few industrialized nations left without comprehensive GHG regulations, the United States is loathe to be left out of the race in the development of new, clean, and efficient technologies to sustain our consumptive energy needs. The United States' global competitiveness and international credibility to support sound energy policies has been dim. However, the recent Supreme Court case *Massachusetts v. EPA*[2] results in a glimmer of hope that change is on the horizon. This decision allows the EPA to regulate carbon dioxide and pushes the federal government towards curbing GHG emissions from automobiles. This also strengthens the position of individual states leading the way with progressive energy regulations and GHG reductions. The future of energy policy in the United States is unknown, but as the greatest contributor of GHG gases, change must occur.

The planet cannot afford an energy policy that does not take into account environmental and climate impacts, just as it cannot afford to have a climate policy that ignores energy impacts. We hope this issue serves as a useful tool for those in the legal community, policy makers, and informed citizens who are working to ensure a sustainable energy future as we face the challenge of powering the 21st century.

Kelly Rain
Editors-in-Chief

Maria Vanko

[1] Energy Info. Admin., Greenhouse Gases, Climate Change, and Energy, Apr. 2004, *available at* http://www.eia.doe.gov/oiaf/1605/ggccebro/chapter1.html (last visited Apr. 17, 2007).

[2] Massachusetts v. EPA, No. 05-1120, 2007 WL 957332 (U.S. Apr. 2, 2007).

Features:

Overview: Intersection of Climate Security With Energy Production and Consumption

*by Vickie Patton**

Global warming is the most serious and profound impact associated with energy production and consumption. New energy policies may or may not aid in lowering global warming pollution. A rigorous climate security framework is essential to ensure the nation's collective energy investments drive global warming pollution to dramatically lower levels. In the United States, environmental advocates have pressed for a protective, declining national cap on global warming pollution to spur investments in low carbon energy technologies and to inextricably align energy policy with the imperative of science-based greenhouse gas ("GHG") reductions. While comprehensive national legislation to cap and reduce global warming pollution is essential, existing law should be fully enforced to harmonize today's energy production and consumption practices with climate security.

On April 10, 1998, then U.S. Environmental Protection Agency ("EPA") General Counsel Jonathan Cannon determined the Clean Air Act empowered EPA to regulate carbon dioxide, a principal heat-trapping gas.[1] On April 2, 2007, the United States Supreme Court agreed. In *Massachusetts v. EPA*,[2] the high Court held the statute's "sweeping" definition of "air pollutant" "embraces all airborne compounds of whatever stripe." "Carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons"—all principal GHGs—"are without a doubt 'physical [and] chemical. . . substance[s] which [are] emitted into . . . the ambient air.'"

The case made its way to the Supreme Court because EPA under the Bush administration decidedly reversed the Cannon legal opinion. EPA refused to establish emission limits for GHGs, withdrew the Cannon legal memorandum, and inserted in its place a new legal memo categorically declaring: "the CAA does not authorize EPA to regulate for global climate change purposes."[3]

The resulting delay in progress comes at a high cost. In the nine years since the April 1998 Cannon memorandum, U.S. sources alone discharged more than 60 billion tons of carbon dioxide into the atmosphere.[4] The extensive volumes of pollution escaping federal regulation perilously elevate carbon dioxide levels to the highest concentrations in 650,000 years.[5] The scientific imperative for strict limits on global warming gases has become grim and urgent.

But the Bush administration has staunchly refused to adopt mandatory national pollution limits on carbon dioxide levels or to participate in binding multinational accords. Internationally, the United States has devolved from a principal architect of the world's global warming policy to a marginal participant. Domestically, EPA has stymied rather than enabled state climate initiatives.[6]

The states alone have devised meaningful corrective action. States are adopting science-based timetables and goals to reduce global warming pollution, and the blueprints for achieving these reductions. The California Global Warming Solutions Act of 2006 requires returning GHG emissions—statewide—to 1990 levels by 2020.[7] California's urgent race to achieve these reductions is buffeted by an array of energy policy measures including laws to limit global warming pollution from motor vehicle tailpipes, expansive requirements for energy efficiency and renewable electricity generating resources, and the nation's first GHG emission limits for power plants.

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Numerous states have advanced mandatory limits on global warming pollution while national policy has retreated. A coalition of eastern states crafted a regional cap on carbon dioxide from the power sector. Five western states are now collaborating on a regional global warming pollution abatement program. With California, a dozen states east and west, have adopted programs to curb GHGs from motor vehicle tailpipes. These tailpipe limits now implicate over one-third of the U.S. motor vehicle fleet and two percent of the total GHGs in the Earth's atmosphere.

The diligence observed in the states sharply contrasts with the national political climate on global warming. Some opponents of national action argue the Clean Air Act's muscular power to address global warming should atrophy while Congress considers legislation. But, while Congress deliberates, the world's largest coal company has hired former House Majority Leader Dick Gephardt to fight legislative limits on carbon dioxide.[8] Notwithstanding the Supreme Court's historic decision, the forces of delay and diminishing returns are circling the beltway.

At the same time, countervailing forces for national leadership could not be more compelling. The science commands a protective, comprehensive solution. The states have incubated new policies and technologies that can be readily scaled up for national application. Major businesses such as Caterpillar and Shell have allied with conservationists in calling for rigorous caps on global warming pollution.[9]

A thorough, rigorous, and swift congressional response is essential for climate security. It is also the case that climate security requires EPA to end the decadal delay since the Cannon opinion and implement existing law now, during the deliberations over national legislation to ensure energy practices and policies are promptly harmonized with greenhouse gas emission reduction imperatives. This two-pronged approach to secure a safe climate is rooted in science, economics, law and politics. Such a two-pronged approach to climate security could capture the following elements:

- The present value of today's reductions. Immediate EPA administrative action during the pendency of congressional debate will help forestall the serious geopolitical consequences of a destabilized climate system. Putting in place a climate policy framework for today's energy investments will blunt the economic impacts of regulatory action that is delayed and will immediately advance innovation. Timely action today will stave off the severe social costs and compliance costs wrought by climate change.
- Informed colloquy between legislative and executive branches. Prompt EPA regulatory action, unbridled by the tightly held political reins of the current Administration, would help engage the valuable expertise of EPA's career technical staff in the national dialogue over climate security policy design and implementation.
- Smooth Transitions. Should executive branch policies leapfrog ahead of congressional action in a race to address climate security, newly adopted administrative polices can be integrated with a legislative response to smooth the transition.
- Limiting global warming pollution from coal plants and industrial activities. The Clean Air Act is expansive in providing for the regulation of global warming from coal plants and industrial activities - both new and existing. For example, every major new industrial facility is required to maximize the emission reductions of each pollutant subject to regulation under the Clean Air Act including carbon dioxide and other GHGs.[10] Further, the Clean Air Act calls for standards of performance limiting emissions from categories of stationary sources, both new and existing, that are anticipated to endanger public health or welfare.
- Curbing Global Warming Pollution from Engines and Tailpipes. The statute is likewise sweeping in providing for the establishment of GHG emission limits for new motor vehicles, motorcycles, aircraft, and large diesel engines and equipment.[11]
- A Supreme Constraint on Evading Responsibility. The endangerment test at issue in *Massachusetts v. EPA* is routinely the trigger for regulatory action under the Clean Air Act. The Supreme Court cabined EPA's discretion to avoid responsibility for global warming pollution by rejecting EPA's reliance on a "laundry list" of factors extraneous to the endangerment test. EPA must tightly adhere to the statutory factors. EPA may refuse to regulate only if it finds that GHG emissions do not endanger public health or welfare. EPA does not, according to the Court, have "a roving license to ignore the statutory text." So Massachusetts v. EPA not only held that global warming pollution is subject to regulation under the Clean Air Act but it sharply curtailed EPA's latitude to evade remedial action for such pollutants.
- State Sovereignty. The balance of power between state and federal governments under the Clean Air Act has largely equilibrated through some 40 years of implementation experience. The statute pointedly protects states' prerogatives to regulate more rigorously with some very narrowly delineated exceptions. Federal climate policy has much to learn from the Clean Air Act's deeply rooted preservation of state power to exceed minimum federal standards.

In a world where scores of lives and livelihoods are precariously synchronized with current climatic conditions, there is simply no time to waste. An endeavor today to tightly integrate energy practices, investments and policies with climate security through robust implementation of existing law while breathlessly pursuing comprehensive congressional action is a prudent and urgent race against time.

This issue of *Sustainable Development Law & Policy* exploring sustainable energy could not be timelier. Many of the current issues contained within the energy and climate nexus that are essential for the next generation of policy are discussed. Contributors explore the need to develop clean energy projects, discussing sustainable finance, waste to energy projects and experiences with the Clean Development Mechanism under the Kyoto Protocol. Moreover, case studies examine the experience implementing renewable portfolio standards and ethanol policies in U.S. states and transaction costs of emission trading programs in Germany. Additionally, various other critical issues, including the impacts on biofuel development on water scarcity and the need for climate change adaptation and mitigation are explored.

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Emerging Standards for Sustainable Finance of the Energy Sector

*by Kirk Herbertson and David Hunter**

Introduction

The energy sector relies heavily on large-scale projects, advanced technology, and complex infrastructure, and thus relies heavily on project finance and other investments from international financial institutions ("IFIs"). Worldwide, the average annual investment in energy is around U.S. $413 billion.[1] This amount is increasing, particularly in the developing world. Developing countries will require an estimated annual investment in electricity of U.S. $165 billion through 2010, which will increase about three percent per year through 2030.[2] Because of the magnitude of their investments in the energy sector, IFIs have the potential to profoundly affect future energy paths.

Because of this influence, civil society advocates are pressuring IFIs to develop a variety of environmental and social policies that can influence the types of energy projects they will finance and how those projects must be implemented. Through these efforts, many energy-related projects have been scrutinized (and in some cases rejected) for their contributions to severe environmental degradation, involuntary resettlement of poor and marginalized communities, or the inequitable allocation of project benefits and costs. Controversy around such projects affects the availability and conditionality of international finance for future proposed energy projects. More recently, civil society activists have also begun to focus on the climate change impacts of IFI energy lending, and have begun to push changes they hope will shift IFI lending portfolios away from fossil fuel projects towards renewable energy or energy efficiency investments. These trends can be expected to continue in the future, with increasingly strict standards applying to the energy sector.

This article surveys the environmental and social policies at the IFIs as they relate to the energy sector. After discussing the general impacts of IFIs on the energy sector, the article describes existing and emerging environmental and social policies that impact IFI support for the energy sector. This survey then addresses policies relating to general development impacts, climate change policies, and policies aimed at specific energy sectors (such as dams, renewables, or nuclear energy).

The Emerging Environmental and Social Standards for IFIs

At least among public IFIs, the World Bank Group is the recognized leader for influencing developing countries' economic and development paths. The World Bank Group is comprised of four separate, but related, financial institutions: the International Bank for Reconstruction and Development ("IBRD"), the International Development Association ("IDA"), the International Finance Corporation ("IFC"), and the Multilateral Investment Guarantee Agency ("MIGA").[3] IBRD and IDA provide loans to support public-sector projects. Together IBRD and IDA are most frequently referred to as the "World Bank." The primary difference between the IBRD and IDA is that IDA provides concessional or low-cost loans to the poorest countries (those having per capita annual income below U.S. $1065 in 2005 dollars).[4] The IBRD provides loans to other developing countries and countries in economic transition at a near-market rate with longer repayment terms than commercial loans. The IFC and MIGA provide financial support to private sector projects in all developing countries or countries in economic transition. IFC makes loans and equity investments in private sector projects. MIGA provides insurance against political risks faced by private sector investments in developing countries (i.e. risks from civil unrest or war).

Courtesy of Ursula Kazarian

Construction of hydro-electric dams, such as this one in Tajikistan, often causes substantial social and environmental harm.

The World Bank Group is the largest source for development financing in the world. Each year the Group supports approximately U.S. $20 billion in projects and leverages an additional U.S. $50 billion from other financial institutions. From 1992 to 2004, the World Bank Group financed approximately U.S. $28 billion towards fossil fuel projects.[5] But the influence of the World Bank Group extends far beyond the monetary value

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of its investments. The Group is the recognized intellectual leader among development organizations, often setting precedents for other institutions to follow. The Group's influence is expanded further by coordinating with other donors, mobilizing bilateral and increasingly private-sector financing, conducting policy research, and providing technical assistance to borrowing countries.

Beginning in the 1970s, independent observers began to recognize that the World Bank and other IFIs were providing support for some of the most environmentally damaging projects taking place in developing countries. These projects, including several large energy infrastructure projects, were often associated with allegations of severe environmental destruction, human rights abuses, and long-term harm to the economic well-being of the poor in the project area. Even assuming good intentions, the size and scale of many of the projects simply dwarfed the legal and policy infrastructure of the borrowing country.[6]

Observers began to recognize that the World Bank and other IFIs were providing support for some of the most environmentally damaging projects in developing countries.

In response, pressure from environmental and human rights groups pushed IFIs to address the sustainable development impacts of the projects they finance.[7] As part of their response, first the World Bank, and then other IFIs, adopted environmental and social policy frameworks that provide certain protections for local communities affected by the projects. The environmental assessment policy is the cornerstone of the Bank's safeguard policy system. All World Bank-financed projects are screened into three categories depending on the extent of environmental impacts associated with the project. "Category A" projects, which have "significant adverse impacts that may be sensitive, irreversible and diverse," must undergo a full environmental assessment, with specific requirements for consultation and disclosure. "Category B" projects have adverse impacts that "are less significant than Category A impacts. Preparation of a mitigatory plan suffices for many Category B projects." "Category C" projects normally do not require any environmental analysis "because the project is unlikely to have adverse impacts."[8] In general, about ten percent of World Bank projects are classified as Category A, and significantly more (57 percent in 2005) are classified as Category B. In addition to environmental assessment, the World Bank environmental and social policies include, among other things, specific policies relating to involuntary resettlement, indigenous peoples, and natural habitats.

Other IFIs, including multilateral development banks ("MDBs") such as the Asian Development Bank and the Inter-American Development Bank, commercial banks such as Citibank and ABN Amro, and export credit and insurance agencies ("ECAs") such as the U.S. Export-Import Bank and the UK's Export Credits Guarantee Department, have all followed the World Bank Group's lead in developing environmental and social standards. Even though many of these IFIs do not share the World Bank's development mandate, they increasingly understand that setting environmental and social requirements for projects lowers project risk and the institution's own reputational risk.[9] Thus, for example, ECAs, which are bilateral agencies that provide project finance, guarantees, or insurance to promote a country's exports and investments abroad, adopted the Organization for Economic Co-operation and Development ("OECD") Recommendations on Common Approaches on Environment and Officially Supported Export Credits.[10] While the OECD Common Approaches bind the ECAs to relatively few commitments, they explicitly require ECAs to benchmark their projects against other environmental and social standards, including those of the World Bank Group's safeguard policies.[11] Many individual ECAs have also adopted more specific environmental and social policies that have significant implications for their support of the energy sector.[12]

Perhaps even more importantly, in 2003, a group of leading commercial banks committed to adhere to the "Equator Principles," which essentially incorporate the IFC's environmental and social standards.[13] The Principles have now been adopted by commercial banks that collectively arrange more than 80 percent of all international project finance in developing countries.[14] In addition, many of these commercial banks have issued separate environmental and social policies that go well beyond the requirements of the Equator Principles (or those of the IFC).[15]

Policies Implicating the Energy Sector

For the most part, IFI environmental and social policies have not specifically targeted the energy sector. Although the World Bank, for example, has developed lending strategies for the energy sector, no policy establishes environmental and social conditions specifically for energy-sector lending. Nonetheless, concern over the development impacts, and more recently the climate impacts, of the energy sector have led to policies that directly bear on the future of IFI financial support.

Development Impacts

Many of the most controversial projects supported by IFIs in recent years have been energy projects. These projects have engendered stiff international opposition from civil society networks, primarily motivated by a belief that these projects do not provide sufficient development benefits for, and impose unaccept-

ably high costs on, local affected communities. In some instances, these campaigns led to stronger environmental and social conditionalities being placed on the projects, including for example the Baku-Tbilisi-Ceyhan pipeline (environmental and human rights conditions),[16] the Chad-Cameroon pipeline (environmental and revenue management requirements),[17] and the Sakhalin II Oil and Gas project off of Russia (expanded protections of whales and salmon habitat).[18] Some projects were precluded from receiving financial support from specific institutions, including the Camisea pipeline in Peru (financing rejected by the U.S. Export-Import Bank due to environmental and social concerns),[19] and China's massive Three Gorges dam (both the World Bank and the U.S. Export-Import Bank refused financial support).[20] Still others have been cancelled (or at least delayed) due to these campaigns, including the Ilisu hydroelectric dam in Turkey[21] and Uganda's Bujagali dam.[22]

These projects were delayed, modified, or cancelled because of their failure to meet the environmental and social conditions that IFIs placed on them, in order to improve the development impacts. Although the environmental and social policies applicable to each project depend both on the proposed lending institutions and the project's specific impacts, in general the policies fall into five categories: (1) policies relating to environmental and social assessment; (2) policies relating to information disclosure[23] and community consultation;[24] (3) policies intended to ensure full compensation to people involuntarily resettled;[25] (4) policies meant to protect the rights and interests of indigenous peoples;[26] and (5) policies meant to protect critical natural habitats. Most of the IFIs mentioned above have adopted their own policies or follow the World Bank Group's policies on these issues.

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In addition to the normative framework found in the environmental and social policies, at least nine financial institutions have also adopted some form of accountability mechanism that enables affected people to raise concerns regarding compliance with the IFIs' environmental and social policies. Beginning with the creation of the World Bank Inspection Panel in 1993, five multilateral financial institutions[27] and three bilateral financial institutions[28] currently provide locally-affected people access to accountability mechanisms. Although the effectiveness and independence of these mechanisms vary, they collectively provide significant new opportunities for challenges to future energy projects.

Climate Change

The impact of IFIs on climate change is clear and significant. The World Resources Institute ("WRI") reports that "[t]he lending profile of MDBs demonstrates significant concentrations of finance in sectors with substantial greenhouse gas ("GHG") emission footprints, including transport, oil and gas, electric power, and mining."[29] The report calculates that 27 percent of the World Bank's lending in 2004 went toward these projects, with an investment of U.S. $7.6 billion. Since the signing of the UN Framework Convention on Climate Change ("UNFCCC") in 1992, the World Bank Group has financed over U.S. $28.4 billion in fossil fuel projects, resulting in 43.3 billion tons of lifetime carbon emissions.[30] Other MDBs are similarly committed to projects that contribute substantially to GHG emissions. In 2004, the Inter-American Development Bank invested U.S. $730 million (twelve percent of its total lending), and in 2003 the European Bank for Reconstruction and Development invested U.S. $3.3 billion (27 percent of its total lending), in projects with potentially substantial impacts on the climate.[31]

Closer review of the World Bank shows the influence of the banks, and their connection to climate change. In addition to its direct financing, the World Bank is also an implementing agency of the Global Environment Facility ("GEF"), which among other roles, acts as the financial mechanism for the UNFCCC.[32] Through its Carbon Finance Unit,[33] the Bank launched the Prototype Carbon Fund in 2000 and continues to champion the global carbon market, by financing the purchase of emission credits under the Kyoto Protocol's Clean Development Mechanism. The Bank's influence is expanded further by coordinating other donors, mobilizing bilateral private-sector financing, conducting policy research, and providing technical assistance to borrowing countries.

In recent years, the IFIs have begun to recognize that the climate change policy landscape has changed and that this may lead to new financing conditionalities and a need to change their energy portfolios. Almost every country in the world has signed the 1992 UNFCCC and the 1997 Kyoto Protocol. Under Kyoto, all industrialized countries, except the United States and Australia, have committed to mandatory timetable and targets for reducing emissions. As a result, many regional, national, and sub-national governments throughout the world have created policies to regulate GHG emissions, and many have established carbon trading systems.[34]

Even though emissions reductions under the Kyoto Protocol do not apply to developing countries, climate change is now recognized as a major *development* issue, requiring more direct attention from development institutions. For example, climate change impacts must now be included in the environmental assessments required by the World Bank and most other IFIs.[35] In addition, IFC's new Performance Standards require projects with annual GHG emissions greater than 100,000 tons to estimate and report their emissions annually.[36]

Other IFIs are also beginning to respond to climate change with new policies that may restrict or change their lending practices. Private commercial banks, which are increasingly exposed to climate risks, are beginning to account for these risks in the costs of their loans and other services.[37] Many commercial banks have started to reduce their own internal carbon footprint, with HSBC having achieved carbon neutrality in 2005.[38] At least four private commercial banks—Bank of America, Citibank, JPMorganChase, and HSBC—have specific policies addressing the climate impacts of their lending portfolios. JPMorganChase has committed to work with its largest GHG-emitting clients to develop carbon mitigation plans, which include measuring and disclosing GHG emissions and developing strategies to reduce or offset them. Starting in 2006, the bank began reporting annually on GHG emissions from its power portfolio and working with clients to develop new financial products that facilitate emission reductions. Bank of America's policy is noteworthy because it includes a reduction target that commits the bank to reduce emissions from its energy and utility portfolios by seven percent by 2008. Neither Citigroup nor HSBC have specific commitments relating to emissions reductions or carbon mitigation plans, although Citigroup has committed to reporting on emissions resulting from its energy sector lending.[39] Export credit agencies can also be expected to shift their climate policies, as part of their home country's national climate or environmental policies.[40]

To be sure, the IFIs' current climate-related policies make only modest commitments and their implementation appears to be insufficient. According to WRI, for example, "[o]ver 80 percent of World Bank's publicly disclosed lending in the energy sector from 2000 to 2004 did not consider climate change issues in project appraisals and documentation."[41] Nonetheless, clear trends are emerging that IFIs will increasingly have to commit at least to: (1) assessing and reporting on climate emissions and impacts; (2) reducing GHG emissions at the transactional and portfolio levels; and (3) shifting towards clean energy technologies.[42] Indeed, recently civil society is beginning to push for the complete withdrawal of international financial assistance to the fossil fuel industry.[43] As climate impacts become more urgent, such pressure will build and we can expect more stringent policy responses from the IFIs.

Renewable Energy Portfolios

Closely related to the push for a response to climate change have been policies aimed at promoting renewable energy. Thus far, IFIs have been slow to shift their energy sector portfolios in the direction of renewable energy. The IBRD has committed to increasing its lending for renewables by twenty percent per year,[44] but this is a modest increase given that renewable lending starts from such a low baseline. In fiscal year 2005, for instance, the IBRD's financing for renewable energy projects comprised less than five percent of its overall lending to the energy sector.[45] In its September 2006 *Investment Framework for Clean Energy and Development*, the IBRD does not make further commitments to sustainable energy practices, and continues to rely on fossil fuel projects to meet the energy needs of the poor.[46]

Other IFIs have made only limited commitments to increasing their renewable energy portfolios. In May 2005, OECD countries participating in the Arrangement on Officially Supported Export Credits, established special financial terms to favor renewable energy projects. For a trial period from 1 July 2005 to 1 July 2007, participating ECAs agreed to give borrowers for renewable energy projects extended repayment terms of fifteen years (an improvement over the twelve year terms generally offered to power plants).[47] This fell short of the calls by civil society groups pushing for ECA reforms, which called for: (1) developing a sustainable energy portfolio, requiring a phase-out of support to fossil fuel and other unsustainable energy technologies within two years; (2) committing twenty percent of the total energy portfolio within two years to supporting sustainable energy; (3) introducing institutional reforms and capacity building measures to abolish preferences for fossil fuels and nuclear technology; (4) providing the lowest interest rates and maximum repayment terms available under existing guidelines to support renewable energy, energy efficiency, and conservation projects; and (5) establishing a Renewable Energy Advisory Committee composed of representatives of the renewable energy sector, civil society, and government officials to make a series of recommendations.[48] These or similar requests are likely to form the civil society platforms for future IFI reforms.

Dams

Large hydro-electric dams have long been a lightning rod for civil society campaigns around IFI financing. Financing for projects such as China's Three Gorges dam, India's Narmada dam, Turkey's Ilisu dam and Uganda's Bujagali dam, have all sparked considerable controversy, and in the cases of the Ilisu and Bujagali dams, international financing (from the World Bank group) was rejected. Nonetheless, in part as a response to climate change, many IFIs are now calling for greater use of hydropower. The World Bank Group, for example, considers large scale dams to be a key component of its renewable energy portfolios.[49] Of the U.S. $748 million that the Bank financed in fiscal year 2005 for "renewable energy and energy efficiency," approximately 60 percent went towards hydropower with capacity of over ten megawatts.[50]

Many civil society organizations have argued that large scale hydropower cannot be considered a viable renewable energy alternative. Large dam projects have displaced between 40 and 80 million people worldwide, in addition to the millions displaced by canals, powerhouses, and other infrastructure associated with dams.[51] In many cases, IFIs, governments, and project proponents have not provided displaced communities with viable resettlement plans or adequate compensation, shattering the livelihoods of these persons.[52] At the same time, dams have caused irreversible impacts to local habitats and water basins.[53] Because of their methane emissions, GHG emissions from large dams have often exceeded the emissions of conventional fossil fuel power plants generating equivalent amounts of energy.[54] Furthermore, dams often do not run efficiently or meet their power generation targets, and often suffer lengthy construction delays and large cost overruns.[55]

Because of these and related concerns, the World Bank constituted a World Commission on Dams ("WCD") in 1997 to provide an independent assessment of the future of large dams. The highly acclaimed WCD report provided several recommendations in 2000, including that IFIs should: (1) use comprehensive options assessments as a risk mitigation tool; (2) incorporate the WCD principles, criteria, and guidelines into their environmental and social policies, and use the guidelines as minimum screens for evaluating support for, and investment in, individual projects; (3) develop legally binding environmental and social provisions in their insurance coverage, and debt and equity arrangements; and (4) develop criteria for bond-rating systems for use in financing all options, including large dams, in the water resources and electric power sectors.[56] Despite its initial support, however, the World Bank rejected the WCD's recommendations and the Banks' environmental and social policies do not currently meet the WCD standards with respect to issues such as human rights, indigenous peoples, social assessments, and transboundary impacts.[57] The IFC's Policy and Performance Standards follow many, but not all, of the main recommendations of the WCD. Most importantly, the IFC does not emphasize the human rights of affected peoples to the same degree as the WCD. The only IFIs to explicitly incorporate the WCD recommendations are the commercial banks HSBC and ABN Amro.[58] Because most IFIs do not have proper safeguards in place for dam projects, their reliance on hydropower as a renewable alternative to oil and coal will likely continue to engender substantial controversy and opposition among civil society organizations.

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Nuclear Policies

Except for one loan to Italy in 1959, the World Bank Group does not support nuclear power, primarily out of concerns that it is non-economic and never a least-cost solution.[59] Indeed, the only multilateral development bank that directly supports nuclear power is the European Bank for Reconstruction and Development, which has supported the construction and modernization of nuclear power plants in the former Soviet bloc. Nonetheless, the World Bank and other IFIs increasingly consider nuclear power projects as a non-fossil fuel option for reducing emissions, acid rain, and air pollution,[60] and the multilateral reluctance to support nuclear power has not carried over to the ECAs, which play a significant role in promoting nuclear power technology around the world. According to one study, fourteen of the 25 nuclear reactors under construction in 2001 were supported by ECA financing.[61]

The renewed interest in nuclear power concerns many civil society organizations because it is essentially "replacing one evil with another." Nuclear power plants contribute fewer emissions than coal or oil, but are not emissions free. In order for nuclear power to contribute to a twenty percent decline in carbon emissions across the world, there would have to be three to four times more reactors. This would cost trillions of dollars, draining resources that could be spent on developing emissions free technologies.[62] Because nuclear power is also a "base-load technology" whose energy output runs continuously, nuclear energy cannot be adjusted to specific consumer and industrial demands, and thus does not create incentives for energy consumers to shift to more efficient, sustainable energy use.[63] Furthermore, there are enormous environmental and public health risks associated with nuclear power. As WWF describes, "The entire commercial chain of the processing of nuclear raw materials from nuclear mining; operating nuclear power stations; handling nuclear waste and finally re-processing, is full of leaks and contamination and produces a highly toxic legacy for thousands of years to come."[64] Nuclear power is also a "power-grid based technology," which means that these projects would be much more unlikely to extend energy access to the world's poorest, remote communities.[65] For these reasons, the European ECA Reform Campaign recommended that a responsible ECA sustainable energy policy (which is applicable to all IFIs) should include the following elements: (1) the IFI will not fund new nuclear projects or the expansion of old or delayed projects; and (2) the IFI "may offer support to help decommission nuclear installations or improve the safety of a running nuclear power plant, but only if this safety improvement does not prolong the life of the plant."[66]

Future Trends

IFIs are in a key position to provide leadership in the shift from fossil fuels to renewable energy that must be part of a global response to climate change. Moreover, the development mandates of many of the IFIs should force them to consider the potential positive and negative development impacts of such a shift, and will likely lead them to continue to expand their environmental and social conditionality on energy lending. This trend will be fueled by civil society's continued calls for stronger policies, to address both climate and development impacts.

Clear trends in the IFI environmental and social policies are evident. These policies have become increasingly salient to energy lending over time and have formed the basis for successful civil society campaigns to delay, prevent or improve environmentally and socially harmful projects.[67] But although progress has been made, the IFIs' policies have failed to keep pace with advances in clean energy technology and knowledge about climate change. Additionally, civil society organizations continue to criticize the weaknesses of existing safeguard policies, for example: (1) many policies fall far short

of current international law and norms; (2) policies do not comprehensively address the full range of environmental and social impacts of IFIs' activities; (3) policies are often limited only to project finance; (4) many policies allow only for limited and inconsistent stakeholder involvement; (5) the language of many policies is crafted so that IFIs do not actually commit to any particular action; and (6) many policies have not been well implemented.[68] In some cases, as with climate change policies, a few commercial banks have surpassed the safeguards of the World Bank and other public institutions. Furthermore, there continues to be lack of full implementation of safeguard policies.

Conclusion

As concern over climate change continues, we can expect more pressure to build on IFIs to restrict their fossil-fuel energy portfolios and to expand their lending to other sectors. Existing policies and approaches with respect to renewables, energy efficiency, dams, and nuclear power will likely be revisited and serve as flashpoints for future policy dialogue. Expansion of relatively new energy sources, most notably biofuels, will likely also launch substantial debates (and future policies) on their development impacts.[69] New IFI policies that emerge from those debates will likely continue to shape the path of energy development in the future.

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Endnotes: Emerging Standards *continued on page 70*

Race to the Top:

The Expanding Role of U.S. State Renewable Portfolio Standards

*by Barry Rabe**

Introduction

The role of U.S. state governments in developing policies to reduce greenhouse gas ("GHG") emissions continues to expand. One of the most widely-used policy tools is a renewable portfolio standard ("RPS"). RPSs mandate that utilities operating within a state must provide a designated amount of power from renewable sources as a portion of their overall provision of electricity. This policy is not unique to the United States, but the RPS has proliferated among the U.S. states at a rapid rate. Twenty-three states and the District of Columbia have adopted an RPS as of mid-2007, with a strong likelihood of continued expansion.

The proliferation of state RPSs and the decision to expand initial policies illustrate that these regulations tend to draw a fairly broad base of political support that often crosses partisan lines. States are motivated to enact or expand RPSs for multiple reasons, and GHG emissions may or may not be a central factor. This paper presents an overview of the RPS as policy tool and examines key factors in both policy formation and implementation. This work considers the experience of all RPS states but devotes particular attention to five case studies illustrating common themes and points of divergence among individual state programs. The analysis concludes by identifying opportunities and challenges facing future development.

Proliferation of The RPS

The RPS combines the policy strategies of regulation and reliance on market mechanisms that is a hallmark of more recent innovations in U.S. environmental and energy policy.[1] For most states, establishing an RPS merely involves an incremental expansion of existing regulatory powers over electricity generation and distribution. Alongside their historic roles in overseeing regulated utilities, market restructuring, approval and siting of new generating facilities, and electricity rate-setting and taxation, states have for decades sought ways to promote renewable energy sources as well as energy conservation.[2] Consequently, many state officials view RPSs as simply a new mechanism to respond to public demand for a reliable, inexpensive, and environmentally friendly electricity supply. With the exception of the Southeast, every region in the United States has at least one RPS in operation at this point. Many states with the largest populations and levels of electricity consumption have enacted RPSs, including California, Illinois, New York, Pennsylvania, and Texas.

Political Drivers

Many areas of state energy policy are enormously contentious, particularly those that propose significant changes for privately held utilities that have traditionally dominated service delivery in a jurisdiction, as has been evident in the battles over proposed restructuring (or deregulation) of wholesale and retail electricity rates.[3] RPSs indeed call for significant changes from past practice, but generally receive bi-partisan support.

Formal representation in the state legislative process from renewable energy developers eager to expand their role is becoming increasingly apparent.[4] In numerous states, these organizations are more visible and influential in RPS deliberations than conventional environmental advocacy groups. GHG reduction constitutes one important benefit from greater use of renewable energy and has been an important consideration, but in many instances, climate benefits are deemed ancillary to a variety of economic advantages. For example, for states frustrated with the unanticipated volatility in natural gas prices over the past half-decade, the prospect of more predictable generation costs through renewables is increasingly attractive.

One common factor facilitating diverse support of RPSs is the perception that promoting renewable energy through these standards produces economic benefits compatible with the major state goal of promoting economic development.[5] Whereas fuel accounts for much of the cost for conventional electricity, renewables concentrate a larger share of their total costs on labor. Development is particularly attractive if new renewable sources are developed within a state's boundaries supplanting imported fossil fuels.

Common Design Trends

Individual RPSs differ but share similar design features. All RPSs establish a percentage or amount of renewable electricity generation or capacity requirement that suppliers must provide by a particular date. Each state program defines qualifying renewable electricity sources and, over time, increases the amount of renewable capacity or generation to meet the standard. Most states allow regulated parties to generate their own renewable supply or purchase credits from other suppliers. The so-called renewable energy credit ("REC") system is an example of market-based mechanisms that allows options for assuring compliance, enabling suppliers to meet regulatory requirements in the most inexpensive way feasible. In turn, each state RPS

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designates a lead governmental agency, commonly the state public utility commission, to oversee implementation.

States have increasingly tended to elevate the bar for the amount of electricity required by an RPS;[6] resembling a multi-state "race-to-the-top," whereby many states are committing to future renewable energy levels that seemed inconceivable a half-decade ago and many states are revising their initial requirements upward. State RPS programs are increasingly complemented by other initiatives to promote renewable energy and energy efficiency. While states historically did not favor one renewable source over another in their RPSs, they have begun to modify that practice placing renewables into differing classes. Some mandate that a specific source comprise some percentage of the RPS to boost relatively expensive technologies, such as solar photoroltaics,[7] raising cost concerns in policy debates.

As RPSs proliferate, increased issues of inter-state collaboration arise.[8] To date, there has been relatively modest interaction on RPS development between neighboring states, reflecting the "home-grown" nature of RPS. But issues such as inter-state recognition and trading of RECs loom larger and may necessitate new forms of inter-state collaboration. Greater intergovernmental collaboration could also cross national boundaries, involving Canadian provinces and Mexican states, reflecting the reality that much North American energy flows north-south and is indifferent to national borders.[9]

Finally, as states move beyond RPS policy enactment into implementation, extensive rule-making provisions are necessary and in some cases, leading to revised legislation. A growing concern involves siting processes, both for renewable energy facilities and transmission capacity to move renewable energy from its point of generation to its point of use. In some instances, political issues related to facility or transmission line siting may be the most important determinant of long-term RPS viability and development.

Illustrative Case Studies

Five cases—Texas, Massachusetts, Nevada, Pennsylvania, and Colorado—represent different patterns of political control at enactment, and have divergent historic levels of commitment to environmental policy. Representing different time periods at enactment, they vary in their degree of interstate engagement on policy collaboration. The following cases do not constitute any effort to highlight "best practices." Instead, they provide a glimpse into common patterns and divergence in current practice.

Texas: A Gust in the Wind Rush

Given its historic role in fossil fuel development and use, Texas might appear to be an unlikely setting for a major RPS commitment. However, the RPS enacted in 1999 under then-Governor George W. Bush triggered a massive increase in the supply of renewables at highly competitive prices. The program has proven so successful that the Texas Legislature overwhelmingly endorsed a major extension and expansion of the legislation, signed into law by Republican Governor Rick Perry on August 1, 2005.[10]

Courtesy of Anne Nolan

Ice Harbor Dam, on the Snake River in Southeastern Washington State, is an example of a renewable energy source being utilized by a state as a portion of its overall provision of electricity.

Electricity restructuring in the late 1990s opened a window of opportunity for Texas to reconsider all dimensions of its electricity system. Several factors converged to push an RPS onto the state's political agenda, including supply concerns, environmental problems, and the availability of enormous wind resources. Moreover, an extensive series of "deliberative opinion polls" demonstrated strong public consensus for a commitment to renewables.[11]

The first piece of RPS legislation is regarded as a textbook model, establishing a clear and effective REC program, a transparent market transaction process, and an "alternative compliance mechanism" that provides options, albeit costly ones, for electricity suppliers unable to meet standard requirements. The RPS focused on total renewable generation capacity and called for an increase from 1280 megawatts ("MW") in January 2003 to 2880 MW by January 2009, including approximately 880 MW of renewables, primarily older hydro facilities, in operation for many decades before enactment of the RPS.

While the policy did not favor any particular source, it has had the effect of tapping into the state's massive wind capacity. In 2007, 1361 MW of new wind generation is expected to be on line, leading to a total of 2600 expected MW of wind generation online by 2011.[12] This new wind capacity, alongside renewable projects under construction or advanced stages of the approval process, indicates that Texas will easily meet-and exceed-its 2009 standard. Moreover, wind energy is produced at rates that are highly competitive with conventional sources when the federal production tax credit (which stands at 1.9 cents per kilowatt hour in April 2007) is included.[13]

The second RPS iteration did not change the basic mechanics of the initial design but it elevated the levels of renewables required by 2007 and 2009 and specified continued expansion into the next decade. The legislation amended Section 39.905 of the Texas Utilities Code to require that "The cumulative installed renewable capacity in this state shall total 5880 megawatts by January 1, 2015."[14]

The unexpectedly rapid development of wind energy in remote sections of Western Texas placed significant demands on

the relatively modest transmission systems that deliver electricity to areas of high demand. This constraint is linked with a larger challenge in Texas, and nationwide, to upgrade and expand the transmission system. As the Texas Public Utilities Commission ("TPUC") considers transmission, developers realize that there are many possible places for renewables and are aware of the need to link new generation with transmission access. Texas faces a particularly acute challenge and the new legislation calls upon the TPUC "to construct transmission capacity necessary" to deliver anticipated expansion of renewables. Implementation of this provision may be the single most important factor in determining effectiveness of the new RPS.

Massachusetts: One Component of a Broad Climate Strategy

Like Texas, Massachusetts developed its RPS in the late 1990s in conjunction with legislation authorizing electricity restructuring. The state also had prior history with promoting renewable energy and significant concerns about electricity cost and supply reliability. While it considers renewable development as part of its long-term economic development, unlike Texas, Massachusetts is explicit about the role of its RPS as part of a broad strategy to address climate change.

Just as new policies can diffuse across states through representative institutions, there is ample precedent for one state's use of direct democracy provisions to trigger replication elsewhere.

The Massachusetts RPS focuses exclusively on new sources of renewable energy or expansion in existing generating capacity, with an initial one percent level to represent sources brought on line between December 31, 1997 and January 1, 2003. Thereafter, renewables must be increased at a rate of 0.5 percent per year, reaching four percent by 2009. At this point, the legislation creates an open-ended increase of one percent per year, until 2009 unless the Massachusetts Division of Energy Resources decides otherwise.[15] The 1997 authorizing legislation establishes a series of alternative compliance payments "to maximize the commercial development of new renewable generation capacity" where direct purchase of renewables is not viable.[16] Similar to seventeen other states, Massachusetts enacted a mandatory "public benefits" charge on electricity bills to support renewable energy. Collectively, these efforts provide a base of support for renewables that is not offered in Texas or some other states.

At the same time, the RPS and related energy initiatives are only a component of Massachusetts' broader effort to link GHG reduction with economic development. In February 2007, Massachusetts formally joined the Regional Greenhouse Gas Initiative ("RGGI"), a regional "cap-and-trade" program for carbon dioxide emissions from fossil fuel burning power plants.[17] The state pioneered efforts in 2001 to cap its own releases from these sources.[18] It is also among the parties who successfully challenged the United States Environmental Protection Agency at the Supreme Court level to regulate carbon dioxide from automobile emissions as a pollutant under the Clean Air Act.[19] Each of these steps systematically link climate protection with economic development.

Implementation of the Massachusetts RPS has not triggered the exponential growth of renewable energy that is occurring in Texas, but it has successfully met requirements by relying on out-of-state renewable electricity. A comprehensive report from the Massachusetts Division of Energy Resources ("DOER") released this year concluded that all twenty parties covered by the RPS achieved compliance in 2005.[20] However, there was a shortage of RECs available in the market, which all but three of the parties required to achieve compliance due to increased demand, among other factors.[21] Additionally, the report noted that DOER expects a better supply/demand balance due to an expected increase in new renewable capacity by 2007.[22]

Massachusetts officials recognize that there may be increasing regional demand for renewable energy and consequently will emphasize in-state renewable energy development, attractive for economic development reasons, but posing serious challenges to implementation. For instance, the Cape Wind Project, a major wind siting initiative off the shore of Nantucket is in serious jeopardy due to political opposition. If implemented, this would involve the placement of approximately 130 wind turbines on a shoal and would meet a significant portion of Massachusetts' RPS requirement in the coming years.[23] Local response has been largely negative, out of concern about the appearance of the turbines and their possible impact on tourism, recreation, and property values of some of the most expensive real estate in the Northeast. Opponents include U.S. Senators from both political parties whose families hold property in the area; they have attempted to amend various federal laws to thwart the proposed project.[24] Massachusetts's officials acknowledge that the Cape Wind development is highly doubtful.

In response to the Cape Wind controversy, wind proponents have attempted public outreach in exploring the possibility of developing a set of smaller wind sources. In turn, other renewable technologies are receiving greater attention, reflected in a particularly strong emphasis by potential private developers and state officials in a possible expansion of biomass capacity in Massachusetts and neighboring states. Biomass, however, does not begin to match the scale of renewable energy anticipated

from Cape Wind, and has triggered its own set of controversies. State officials are moving toward finalization of regulations for biomass eligibility but these will not resolve the considerable uncertainty regarding Massachusetts' ability to achieve its ascending RPS targets in the coming years.

Nevada: The Next Texas?

Unlike Texas and Massachusetts, Nevada decided not to pursue electricity restructuring, shaken by the experience of California. However, energy issues retained saliency in Nevada throughout the last decade. As the state's population and economy have expanded, so too have electricity demand and reliability concerns. Additionally, as the federal government continues to press the case that all of the nation's high-level radioactive waste should be transferred to a repository in the southern part of the state at Yucca Mountain, a unifying theme in Nevada politics has been to take every conceivable step to demonstrate to the nation that there are viable alternatives to nuclear energy.[25]

These factors have converged to make renewable energy, and RPS legislation, a staple in the Nevada legislature. Building on a fairly modest start in 1997, Nevada has continually expanded its RPS and come to depict itself as an emerging national leader in renewable energy generation. In its most recent iteration, signed into law by Republican Governor Kenny Guinn in June 2005, Nevada elected to "up the bar" again, mandating that twenty percent of Nevada's electricity come from renewable sources by 2015.[26]

Few anticipated such an ambitious target in 1997 when the legislature enacted an RPS that called for a very modest set of incremental increases in renewable energy, reaching one percent by 2009.[27] The primary driver behind that legislation was an effort to promote a large solar facility near the Nevada Test Site, which is best known as a former weapons testing facility proposed as a transitional waste transfer site prior to the planned opening of Yucca Mountain. The project collapsed for financial reasons; however, the framework for RPS expansion was established. Four years later, during the California electricity crisis that prompted that state to desperately attempt to increase imports of energy from its neighbors, the Nevada legislature repealed the earlier bill and replaced it with a far more expansive and ambitious RPS, including a markedly higher standard that reached fifteen percent of electricity from renewable sources by 2013.[28] Many important provisions were modeled after the RPS experience in Texas, including the renewable energy credit system and a provision to confine eligible electricity to that generated within state boundaries or imported through a dedicated transmission line.

RPSs continue to proliferate and mature, with the possibility of eventual incorporation into a policy that applies across jurisdictions.

Unlike Texas, Nevada decided to retain a solar carve-out, although reducing the level from solar electricity to five percent from the higher level established in 1997. Additionally, whereas Texas quickly realized that it was likely to derive most of its renewables from one source (wind) in one part of the state (West Texas), Nevada prepared for a much more diverse set of energy sources (including geothermal, wind, solar, biomass, and others) from virtually every corner of the state.

Over the next four years, however, Nevada would return its RPS to the legislative shop for further modification, reflecting broad consensus about the potential for renewable expansion and its possible impact on economic development, although environmental benefits remain salient as concerns about air quality and nuclear waste storage persist. Anticipated GHG reductions have not figured prominently, although state officials have become increasingly aware of this issue.

Nevada's 2003 revisions provided a new boost for solar energy, through development of a REC bonus or "multiplier" for electricity that is generated from the sun as opposed to other sources.[29] Two years later, Nevada literally transformed its renewable energy credits into "portfolio energy credits" by giving RPS credit to approved energy efficiency activities.[30] The repeated modifications of the Nevada RPS have given the Public Utility Commission of Nevada a series of implementation challenges, involving a massive set of rule-making procedures that have continued into 2007.

Pennsylvania: Green as Gold

Pennsylvania's attraction to renewable energy has mainly been economical, but under unique circumstances. The Commonwealth suffered from a significant loss of jobs, particularly in the manufacturing sector, and recent governors and legislators have struggled to revitalize the economy. It has also suffered from a series of environmental problems that may have impaired economic development, including an unusually large number of land tracts with extensive environmental contamination. At the same time, coal mining and coal use in electricity have been Pennsylvania staples for generations, posing formidable challenges for any policies that might encroach on that resource.

In recent years, Pennsylvania has given new prominence to environmental protection and renewable energy, a hallmark of the administration of Democratic Governor Edward Rendell, who frames environmental improvements and renewable energy as essential for economic development. As a result, legislation and program initiatives supporting the Commonwealth's development of renewable energy sources and technologies, as well as environmental clean-up expertise, have been part of a larger

strategy to revitalize the economy. This effort has included a series of tax incentives and renewable energy development programs, with the centerpiece being the enactment in November 2004 of the Pennsylvania Alternative Energy Portfolio Standards Act.[31] Introduced with bipartisan support, this legislation took effect in March 2005, followed by extensive rulemaking directed by the Pennsylvania Public Utility Commission.

Pennsylvania had some prior experience with renewables, including 129 MW of wind power and a variety of hydro sources. It retains, of course, its strong historic linkage with coal, which was evident in its unique definition of what constitutes a qualifying source. Like several other states, Pennsylvania divided its Alternative Energy Portfolio Standard ("AEPS") into two distinct categories, with Tier I sources required to climb to a level of eight percent by 2020 and Tier II sources required to reach a level of ten percent by that same year. Under Tier I, the legislation includes such familiar renewable sources as wind, geothermal, solar photovoltaic, low-impact hydropower, biologically derived methane gas, biomass, and fuel cells. However, it also includes coalmine methane. Under Tier II, Pennsylvania joins Nevada in including energy efficiency, but also adds environmentally controversial sources such as waste coal, integrated coal gasification combined cycle, and incineration of municipal trash and poultry farm wastes. This expansive definition made the passage of the Pennsylvania legislation unusually controversial and state-based environmental groups characterized the proposal as "the dirtiest RPS" in the nation and urged the legislature to narrow the definition of eligible energy sources. At the same time, supporters contended that the creation of Tier II essentially accepted energy sources that were already on line to be developed and that Tier I would foster considerable new renewable capacity in the state.

Overshadowed by the definitional controversies, the Pennsylvania AEPS does make specific commitments to solar energy and energy efficiency. It continues the trend in recent years toward boosting the prospects for solar electricity through a designated percentage of Tier I energy that must be derived from solar sources. In turn, it preceded Nevada by several months in encouraging "the participation of demand side management and energy efficiency resources" as eligible for inclusion within an RPS, placing them alongside the more controversial items in Tier II.[32]

Many of the details of these provisions continue to be refined through rule-making procedures. Initial rule-making indicates that defining the boundaries from which renewable energy can be counted toward the Pennsylvania standard will entail a major challenge. Much like other Eastern states, Pennsylvania has substantial cross-border exchange of energy. Most of the Commonwealth is located within one regional transmission organization, the PJM Interconnection that integrates Pennsylvania with electricity providers in twelve states and the District of Columbia. However, portions of the state are located in other regional organizations, suggesting that a wide range of states could conceivably contribute renewable energy to Pennsylvania. The RPS legislation establishes that eligible energy must be "derived only" from within Pennsylvania or "within the service territory of any regional transmission organization that manages the transmission system in any part of this Commonwealth."[33] Debate over just how to interpret that clause continues, weighing the constitutional requirement not to constrain interstate commerce against Pennsylvania's desire to capture economic and environmental benefits of renewable energy internally.

Colorado: Power To The People

For many years, the lone mechanism whereby states enacted RPSs and related state policies to reduce GHGs involved the traditional channels of representative government. But the majority of U.S. states have constitutional provisions allowing legislation through majority vote of the electorate; states have used them increasingly in recent decades on a range of environmental and energy issues.[34] Consistent with that trend, in November 2004, Colorado became the first state to enact an RPS through "direct democracy" when Proposition 37 passed by a 54-to-46 percent margin. This led to rule-making by the Colorado Public Utility Commission, with an Order released in December 2005 requiring three percent of electricity generation from renewables, and increasing their renewable output to ten percent by 2015.

More recently, Colorado has vastly expanded its RPS goals as newly elected Democratic Governor Bill Ritter signed two bills in April 2007 doubling the state's RPS to twenty percent by 2020 and constructing new transmission crucial to delivering the renewably generated energy.[35] The development of a new energy economy is central to Governor Ritter's policy platform, and is focused on creating jobs, adding economic value to the state and establishing Colorado as a potential national leader in the new energy economy.[36]

The ballot initiative happened after a coalition headed by utilities and coal-mining interests blocked an RPS in three consecutive sessions of the Colorado legislature. Indeed, Colorado had been among those states most reluctant to take any steps related to GHG emissions during the previous decade.[37] At the same time, proponents felt that there was a strong base of support for the RPS. Consequently, supporters decided upon a ballot initiative and the opposition, under a banner of Citizens for Sensible Energy Choices, spent more than U.S. $2 million investing heavily in a television advertising campaign focusing on potential costs. However, support was maintained through a campaign with bipartisan leadership and a tapestry of supporters, representing numerous renewable energy developers, agriculture and ranching interests, public health and environmental protection constituencies, and various religious organizations. Proposition 37 also received endorsements from most of the state's major media outlets. A number of anticipated environmental benefits were raised during the campaign but the most important driver behind the passage of Proposition 37 was projected economic development from expanding renewable capacity.[38]

Just as new policies can diffuse across states through representative institutions, there is ample precedent for one state's use of direct democracy provisions to trigger replication elsewhere. The Colorado RPS attracted considerable national publicity due to its route of enactment and RPS proponents in Washington

state successfully followed its model in November 2006 with the enactment of its own RPS by ballot initiative.[39]

Challenges And Opportunities: The Next Round Of RPS Development

In anticipating the next generation of RPS development, a series of important challenges and opportunities appears to loom, concerning both continued policy development by individual states and increasingly salient interstate and intergovernmental factors.

First, a series of important issues has begun to emerge that may not have been fully anticipated at the point of enactment but could pose a challenge to successful implementation. Part of the initial attraction of the RPS concept was that while it did impose regulatory requirements specifying the amount of renewable energy that would be provided, it did not favor one source over another as long as it was deemed eligible. The growing tendency to accord specialized status to more expensive renewable sources removes the level playing field originally intended in most states and, in some instances, may require significant financial subsidies from state sources or rate payers and thereby raise the cost of the policies. Moreover, the shift toward differential treatment has moved some of the recent debate over renewable energy policy in state capitals toward a collision between competing special interests, each seeking preferential treatment.[40] Over time, one could envision a transformation whereby a well-intended effort to supplement select renewable sources altered RPSs into a complex formula with differential treatment for varied sources, thereby removing much of the flexibility of this policy tool and increasing the cost of implementation.

Second, much of the early planning for RPS targets assumed public support for renewable energy not only in general terms but also in presumed receptivity to siting facilities and related transmission capacity. In two of the five cases, one of the most important determinants of RPS success will involve siting issues. This problem may become common for states with relatively concentrated and populated areas for outstanding renewable sources. More generally, the development of both intra-state and inter-state transmission capacity remains a significant challenge, particularly in those regions of the country where there is substantial physical distance between the energy source and its potential consumers.

Third, the challenge of developing superior transmission capacity and RPS proliferation more broadly suggests an increasing likelihood that states may benefit from greater interaction and collaboration with each other. This may include agreements for common definitions of renewables and related credits as well as shared efforts to promote regionally based renewable resources with high potential. States will also need to guard against "double counting," ensuring that renewable generation can only count toward RPS and GHG reduction requirements in one state. Thus far, states are clearly learning lessons from one another, just as Nevada has closely monitored developments in Texas in refashioning its own RPS. Much of this cross-state interaction, however, occurs only sporadically and state officials across the United States acknowledge that they lack resources to carefully evaluate other programs and draw important lessons. Review of legislative testimony in all of the states examined as case studies suggests only occasional and often imprecise reference to the experience of other states. State budget woes erode the capacity of some state agencies to maintain policy analysis expertise, attend conferences and workshops out of state, and monitor developments in neighboring states.

In turn, pressures to maximize the capture of economic development benefits within state boundaries can serve to deter serious exploration of cross-state collaboration. One area with considerable potential for inter-state collaboration is the development of a common metric for determining the GHG emissions impacts as various levels of renewable energy are brought on line in concert with RPS requirements. Interstate collaboration could also take other forms, allowing neighboring RPS states to trade RECs and encourage integration between RPS implementation and other state policies designed to reduce GHG through both informal and formal agreements between states.

Renewable energy—and RPSs—may offer similar opportunities for states, much as other states are beginning to join common cause on other climate initiatives. Such collaborative precedents might fruitfully guide states away from steps that significantly constrain interstate movement of renewable energy and potentially violate the Commerce Clause of the U.S. Constitution. It is conceivable that policies that are in some way designed to minimize the role of out-of-state renewables in meeting RPS targets could face a Constitutional challenge. Examples of such policies include those that confine acceptable imports to those that arrive via a dedicated transmission line, most notably Nevada and Texas. The Constitutional boundaries are not at all clear in this area, especially given the recent departure from the Supreme Court of Justices William Rehnquist and Sandra Day O'Connor, who held strong views on the power of states in relation to the federal government. To date, no legal challenges invoking the Commerce Clause have been brought against a state RPS. Nonetheless, the very possibility of such a challenge further underscores the potential benefits of greater interstate collaboration to minimize the likelihood of such a confrontation.

Fourth, as the United States moves toward a *de facto* national RPS through a tapestry of state-based programs, it is important to find ways that the federal government can play a constructive and supportive role. President George W. Bush signed the Texas RPS into law in 1999. That statehouse experience has not, however, necessarily translated into constructive federal engagement and support for continued state experimentation with RPSs. Indeed, it is difficult to understate the antipathy across partisan and regional lines that individuals responsible for different areas of RPS development and implementation at the state level express over their dealings with the federal government. Moreover, repeated fluctuation in the federal production tax credit for renewable energy has fostered a boom-and-bust cycle for renewable development in a number of states, leaving significant lags in the development of renewables during those periods in which the credit has been terminated or

its status has remained uncertain. Additionally, state officials are opposed to any federal legislation that would preempt or constrain existing state policies and are very concerned about any steps that would penalize them for taking early actions.

One constructive step that could occur on the national level is a sequence of Congressional hearings designed to distill lessons from state practice that could guide future consideration of the design of a federal RPS.[41] Such hearings might also explore models for a two-tier RPS system, with one tier that established a national framework and national REC trading process alongside another that allowed them to sustain renewable targets above any federal level through their own programs. Terms for state entrance into a possible federal program have been a major focus in the creation of the RGGI, the multi-state effort to establish a carbon cap-and-trade program in the Northeast. This experience and lessons from other forms of intergovernmental collaboration in environmental policy could also afford useful guidance for possible models of state and federal cooperation under a multi-tier RPS.

State policy makers perceive the federal production tax credit as an essential step to level the playing field with conventional sources that have long received a range of governmental subsidies. They also acknowledge the need for federal assistance in improving transmission capacity, particularly given the challenge of tapping renewable sources in remote areas and finding ways to transfer such electricity to high-demand areas. In turn, many state officials note that the federal government could also promote interstate learning about RPS experience and help with the development of common metrics to determine GHG impacts as well as foster cross-state collaboration. It remains unclear whether the federal government might at some point draw larger lessons from the states and develop a nation-wide version of an RPS that thoughtfully and systematically builds on the best practices of state experience.

At present, the American experience resembles that of other federated systems of government, such as the European Union and Australia. In all of these cases, RPSs continue to proliferate and mature, with the possibility of eventual incorporation into a policy that applies across jurisdictions. For now, states have moved to the cutting edge of this issue, having evolved in recent years from modest experimentation to the assumption of central roles in this area of climate policy development.

Conclusion

The 23 states that currently operate an RPS represent nearly every region in the country. Each RPS embodies the same principles, but tailor particular programs to special state circumstances. Early indicators suggest that RPSs have considerable promise for boosting renewable energy supplies and doing so in a cost-effective manner. The basic structure of an RPS involves a blending of regulation and delegation of many choices to the marketplace that is clearly appealing to a diverse set of elected officials and organized interests. Collectively, the evolving and expanding state experience with RPSs confirms the very real potential of policy development that simultaneously advances economic and environmental progress. At the same time, a number of implementation challenges have arisen that underscore the importance of careful policy design.

Endnotes: Race to the Top

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[2] Paul Teske, Regulation in the States (2004); William T Gormley, The Politics of Public Utility Regulation (1983); Ed Smeloff & Peter Asmus, Reinventing Electric Utilities (1987).

[3] Matthew Brown, Restructuring in Retrospect (2001), *available at* http://www.oe.energy.gov/DocumentsandMedia/restructing_in_retrospect.pdf (last visited Apr. 15, 2007).

[4] Barry G. Rabe & Philip Mundo, *Business Influence in State-Level Environmental Policy, in* Business and Environmental Policy 265, 297 (Michael Kraft & Sheldon Kamieniecki eds., 2007).

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[6] While all maintain some phase-in policy over a specified period of time, the end target date tends to feature increasingly high levels of renewables. More recent RPS enactment has tended toward more ambitious levels, consistently in double-digits and as high as twenty percent by 2020 in California and 25 percent by 2013 in New York.

[7] For instance, approximately 80 percent of New Jersey's new renewable capacity must fall into Class I, which includes sources that have been deemed to have the least environmental impact. In turn, New Jersey's RPS features a "solar carve-out," which mandates that at least 90 megawatts of the new capacity in that class must come from solar sources by 2008, and 1500 megawatts by 2020.

[8] States have a clear incentive to attempt to retain any economic development and environmental benefits from promoting renewables. *See generally* Barry G. Rabe et al., *State Competition as a Source Driving Climate Change Mitigation*, 14 N.Y.U. Envtl. L.J. 1 (2005).

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Endnotes: Race to the Top *continued on page 72*

Building Stock Offers Opportunities to Foster Sustainability and Provides Tools for Climate Change Mitigation and Adaptation

*by Edna Sussman**

Introduction

The overwhelming consensus of the scientific community is that climate change is upon us. The most recent reports issued by the Intergovernmental Panel on Climate Change confirmed with an even greater degree of certainty that the earth is warming and that greenhouse gas ("GHG") emissions generated by humans and land use practices are causing a warming trend and are poised to cause monumental damage.[1] Our building stock presents enormous opportunities to address the climate change challenge. Adopting green building practices will further the goal of sustainability by providing effective tools to mitigate the increase in GHGs and adapt to the irreversible impacts of climate change.

While climate change is a crucial driver, there are other significant factors that are moving the green building movement forward. The cost of energy fuels has risen, making the goal of efficiently supplying energy even more important. Such cost increases seem likely to continue, particularly if the worldwide demand for energy continues to increase. International geopolitical concerns have led to a national call for increased energy independence. The constantly increasing demand for energy, projected to continue with the growth in population and energy-intensive activities, has created serious concerns about energy reliability. As siting and constructing new generation facilities, transmission infrastructure, and pipelines are difficult in our settled society, other means to deal with energy demand are also required. Recent reports by military advisers have added concerns about U.S. national security to the list of reasons climate change should be addressed now.

As these compelling drivers gain recognition, green buildings have moved into the ascendancy. Green building is being employed as a major tool by government and the private sector to address climate change.[2] The Architecture 2030 Challenge,[3] with its goal of making buildings dramatically more energy efficient today and carbon neutral by 2030, is gaining acceptance and was recently adopted as a goal by the U.S. Conference of Mayors, the official nonpartisan organization of U.S. cities. Many believe that the tipping point on green buildings has been reached. The trade industry considers that soon Class A buildings that are not green will become Class B buildings, commanding lower prices and occupancy rates, as occurred with the advent of air conditioning in an earlier generation.

Green building is being employed as a major tool by government and the private sector to address climate change.

Government Action To Address Climate Change Includes Green Building Initiatives

In the absence of climate change legislation at the federal level, the states have moved ahead with aggressive initiatives. Twenty nine states, representing a population of over 180 million, have developed some form of a climate action plan; fourteen of those states have set GHG reduction targets. The Northeastern and Mid-Atlantic states have entered into the Regional Greenhouse Gas Initiative ("RGGI") that sets caps on carbon dioxide emissions from electricity generation establishing the first mandatory GHG regime in the United States and requiring emissions to be reduced by ten percent by 2019.[4] In February 2007, the Governors of Arizona, California, New Mexico, Oregon, and Washington signed an agreement establishing the Western Regional Climate Action Initiative, a joint effort to reduce GHG emissions and address climate change.[5]

Several other regional efforts have been launched. The Western Governors Association covers seventeen states and aims to increase clean energy generation and energy efficiency.[6] "Powering the Plains" was initiated by a group of five states in the Midwestern United States: Iowa, Minnesota, Wisconsin, North Dakota, and South Dakota. This group is working with industry and clean energy advocacy groups to address energy and agricultural issues.[7] Similarly, the Southwest Climate Change Initiative is a collaborative effort by Arizona and New

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Mexico to identify measures to reduce GHG emissions and promote clean energy and energy efficiency.[8]

Many states have taken steps individually to address climate change. California, often a leader on environmental matters in the United States, passed legislation in the fall of 2006 mandating statewide reductions in GHG emissions to 1990 levels by 2020 and 80 percent below 1990 levels by 2050.[9] Numerous other states have established various targets for GHG reductions, and have adopted a suite of initiatives to increase energy efficiency, promote green building, and foster the development of renewable energy.[10]

In the face of the failure of the federal government to ratify the Kyoto Protocol, local governmental entities in the United States became a vigorous force in moving the country towards compliance with the Protocol's requirements. On February 16, 2005, the day the Kyoto Protocol went into effect, Mayor Nickles of Seattle, Washington launched the U.S. Mayors' Climate Protection Agreement.[11] The goal was to have 141 mayors, the number of countries that had ratified the Kyoto Protocol at that time, sign on and commit to meet or beat the Kyoto Protocol targets in their own communities, a seven percent reduction from 1990 levels by 2012. As of April 2007, over 442 U.S. mayors representing over 61 million people from every state in the union and governed by leaders from every political party have joined the U.S. Mayors' Climate Protection Agreement.[12] The initiative was endorsed by the U.S. Conference of Mayors. Joining in another important program, over 240 local governments in the U.S. collaborate with International Council on Local Environmental Initiatives in its Cities for Climate Protection program.[13]

Through these and other mechanisms municipalities are embarking on developing full fledged sustainability or climate change action plans and setting their own GHG reduction goals. For example, New York City recently launched an office of Long Term Planning and Sustainability which has set as one of its goals to reduce global warming emissions in New York City a full thirty percent by 2030.[14] San Francisco has set its goal at achieving a twenty percent reduction from 1990 levels by 2012.[15] Austin, Texas and Woodstock, New York have announced that they are seeking to be essentially carbon neutral by 2020.

Local governments are addressing climate change with a host of green building approaches. Such actions include changing land use regulations to discourage sprawl and increase density in urban centers, fostering green building construction, promoting mass transit, biking, and pedestrian traffic, purchasing cleaner vehicles and fuels, increasing energy efficiency, reducing waste, planting trees, purchasing renewable energy, and carbon offsets. Government is also engaging the citizenry and businesses in the effort, recognizing that a sustainable future and the required emission reductions can only be achieved with the participation of the entire community.

Green Buildings Facts and Figures

Green buildings, as they are commonly known, are high performance buildings that: (1) increase the efficiency with which buildings use energy, water, and materials; and (2) reduce building impacts on human health and the environment through better siting, design, construction, operation, maintenance, and removal. While climate change has been an impetus for action, the historic facts in the United States demonstrate the compelling need to use green building practices to foster sustainability. Currently, traditional buildings:

- Use 39 percent of all the energy consumed and 79 percent of all the electricity;
- Are responsible for about 40 percent of the country's emissions of carbon dioxide, the principal cause of global warming;
- Account for 49 percent of sulfur dioxide emissions, 25 percent of nitrous oxide emissions, and ten percent of particulate emissions, all of which degrade air quality;
- Produce 136 million tons of construction and demolition waste annually, as compared to 210 million tons of municipal solid waste; and
- Use 40 percent of the raw materials consumed globally.[16]

The trend to date has been away from sustainability:

- Developed land in the United States has increased 34 percent from 1982 to 1997;
- An American household uses on average 146,000 gallons of water per year, 42 percent indoors and 56 percent outdoors, a tenfold increase over the last 100 years;
- Mass transit ridership is down from a peak in 1946 of 23.4 billion to 9.4 billion in 2001;
- Annual number of person miles traveled per capita increased by 38 percent from 1969 to 1990, mostly because of lengthened distances from home to work; and
- House sizes have more than doubled from 1950 to 1999.[17]

The green building movement seeks to reverse these trends and diminish the impact buildings have on the environment. Green buildings provide an easy, cost effective opportunity for climate change mitigation by reducing GHG emissions and adopting more sustainable land use practices. Green buildings provide the co-benefit of providing a means to adapt to the inevitable warming caused by climate change and consequent increase in demand for energy by curbing that increased demand through design features.

The opportunity presented by green building is enormous. There are more than 76 million residential buildings and nearly five million commercial buildings in the United States. Massive energy savings can be achieved in this existing building stock by implementing cost effective energy efficiency retrofits. By the year 2015 the nation is projected to build fifteen million new buildings; how these are built is critical to the future.

Green Building Features and LEED

Green building design addresses all aspects of a building, including siting, energy conservation, water conservation, landscaping, materials used, and indoor air quality. Founded just over a decade ago, the United States Green Building Council ("USGBC") emerged as the leader of the green building movement in the United States.[18] Using a membership consensus process, the USGBC developed a green rating system for new

commercial construction and major renovation that is increasingly utilized as the national standard for green buildings.

The Leadership in Energy and Environmental Design ("LEED") Green Building Rating System,[19] first version 2.0 released in 2000, established a system that ranks buildings as Certified, Silver, Gold, or Platinum based on the level of sustainability achieved by construction and renovation projects. In late 2004, the USGBC issued a LEED Green Building Rating System for Existing Buildings, which creates a system for measuring upgrades, operations, and maintenance. Following these initial LEED programs, the USGBC added programs for commercial interiors and core & shell, is piloting a program for homes, is developing programs for neighborhood development, schools, on campus projects, multiple buildings, and health care. The LEED criteria serve the critical purposes of promoting sustainable design features and creating a standard that can be applied universally and credibly.

The LEED system has gained wide acceptance. The LEED training programs are widely attended and there are now over 35,000 accredited LEED professionals who have completed the rigorous training and demonstrated proficiency in green building strategies. There are 735 LEED certified projects to date but over 5,500 additional buildings are registered for certification.

The Energy Policy Act of 2005 established a host of incentives to promote green building and energy efficiency.

LEED is being followed for construction and renovation at every level of government. Several federal government agencies, including the Department of Agriculture, Department of State, NASA, U.S. General Services Administration ("GSA"), Army, Navy, and Air Force, have adopted LEED standards for construction. Over twenty states have issued executive orders or laws that require construction to LEED standards or otherwise mandate green building practices consistent with LEED. These states cover all regions of the country. As municipalities and counties all over the country strive to reduce their carbon footprint, many are mandating LEED certification for construction that they fund or require green building practices consistent with LEED. These encompass virtually every major city. Smaller communities are also legion in the ranks of those that have adopted LEED as a standard for construction. Some communities have taken the next step and have also mandated green building standards for private residential construction.[20]

Costs of Green Buildings

One of the major disincentives to the construction of green buildings has been the view that they are more expensive. Comprehensive studies have demonstrated that this is not the case. A report issued in October of 2004 by Davis Langdon Adamson studied the actual construction cost of 45 LEED and 93 non-LEED buildings and concluded that there was no statistical difference in construction costs for LEED versus non- LEED buildings.[21] Similarly, a comprehensive study published in October of 2004 conducted for the U.S. GSA by Steven Winter Associates Inc. concluded that a "LEED rating could potentially be achieved within a standard GSA project budget without a green building budget allowance."[22] A report released in October 2003 by Greg Kats, commissioned by the State of California's Sustainable Building Task Force ("California Study"), found a minimal average cost increase of about two percent. However, when the many ancillary benefits of green buildings are added to the analysis, the case for building green is compelling.[23]

Benefits of Green Buildings

The California Study addresses not only construction costs but also benefits, using a life cycle costing perspective. Life cycle costing is a much more accurate way to measure true cost and is being increasingly applied, not only in the private sector but also by governmental entities concerned about sustainability. This approach often enables public institutions to make more sustainable and healthier choices without being faulted for sacrificing a seemingly cheaper alternative that might otherwise be politically or even legally compelled. Applying life cycle cost, the California Study concluded that while energy savings alone, which are typically in the order of 30 percent for green buildings, would more than pay for any additional construction cost, when the value of water conservation, emission reduction, waste reduction, commissioning operations and management, and health and productivity gains is added, the additional costs to support green design would on average result in life cycle savings of more than ten times the initial investment in the green features.

What may prove to be most compelling to the marketplace are the conclusions in the California Study relating the impact of green buildings to human health and productivity. Based on a thorough review of the numerous studies conducted on this question, the California Report concludes that a conservative value to attribute to the benefits in human health and productivity is a one percent overall increase. This attribute of green buildings is not only supported by numerous studies, but also makes sense intuitively: people work harder and more efficiently in work environments with more comfortable thermal, light, and ventilation levels. In the case of the California analysis, the conservative one percent increase in human productivity resulted in a per square foot benefit of $36.89 to $53.33 depending on the LEED level achieved over a twenty year life of the building, a number many multiples higher than the additional cost of $3-$5 per square foot for the green building features.

With the many benefits of green buildings, incentives to promote green building have already been initiated in many

jurisdictions. These incentives can often be utilized to drive down the costs of building green even more.

Green Building Incentives

The Energy Policy Act of 2005 established a host of incentives to promote green building and energy efficiency. It is likely that the 110th Congress, which is vigorously examining issues related to global warming and energy independence, will pass additional applicable legislation. Many local jurisdictions offer design and consultation assistance, and a variety of incentives for specific technologies to encourage green buildings. Direct subsidies are offered for green features such as low flush toilets, solar hot water heaters and other solar installations, and energy smart appliances. These incentives change over time and each jurisdiction must be consulted for its current offerings. Some examples of additional innovative incentives include:

- *Tax Credits*—New York led the way with a green building tax credit enacted in 2000 keyed to performance guidelines. Maryland, Nevada, Oregon followed with similar enactments.
- *Expedited Permitting*—Scottsdale, Arizona has implemented a highly successful green building program by offering a fast track plan review service that cuts building permit time in half. The program is so successful that about 21 percent of the residential permits in 2004 were for green buildings. Similar programs are in place in several other locales including Gainesville, San Diego, San Francisco, and Sarasota County.
- *Density or Height Bonus*—Arlington, Virginia offered bonus density of between 0.15 and 0.35 FAR (floor-area ratio) and/or an additional three stories in exchange for a LEED Silver rating or higher. Portland, Oregon offers three additional square feet for every square foot of vegetated roof in the project.
- *Waiver or Reduction of Fees*—San Antonio authorizes an administrative waiver or reduction in certain development fees for green buildings that meet specified standards.
- *Home Financing Incentives*—Energy-efficient mortgages are available through Fannie Mae, the Federal Housing Authority, Freddie Mac, and the Veterans Administration. Further, many private mortgage lenders have signed up to become Energy Star Mortgage Partners; these enable homeowners to qualify for a larger mortgage as a result of projected energy savings.

Conclusion

Spreading the word about the attributes of green buildings is the key to expediting their growth. The many benefits of green buildings and the contribution they can make to the climate change challenge are leading to increasing market demand. Building appraisers and lenders are beginning to equate higher performing buildings with greater occupancy rates, rents, and resale values. Insurance companies are beginning to talk about premium credits and building code enforcers are beginning to understand green building features and are able to process permit applications more quickly.

The success of green buildings is illustrated by buildings all over the country and is exemplified by the Durst buildings in New York City. The Durst's renowned Conde Nast building at 4 Times Square was such a success that the Durst Organization is now in the process of completing the development of an adjacent 2.1 million square foot building with the Bank of America, which seeks a LEED Platinum designation. Its features will include construction largely of recycled or recyclable materials, a state-of-the-art cogeneration plant, a gray water system to recapture and reuse all rain and waste water, a green vegetated roof that will reduce the heat island effect, carbon monoxide detectors to add fresh air when necessary, maximum daylighting and daylight dimming for greater occupant productivity, and energy use reduction.

Growing sensitivity to sustainable development and climate change by government and corporate America, increasing interest by homeowners in energy efficient and healthy homes, and increasing knowledge of the low costs and many benefits of green buildings are setting the stage for the burst in green building activity essential to reducing America's ecological footprint, reducing GHG emissions, and enabling the United States to move towards living within its ecological means.

Endnotes: Building Stock Offers Opportunities

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Endnotes: Building Stock Offers Opportunities *continued on page 72*

Wave Energy:

"New-Wave" Interest in an Old Alternative Resource

*by Scott Johnson**

Due to increasing concerns regarding energy policy, security, and climate change, various alternative energy resources recently enjoyed increased media and investment attention in both domestic and international spheres.[1] Among these is "ocean energy," which encompasses energy derived from waves, tides, currents, and salinity and thermal gradients.[2] Like other resources, wave energy is imperfect, and its development raises numerous challenges.[3] However, wave energy may have great potential, particularly in light of the increasing environmental and economic costs of fossil and nuclear energy, to provide clean, abundant, and sustainable energy in suitable regions around the globe, or at least, to contribute to the production of clean energy carriers (e.g., hydrogen) for use in other applications.

Wave energy is, in essence, concentrated solar energy.[4] Solar radiation creates temperature and air pressure differentials on land and over water, which result in wind.[5] These winds blow over ocean surfaces, causing ripples, then chop, then developed seas, and eventually, swells, which can travel thousands of miles in deep water until dissipating their energy when they break on shore.[6] Wave energy technologies extract the kinetic energy from surface waves, or from subsurface pressure fluctuations,[7] and convert that energy into electricity, or make it available directly for other purposes.[8] Compared to traditional generation resources, e.g., fossil fuel combustion and nuclear generation, wave energy, with appropriate site selection and careful design, is generally environmentally benign, does not directly generate emissions or waste, is generally low-profile (far offshore or close to or below the ocean's surface), generally is more predictable than solar and wind generation, and carries zero continuing fuel cost.[9] Research into wave energy extraction technologies began in earnest following the oil crises of the early 1970s.[10] However, available financing diminished with depressed oil prices in the 1980s and 1990s.[11] Wave energy technology garnered relatively little research or investment attention since that time, and therefore, still is considered an emerging technology.[12]

Wave energy has limitations, many of which are economic or technical.[13] Extraction technology remains expensive, and is not cost-competitive with traditional generation.[14] For example, extraction potential for deep ocean wave energy can be many times greater than extraction potential at adjacent coastal sites, but long-distance undersea transmission is prohibitively expensive.[15] Technical considerations, such as the oscillating, low-frequency nature of wave energy, which would require it to be converted to standard frequency before addition to the U.S. national grid, and which present a potential reliability problem, also must be addressed.[16] Proving actual energy conversion potential and demonstrating marine survivability of wave energy extraction technologies also are among the challenges to be overcome if wave energy is to become a viable, large-scale alternative resource.[17] Despite these economic and technical obstacles, however, the costs of wave energy extraction are decreasing.[18]

Relatively few large-scale wave energy extraction projects currently are operational. However, in recent years, several commercial projects have been installed, or are planned to be installed, off of the coasts of Portugal and Scotland, among other nations.[19] In February 2007, citing "increasing interest in new hydroelectric technologies," including wave energy,[20] and recognizing the "significant potential," for such technologies to increase U.S. hydropower production,[21] the U.S. Federal Energy Regulatory Commission ("FERC") issued an interim statement of policy for review of preliminary permit applications for wave, current, and river instream new technology projects.[22] The interim policy provides for, among other things, "strict scrutiny" of new preliminary permit applications.[23] However, while FERC's proposed regulations might delay wave and other energy projects in the short term, increased regulatory certainty could, in fact, foster future development.

Widespread implementation of wave energy extraction technologies could serve several sustainable development goals, including enabling developing coastal and island nations to increase electrification and standards of living, while minimizing carbon emissions and other pollution.[24] If able to be included in commercial generation portfolios in developed nations, wave energy extraction technology might also reduce fossil fuel consumption and promote the concomitant benefits of such reductions. Where technological limitations or reliability requirements prevent interconnection with local electric transmission infrastructure, wave energy extraction technologies could be used in independent, off-grid operations for standalone desalinization operations[25] or hydrogen production.[26] Realization of the promise of wave energy, which some commentators describe as "too important to overlook,"[27] will require continued focused research, development, investment, and regulatory support. Current global environmental, economic, and energy security concerns provide a strong mandate for such efforts.

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Fueling the Future:

A Policy-Based Comparison of Alternative Automotive Fuel Sources

*by Chris Stefan**

Introduction

The issues of energy supply and climate change are inseparable. With the world's demand for energy expanding, and concerns about climate change growing, policy decisions need to acknowledge the nuances of both problems. Fuel supply for the automotive sector represents the most obvious area where these issues overlap.

While efficiency increases in traditional hydrocarbon-based fuel sources are sure to continue, world economic growth will necessitate alternative energy resource development. Options available for change in the automotive sector include: (1) switching to technology that uses an alternative fuel source; or (2) increasing fuel efficiency using fossil fuels. A brief analysis of these two policy considerations is presented in this article.

World economic growth will necessitate alternative energy resource development.

The first section of this article will discuss viable fuel source options that may be the answer to our increasing energy needs; the common problems within each fuel source genre will also be discussed. The second section explores options that policymakers—on the local, state, and national level—can make to increase acceptance and prevalence of such alternatives.

Viable Fuel Source Options

There are presently seven viable fuel sources for automotive use.[1] These options include six alternative sources: ethanol, methanol, compressed natural gas, bio-diesel, hydrogen, electricity, and, of course, petroleum. These fuel resources can be separated by the nature of their production into three categories: (1) fuel sources that must be manufactured (requiring "energy to make energy"); (2) agricultural sources; and (3) fossil fuels. Regardless of the option chosen, legal strategies will play a pivotal role in both the final decision and the speed at which the transition is implemented.

It is important to remember that every viable option available today has considerable problems, some of which may be alleviated by future technology, and others that will need to be mitigated through regulation. When considering the environmental impacts of alternative fuel sources, the discussion must not be limited to only the impact on greenhouse gas ("GHG") levels, other environmental and economic impacts from these decisions must be analyzed.

For example, fuel sources that require "energy to make energy" may increase society's reliance upon traditional sources of energy, i.e. coal, natural gas, hydroelectric, or nuclear. Expanding the use of traditional energy sources will lead to an increase of the environmental and economic problems currently attributed to them (such as GHG emissions) and may result in economic repercussions by complicating the pricing for these existing energy services. In the case of agricultural sources, increasing pesticide use to result in higher yields will impact the environment and human health. As a result, reliance on agricultural sources may complicate the food and water markets that are currently in place. Additionally, the drilling and transportation of fossil fuels can lead to environmental contamination upon the occurrence of accidents. Geopolitics can influence supplies of fossil fuels; as a result, increasing utilization of fossil fuels will maintain the current system of economic vulnerability in producing nations.

Fuel Sources That Must Be Manufactured

Methanol

Methanol is an alcoholic compound capable of use as a fuel source; virtually all domestic methanol uses methane derived from natural gas associated with increased carbon emissions.[2] Research and development shows the weakness of methanol as a potential fuel because utilization results in low fuel economy and high costs.[3] Additionally, methanol requires additives to run an engine negating many of its advantages (i.e. high octane ratings).[4] Methanol can also have serious negative effects on human health and the environment[5] in addition to other environmental concerns associated with the leakage of methanol.

Regardless of the negatives, independent technological research in methanol continues, specifically focusing on the use of methanol as a potential hydrogen carrier for fuel-cells.[6] While use of these fuel-cells would still result in emissions of carbon dioxide at the point of use,[7] the greatest amount of GHG emissions in an economy that uses methanol as a fuel-cell carrier will be in the production of methanol itself.[8]

Hydrogen

Hydrogen is a source for automotive power that is associated with the use of fuel-cell technology. Hydrogen is a secondary

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source of energy, and increased levels of energy are necessary to safely transport it,[9] resulting in a high price of fuel for these vehicles. Additionally, the fact that hydrogen is highly combustible creates a safety concern.[10] This technology poses the risk of increased explosions resulting from traffic accidents, leading to high insurance-costs for these kinds of vehicles. The combustible nature of hydrogen also adds to the cost of transporting it. The use of "carriers," such as methanol and ethanol, might mitigate the risk of explosion in transporting hydrogen.[11] Unfortunately, this technology is not yet developed.

Electricity

Electric cars are able to tap into the preexisting complex electric infrastructure. The attractiveness of this car is unfortunately limited by a shortfall in battery technology.

The electric batteries used to power the vehicles are far more expensive than other batteries.[12] The most recently developed electric vehicles utilize lithium ion batteries.[13] These batteries have several problems, including a tendency to catch fire,[14] and such fires may have liability and litigation consequences. The life-cycle approach results in problems regarding recycling the batteries at the end of the car's life, a cost that will eventually be passed onto the consumers of the vehicles themselves. In addition, the limited range of the batteries and the need for battery re-charging may reduce the likelihood of widespread consumer acceptance.[15] The problem of re-charging would also complicate the utility market for electricity, as increases in demand could potentially overwhelm current systems.

Common Problems With Manufactured Fuels

All three of these fuel-options are most efficiently produced by non-renewable fossil fuels.[16] The resulting need for "energy to make energy" does not contribute to a reduction of GHG emissions. A solution is to investigate alternative energy resources that can efficiently produce methanol, electricity, and hydrogen. Nuclear energy is an option, but this source poses significant environmental and safety concerns. Hydro-electric power is also a consideration, but it is limited in availability and unlike nuclear power, it is not climate neutral.[17] Other primary sources of renewable power, such as wind, solar, geothermal, and wave, are not adequately developed to satisfy the market at this time.[18]

As a result, the environmental impact of all three of these options is largely dependent upon the method of production. Without adequate advances in the renewable sources listed above, a reliance upon any fuel source that must be manufactured will increase the demand for coal, natural gas, nuclear, and/or hydroelectric production. Consequently, policymakers need to realize that a reliance on manufactured fuel source must be coupled with an increase in the development of other alternative energy sources.

Agriculturally-Based Energy Products

Ethanol

Experts have shown that ethanol produced from corn, the most prevalent method of production in the United States, is inefficient.[19] Sugarcane-based ethanol, which is prevalent in Brazil, is a more efficient source of fermentable carbohydrates than corn. Cellulosic ethanol (ethanol fuel produced from cellulose) uses agricultural waste and shows promise in terms of efficiency; however, the technology has not yet reached maturation.[20] Furthermore, whether agricultural waste can produce enough cellulosic ethanol to provide for the entire automotive fuel market is an unanswered question.

Other problems with ethanol, regardless of its source, include the difficulty of transporting it to market, land use change for the cultivation of the input products, increased water consumption, and increased levels of nitrogen emissions. Ethanol also requires refinement, thus its overall efficiency would have to improve dramatically to justify it as an option.

Biodiesel

Biodiesel is considered a clean burning alternative fuel, produced from domestic, renewable resources (such as new and used vegetable oils and animal fats), that results in reduced carbon emissions. Additionally, biodiesel proponents argue that the process of growing plants to manufacture the fuel will act as carbon sinks, offsetting the emissions. However widespread use of bio-diesel will likely lead to land use change, another major contributing factor to climate change.[21] Concerns over water consumption also exist, as hydro-politics in many areas are currently complex. In addition, research suggests that biodiesel use may lead to increased human health impacts.[22]

Common Problems With Agriculturally-Derived Fuels

Both bio-diesel and ethanol share common problems. By relying on society's ability to grow a necessary food source, we would be placing our fuel supply at the mercy of the climate that is currently changing and may impact agriculture. Heat waves, forest fires, droughts, and other potential impacts from climate change could place the food and energy supply in jeopardy. The regulatory measures that need to address this problem include requiring a reserve capacity of whatever fuel utilized. This would require the producers of these fuel sources to be able to supply *more fuel* than the market demands, thus, the efficiency of either source would have to increase dramatically to be a reliable source.

The environmental impacts of a large-scale transition to agriculturally-based energy products are not entirely known. However, increases in land-use change, increased use of fertilizer and pesticides, increased water consumption, and perhaps increases in air or water pollution depending upon the method of production are all possible negative effects. Further, in areas of food scarcity using agriculture to produce fuel may result in dire conflicts.

Fossil Fuels

Compressed Natural Gas

Compressed natural gas is a fossil fuel, and because it is a finite resource, it is subject to price fluctuations and eventual depletion. If used as automobile fuel, it will likely increase natural gas utility prices and further complicate the larger energy and climate picture. In addition, increasing the value of natural gas would lead to an increase in expeditions to find potential sources of natural gas, which is often found in areas rich in crude oil.

Discoveries of sources of crude oil usually leads to lower prices for products derived from it, such as gasoline, diesel, and jet fuel. These discoveries and the subsequent price decrease of gasoline would slow the transition and stagger investment in alternative fuels. Given these drawbacks, the costs of creating a compressed natural gas infrastructure appear unjustified. Additionally, while fossil fuels represent the cheapest source of automotive fuel at the current time, policy-makers must remember that fossil fuels are exhaustible resources, and that eventual depletion is possible.

Encouraging The Changes

The next question to be tackled is how to encourage people to trust and purchase alternative fuel-powered vehicles. While concerns about the environment and energy supply are present amongst the populace, *economics determine consumer actions*. In order to make the economics of alternative fuel vehicles more attractive to consumers the tax code must be adjusted and research and development must be encouraged by subsidizing such projects. Policymakers must understand the importance of these changes in order for alternative fuels to become the norm in our society.

Tax Credits And Deductions

One of the easiest ways to encourage alternative fuel vehicle purchases is to increase the price of petroleum products. However, taxes on petroleum products are politically unpopular. Absent large changes in political will, this policy decision is unlikely to be chosen.

Tax credits and deductions *are* politically popular, and could have a large effect on encouraging consumer transition to alternative fuel sources. In the Energy Policy Act of 2005, dollar for dollar tax credits are allowed for purchasers of new alternative powered vehicles, or highly efficient vehicles. The policy implications of this Act is that consumers who can afford to purchase new alternative fuel-powered vehicles may be rewarded for doing so.[23] Some states have also enacted similar tax incentives for the purchase of alternative vehicles. However, the downstream market of used-vehicles purchases is largely unaffected, limiting the overall impact that such policies may have. Regardless, tax credits and deductions are still mechanisms for policymakers to convince American consumers to consider alternatively powered automobiles.

Additional Incentives To Promote Alternative Fuel Vehicles

Other laws can be enacted to provide small incentives to encourage more consumers to utilize alternative fuels. For example, many states have carpool lanes in metropolitan areas, designed to relieve traffic congestion. In California, owners of alternative fuel vehicles and hybrid vehicles are allowed to use the carpool lanes regardless of the number of passengers.[24] Similar programs in other metropolitan areas, along with the inclusion of all kinds of alternative vehicles in these programs, could provide further encouragement. Additionally, minor local tax incentives can encourage parking lots to allow preferential parking for alternative fuel vehicles, or cities could waive parking meter payments for alternative vehicle owners. Even though such policies would require enforcement mechanisms to be instituted to protect against fraud, the fines collected from offenders could help to mitigate the program's costs.

The Importance Of Subsidies

Another method to promote a policy change is to encourage the government to support the development of alternatives as viable substitutes. Absent major breakthroughs in research, all of the renewable energy sources will require government subsidies in order to develop into permanent solutions.

At the federal level, the Energy Policy Act of 2005 is subsidizing alternative energy development by slowly increasing the minimum percentage of alternative automotive fuel sold or dispensed to consumers.[25] Grants have been authorized to fund research on improving hybrid utilization,[26] improving traditional fuel efficiency,[27] as well as other programs. Funding alternative fuel infrastructure and development will continue to increase, as it becomes a more prevalent concern among the electorate.[28]

Hydrogen[29] and ethanol[30] have received the lion's share of the distributed subsidy funds. This may reflect that these alternative fuel sources are favored by interest groups capable of influencing the political system; it may also reflect piqued consumer interest.

Common Problems

Despite the policy efforts taken by the government, alternative fuel sources still represent a small portion of the automotive fuel market. While increasing interest in alternatives may ensure continued funding for projects, vital technological innovations will be necessary for alternatives to compete with traditional fuels on a large-scale. Political decisions are often made based on the political popularity of an idea, and popular ideas are not always technologically viable.

Conclusion

The greatest challenge poised to policymakers tackling energy security and climate change issues is time. Everyday more carbon is emitted in the atmosphere, and more non-renewable energy sources are depleted. Quick action is necessary, which will likely result in utilization of new technology without knowing all of the possible complications that may arise. To prevent this, and the backlash that would likely ensue, policymakers must provide additional funding for study of the environmental impacts of alternative fuels in their current stages of development, especially accounting for the wide range of variability of the impacts based on the method of production.

In short, policymakers must continue to promote the development of alternative fuel sources, but remain mindful of the dangers involved in promoting alternatives without adequate study. While the evaluation of many of these alternative sources may have appeared pessimistic at times, we can only hope that one of these sources will provide the answer to society's increasing energy demands.

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Misleadingly Green:

Time to Repeal the Ethanol Tariff and Subsidy for Corn

*By Marcel De Armas**

The United States is recognizing the value and importance of energy diversification, but it may also be creating greater environmental harm in the process.[1] If America decreases its dependence on foreign oil it will create greater economic security for itself, reduce its current account deficit, provide less financing for tyrannical leaders and terrorists with American petro-dollars, and improve its environmental credentials.[2] To reduce America's craving for oil, the government encourages domestic ethanol production; the United States is behind only Brazil, the world's largest producer of ethanol, and combined the two produce over 70 percent of the world's ethanol.[3] Currently the U.S. domestic ethanol industry is growing as a result of alternative fuels becoming politically popular, and the addition of a subsidy and tariff applied to ethanol.[4] However, arguably the ethanol tariff and subsidy do not provide any substantial environmental benefits for the United States or the world.[5]

The United States grants a 54 cent tax credit for each gallon of ethanol in a qualified mixture, which is a mixture of alcohol and gasoline.[6] Additionally, the government provides extra protection to the ethanol industry from foreign competition by imposing a 2.5 percent *ad valorem tax* and 14.27 cents per liter tax on imported ethanol from countries with normal trade relations.[7] Proponents of the tariff argue that it protects and promotes a domestic industry, prevents the government from subsidizing foreign ethanol production, and encourages the development of cleaner technology.[8]

On closer inspection, ethanol produced from corn may generate as much pollution as the fossil fuels it replaces and may create new environmental problems.[9] Due to the growing demand for ethanol, farmers intend to plant an estimated 88 million acres of corn this year, the equivalent of covering Florida, Georgia, and South Carolina in corn.[10] In addition, farmers will likely reduce crop rotation and replant fallow fields, which will increase the use of fertilizers and insecticides and result in greater pollution run-off into our water system.[11] To replace the United States' current dependence on gasoline (140 billion gallons per year) would take approximately 350 million acres of corn (assuming 400 gallons per acre per year of ethanol).[12] Since greater ethanol production results from plants with higher cellulose content, switchgrass or sugar cane should be used to produce ethanol, and thus, minimize the amount of land cultivated.[13]

Besides having a higher cellulose content, sugar cane offers several advantages over corn in the production of ethanol. First, unlike corn, farmers plant sugar cane once every four to seven years but harvest it yearly resulting in less soil erosion. Second, sugar cane requires less fertilizers since it can obtain some of its nitrogen from the air. Third, the energy to power the transformation from sugar cane to ethanol comes from burning the sugar cane's waste product and not from oil, gas, or the electrical grid as with corn.[14] Unfortunately with our current technology, even if the United States produced most of its ethanol from sugar cane or other crops with higher cellulose content it still would require excessive amounts of land for cultivation.[15]

To protect its environment the United States should eliminate the current ethanol tariff and subsidy, or at least focus the subsidy on crops with high cellulose contents. In particular, eliminating the tariff on ethanol will promote the growth of an ethanol distribution system because more imports would enter the country increasing the market for ethanol.[16] In addition, eliminating the ethanol tariff would increase the demand for sugar cane, and thus, reduce third world countries' excess supply. As a result, the price of sugar cane would increase providing additional revenue to the third world sugar cane producers.[17] The additional sugar cane revenue entering these third world countries could foster the development of a middle class interested in protecting their own environment and promoting sustainable development.[18] Finally, the elimination of the tariff and subsidy could rekindle the trade negotiations for a Free Trade Area of the Americas that stalled over agriculture and service industry differences between Brazil and the United States.[19]

Even if America could end its thirst for foreign oil by using crops with higher cellulose content and allowing greater imports of ethanol from abroad, it still should encourage the development of alternative renewable energies to ensure its economic, national, and environmental security by ending its addiction to foreign oil.[20] The United States needs to seek alternative renewable energies, in addition to raising mileage standards for vehicles, creating a carbon tax or tradable carbon market to discourage the burning of fossil fuels in the development of ethanol and other energy intensive industries, and end or refocus its subsidy to more efficient crops.[21] These steps would allow for American oil dollars to end up in the pockets of Americans and its neighbors to the North and South rather than in the pockets of potentially tyrannical regimes or hostile terrorists.[22]

Endnotes: Misleadingly Green *on page 74*

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Construction of a Fool's Paradise:

Ethanol Subsidies in America

*by John A. Sautter, Laura Furrey, and R. Lee Gresham**

Introduction

Ethanol is poised to become one of America's most important renewable energy sources in the near future. A complex web of state and federal subsidies to ethanol producers, refiners, and corn growers supports this fuel. Without these subsidies, America's thriving ethanol trade would not exist. This article outlines the most important laws that provide the financial largesse upon which ethanol production depends—the analysis of the sustainability of ethanol is left to the reader. Rather, the goal of this article is to explain how these laws and policies operate, with the aim of helping the reader understand the strong influence of government intervention throughout all aspects of ethanol production and distribution. In short, this article will demonstrate that American ethanol production has become the business of government.

Recent History Of Ethanol Subsidies

On October 22, 2004 President Bush signed into law the American Jobs Creation Act. By providing a new excise tax credit system for all ethanol blends and biodiesel, this law significantly changed the way taxes are collected on gasohol (a fuel mixture containing ethanol and gasoline) and other ethanol blends. Effective January 1, 2005, the Act eliminated the reduced rate of excise tax for gasohol blends containing ten percent, 7.7 percent, and 5.7 percent ethanol. It replaces this tax with the Volumetric Ethanol Excise Tax Credit ("VEETC"), a $0.51 per gallon excise tax credit for each gallon of ethanol blended with gasoline. Additionally, the Act extends the ethanol tax incentive to 2010 and deposits all taxes paid on gasohol and other ethanol blends into the Highway Trust Fund (while the credits are paid for out of the General Fund). Furthermore, farmer cooperatives may now also claim the small ethanol producer tax credit that was created in the Omnibus Budget Reconciliation Act of 1990 under this Act.[1]

Corn Subsidies

Perhaps most importantly, U.S. taxpayers subsidize the production of corn itself, to the tune of $51.3 billion from 1995 to 2005, according to the Environmental Working Group.[2] Without these subsidies, no corn-based ethanol would be produced in the United States. The Department of Agriculture reported that corn ethanol's variable production costs are $0.96 per gallon, with capital costs averaging $1.57 per gallon. In total, ethanol costs an average of $2.53 per gallon to produce in the United States.[3] A recent study published by the International Institute for Sustainable Development ("IISD") estimates that U.S. subsidies for ethanol totaled approximately between $5.1 billion and $6.8 billion in 2006.[4] These subsidies translate into $1.05 to $1.38 per gallon of ethanol, or 42 to 55 percent of its wholesale market price.[5]

Import Tariffs

Today, importers of Brazilian ethanol pay a $0.54 per gallon import duty plus a 2.5 percent tax. This import tariff shields U.S. producers from their Brazilian counterparts, whose sugar-derived ethanol is far cheaper to produce and has higher energy content than corn-based fuel.[6] Even with the tariffs in place, about half of the 160 million gallons of ethanol that the United States imported in 2004 came from Brazil, and Brazil is spending $ nine billion on new facilities to export even more.[7] This could pay off, as soaring U.S. wholesale prices are making Brazilian imports more competitive with domestic supplies. The import tariff will expire at the end of September 2007, but many federal legislators hope to see it extended[8] because it has generated revenues of $53 million and $22 million in 2004 and 2005, respectively.[9] Additionally, a most-favored nation *ad valorem* tariff is applied on imports of un-denatured ethyl alcohol (80 percent volume alcohol or higher) and denatured alcohol.[10] Revenues under the *ad valorem* tariff have been less than eight million dollars per year in recent years.[11]

Volumetric Ethanol Excise Tax Credit

Enacted in 2004 under the Jumpstart Our Business Strength Act, the VEETC provision is the single largest subsidy to ethanol.[12] VEETC provides a tax credit based on ethanol blended into motor fuel. According to IISD's Global Subsidies Initiative, "[i]t is awarded without limit, and regardless of the price of gasoline, to every gallon of ethanol blended in the marketplace, domestic or imported."[13] The cost to the U.S. Treasury from the subsidy is rising rapidly. In 2005, the Joint Committee on Taxation ("JTC") estimated that tax losses from the VEETC would average $1.4 billion per year for the period 2005 to 2009.[14] A year later, the JTC's estimate increased more than 50 percent, averaging $2.2 billion per year for the period 2006 to 2010.[15] The U.S. Treasury estimated an even higher cost value, an average of $2.6 billion per year from 2005 to 2011.[16]

Actual demand growth, however, is outstripping government estimates. Sales for 2006 resulted in VEETCs worth $2.5 billion, higher than either the Treasury's or the JTC's projections

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for the year.[17] Demand is expected to continue to grow greatly during the coming years. Projecting the cost of the VEETC provision is difficult in such a quickly expanding market, but the Renewable Fuel Standard mandates "provide one stable benchmark against which to estimate VEETC subsidies."[18] Presupposing that the nation will meet these targets, revenue losses will increase to $3.8 billion a year by 2012, when 7.5 billion gallons of ethanol must be expended.[19] This equates to a $3.05 billion per year average for revenue losses for the period 2007 to 2012, which is well above both Treasury and JTC estimates. In its 2006 *Annual Energy Outlook*, the Energy Information Agency ("EIA") projects corn ethanol consumption of $9.64 billion in 2012, far surpassing the $7.5 billion mandate, which the EIA expects to be passed in 2010.[20]

An important issue is whether the credits themselves are tax exempt. Even the tiniest changes in the interpretation of the tax code can greatly affect aggregate subsidy values.[21] If the tax credit were includable income, the total subsidy would be the revenue loss estimated above. If the credit were not includable, however, the VEETC subsidy would increase by more than one billion "on an outlay-equivalent basis."[22] Thus, the "total subsidy value" during the 2006 to 2012 period of the renewable fuel standards would be approximately $ nine billion higher.[23]

In January of 2005, the Internal Revenue Service ("IRS") issued a guidance document on implementation issues related to the VEETC.[24] The guidance on implementation of VEETC was silent on the tax treatment of the credits and indicated an inclination to characterize VEETC as non-includible in taxable income until clearly instructed to do otherwise.[25]

CHART 1: GOVERNMENT SUPPORT FOR BIOFUELS, ENERGY POLICY ACT OF 2005.

GOVERNMENT SUPPORT FOR BIOFUELS ENERGY POLICY ACT OF 2005

Program	Fiscal Years	Total Amount
Sugarcane Ethanol Program	2005-2007	$36 million
Cellulosic Biomass Ethanol and Municipal Solid Waste Loan Guarantee Program	N/A	$1 billion
Cellulosic biomass ethanol conversion assistance	2006-2008	$750 million
Ethanol production at Mississippi State and Oklahoma State universities	2005-2007	$12 million
Renewable Fuels Research and Development Grants	2006-2010	$125 million
Advanced Biofuels Technology Program	2005-2009	$550 million
Sugarcane Ethanol Loan Guarantee Program	N/A	Up to $50 million per project

THE ENERGY POLICY ACT OF 2005

The Chart entitled "Government Support for Bio-Fuels" lists the amount of money earmarked for each subsidy program, as it was outlined in the Energy Policy Act of 2005 ("EPACT 2005"). What is extremely troubling to realize is that this monetary support does not displace the amount of money already being given to farmers for corn production. Rather, this money adds to the total amount that all individuals involved in ethanol production will consume from U.S. taxpayers. For example, Section 1342, Title XIII, Subtitle D of EPACT 2005:

> "Provides a tax credit equal to 30 percent of the cost alternative refueling property, up to $30,000 for business property. Qualifying alternative fuels are natural gas, propane, hydrogen, E85 [(85 percent ethanol)], or biodiesel blends of [twenty percent] [(]B20[)] or more. Buyers of residential refueling equipment can receive a tax credit for $1,000. For non-tax-paying entities, the credit can be passed back to the equipment seller. The credit is effective on purchases put into service after December 31, 2005. It expires December 31, 2009."[26]

Additionally, EPACT 2005 modifies the definition of "small ethanol producer" so that facilities that produce up to 60 million gallons per year (previously 30 million gallons per year) are eligible for the tax credit.[27]

RENEWABLE FUELS STANDARD

Title XV of EPACT 2005 gave a huge boost to the ethanol industry by establishing a national Renewable Fuel Standard ("RFS"), which requires that gasoline sold in the United States contain a specified volume of biofuels and sets a target of 7.5 billion gallons of ethanol produced by 2012. The volume is "allocated to all refiners, marketers and importers on a pro rata basis."[28] Virtually all of this mandate will be met with traditional (corn) ethanol despite sales-volume credits awarded to cellulosic ethanol.[29]

The RFS has been highly successful in creating incentives for ethanol and 2006 marked a new record in ethanol production in the United States with some 4.9 billion gallons being pumped out of the refineries. Because capacity expansion is proceeding at tremendous rates, with approximately 80 refinery projects underway and an expected added capacity of six billion gallons by the middle of 2009, the RFS are now considered a floor for ethanol production and not a target. Indeed, President Bush's recent announcement of a production target for 35 billion gallons by 2017 will further build up the ethanol industry.[30]

The federal RFS does not preclude states from issuing more ambitious mandates of their own; however, none of the estimates above includes the price effects of state-level mandates. State renewable fuel mandates, if they are more stringent than the federal requirement, can further increase price distortions within their respective states.[31] If the state mandates are equivalent or less stringent than federal ones, no price distortions should be reserved.[32] However, state policies requiring the use of specific feedstocks or quotas on locally produced fuels may result in an incremental price effect where the percentage target does not differ from the federal mandate.[33]

Price Effects & Market Hedging

As the demand for ethanol rises as a result of purchase mandates, prices of intermediate inputs often rise as well—these are goods and services consumed during the production process, such as feedstocks and construction services to build ethanol production plants.[34] Where they occur, price increases may exclude buyers in more price sensitive markets,[35] which tend to be poor and grain-importing countries.[36] While not all related products are expected to increase in price, co-products such as distillers' grain are expected to experience "price erosion" as the increase in supply far outpaces market demand.[37]

Mandates may have the effect of greatly reducing the downside risk to producers.[38] High gasoline prices and elimination of methyl tert-butyl ether ("MTBE") mean that demand for ethanol will likely rise regardless of the federal RFS. Investors recognize than demand is often fickle and expect non-ethanol MTBE alternatives to emerge over the long-term.[39] Similarly, rising crop prices and/or falling fuel prices could very well reduce the economic rationale for using ethanol.

Many states vested in ethanol production have passed their own types of ethanol subsidy laws.

State Support and Ethanol Production: The Minnesota Model

Many states vested in ethanol production have passed their own types of ethanol subsidy laws. Indeed, some states make direct payments to ethanol producers. Minnesota has implemented a policy to award manufacturers a twenty-cent-per-gallon producer incentive to support the state's ethanol production.[40] Similarly, a South Dakota subsidy program provided $3.1 million to ethanol plants in just three towns in 2001.[41] Nebraska also pursued a similar policy awarding 60 cents in federal and 20 cents in state subsidies per gallon of ethanol produced.[42] Twenty states have similarly awarded tax credits or other incentives to construct ethanol and biofuel production plants.[43]

Minnesota has by far been one of the most aggressive and forward thinking states in passing ethanol legislation. In 1987, the state legislature attempted to capitalize on Minnesota's largest crop, corn, by granting the Minnesota Department of Agriculture $100,000 per year to conduct an ethanol promotion program.[44] The Minnesota Ethanol Commission was established to promote the production and use of ethanol in Minnesota. By 1995, the commission's purpose was furthered by a statutory goal to develop 220 million gallons of Minnesota ethanol production.[45] This goal was quickly surpassed. Minnesota ethanol production in 2006 was projected at 550 million gallons.[46]

As of June 2006, sixteen Minnesota facilities were producing ethanol.[47] Minnesota has 226 public pumps, nearly one-third of the 755 public pumps nationwide.[48] By 2010, Minnesota cars must begin running on twenty percent ethanol.[49] Many Minnesotans believe that ethanol will play a large role in the transition from oil to something else.[50]

In 2005, Corn Plus, a 750-member farmer co-op, achieved substantial efficiency gains in ethanol production.[51] The majority of ethanol facilities require one unit of energy to about 1.6 units of ethanol.[52] Corn Plus, using assorted efficiencies, has improved that ratio to nearly one to six through a process called a fluidized bed biomass incinerator which burns a recycled ethanol byproduct as steam cogeneration to power the facility.[53] Since pioneering the technology, Corn Plus reduced natural gas consumption by more than half.[54]

In order to protect its promising new industry, Minnesota has taken steps to combat the influence of corporations in their state subsidized ethanol industry. In 2002, the Minnesota Corn Processors cooperative, formerly owned by 5,500 Minnesota farmers and the country's second-largest ethanol producer, voted to sell all its shares in an ethanol plant to Archer Daniels Midland Company ("ADM") and subsequently believed that the cooperative board deceived the farmers in the sale.[55] Consequently, Minnesota introduced a law in 2003 to ensure that members of agricultural cooperatives would have increased access to information and have more direct influence over their cooperative policies.[56] A law was also introduced strengthening the state's ethanol producer payment program, restricting subsidies to those facilities owned by a majority of farmers and requiring the repayment of subsidies if the ethanol plant was sold to a corporation whose shareholders were not mostly Minnesota farmers.[57]

The Minnesota model of ethanol production provides an alternative scheme to how government intervention into ethanol production can yield the most profitable results. By requiring that farmers be the majority shareholders in order for ethanol production plants to receive state subsidies, the Minnesota law directs financial resources to moderately-sized, family-owned farms. Thus, this law keeps financial resources in the rural community where the corn is grown and production occurred. Because those profiting from the sale of ethanol are local farmers and not larger corporate interests (such as an out-of-state corporation like ADM), revenues are re-invested locally.

Increasing The Scope: Pending Ethanol Legislation And Subsidies

There are currently a number of bills circulating in both the U.S. Senate and House of Representatives that call for amendments promoting the expansion of ethanol use through subsidies to ethanol producers and distributors. Importantly, none of the bills alter the subsidy scheme that has been used in the past. As a result, all of the new bills merely add more layers of government intervention and support.

The first is the American Fuels Act of 2007.[58] The proposed Act offers an incentive for the retail sale of E-85 (fuel blends of 85 percent ethanol and fifteen percent gasoline) starting at $0.35 per gallon (before 2010) and decreasing to $0.10 per gallon in 2012. Furthermore, the bill has incorporated another financial incentive that pays for 50 percent of the equipment used to blend and process ethanol. The incentive caps at $2,000,000, the amount that ethanol producers can garner from the government for the equipment.[59] The bill also includes tax credits for manufacturers of flexible fuel motor vehicles.

Another proposed law is the Dependence Reduction Through Innovation in Vehicles and Energy Act ("DRIVE Act"), introduced in the House of Representatives. The bill includes an "Ethanol Action Plan" that calls for ten percent ethanol in the transportation fuel supply by December 31, 2015.[60] This bill also proposes to amend the Internal Revenue Code of 1986 by increasing the ethanol tax credit from thirty percent to fifty percent of the cost of any qualified alternative fuel vehicle refueling property put into service by the taxpayer. A refueling property will qualify as an alternative fuel vehicle refueling property if at least 85 percent of the volume is ethanol (amongst other alternative fuels).

The Biofuels Security Act of 2007 calls for the increase of renewable fuels to 60 billion gallons by 2030. The bill also requires the installation of E-85 pumps at an increasing percentage of refueling stations by "major oil companies" at owned and branded stations. The Biofuels Security Act also provides incentives for the manufacture of dual fuel vehicles in order to promote the use of vehicles that utilize ethanol and other alternative fuels.

Many of the proposed subsidies being contemplated for ethanol producers are taking the form of tax incentives. These subsidies operate by making ethanol producers pay less in taxes, thus keeping more money for investment. One such amendment to the IRS is the E-85 Investment Act of 2007, which would increase the incentives for E-85 "fuel vehicle refueling property" related to ethanol from 30 percent to 75 percent.[61] Another bill, the Independence from Oil with Agriculture Act of 2007, proposes permanent tax incentives for alternative energy.[62] The Renewable Fuels and Energy Independence Promotion Act of 2007 further anticipates permanent tax incentives for ethanol and biodiesel.[63] The "To Encourage Alternatively Fueled Vehicle Manufacturing up for Energy Independence Act of 2007," also known as "TEAM up for Energy Independence Act," plans to amend the IRS Code to impose an excise tax on automobiles sold in the United States that are not compatible with alternative fuels.[64] Other legislation promoting the use of ethanol is the "Congress Leads by Example through Alt-fuel Resources Act," or the CLEAR Act, which proposes to prohibit the use of a Member's Representational Allowance to provide any individual with a vehicle, including providing an individual with a vehicle under a long-term lease, which is not an alternative fuel vehicle.[65]

As their names indicate, these legislative bills attempt to capitalize on the yet unproven exogenous benefits promised by ethanol producers. Although this pending legislation will not necessarily be enacted into law, it is important to realize that Congress is contemplating an array of ethanol subsidies. If even a minority of these ethanol subsidies were passed, it would add to the growing government largess that artificially supports ethanol production.

Conclusion

The policy relationships embedded in ethanol production, based on ever-growing tax incentives and subsidies, will likely be perpetuated until one of two events occurs. Ethanol subsidies and protective tariffs might lead to the establishment of an "ethanol infrastructure" that will be competitive and independent of government support. Alternatively, there is the risk that government intervention could lead to ever-greater dependence on government protection and price supports. Regardless of which scenario occurs, it is important to realize the full scope of the support that is occurring. Ultimately, the laws that mandate billions of dollars toward subsidizing ethanol production represent a policy risk. It is our hope that by understanding the laws behind ethanol production, a more informed assessment of that risk can be made.

Endnotes: Construction of a Fool's Paradise

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Endnotes: Construction of a Fool's Paradise *continued on page 74*

Switchgrass:

A New Energy for the Future?

*by Lisa Novins**

The United States consumes over twenty million barrels of petroleum products each day, over half of which is imported.[1] Oil consumption is currently center stage in the national debate over how to address our oil addiction. Since almost half of our petroleum is used for automobiles, changing the way we power our cars is essential to any solution. A sustainable answer must combine vehicle efficiency, technological innovation, and clean renewable fuels.

One promising alternative to petroleum for gasoline is cellulosic ethanol made from switchgrass. Cellulosic ethanol is the same final product as corn or starch ethanol but made through another process from different raw materials.[2] These differences result in a product that replaces more renewable energy than corn ethanol with a more favorable energy balance.[3,4] In addition, using switchgrass also reduces both greenhouse gas emissions and fossil fuel use because a primary co-product of cellulosic ethanol production is lignin which is similar to coal and can be used to power cellulosic ethanol plants.[5,6]

Switchgrass is a fast-growing, cellulose rich, hardy grass native to the mid-western United States.[7] As an energy crop switchgrass offers many potential benefits because it thrives within our existing infrastructure.[8] First, switchgrass shows great promise for improving its yields in part because it is well-adapted to our climate and soils.[9] Second, switchgrass grows well, up to ten feet high in a single growing season.[10] Third, switchgrass does not require the extensive fertilizers and other chemicals that many traditional crops, such as corn, need.[11] Thus, switchgrass offers energy, environmental, and agricultural benefits over traditional crops.

As a result of its biological characteristics, switchgrass also offers additional benefits over other traditional energy crops. First, its robust root system can help prevent erosion and act as a filter for runoff from other crops, thus preventing water pollution.[12] Second, switchgrass has a superior ability to sequester carbon in the soil which has very positive implications for its carbon lifecycle.[13] Third, switchgrass absorbs nitrogen more effectively than corn and other crops.[14] Finally, using switchgrass will likely decrease coal, natural gas, and other fossil fuel consumption.[15]

The Energy Policy Act of 2005 included several provisions promoting increased ethanol use such as a $0.51 tax credit per gallon of ethanol used as motor fuel and a mandate for up to 7.5 billion gallons of renewable fuel to be used in gasoline by 2012.[16] Before those provisions can be implemented more research studying the environmental impacts of switchgrass must be done including: air pollution, energy efficiency, and viability of commercial cellulosic ethanol production. In addition, other types of ethanol should not be ruled out since their commercial viability is currently more advanced and their energy benefit might increase when manufactured in conjunction with cellulosic.[17] Overall, switchgrass promises to be an extremely viable energy crop that can help the United States reduce its fossil fuel consumption with a renewable biofuel that can be grown within its existing agricultural infrastructure.

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10 Bioenergy Feedstock, *supra* note 7.

11 Natural Resources Defense Council, *supra* note 8.

12 Bioenergy Feedstock, *supra* note 7.

13 Natural Resources Defense Council, *supra* note 8.

14 Natural Resources Defense Council, *supra* note 8.

15 Farrell et al., *supra* note 5, at 507.

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Status Check:

Assessing Interior's Implementation of the Energy Policy Act of 2005

*by Peter J. Schaumberg and William N. Sinclair**

Introduction

On August 8, 2005, President George W. Bush signed into law the Energy Policy Act of 2005 (the "Act"), the first major piece of energy legislation in over a decade. Congress enacted this law to encourage energy efficiency and conservation, to promote alternative and renewable energy sources, to reduce dependence on foreign sources of energy, and to increase domestic production of oil and natural gas. While the purpose of the Act—"to ensure jobs for our future with secure, affordable, and reliable energy"[1]—is simple, the Act's scope and range are far-reaching and its implementation requires several federal agencies to work together, as well as separately, to achieve the goals outlined above.

The Department of the Interior ("DOI" or "Interior") and, in particular, the Bureau of Land Management ("BLM") and the Minerals Management Service ("MMS"), play critical roles in implementing the Act and developing many of its initiatives and programs with respect to energy resources on public lands onshore and on the outer continental shelf ("OCS"). No fewer than 86 Sections of the Act require DOI action, and many of these Sections prescribe time deadlines to complete rulemaking or other activities. It is not surprising that so many Sections of the Act are directed at DOI because Interior-managed onshore and offshore resources are responsible for 30 percent of the domestic production of oil and natural gas, 50 percent of geothermal resources, and five percent of wind energy.[2]

In less than two years following enactment, DOI has timely met, or is on schedule to meet, most of the deadlines prescribed by the Act. In the few instances where significant deadlines were not met or likely will not be met based on the current status of the implementation process, DOI's delay often is understandable. For example, in certain cases the prescribed deadlines were somewhat unrealistic from the outset (such as the requirement under Section 344 to issue a final rule on deep gas royalty relief, an extremely complicated rule, within 180 days of enactment). In other situations, the statutory direction Congress provided was either incomplete or unclear, requiring Interior to speculate as to Congress' purpose. Also, some of DOI's requirements under the Act involve inter-agency coordination which often requires additional time. Compounding the implementation issues, particularly where Congress' intent is unclear, is the lack of legislative history explaining how Congress intended the Act to be implemented. The Conference Report accompanying the Act consists of approximately 1,700 pages of statutory provisions and only one paragraph of text.[3]

This article examines DOI's progress, and in particular BLM's and MMS' efforts, in implementing selected Sections of the Act that relate to oil and gas, geothermal energy, and alternative energy. The article highlights some of the statutory interpretation and other legal issues that Interior encountered during the implementation of some of these Sections, which in some instances has caused DOI to miss deadlines. While there is still more work to be done, a review demonstrates that, less than two years after enactment, BLM and MMS had substantially met Congress' challenge and completed or initiated an enormous number of tasks.

Implementing The Act: Review Of Interior's Record Two Years Later

Set forth below is a discussion regarding principal Sections of the Act related to three resources produced on public lands onshore and on the OCS: oil and gas, geothermal energy, and alternative energy. Sections relating to each resource are organized by the implementation deadlines the Act imposes from earliest to latest.

Oil And Gas

Actions Effective on the Date of Enactment of the Act

Naval Petroleum Reserve Numbered 2, Sections 331 and 332: These Sections provide that administrative jurisdiction and control over all public domain lands[4] included within Naval Petroleum Reserve Numbered 2 ("NPR-2"), located in Kern County, California, are to be transferred from the Department of Energy ("DOE") to DOI.[5] The Act also provides that certain revenues from existing leases and new leases will be deposited into a U.S. Treasury account, and the amounts in that account are available to DOI, without further appropriation, for environmental remediation and transition costs related to the transfer and leasing of NPR-2 lands.[6] On March 6, 2006, BLM issued a final Environmental Assessment and proposed land use plan amendment for further oil and gas leasing.[7] BLM held its first lease sale in NPR-2 on September 13, 2006 and leased five parcels totaling 2,533 acres (the balance of the unleased acreage) for $1.6 million. The transfer from DOE to BLM was effective on the date of enactment. BLM has far more experience than DOE in managing oil and gas production. BLM's management of NPR-2 should result in enhanced production from existing

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leases, increased efforts to lease the remaining portions of NPR-2, and improved environmental monitoring.

Deepwater Royalty Relief, Section 345: This Section requires DOI to provide a royalty relief incentive for Outer Continental Shelf Lands Act ("OCSLA")[8] leases in water depths greater than four hundred meters in the Western and Central Planning Area of the Gulf of Mexico during the five-year period following enactment of the Act. It also prescribes royalty suspension volumes (i.e. volumes of production for which no royalty would be owed) for each lease in four specified water depth ranges. The Act authorizes royalty suspension volumes of up to sixteen million barrels of oil equivalent for each lease in water depths greater than two thousand meters.[9]

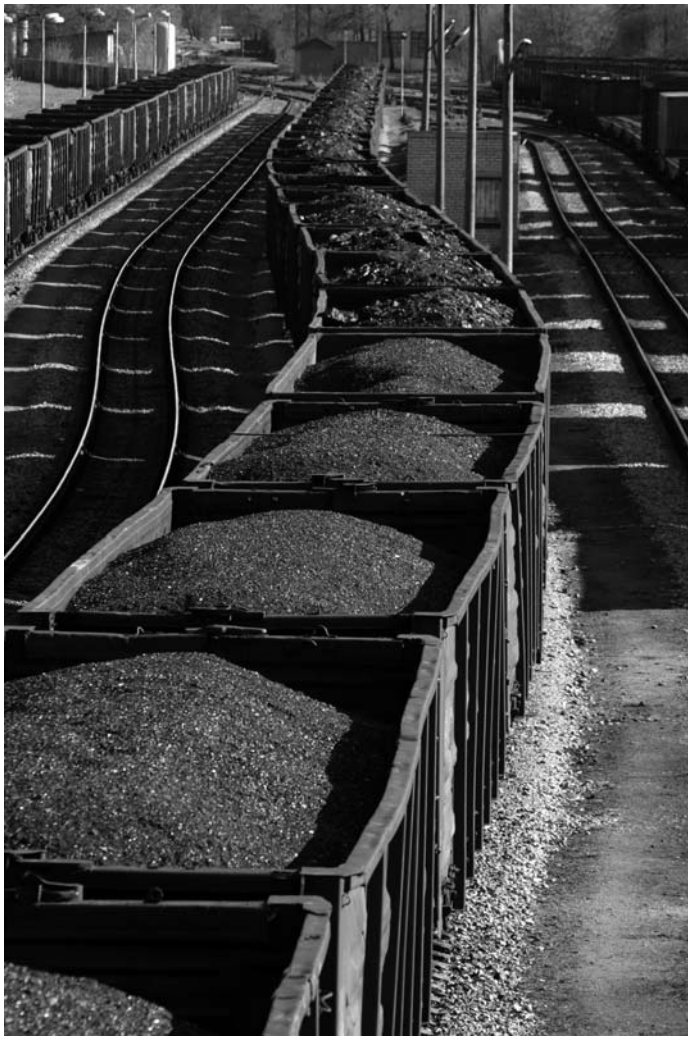
The action prescribed by Section 345 was effective upon enactment. The relief provisions have been included in all leases issued since that date. Whether the prospect of increased royalty relief will result in heightened interest in these OCS areas and higher bonus bids for leases will depend on industry projections as to whether prices for oil and gas will remain above the price thresholds that operate to suspend the royalty relief. In January 2007, the House of Representatives passed H.R.6,[10] which among other things would eliminate the royalty relief provided by this Section. H.R. 6 is currently under consideration by the Senate.

Actions Required Within 45 Days After Enactment of the Act

Oil and Gas Leasing In Tar Sands Areas, Section 350: Section 350 provides DOI with the authority to issue separate leases in tar sands areas on federal lands for the exploration and development of oil and gas and for the exploration and development of tar sands, as opposed to the previous practice of issuing a combined lease for the exploration and development of oil, gas, and tar sands. Section 350 prescribes a time limit of 45 days after the date of the enactment of the Act for DOI to issue a final rule implementing this Section.[11] On May 18, 2006, BLM issued a final rule implementing this Section.[12] However, BLM already had implemented this new authority in an interim final rule on October 7, 2005, 60 days after enactment.[13] This action has been completed. The ability to obtain access to the conventional oil and gas resources without the tar sands issues should increase industry interest in the area.

Actions Required Within 90 Days After Enactment of the Act

BLM Pilot Project Offices, Section 365: Section 365 directs DOI to enter into a memorandum of understanding ("MOU") within 90 days after enactment of the Act with the Department of Agriculture ("Agriculture"), the Environmental Protection Agency, and the Army Corps of Engineers. The purpose of the MOU is to develop a pilot project to streamline the federal permitting process for oil or gas development, especially with regard to processing an Application for Permit to Drill ("APD") which the lessee must obtain before beginning oil and gas drilling operations on federal oil and gas leases. Employees from each of the above-mentioned agencies will be assigned to seven



Courtesy of Indiana Office of Energy & Defense Development

Coal is a traditional, yet antiquated, source of energy in the United States.

BLM field offices in Colorado, Montana, New Mexico, Utah, and Wyoming, the states with the highest potential for the development and production of onshore domestic energy, to implement the pilot project.[14] The purpose of this Section is to locate in one office the expertise to complete reviews and issue permits, including consultations and the preparation of biological opinions under Section 7 of the Endangered Species Act;[15] permits under Section 404 of the Federal Water Pollution Control Act;[16] regulatory matters under the Clean Air Act;[17] planning under the National Forest Management Act of 1976;[18] and the preparation of analyses under the National Environmental Policy Act ("NEPA").[19] The MOU was signed on October 24, 2005[20] within the 90-day deadline prescribed by Section 365 and all seven pilot offices are staffed and functioning. This action has been completed.

Actions Required Within 180 Days After Enactment of the Act

OCS Deep Gas Royalty Relief, Section 344: Section 344 is a royalty relief provision providing that, within 180 days after enactment, DOI must issue a regulation granting royalty relief for the production of natural gas from ultra deep wells on leases issued in water depths less than four hundred meters in the Gulf

of Mexico. Ultra deep wells are defined under this Section as "a well drilled with a perforated interval, the top of which is at least 20,000 true vertical depth below the datum at mean sea level." Under Section 344(c), DOI may establish price thresholds limiting the royalty reduction granted under this Section. This new authority supplements MMS' existing regulatory program for deep gas royalty relief. MMS is still drafting a proposed rule. This Section is not self-executing, and MMS has not met the 180 day deadline to issue a final rule. Further, as explained above regarding Section 345, H.R. 6 would repeal this section. MMS is faced with several interpretational issues here which could have a significant effect on the scope of royalty relief offered. Because the amount of potential royalty relief in issue is so large, the impact could be millions of dollars per eligible well. MMS will publish proposed regulations in May 2007.

Actions Required Within One Year After Enactment of the Act

Royalty Relief For Gas Hydrates/CO_2 Injection, Sections 353 and 354: Section 353 provides that DOI may grant royalty relief as an incentive to produce natural gas from gas hydrate resources[21] on the OCS or on federal leases in Alaska. DOI must conduct a rulemaking to establish a royalty relief program if the Secretary determines that royalty relief would encourage the production of natural gas from gas hydrates.[22] Similarly, Section 354 provides that if the Secretary determines that it is in the public interest to provide royalty incentives for enhanced recovery techniques for oil and gas using the injection of carbon dioxide, DOI must conduct a rulemaking to provide for those royalty incentives for an eligible onshore federal or OCS lease.[23] DOI is required to publish advanced notices of proposed rulemaking for both sections within 180 days after the date of enactment of the Act and final rulemaking for both Sections must be completed within 365 days after the enactment of the Act unless the agency decides not to proceed with a rule. On March 8, 2006, BLM and MMS jointly issued advanced notices of rulemaking for public comment for both sections.[24] These actions have been completed.

On August 4, 2006 DOI determined not to proceed with rulemaking under either section. DOI concluded that the Act's royalty relief provisions would not result in additional natural gas production from methane hydrates because of the operational, economic, and environmental uncertainties involved with this emerging technology. DOI also concluded that the royalty incentives would not lead to increased oil production on the OCS, primarily due to unfavorable economics associated with the high cost of installing appropriate equipment and the lack of affordable nearby sources of carbon dioxide. For federal leases onshore, DOI determined that current high oil prices made the use of this technology affordable without additional financial incentives.[25]

Oil and gas, and geothermal production from leases managed by BLM and MMS contribute significantly to meeting the energy needs of our Nation today.

Actions Required Within 18 Months After Enactment of the Act

Oil Shale/Tar Sands Leasing, Section 369: The United States is blessed with enormous oil shale resources on the public lands. To encourage the development of this resource, the Act provides, among other things, that: (a) within 180 days, DOI must make available for leasing under the Mineral Leasing Act ("MLA")[26] land within Colorado, Utah, and Wyoming that DOI considers to be necessary to conduct research and development activities with respect to technologies for the recovery of liquid fuels from oil shale and tar sands resources on public lands; (b) within 18 months, DOI must develop a programmatic environmental impact statement ("EIS") for a commercial leasing program; and (c) within six months after completing the EIS, DOI must issue regulations for a commercial leasing program for oil shale and tar sands. Within 180 days after the final rule establishing the commercial leasing program, the DOI is directed to consult with the States, Indian tribes, and other interested persons, and the DOI may conduct a lease sale only if there is sufficient support to proceed. To expedite oil shale and tar sand project permit review, subsection (k) directs the DOI to act as lead agency in coordinating environmental and other reviews with states, local governments, and Indian tribes. Regulations implementing this requirement are due six months after enactment. The DOI is required to submit a report to Congress within 90 days of enactment describing its program in developing regulations and conducting the final lease sales. In addition, Section 369 amends the MLA to increase the acreage limitation from 5,120 acres to 5,760 acres for oil shale and tar sands.[27] On March 4, 2006, BLM selected six oil shale Research, Development, and Demonstration ("RD&D") lease nominations in Colorado and Utah for further review and analysis under NEPA and submitted a report to Congress on December 6, 2006 on the status of implementation actions to promulgate regulations. In addition, on December 13, 2005, BLM initiated a programmatic EIS to evaluate oil shale and tar sands development in Colorado, Utah, and Wyoming[28] and on August 25, 2006, BLM published an advance notice of proposed rulemaking for oil shale regulations.[29] On December 15, 2006, BLM issued five RD&D leases to Chevron, Shell, and EGL Resources. BLM has made progress in meeting the various deadlines set forth in Section 369. Now that the RD&D leases have been issued, there is increased interest in the upcoming regulations for full-scale oil shale development.

Actions Required Within Three Years After Enactment of the Act

Royalty-In-Kind, Section 342: This Section provides permanent authority to DOI to more effectively and efficiently operate its royalty-in-kind ("RIK") program. The MLA[30] and the OCSLA[31] provide that DOI may allow federal oil and gas lessees to satisfy their royalty payment obligations through RIK arrangements under which the lessees provide physical volumes of oil or gas in lieu of money. When DOI takes RIK, it then either sells the oil or gas or transfers it to another federal agency, such as the DOE, which stores oil in the Strategic Petroleum Reserve.

In recent years, MMS has taken increasingly large proportions of its royalties in-kind, particularly from OCS leases, and marketed that production in an effort to enhance revenues for the United States. Annual appropriations acts provided MMS the authority necessary to spend money for transportation, processing, or other activities involved in marketing oil and gas. Section 342(b)(4) makes that authority permanent. The statute provides that MMS may take and market RIK only if the benefits to the United States are greater than or equal to taking royalties in value. On September 29, 2006, MMS delivered its Royalty in Kind report to Congress highlighting business processes, systems, and plans to support RIK capabilities.[32] Many of the provisions in Section 342 reaffirm existing RIK provisions in the MLA and OCSLA, and most of the new provisions are self-executing. In Fiscal Year 2006, MMS expects to take almost 80 percent of its Gulf Of Mexico OCS lease oil royalties in-kind (a value approaching four billion dollars) and 30 percent of its gas (valued at over $2 billion).[33] Having permanent authority will enable MMS to develop additional marketing tools to enhance the benefits of the RIK program to the United States.

Actions Required With No Deadline

Streamlining APD Processing, Section 366: This Section provides that (a) no later than ten days after receiving an APD for a federal oil and gas lease, BLM will notify the applicant whether the application is complete and explain what information is missing or required for it to be complete, and, no later than 30 days after receiving a complete application, BLM will issue the permit if it is in compliance with NEPA and other applicable laws or defer the decision and provide the applicant with steps it must take and a list of actions to be taken by Interior to complete compliance. Once the applicant completes any required steps, BLM must make a decision on the permit within ten days unless compliance with NEPA or other applicable laws is not complete.[34] On March 7, 2007, BLM issued Onshore Oil and Gas Order Number 1 incorporating the Act's APD processing timeframes.[35]

NEPA Categorical Exclusions, Section 390: Pursuant to this Section, the following five actions are subject to a rebuttable presumption that a categorical exclusion under NEPA applies if the activity is conducted pursuant to the MLA for the exploration and development of oil and gas on federal leases: (1) individual surface disturbances of less than five acres so long as the total surface disturbance on the lease is not greater than 150 acres and site-specific analysis in a document prepared pursuant to NEPA has previously been completed; (2) drilling an oil and gas well at a location or well pad site at which drilling has occurred previously within five years prior to the date of spudding the well; (3) drilling an oil or gas well within a developed field for which an approved land use plan or any environmental document prepared pursuant to NEPA analyzed such drilling as a reasonably foreseeable activity, so long as such plan or document was approved within five years prior to the date of spudding the well; (4) placement of a pipeline in an approved right-of-way corridor, so long as the corridor was approved within five years prior to the date of placement of the pipeline; and (5) maintenance of a minor activity, other than any construction or major renovation of a building or facility.[36] On September 30, 2005, BLM issued policy guidance to implement these categorical exclusions.[37] This action has been completed.

BLM reports that as of September 2006, it has used the Section 390 categorical exclusions for more than 1300 actions. Although yet to be administratively or judicially challenged, BLM's policy guidance interpreting Section 390 has raised legal questions regarding its efficacy. Specifically, BLM's guidance stated that the categorical exclusions in Section 390 are not subject to the extraordinary circumstances exception set forth in the regulations promulgated by the Council on Environmental Quality ("CEQ") implementing NEPA.[38] In other words, BLM interpreted Section 390 as creating statutory categorical exclusions not subject to review under the normal CEQ process for approval. This aggressive stance was lauded by members of the oil and natural gas industries as an improvement to the process for permitting oil and gas exploration and development on public lands.[39] Not everyone, however, agrees with BLM's interpretation regarding the categorical exclusions. For example, in correspondence to BLM dated November 29, 2005, the Wilderness Society argued that BLM's interpretation of Section 390 was legally deficient. BLM responded to the Wilderness Society and announced that it would address the interpretation set forth in its policy guidance in a rulemaking and would solicit comments from the public. However, when BLM published its proposed changes to Onshore Order Number 1 on March 13, 2006, no language was included addressing the implementation of Section 390. Similarly, the Final Onshore Order Number 1 did not address the Section 390 categorical exclusions. In sum, while BLM has met its charge under the Act to develop guidance related to Section 390, the continuing viability of that guidance may be unsettled.

Geothermal

Action Required Within 180 Days After Enactment of the Act

Coordinating Leasing/Permitting, Section 225: This Section requires that DOI and Agriculture enter into an MOU within 180 days regarding the coordination of leasing and permitting for geothermal development of public lands and national forest lands.[40] On April 5, 2006, BLM signed an interagency MOU with the Forest Service to improve geothermal leasing and permitting

procedures.[41] This action has been completed. After the new leasing provisions implementing the Act are adopted, BLM will assess the effectiveness of the streamlining efforts for leasing and permitting geothermal activities on national forest lands.

Actions Required with No Deadline

Geothermal Leasing/Royalty Value, Sections 222-224, 228-229, and 231-234: These Sections amend the Geothermal Steam Act of 1970[42] by changing the methodology for leasing federal geothermal resources and simplifying the valuation calculations for geothermal resources used for both direct use (e.g., heating greenhouses or other buildings) and electrical generation. The Act also directs DOI to process pending lease applications under the provisions of law existing before the date of enactment. On October 7, 2005, BLM issued interim guidance for processing pending geothermal lease nominations (Section 222). On May 2, 2007, MMS[43] and BLM[44] issued final geothermal leasing and royalty valuation regulations. Leasing activity under the newly-amended provisions of the Geothermal Steam Act may now proceed under the new MMS and BLM regulations.

Alternative Energy

Onshore Renewable Energy, Section 211: This Section establishes a goal, as opposed to a directive, for DOI to "seek to have approved non-hydropower renewable energy projects located on the public lands with a generation capacity of at least 10,000 megawatts of electricity" before 2015.[45] A Final Programmatic Wind Energy Development EIS was published in June of 2005 and a Record of Decision ("ROD") to implement best management practices and land use plan amendments to provide for wind energy development on public lands was issued in December of 2005.[46] A BLM wind energy policy implementing the ROD was issued August 24, 2006.[47]

Actions Required Within 270 Days After Enactment of the Act

OCS Alternative Energy Development, Section 388: This Section provides that DOI may grant leases, easements, or rights-of-way on the OCS for activities that support exploration, development, production, or storage of oil or natural gas; support transportation of oil or natural gas, excluding shipping; produce or support production, transportation, or transmission of energy from sources other than oil or natural gas; or use, for energy-related or other authorized marine-related purposes, facilities used for OCS activities. In addition, DOI is charged with establishing royalties or other payments for any lease, easement, or right-of-way granted under Section 388. Within 180 days after the enactment of the Act, Section 388 directs DOI to issue a final rule regarding the provisions for sharing revenues from these activities with coastal states. Within 270 days after the enactment of the Act, Section 388 directs DOI to issue a final rule implementing this subsection.[48] On December 30, 2005, MMS published an advanced notice of proposed rulemaking ("ANPR") providing for public comment.[49] This ANPR addressed various rulemaking issues for alternative energy projects on the OCS other than oil or gas, such as wind, wave, or current energy projects. It also addressed alternative uses of OCS facilities, such as using oil and gas platforms for aquaculture. In March 2007, MMS published a draft programmatic EIS examining the potential environmental consequences of implementing an alternative energy and use program on the OCS.[50] MMS estimates that proposed rules, final rules, and a final programmatic EIS will be published in 2007.

Until the final regulations are complete, MMS is unlikely to consider approving any alternative energy projects except, perhaps, the proposed wind energy project offshore Cape Cod. Several implementation issues exist with regard to this Section. Section 388 delegates to DOI the authority to grant a lease, easement, or right-of-way on the OCS for alternative energy exploration and development. DOI has managed oil and gas leasing on the OCS for over 50 years, and MMS has assumed responsibility for implementing Section 388. Alternative energy exploration and development has focused on wind, wave, and tidal resources, each of which would be used to develop electricity. Of these resources, wind energy is the most promising, and projects are proposed in federal waters off of Cape Cod and Long Island and state waters offshore of Texas.

Section 388 has created a debate as to which federal agency has the authority to regulate alternative energy projects on the OCS. In an ANPR, MMS stated that it interprets the authority granted by Section 388 to issue leases, etc., "as also providing MMS authority to regulate or permit the activities that occur on those leases, easements or rights-of-way, if those activities are energy related."[51] However, Section 388(a) provides that "[n]othing in this subsection displaces, supersedes, limits, or modifies the jurisdiction, responsibility, or authority of any Federal or State agency under any other Federal law." In comments responding to the ANPR, the Federal Energy Regulatory Commission ("FERC") asserts that it has jurisdiction under the Federal Power Act[52] to license offshore energy hydropower projects.[53]

The basis for FERC's assertion appears to be, in part, an administrative decision from 2003, *In re Aqua Energy Group, Ltd.*, in which an administrative law judge ruled that wave energy projects are hydroelectric projects subject to FERC licensing requirements where located on a navigable waterway, on government lands, or in commerce clause waters and affecting interstate commerce.[54] This struggle between FERC and MMS, whether perceived or real, may have a significant effect on the nascent industry seeking to develop alternative energy sources on the OCS. Many companies cannot afford to go through, for example, FERC's permitting process only to find that, in fact, they should have gone through MMS' permitting process, or vice versa. Obtaining approvals from both agencies would also be extremely burdensome. In short, inter-agency squabbling may delay the growth of this industry and serve as a bar that would prevent potentially interested companies and investors from entering into this field. Regardless, the jostling between FERC and MMS over this issue has hindered MMS in implementing Section 388, and it appears that MMS will not issue a final rule implementing this Section until late in 2007 or 2008.

Conclusion

Interior's substantial progress in less than two years of implementing the Energy Policy Act of 2005 demonstrates that DOI, MMS, and BLM have taken these implementation responsibilities seriously and devoted the resources necessary to substantially comply with Congress' ambitious time schedule. Moreover, while there have been some legal or policy implementation hurdles along the way, given the breadth of this new law, the agencies have handled diligently multiple, overlapping deadlines and deftly implemented sometimes vague statutory mandates.

Oil and gas, and geothermal production from leases managed by BLM and MMS contribute significantly to meeting the energy needs of our nation today. Development of alternative energy, particularly on the OCS, and development of the vast oil shale and methane hydrate resources on Interior-managed lands hold great promise for the future. The investment that BLM and MMS are making today in response to Congress' direction in the Energy Policy Act of 2005 undoubtedly will pay substantial dividends in our energy future.

Endnotes: Status Check

[1] Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594 [hereinafter Energy Policy Act].

[2] Minerals Management Service, Energy Policy Act of 2005, *available at* http://www.mms.gov/2005EnergyPolicyAct.htm (last visited Apr. 12, 2007).

[3] H.R. REP. NO. 109-190 (2005) (Conf. Rep.).

[4] Of the approximately 10,451 acres of land in NPR-2, approximately 7,919 acres are currently under lease for oil and gas production.

[5] Energy Policy Act, *supra* note 1, § 331.

[6] Energy Policy Act, *supra* note 1, §§ 331(c)(2), 332(b)(1), (2).

[7] Proposed Caliente Resource Management Plan Amendment and EA Regarding Management of Lands Recently Transferred to BLM Known as NPR-2, *available at* http://www.blm.gov/ca/pdfs/bakersfield_pdfs/minerals/NPR2_rmp_amendment.pdf (last visited Apr. 12, 2007).

[8] 43 U.S.C. § 1337(a)(1)(H).

[9] Energy Policy Act, *supra* note 1, § 345.

[10] H.R. 6, 110th Cong. (2007).

[11] Energy Policy Act, *supra* note 1, § 350.

[12] Leasing in Special Tar Sands Areas, 71 Fed. Reg. 28,778 (May 18, 2006).

[13] Leasing in Special Tar Sands Areas, 70 Fed. Reg. 58,610 (Oct. 7, 2005).

[14] Energy Policy Act, *supra* note 1, § 365.

[15] Endangered Species Act § 8, 16 U.S.C. § 1536 (1973).

[16] Clean Water Act § 404, 33 U.S.C. § 1344 (1972).

[17] Clean Air Act § 101, 42 U.S.C. § 7401 (1970).

[18] National Forest Management Act § 14 (a), 16 U.S.C. § 472a (1976).

[19] National Environmental Policy Act § 2, 42 U.S.C. § 4321 (1969).

[20] BLM MOU WO300-2006-06, Oct. 24, 2005, *available at* http://www.blm.gov/nhp/spotlight/epa2005/BLM_MOU_WO_300-2006-07.pdf (last visited Apr. 12, 2007).

[21] Gas hydrates are crystalline substances composed of water and gas together in solid form far above the freezing point of water, in which a solid water-lattice accommodates gas molecules in a cage-like structure, or clathrate. Gas Hydrate Production Incentives, 71 Fed. Reg. 11,559, 11,560 (Mar. 8, 2006).

[22] Energy Policy Act, *supra* note 1, § 353.

[23] Energy Policy Act, *supra* note 1, § 354, 119 Stat. 594, 715.

[24] Gas Hydrate Production Incentives, 71 Fed. Reg. 11,559 (Mar. 8, 2006); Enhanced Oil and Natural Gas Production Through Carbon Dioxide Injection, 71 Fed. Reg. 11,557 (Mar. 8, 2006).

[25] DOI Defers Action on Rulemakings for Gas Production from Gas Hydrates and Enhanced Oil Recovery Through Carbon Dioxide Injection, http://www.blm.gov/nhp/spotlight/epa2005/Aug06_jt_stmt.pdf (last visited Apr. 12, 2007).

[26] Federal Onshore Oil and Gas Leasing Reform Act, 30 U.S.C. §§ 226, 241 (1987).

[27] Energy Policy Act, *supra* note 1, § 369.

[28] Notice of Intent to Prepare a Programmatic EIS and Plan Amendments for Oil Shale and Tar Sands Resources Leasing on Lands Administered by BLM in Colorado, Utah, and Wyoming, 70 Fed. Reg. 73,791 (Dec. 13, 2005).

[29] Commercial Oil Shale Leasing Program, 71 Fed. Reg. 50,378 (Aug. 25, 2006). On September 26, 2006, the deadline for public comments on this advance notice of proposed rulemaking was extended until October 25, 2006. Commercial Oil Shale Leasing Program, 71 Fed. Reg. 56,085 (Sept. 26, 2006).

[30] Mineral Leasing Act § 36, 30 U.S.C. § 192 (1920).

[31] Outer Continental Shelf Lands Act § 27, 43 U.S.C. § 1353 (1953).

[32] Report to Congress: Minerals Management Service Royalty in Kind Operation, http://www.mrm.mms.gov/rikweb/PDFDocs/ReportToCongress.pdf (last visited Apr. 12, 2007).

[33] In Fiscal Year 2005, MMS actually took in-kind 75percent of its OCS oil royalty and 30 percent of its OCS gas royalty. *See* Minerals Management Service, Royalty in Kind Program Fiscal Year 2005 Report (2006), *available at* http://www.mrm.mms.gov/rikweb/PDFDocs/RIKPRPFY2005.pdf (last visited Apr. 12, 2007).

[34] Energy Policy Act, *supra* note 1, § 366.

[35] Onshore Oil and Gas Operations; Federal Oil and Gas Leases; Onshore Oil and Gas Order Number 1, Approval of Operations; Final Rule, 72 Fed. Reg. 10,308 (Mar. 7, 2007).

[36] Energy Policy Act, *supra* note 1, § 390.

[37] IM No. 2005-247, Sept. 30, 2005.

[38] IM No. 2005-247, Attachment 2, Sept. 30, 2005.

[39] *See* Testimony of Duane Zavadil on behalf of IPAMS before the Senate Commission on Energy and Natural Resources (June 27, 2006), *available at* http://energy.senate.gov/public/index.cfm?FuseAction=Hearings.Testimony&Hearing_ID=1570&Witness_ID=4445 (last visited Apr. 30, 2007).

[40] Energy Policy Act, *supra* note 1, § 225.

[41] BLM MOU WO300-2006-08, Apr. 5, 2006, *available at* http://www.blm.gov/nhp/spotlight/ epa2005/BLM_MOU_WO_300-2006-08.pdf (last visited Apr. 12, 2007).

[42] Geothermal Stream Act, 30 U.S.C. §§ 1001 *et seq.* (1970).

[43] Geothermal Royalty Payments, Direct Fee Uses, and Royalty Valuation, 72 Fed. Reg. 24448 (May 2, 2007).

[44] Geothermal Resource Leasing and Geothermal Resources Unity Agreements, 72 Fed. Reg. 23458 (May 2, 2007).

[45] Energy Policy Act, *supra* note 1, § 211.

[46] Wind Energy Development Programmatic EIS, http://windeis.anl.gov (last visited Apr. 12, 2007).

[47] IM No. 2006-216, Aug. 24, 2006.

[48] Energy Policy Act, *supra* note 1, § 388.

[49] Alternate Energy-Related Uses on the OCS, 70 Fed. Reg. 77,345 (Dec. 30, 2005).

[50] Notice of Availability of the Draft Programmatic Environmental Impact Statement and Public Hearings, 72 Fed. Reg. 13, 307 (Mar. 21, 2007).

[51] Alternate Energy-Related Uses on the OCS, 70 Fed. Reg. 77, 345 (Dec. 30, 2005).

52 Federal Power Act § 1 et seq., 16 U.S.C. §§ 792 et seq (1920).

53 FERC Comments, https://ocsconnect.mms.gov/pcspublic/do/ProjectDetailView?objectId=0b011f8080050473&attribute=comments#comments (last visited Apr. 16, 2007).

54 102 FERC ¶ 61,242.

Renewable Energy Technologies:

A Promising Energy Alternative

*by Ursula Kazarian**

Creating legal instruments that incorporate renewable energy policy interests is a complex, but not insurmountable, challenge. Renewable energy technologies ("RETs") provide clean, safe, and lasting energy supplies. The finite nature of hydrocarbon fuels, the controversy surrounding carbon sequestration, the debate over "clean coal," and the safety and waste management concerns regarding nuclear energy have resulted in RETs emerging as promising alternatives. Successful examples of the implementation of RETs demonstrate the importance of integrating this technology into local, national, and international legislation.

The traditional emphasis of energy law has been to ensure an adequate supply of energy, without adequate considerations of efficiency, equity, and ecology.[1] While the international community increasingly views RETs as strategic solutions to issues such as climate change, rural electrification, energy security, and environmental degradation due to hydrocarbon fuel burning,[2] incorporating RETs in national projects will present a challenge. International legal institutions provide the global community a venue for strategic dialogue and goal-making; however, the power of technology development and legal enforcement remains in the control of national and local governments.

Numerous developed countries are beginning to alter their energy portfolios to incorporate more RETs. For example, between 1900 and 2003, RETs presence in Germany's electric power generation fuel mix grew from less than three percent to almost nine percent.[3] This German increase in utilization of RETs occurred during a net national electricity consumption growth of about five percent. The United States has also shown promise in adopting more RETs when the Department of Energy announced their aim to cut federal energy consumption levels through the use of more efficient technologies. On the sub-national level, California Governor Arnold Schwarzenegger signed into law the Global Warming Solutions Act (also known as "AB 32") on September 27, 2006, which is designed to limit the state's global warming emissions to 1990 levels by 2020, and it is publicly anticipated that California will pioneer many new clean and efficient energy technologies to comply with the limits.[4]

Developing and newly-developed countries are also adopting progressive national laws to promote the increase and integration of RETs. For example, in February 2005, the national legislature in China approved the country's first renewable energy law, which requires power grid operators to purchase resources from registered renewable energy producers.[5] It also encourages oil distribution companies to sell biological liquid fuel and offers financial incentives, such as a national fund, to foster renewable energy projects.[6] In India, the government has worked with the World Institute for Sustainable Energy and the Renewable Energy and International Law Project to develop a model renewable energy law, which aims to help the country meet its energy security, environmental, and economic development objectives.[7]

Courtesy of Allan Kilgour

A Cooling Tower for a Geo/Thermal Power Plant in New Zealand.

Regardless of the importance of national implementation, international legal institutions can play a significant role in facilitating the national promotion of RETs, including deployment and exports. For example, domestic subsidies for RETs development are currently not actionable under World Trade Organization ("WTO") law. However, modifications can be be made during future Doha Round negotiations regarding environmental goods and services by targeting the removal or lowering the barriers to trade in RETs.[8] Additionally, RETs could be acknowledged and incorporated into standing treaties, and clearly and thoroughly addressed in the language of new international agreements and treaties.[9]

Thus, International legal institutions have the potential to play a significant role in facilitating the national promotion of RETs.

Endnotes: Rewnewable Energy Technologies *on page 75*

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Regulation of Gas Utilities:

At Odds with Conservation

*by Edward L. Flippen**

Introduction

According to *Annual Energy Outlook 2007*, released by the Energy Information Administration in February 2007, it is forecasted that long-term trends in oil supplies will remain tight—with prices declining gradually through 2015, but rising after 2015 as demand continues to grow and higher cost supplies are brought to market. Likewise, wellhead natural gas prices are projected to decline from current levels through 2015, but rise after 2015.[1]

Since 2000, world oil prices have risen sharply as supply has tightened, first as a result of strong demand growth in emerging Asia, most notably in China, and later as a result of supply constraints resulting from domestic disruptions and inadequate investment to meet demand. Higher oil prices have impacted, and will continue to impact, natural gas prices in the United States.[2] In fact, a June 27, 2006 *Wall Street Journal* article points out that the United States has among the highest natural gas prices in the industrial world and if these prices remain high, companies will be driven to other countries, costing U.S. workers their jobs.[3]

Courtesy of Chad Teer

An offshore oil platform located in the Gulf of Mexico.

Impact of Customer Conservation

With the projected tightening of fuel supplies and inadequate overall investment to meet demand, which is part of the result of severe impacts on U.S. infrastructure and offshore drilling from Hurricanes Katrina and Rita,[4] the United States is starting to focus on conservation. Along with certain other countries, the United States has enacted policies encouraging demand side management, energy efficiency, and customers curbing their use of natural gas. However, in the United States, the interests of natural gas utilities and their customers are often at odds.

As the United States becomes more aggressive in pushing conservation and decreased consumption results, natural gas utilities increasingly will be negatively impacted with lower profits.

Natural gas customers have seen their bills increase by as much as two hundred percent in the last few years. At the same time, earnings for many of their respective gas utilities have been below expectations. A primary source of this reduction in earnings is due to customer conservation. For example, NiSource Inc., the parent company of local distribution companies serving 3.3 million customers in nine states, announced that residential usage decline due to customer conservation efforts has increased from a historical average of between 0.5 percent and one percent per year to approximately four percent in 2006. This decline in usage, which is independent from the normal variations in usage caused by weather, is anticipated to reduce the company's profits by approximately $20 million in 2006.[5]

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In the long run, customer conservation is the product of equipment efficiency changes. Natural gas utilities can adjust to the decline in customer usage, mainly resulting from more efficient consumer appliances and equipment, with increases in firm productivity. However, there are few short-term off-setting steps to the price-driven decline in utility sales. For example, gas rates are designed by regulators to recover a part of a utility's profits in the commodity or fuel charge component of rates. As the United States becomes more aggressive in pushing conservation and decreased consumption results, natural gas utilities increasingly will be negatively impacted with lower profits.

The Importance of Parallel Interests

Unfortunately, the historical solution for utilities with declining profits—filing applications with regulators for increased rates—only exacerbates the problem. As a result, there is a misalignment of interests. What is needed to resolve this misalignment is to provide customers with incentives to conserve and, at the same time, provide a mechanism that allows natural gas utilities to remain financially sound. A profitable solution for the utility is as important as conservation is to the consumer. Without the former, the latter is near counterproductive because utilities will simply seek to increase prices to offset the lost profits resulting from reduced consumption.

Clearly, it is in a utility's interest to encourage and even promote conservation to both attract new customers and maintain existing ones. That means, however, realigning the customers' and the utilities' interests so both are attempting to achieve the same outcome, specifically lower natural gas bills. Unfortunately, there is little if anything in the Energy Policy Act of 2005 to direct federal and state regulators to realign the interests of utilities and their customers. However, words of encouragement are coming from state regulators. A resolution adopted in 2005 by the National Association of Regulatory Utility Commissioners ("NARUC") states that ". . . innovative rate designs including 'energy efficient tariffs'. . . may assist, especially in the short term, in promoting energy efficiency and energy conservation and slowing the rate of demand growth of natural gas. . ."[6] Importantly, the resolution notes that ". . . current forms of rate design may tend to create a misalignment between the interests of natural gas utilities and their customers."[7]

There is little if anything in the Energy Policy Act of 2005 to direct federal and state regulators to realign the interests of utilities and their customers.

Conclusion

State regulators, of course, are not policymakers. But they understand the problem and are attempting to address it collectively through NARUC. Many utilities also support changing financial incentives to encourage energy conservation. As of February 2007, a dozen of the nation's largest utilities signed on to a "National Action Plan for Energy Efficiency."[8] Now federal and state policymakers must respond by augmenting the regulatory process to provide natural gas utilities with incentives to manage costs, maintain or improve reliability, and reward improved performance. They should focus on results and outcomes rather than on outdated regulatory models developed decades ago. If natural gas conservation is important—and surely it is until someone finds an unlimited supply—regulation of natural gas utilities cannot continue to be business as usual.

Endnotes: Regulation of Gas Utilities

[1] Energy Info. Admin., Annual Energy Outlook 2007 2-3 (2007), *available at* http://www.eia.doe.gov/oiaf/aeo/index.html (last visited Apr. 15, 2007).

[2] Energy Info. Admin., *id.* at 4.

[3] John J. Fialka, *Politics & Economics: Unlikely Duo Tackles Drilling — Democrat, Republican Lead Push to Open Natural-Gas Sites*, Wall St. J., June 27, 2006, at A6.

[4] Chairman Joseph T. Kelliher, Opening Statement at the Conference on the State of the Natural Gas Infrastructure (Oct. 12, 2005), *available at* http://www.ferc.gov/EventCalendar/Files/20051020121515-10-12%20Gas%20Conf%20Opening%20Statement.pdf (last visited Apr. 11, 2007).

[5] NiSource, Inc., 2006 Form 10-K: Annual Report Pursuant to Section 13 or 15(D) of the Securities Exchange Act of 1934 24, *available at* http://ir.nisource.com/reports.cfm (follow "NiSource's 2006 Form 10-K" hyperlink) (last visited Apr. 11, 2007).

[6] NARUC Resolution on Energy Efficiency and Innovative Rate Design, Nov. 16, 2005, *available at* http://www.aga.org/Template.cfm?Section=Congressional_Testimony&template=/ContentManagement/ContentDisplay.cfm&ContentID=21846 (last visited Apr. 16, 2007) [hereinafter NARUC].

[7] NARUC, *id.*

[8] Matthew Dalton, *The Bottom Line: Utilities Typically Have Had Little Incentive to Reduce Demand for Their Product; States are Trying to Change the Math*, Wall St. J., Feb. 12, 2007, at R4.

The Struggle Between Peru's Energy Needs, Indigenous Rights, and Ecosystems

*by Desiree Moreno Gutierrez**

Not far from the ancient streets of Cusco, the once mighty center of the Incan Empire, lays one of the most important natural gas discoveries in Latin America. An estimated 8.7 trillion cubic feet of natural gas and 411 million barrels of associated products (such as propane, butane, and condensate) make the Camisea field an important source of energy for Peru with enormous economic potential.[1] However, the Camisea field's location on the lower Urubamba valley among pristine natural areas home to isolated indigenous tribes[2] and hundreds of rare species of plants, birds, fish, reptiles, and small mammals[3] creates a real challenge for the Peruvian government. Officials must carefully proceed with development while balancing the social aspects and biodiversity of the region.

With investment exceeding U.S. $1.6 billion, Camisea represents the most ambitious energy project in Peru's history.[4] Despite its discovery in the mid-1980s and the progress of four Peruvian administrations, construction only commenced under President Alejandro Toledo in 2002. Peru, seeking foreign capital and investment, granted rights to exploitation, transportation, and distribution of natural gas via international bids to some of the world's top energy firms.[5] After completing two pipelines for liquefied and natural gas, the project became operational, connecting the gas source within the Amazon forest of Camisea to consumers in Lima, and the southern port city of Pisco. But despite progress and economic benefits, five ruptures in the liquid natural gas pipeline occurred, putting sensitive habitat and isolated indigenous communities in danger. These incidents resulted in heavy criticism of the government, particularly for a lack of involvement and oversight in the project's design and construction.

Local and international nongovernmental organizations are advocating for indigenous rights and environmental protection. Both Amazon Alliance and Amazon Watch recently cited an independent report by a California non-profit organization finding numerous deficiencies in the project.[6] The report lists troubles including: a lack of supervision, little concern for indigenous needs, rushed construction to avoid U.S. $90 million in contractual late fees, and allegations that nearly 40 percent of the pipe material came from defunct projects in South America. These accusations strengthened opposition to the project along the entire pipeline route.[7] In response, Peruvian officials have countered these charges with studies indicating that the Camisea project met technical specifications and are compliant with international agreements protecting indigenous tribes and surrounding habitat. Officials assert the ruptures were caused by poor soil. Ultimately, an independent audit ordered by a special congressional commission will evaluate the real effects of the pipeline on neighboring communities.

As a result of the Camisea development, Peruvian gas usage continues to rise. However, project's true economic potential lies in exports. To complete the next phase, Peru requires U.S. $400 million from the Inter-American Development Bank,[8] but the bank has postponed any decision pending an independent study to determine if the project meets sustainable development guidelines. The Camisea case represents a difficult struggle between economic potential in the impoverished Amazon Basin and the need for conserving pristine areas and indigenous rights. Sustainable development offers the best hope that political, economic, social, and environmental concerns can coexist to reduce the poverty and increase the quality of life for all concerned. Any progress must consider long term outlook rather than short-lived profits. Nevertheless, Camisea may potentially benefit all Peruvians.

Camisea represents the most ambitious energy project in Peru's history.

Endnotes:

[1] Camisea Project, http://www.camisea.com.pe (last visited Feb. 28, 2007).

[2] *See* Diana Alberca Rivera, *Recursos Energéticos del Perú: Proyecto Camisea*, *available at* http://www.monografias.com/trabajos34/recursos-energeticos-peru/recursos-energeticos-peru.shtml (last visited Feb. 28, 2007).

[3] *See* Smithsonian National Zoological Park, MAB: Camisea Project, http://nationalzoo.si.edu/ConservationAndScience/MAB/conservation/camisea.cfm (last visited Feb. 28, 2007).

[4] *See* IDB America, *The Most Important Energy Project in the Country's History*, http://www.iadb.org/idbamerica/index.cfm?thisid=3665 (last visited Feb. 28, 2007).

[5] *See* Camisea Project, *supra* note 1.

[6] Carlos Salazar Tirado, *E-tech International: Evaluation Of Camisea Project Piping Failures and Long-Term Solutions*, Amazon Watch, Feb. 27, 2006, *available at* http://www.amazonwatch.org/newsroom/view_news.php?id=1050 (last visited Feb. 28, 2007).

[7] *See* Kelly Hearn, *Bungle in the Jungle*, Grist, Apr. 26, 2006, http://www.grist.org/news/maindish/2006/04/26/hearn/index.html (last visited Feb. 28, 2007).

[8] *See* Inter-American Development Bank, Camisea Natural Gas Project, http://www.iadb.org/pro_sites/camisea/index.cfm?language=EN&parid=1 (last visited Feb. 28, 2007).

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The Clean Development Mechanism:

Considerations for Investors and Policymakers

*by Craig A. Hart**

Introduction

The Clean Development Mechanism ("CDM") of the Kyoto Protocol to the United Nations Framework Convention on Climate Change ("Kyoto Protocol") is intended to provide financial incentives that support the adoption of technology in developing countries to reduce carbon dioxide ("CO_2") and other greenhouse gas ("GHG") emissions through the creation of certified emissions reductions certificates ("CERs"). A major aim of the CDM is to promote sustainable development, including sustainable energy technologies.[1] Project developers may either sell CERs to a third party in order to raise additional project revenues or use the CERs themselves to meet their own carbon emissions obligations under domestic laws implemented pursuant to the Kyoto Protocol.[2]

Although the issuance and sale of CERS potentially provide an additional source of revenue for qualifying projects, the CDM aspects of a project involve their own subset of risks. This article evaluates CDM project risks, focusing on three risks that remain outside the control of project developers and are critical for evaluating CDM opportunities: (1) the estimation and delivery of CERs; (2) CERs price and volatility; and (3) uncertainty concerning the future of the Kyoto Protocol arrangements and the CDM. It concludes by assessing the potential for the CDM to address climate change and the development of clean energy technologies to mitigate climate change.

CDM risks should be separately identified, allocated and mitigated.

Overview of the CDM Project Cycle

The CDM project cycle is a multi-step process. First, project parties prepare a proposal, which sets out the design of the venture in a document called the Project Design Document ("PDD"). The PDD is then evaluated by a Designated Operational Entity ("DOE"), a private third party certified by the CDM Executive Board, which validates the project's design and estimates the expected contribution to emissions reductions.[3] During this phase, the project parties procure an environmental impact assessment, obtain the approval of the host government, and circulate the PDD for public comment. The PDD is then submitted to the CDM Executive Board who reviews it for compliance with CDM requirements. Projects involving new methodologies will also be required to obtain approval of the specific methodology. If approved, the project is registered with the CDM. Registered projects then implement a monitoring plan approved by the CDM Executive Board.[4]

Pursuant to the monitoring plan, a DOE periodically verifies the actual emissions reductions that have occurred during each verification period. Based on the DOE's written certification of the emissions reductions, the CDM Executive Board instructs the CDM Registry Administrator to issue the appropriate number of CERs to the project for each verification period.[5]

CDM Project Risks

In addition to the risks associated with project financings generally, the CDM aspect of a project entails substantial risk for project sponsors, investors, and project customers that rely on the issuance of CERs either as a source of project revenues or to meet regulatory obligations. Issuance of CERs requires approvals of the host government and the CDM Executive Board. Additionally, the actual number of CERs that a CDM project produces depends upon the verified performance of the project. Purchasers of CERs should be concerned about the financial stability and performance of the project and their ability to take legal title to the CERs.[6] As a result, CER purchasers tend to favor project sponsors with established records, countries with legal systems that will enforce project contracts, national regulatory authorities that will provide the necessary project approvals promptly, and reliable technologies.

As with any risk in project financing, CDM risks should be separately identified, allocated, and mitigated. This may be accomplished through the use of insurance or other similar products or through the project documents.[7]

Below we analyze several critical CDM risks commonly identified by CDM sponsors, advisors, and investors in interviews: validation/verification error, limited price visibility, and regulatory uncertainty. These are not the only critical risks identified by CDM participants. For example, high transaction costs and scalability of projects were also frequently cited risks. The risks analyzed here should be considered in evaluating the future

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Table 1: CDM Project Risks[8]

Risks	Examples
Market and Supply Risks	Immature market; affected by Assigned Amount Units prices, energy prices, and weather conditions.
Technology Risk	Clean technologies still developing; uncertain costs and benefits.
Certification/Verification Risk	Variation in validation and verification procedures. Proving additionality requirement. Difficulty in monitoring emissions reductions. Failure to deliver promised CERs due to validation/verification estimate error.
Regulatory Risk	CDM methodologies still developing and untested. Kyoto Protocol only extends to 2012. Potential for commodities or securities regulation.
Political Risk	Host government must approve the project under domestic laws for sustainability.
Accounting/Disclosure Risk	No standard or oversight for reporting national emissions or CDM results. Conflicts of interest among project parties.
Credit Risk	Counterparty credit risk (no exchange clears CERs).
Default Risk	Failure to deliver CERs due to financial or technical failure.
Legal Risk	No legal standards for CDM. No case law in any country. Complex national and international law issues.
Capital Markets/Finance Risk	Significant volume needed for economies of scale.

of the CDM as they are inherent to the structure of the CDM arrangement and largely beyond the control of project developers.

Validation/Verification Estimation Error

In order for CERs to be issued, the emissions reductions are first "validated." Validation is an estimate made at the design stage for purposes of approving the project methodology and monitoring plan.[9] Expectations are created from the emissions reduction estimate, including the expectations of investors and those who are considering purchasing the CDM CERs produced by the project. After the project has begun operation, a DOE periodically verifies the project's actual emissions. The verification determines the actual number of CERs to be issued for each particular verification period.[10]

In order to assess risk associated with validation/verification error, this author compared the validation estimates and verified results of the 175 CDM projects that had issued CERs as of May 1, 2007. The comparison suggests that validation procedures tend to overestimate the number of CERS that will ultimately be issued by a project. Significantly, these results reflect a broad range of CDM projects.

For the first 175 CDM projects that issued CERs, the validation procedure overestimated the number of CERs produced by approximately 27 percent on average. The standard deviation for the population of 175 projects is 42.5 percent.[11]

The large error rate for estimating the issuance of CERs increases the risks associated with sourcing CERs and investing in CDM projects. For example, one major Canadian electric generator that has committed itself to meeting its requirements for allowances through CDM and Joint Implementation ("JI") projects expressed concern that the availability of CDM CERs will be inadequate to meet its company's needs. This company has adopted a 25-year plan to achieve zero net emissions by 2024 and has gained considerable experience assessing approximately a dozen CDM projects. However, due to financial and other risks associated with CDM, the company has undertaken only one CDM project. Given Canada's role as an energy-exporter in such carbon intensive areas as tar sands, the company expects that CDM may not provide a realistic method for meeting its supply requirements for emissions allowances.[12]

The estimation error in the CDM validation/verification process has significant implications for CDM. As of May 1, 2007, there were over 1800 CDM projects that had estimated their emissions reductions through the validation process and will eventually verify their CERs. Because the validations have already occurred in over 1800 projects, they may show error rates of similar magnitude to the 175 projects that are analyzed here.

Potential Explanations for CDM Validation/Verification Error

Interviews were conducted with CDM DOEs, sponsors, and advisors in order to ascertain the reasons for the high error rate in the CDM validation/verification process. Interviews were conducted with three firms that are approved by the CDM Executive Board as DOEs. Collectively, these firms are involved in the validation or verification of 83 percent of the approximately 740 CDM projects that were registered as of May 1, 2006, when the interviews were conducted.[13] In addition, interviews were conducted with four firms that invest in and/or act as project consultants to approximately 30 percent of all CDM projects then listed with the CDM Executive Board.

Surveys of these CDM participants revealed that a variety of factors potentially contribute to CDM validation/verification error. These firms identified the following as contributing factors:

(1) Inadequate Technology or Measurement Methodology;
(2) Environmental Fluctuations;
(3) Supply and Demand Fluctuations;
(4) Delays in Project Completion or Operation;
(5) Use of Conservative Assumptions in Verification Procedures; and
(6) Inadequate Guidance or Changes in Validation/ Verification Procedures.

The leading explanation of validation/verification error was inadequate technology or methodology to measure emissions reductions. For example, with respect to methane landfill projects, several respondents identified the primary cause of error to be the lack of adequate technology to measure low concentrations of gases over large areas. Survey respondents noted that measurements are typically not conducted under ideal conditions (as assumed in the standard methodologies), and very little is known about the quality of waste in landfill sites, which affects decomposition rates and the selection of appropriate methods for analyzing data. Further, models and assumptions used for estimation are often not reliable or appropriate for local conditions.[14]

With respect to environmental conditions, the performance of projects that depend upon wind, precipitation, river flow, or heat (as in the case of decomposition of waste) will be affected by fluctuations in weather conditions. These factors will significantly influence the outcome of verification results.[15]

Supply and demand conditions also influence the verification results of projects whose performance is linked to market conditions. For example, electricity generation projects are verified based on the actual amount of electricity supplied to the grid.[16] Furthermore, delay of project completion or operation can significantly affect the economic feasibility of a project and its verification results.[17] In particular, hydroelectric plants are highly sensitive to construction delays.[18]

Several firms identified the use of inappropriate assumptions in the validation stage and conservative assumptions in the verification stage as potential factors influencing validation/verification error. Several respondents noted that CDM methodologies often use generalized Intergovernmental Panel on Climate Change ("IPCC") estimates that do not take local conditions into account. For example, the use of IPCC estimates for methane projects fails to take into account local agricultural conditions.[19] Several individuals noted that because the validation stage involves estimation, it is inherently subject to error, and one respondent noted that project sponsors are often optimistic in the validation stage.[20] Others suggested that firms conducting the verification may use conservative assumptions in accordance with best practices recommended by the International Organization for Standardization and other organizations, thereby further increasing the difference between validation estimates and verification results.[21]

With respect to the adequacy of guidance or change in procedures, several respondents noted that the CDM Executive Board has not provided adequate guidance for validation and verification procedures. CDM methodologies have been frequently revised, which has greatly contributed to uncertainty. One respondent noted that some of these methodologies have been revised several times already since their inception and that CDM guidelines do not specify exactly what steps need to be taken to validate or verify emissions.[22] Another person indicated that CDM rules which prohibit direct contact between project sponsors and reviewing personnel have slowed approvals and prevented project sponsors from receiving timely or detailed guidance.[23]

Prospects for Improvement

Several respondents suggested specific aspects of the CDM that can be improved to reduce validation/verification error. One respondent suggested more detailed methodology regarding monitoring requirements should improve data collection and the consistency in assumptions used at the validation and verification stages.[24] Several individuals emphasized that proven technologies should exhibit less variability between validation estimates and verification results.[25] Finally, one respondent indicated that training and assistance in locating qualified people to carry out estimates for each methodology would help reduce error.[26]

Finally, CDM participants were asked their opinion as to whether they expected estimates would improve in the future. Respondents generally believed that results should improve, while at the same time acknowledged that estimation error is likely to continue due to the inherent nature of prediction. One respondent stated that observers should continue to see estimation error, especially for projects that are influenced heavily by outside factors. In general, respondents believed that the variability is inherent in the design of the CDM validation and verification arrangement; validation estimates are made based on theoretical engineering estimates, whereas the verification is based on actual plant operations.

Emissions Allowances Price Volatility And Excess Supply

Interviews with industry participants revealed that CDM CERs are priced based on multiple factors: spot and futures prices of European Union Emission Allowances ("EUAs"), the rules governing carbon offsets, risks of the particular project producing the CERs, expectations regarding supply and demand for CERs, and expected supply and demand for other carbon offsets, especially AAUs.

The starting point for pricing CERs is the spot and futures prices of EUAs as this market is the most highly liquid and provides near-term price visibility. CDM CERs are priced based on expected supply and demand for carbon offsets. CERs must compete against supply from various other sources, including JI Emission Reduction Units ("ERUs"), RMUs, and excess Assigned Amount Units ("AAUs").

Over-allocation of emissions allowances presents one of the greatest risks to the viability of the CDM. The availability of a

Figure 1: European Union Emissions Allowance Prices, April - May 2006[28]

large number of low-cost allowances will lower the price of carbon and potentially increase price volatility of CO_2 emissions allowances. In turn, this will make more costly CDM projects unattractive financially and will increase the risks of CDM projects in general.

Over-allocation of emissions allowances has occurred in both the European Union and Eastern Europe. The announcement of the first verification of EU national emissions in May 2006 caused the EU Emissions Trading System ("EU ETS") market price of EUAs to drop by over 67 percent because verified emissions were 41 million metric tonnes of CO_2, or approximately 2.5 percent, lower than expected.[27]

The drop in EUA prices in May 2006 placed downward pressure on CER prices and slowed CDM activity considerably. As a result, many CDM projects are no longer financially competitive.[29]

To place the EU over-allocation in perspective, CDM projects that had filed with the CDM Executive Board as of May 1, 2007 represented 305,801,000 metric tonnes of validated CO_2 emissions reductions per year.[30] The EU carbon over-allocation displaces over one eighth of the total amount of these estimated CDM emissions reductions. However, if the verification process results in a lower issuance of CERs, as has been observed in projects verified to date, the displacement could be considerably higher. If the validation/verification error of the first 175 CDM projects is representative of the other 1660 validated and unverified CDM projects filed as of May 1, 2007, the expected number of CDM CERs to be issued would be approximately 223 million metric tonnes of CO_2 per year. The May 2006 over-allocation would displace 18 percent of the expected CERs from the CDM projects validated as of May 1, 2007.

Eastern European excess emissions allowances could have an even greater effect on carbon prices. Most excess emissions allowances are held by Russia and Ukraine. Russian and Ukrainian excess emissions are expected to exceed 791.5 million metric tonnes of CO_2 per year by 2010 from fossil fuel emissions alone. Table 2 sets forth the Energy Information Administration's estimate of projected Russian and Ukrainian CO_2 emissions from fossil fuel consumption, and the resulting estimated excess CO_2 allowances.

If Russian and Ukrainian excess allowances enter the market in 2008, they would exert significant downward pressure on CERs and prices. To place this in perspective, if 791.5 million tonnes of Russian and Ukrainian annual excess allowances produced from fossil fuel CO_2 emissions enter the market, this additional supply would be approximately twenty times larger in volume than the 41 million tonne over-allocation of CO_2 in May 2006 that caused the price of EUAs to drop by over 67 percent. The same 791.5 million metric tonnes CO_2 per year would be almost three times greater than the validated annual emissions reductions of the 1835 CDM projects filed as of May 1, 2007, and almost four times greater than the expected annual volume

Table 2: Russia and Ukraine Projected CO_2 Allowances (metric tonnes)[31]

Year	Russia Emissions	Ukraine Emissions	Total Emissions	Projected Excess Allowances
1990	2,347,000,000	674,400,002	3,021,400,002	
2002	1,522,000,000	426,024,926	1,948,024,926	1,073,375,075
2010	1,732,000,000	497,898,263	2,229,898,263	791,501,738
2015	1,857,000,000	539,804,109	2,396,804,109	624,595,893
2020	1,971,000,000	568,392,418	2,539,392,418	482,007,583
2025	2,063,000,000	599,999,369	2,662,999,369	358,400,632

Note: Ukraine is 17.76% of former Soviet Union projections. These projections only take account of excess allowances from carbon dioxide emissions from fossil fuel consumption. Other greenhouse gas sources may increase the allowances.

of CERs to be issued by these CDM projects assuming that validations continue to overestimate actual issuances of CERs by a 27 percent error margin.

In addition, other GHGs are expected to produce additional allowances for Eastern European countries in excess of 100 million metric tonnes of CO_2 equivalent per year, a majority of which will belong to Russia and Ukraine.[32] These excess emissions allowances are approximately 33 percent of validated CDM emissions reductions as of May 1, 2007, and almost one half the number of CERs expected to be issued, assuming validation estimates continue to exhibit an error rate of 27 percent. To the extent these other gases are permitted to enter the market, the resulting excess AAUs from Eastern Europe will place additional downward pressure on the price of CDM CERs.

Rules Governing Emissions Allowances

The rules governing the CDM and other emissions allowance instruments also affect the prices of CERs. Under the Kyoto Protocol, CDM CERs and JI ERUs may be used in future compliance periods up to a maximum of 2.5 percent of a party's AAUs of emissions.[33] However, Article 12(10) of the Kyoto Protocol ensures that CERs and ERUs obtained prior to 2008 can be fully banked for use in the 2008-2012 compliance period.[34] In contrast, AAUs are fully bankable without limitation starting during the 2008-2012 compliance period.[35] Still, the EU has allowed its member states to decide whether unused EUAs acquired during the 2005-2007 trial phase can be carried over and used to meet emissions limits in the first commitment period in 2008-2012.[36] Potential temporary restrictions on the ability to bank EUAs for the 2008-2012 period enhance the value of CERs relative to EUAs during the trial phase.

Over-allocation of emissions allowances presents one of the greatest risks to the viability of the CDM.

To the extent excess emissions allowances held by Eastern European countries enter the market, these excess allowances will affect prices and the operation of the EUA market, and in turn, the CDM and JI programs. The Kyoto Protocol does not place explicit limits on the entry of excess allowances; however, parties are required to limit their use of tradable allowances to levels that are "supplemental" to "significant" domestic measures to reduce GHG emissions.[37] The EU has been particularly active in seeking to promote domestic reductions through the supplementarity provision. However, there are differences of opinion among European officials whether a quantitative limit on trading allowances is desirable.[38] While it is not clear how the supplementarity restriction will be implemented by Kyoto Parties, it will influence how Eastern European excess allowances compete with EUAs and other forms of AAUs, CERs, ERUs and Removal Units.

The imposition of penalties by the EU provides some level of price support for EUAs and CERs. The EU imposes penalties for failure to deliver adequate EUAs of 40 euros per tonne of CO_2 in the trial phase which runs until December 21, 2007, and 100 euros per tonne in the first commitment period from January 1, 2008 through December 31, 2012.[39]

CDM CER prices are also influenced by the perceived quality of the project and project sponsors. As previously discussed, there is a great deal of uncertainty regarding the delivery of verified CERS, which increases supply risk for the purchaser of CERs. One way to address this risk is to price CERs differently based on the stage of the project; sales early in the process prior to final approval receive a much lower price than those sold post-verification. The creditworthiness of the seller also significantly affects the price of CERs.[40]

Academic Study Projections of Future Prices

A number of studies have estimated future carbon prices, with the results varying widely based on differing assumptions and models. These assumptions include different estimates of future economic growth, oil prices, cost of emissions abatement, the rules concerning the availability of Eastern European excess emissions allowances, the rules concerning trading across emissions sectors and countries, and banking of emissions. One 1999 study that compared the results of eleven leading models predicted prices would range below twenty euros to 100 euros per tonne of CO_2 in order to achieve five percent emissions reductions from 1990 levels. Seven of the eleven models surveyed predicted the price would range from twenty euros to 35 euros per tonne of CO_2 for a five percent reduction of 1990 levels in a market in which the United States participated.[41] More recent studies have predicted median prices to range from under one euro to under six euros per tonne of CO_2 if trading across sectors and countries is permitted under the EU ETS.[42] The study which predicted that CO_2 prices should be under one euro per tonne was based on analysis of the current EU ETS regime and assumed that emitters will find relatively inexpensive methods to meet target reductions.[43]

These estimates are well below observed trading prices in the 15-40 euros range. Again, the imposition of a 40 euros/tonne penalty for failure to meet targets during the 2005-2007 period may have supported the price at the observed levels. Alternatively, these studies may underestimate the cost of reducing emissions.[44]

Limited Price Visibility

Interviews conducted by this author and industry reports confirm that CDM projects have generally sold CERs for delivery though 2012, reflecting the duration of the regulatory regime

rather than the potential duration of CERs contracts.[45] Although there is little activity beyond 2012, some survey respondents and other commentators have confirmed that purchasers of CERs have entered into options agreements for CERs to be produced in the post-2012 period.[46]

The survey shows that because CDM projects require a minimum of approximately eighteen to 24 months to register and verify CERs, most activity in the CDM market is for future delivery of CERs starting approximately two years ahead of time.

The EUA market provides limited, near-term price visibility for emissions credits. Trading EUAs is primarily conducted through brokered transactions over the Over the Counter ("OTC") market. In 2005, OTC trades accounted for an estimated 80 percent of combined OTC and exchange trades.[47] Little data is publicly available for OTC trades.

Several organized exchanges also trade EUAs. The European Climate Exchange is the largest exchange, representing 63 percent of exchange-traded emissions contracts. This exchange trades standardized futures contracts for delivery of EUA.[48] As of April 2006, 100 metric tonnes of carbon contracts were available for quarterly delivery through March 2008, and then annual delivery from 2008 through 2012.[49]

An analysis of the European Climate Exchange's Carbon Financial Instruments ("ECX CFI") futures contracts reveals that liquidity in this market is mostly short-term. Open interest in ECX CFI futures contracts is most liquid in the first year. At the time of analysis, 79 percent of open interest in exchange-traded EUAs was for delivery by December 2007, the time period during which regulatory certainty is greatest. Survey responses confirm the OTC EUA market follows the same short-term pattern as the exchange-traded futures markets.

Table 3: Open Interest in European Climate Exchange CFI Contracts, April 2006[50]

Period	Open Interest
June, September, December 2006	46%
March, June, September, December 2007	32%
March, June, September, December 2008	17%
December 2009	3%
December 2010	1%
December 2011	1%
December 2012	1%

The statistics in Table 3 reflect the short-term nature common to most trading markets as well as the fact that supply and demand in EUA markets is strongly influenced by regulatory considerations. The significant volume of trades for the 2008 to 2012 period may be influenced by EU rules that impose a penalty of 100 euros per tonne of CO_2 equivalent for failure to deliver adequate allowances in the first commitment period from January 1, 2008 through December 31, 2012.[51]

The short-term nature of the EUA market provides limited price visibility for longer-term CDM projects. This introduces an added price risk for investors in CDM projects and purchasers of CERs.

Regulatory Uncertainty

Regulatory uncertainty has adversely affected the CDM at several levels. Because the Kyoto Protocol is only in force until 2012, there is uncertainty regarding the future of the CDM. The short time horizon for the CDM through 2012 reduces incentives to develop CDM projects.[52] One project sponsor noted that if there was greater commitment to the Kyoto Protocol by his own government, he believes his firm would be much more aggressive in developing CDM and JI projects.[53]

Uncertainty regarding CDM standards and methodologies is another source of regulatory uncertainty. All firms surveyed identified that uncertainty in standards and methodology were causing significant delays and additional cost. For example, the cost of a new methodology is typically recovered by its application in multiple projects. Interviewees stated that the cost of developing a methodology is approximately U.S. $150,000.[54] Further, the time required to develop new methodologies is substantial. Methodologies have required an average of 280 days for approval.[55] Yet, a number of methodologies are under revision and review, some of which have been revised multiple times.[56] Several firms expressed concern that these problems could undermine the viability of the CDM.

Significantly, because CDM projects require a minimum of approximately eighteen to 24 months to register and verify the CERs, CDM regulatory requirements need to be clarified well in advance of the upcoming compliance period to ensure a large volume of CDM activity.[57]

Finally, the CDM will also be affected by the rules concerning trading emissions between countries. In addition to the EU, a number of countries are developing emissions trading regimes in anticipation of the 2008-2012 compliance period.[58] The regulatory arrangements for linking these national trading systems, the rules concerning the supply of gases, and the excess AAUs that will enter the market will affect the viability of CDM.[59]

Prospects for CDM to Address Climate Change

The CDM is in the development stage and must overcome several significant hurdles before it is a viable mechanism for addressing climate change, promoting sustainable development, and fostering clean energy technologies in developing countries on a meaningful scale. Specifically, difficulty in reliably estimating and delivering CERs, oversupply of emissions allowances, lack of clear CDM standards and methodologies, and regulatory uncertainty concerning the future of the Kyoto Protocol are critical issues that must be addressed successfully in order for the CDM to be a commercial and policy success.

Endnotes: The Clean Development Mechanism *on page 75*

The Next Generation of Consumption

*by Jaesa McLin**

An alarming, and at the same time, reassuring realization is making its way to the forefront of the minds of energy onlookers. The United States has one of the world's largest oil reserves:[1] trapped deep within the rocks of Colorado, Wyoming, and Utah, as well as Kentucky, Ohio, and Indiana, is an oil shale with deposits estimated at more than five times the size of Saudi Arabia.[2] However, this oil is not readily available. If nature were to take its course, the oil could not be extracted for millions of years.

Royal Shell Oil Company ("Shell") has created a way to speed up the process, allowing for extraction in three to four years.[3] The method is called In-Situ Conversion Process ("ICP"). The process begins with drilling holes into the earth's crust and then dropping huge heating coils into the ground.[4] By heating up the earth's surface, kerogen, a solid organic substance, transforms into oil and gas.[5] Shell's pilot project has produced over 1,200 barrels of oil on government-owned land containing oil shale deposits.[6] Currently, Shell is perfecting the ICP and moving toward a large-scale commercial project that could produce up to one trillion barrels of oil on U.S. soil.[7] While Shell is spending millions of dollars to perfect its system, it is also lobbying the United States Congress for the right to lease more land where the oil shale is located. The U.S. government took ownership of the land in 1910 with the passage of the Pickett Act and set aside the land as the nation's first strategic reserve.[8]

Can the earth sustain itself if a trillion more barrels of oil are burned in the next generations than would have been naturally available?

The oil shale could potentially solve many of the energy problems that the United States has faced since the oil embargo in the 1970s. With access to this reserve, the United States will greatly diminish its oil imports. However, what does this mean for the environment? Shell maintains that the environmental impact of oil shale exploration is actually less than the impact in regular oil exploration.[9] More worrisome is the effect on the atmosphere if that much more fossil fuel is burned. Can the earth sustain itself if a trillion more barrels of oil are burned in the next generations than would have been naturally available?

In the United States, national security concerns seem to outweigh many other considerations these days, and so the exploration and exploitation of this reserve may be viewed by some as the best option to lessen the dependency of the United States on foreign energy sources. Governmental and commercial players posit that they have the utmost consideration for the environment and sustainable development. However, at this critical moment it is exceedingly important for nongovernmental organizations and environmental groups to weigh in with their expertise. Furthermore, the benefits of renewable energy sources and other new technology must be considered.

* *Jaesa McLin is an L.L.M. candidate, May 2007, at American University Washington College of Law.*

Endnotes:

[1] Harry R. Johnson et al., Strategic Significance of America's Oil Shale Resource (2004), *available at* http://www.oildrop.org/Info/Lib/Shale/npr_strategic_sigv2.pdf (last visited Feb. 23, 2007).

[2] Dan Denning, *Oil Shale Reserves: Stinky Water, Sweet Oil*, Daily Reckoning, *available at* http://www.dailyreckoning.com/rpt/OilShale.html (last visited Feb. 23, 2007).

[3] *Oil Shale and Oil Sands Resources: Hearing Before the Senate Energy & Natural Resources Committee* (2005) (testimony of Stephen Mut, CEO, Shell), *available at* http://energy.senate.gov/public/index.cfm?FuseAction=Hearings.Testimony&Hearing_ID=1445&Witness_ID=4139 (last visited Mar. 9, 2007) [hereinafter Mut].

[4] Mut, *id.*

[5] Mut, *id.*

[6] Mut, *id.*

[7] Mut, *supra* note 3.

[8] Denning, *supra* note 2.

[9] Mut, *supra* note 3.

Transaction Costs of the EU Emissions Trading Scheme in German Companies

*by Frieder Frasch**

Introduction

Recently published scientific studies, such as the Stern-Report[1] and the Fourth Intergovernmental Panel on Climate Change ("IPCC") Assessment Report,[2] illustrate the dire need to curb carbon dioxide ("CO_2") emissions in order to combat global climate change. As a result, climate change mitigation has become a cornerstone of European energy policy and is becoming increasingly important in the United States.[3] European leaders have agreed on ambitious targets, including a twenty percent CO_2 emission reduction from 1990 levels by 2020. In view of these European commitments and the nascent carbon emissions trading regimes underway in the United States, it is worthwhile to inspect the efficiency of European Union Emissions Trading Scheme ("EU ETS"), the central instrument of European climate policy. This paper presents an empirical analysis of the corporate transaction costs from three German companies obligated to take part in the EU ETS. The data presented in this article are among the first systematically surveyed results in Europe. Under inspection, these costs vary widely by companies participating in such regimes and can differ by a factor of five.

The information presented in this article helps identify optimization potential within the German implementation of this Emissions Trading Scheme and assist in the design of sound emission trading systems in the United States or elsewhere. As a result, the countries' energy policies will be better suited to fulfill energy needs with a reduction in greenhouse gases.

Transaction Costs

In this article, the term transaction cost is not restricted to search, negotiation, and decision-making costs. It is used here in a wider sense to include information and opportunity costs beyond those directly associated with a good's transaction. Simplified, all costs that arise in the course of administration and management of the emissions trade are considered transaction costs, excluding purchasing or abatement costs (See Table 1). Generally all transaction costs are "deadweight losses," as expenditures for the obligations of the emissions trade cannot be used to realize emission abatement measures.

Macroeconomic theory states that transaction costs hinder the cost-effective allocation of tradable permits as the volume traded decreases, which results in an increase of macroeconomic abatement costs.[4] However, this aspect is of less importance since a significant proportion of the transaction costs associated with the EU ETS arises with non-trade related activities; therefore, the effect on trade volume is not as significant as new institutional economics would expect.[5]

Transaction costs are influenced by the frequency, asset specifics, and uncertainty of the transaction.[6] All these factors are to some degree interrelated with the implementation of the EU ETS but depend mainly on the size and the type of company participating in the system.[7] For instance, it can be expected that a pulp and paper company will have higher costs to develop a trading strategy than a large utility actively engaged in electricity trade due to the necessary expertise already being developed in the utility sector.

EU Emissions Trading In Germany

The European Emissions Trading Directive 2003/87/EG[8] defines the structural elements of the ETS. As an EU Directive, it must be implemented into national law in all EU member countries. In Germany, the Directive was implemented through two laws and two ordinances.[9] The first, the Greenhouse Gas Emissions Trading Act ("TEHG") is composed of six sections defining the ETS framework and how the system functions. The first section of the Act defines the aim, the criteria for participation in the system (defined as installations, or sources, with a generation capacity greater than 20 MWh), and the central terms of the scheme. The second section requires affected companies to properly monitor their emissions and to have a permit to run the installation. The third section of the TEHG sets forth the terms implementing the national allocation plan and sets allocation rules. The terms of the actual emission trade are defined in the fourth part. The fifth and sixth parts contain sanction mechanisms, assign jurisdiction to the German Emissions Trading Agency ("DEHSt"), and define additional formal requirements.

The Allocation Law of 2005-2007 and the Allocation Ordinance of 2005-2007 govern the allocation for the first commitment period from 2005 to 2007.[10] The former outlines the allocation rules, whereas the latter contains all the technical definitions and details necessary for calculating the exact number of EU Allowances ("EUA") an installation receives.

Germany allocates emission credits to sources through a range of methods. Primarily, emission allocation is based on benchmarks or historical emissions; however, the political process has resulted in special rules for certain facilities. For instance, exceptions are made for certain efficient technologies, such as combined heat and power plants, or firms experiencing undue hardships. As a result, there is a fairly complicated set of 58 different possible combinations of allocations rules that the

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DEHSt, as the executive agency, must navigate. Thus, regulatory complexity is a main driver of transaction costs in the first commitment period. Moreover, a cost ordinance determines which fees a company has to pay to participate in the EU ETS. The TEHG specifies that participating companies must bear the cost of the DEHSt through these fees, making the administration of the EU ETS cost neutral for the German government.

Table 1 presents eight categories summarizing transaction costs facing companies participating in the EU ETS. Specifically, these costs consist of application, implementation of an emissions trading management, monitoring, reporting, abatement measures, trade related activities,[11] and development or adaptation of strategic considerations. The cost for appeals and other legal claims belong to the application category but are not analyzed in the following case studies.[12]

TABLE 1: TRANSACTION COST CATEGORIES

Category	Transaction Costs
Application	• Quantification of historic emissions • Development of emission outlooks • Decision for an application rule • Compilation of an application • Where necessary, compilation of a benchmark • Verification of the application • Fees for annual allocation • Fees for emissions register
Implementation of an emissions management	• Information, training • Assessment of obligation to participate in the EU ETS • Set up of organizational structures and assignment of responsibilities • Adaptation or purchase of software • Material costs
Monitoring	• Design of a monitoring concept • Implementation of an internal monitoring system • Ongoing monitoring
Reporting	• Quantification of annual emissions • Compilation of an emissions report • Verification of an emissions report • Delivery of data for ex-post-control
Abatement measures	• Identification of abatement measures • Decision about abatement measures
Trade	• Transactions fees (exchange fees, broker fees, clearing) • Trade • Market observation
Strategy	• Definition of a risk strategy • Definition of a trade strategy • Definition of a abatement strategy

CASE STUDIES

Case studies are well suited to analyze transaction costs, because it is possible to effectively consider unique characteristics facing the corporation that cannot be gleaned from surveys or simplistic questionnaires. For instance, observed transaction costs arise in different parts of the companies and their underlying time and cost expenditures are typically not separately recorded from other ongoing business routines. For this case study, three companies were chosen and several corporate employees interviewed in-depth after the first emissions reports were sent to the DEHSt in April 2006. The data surveyed can be considered to be precise because all information was verified by interviewees. It should be emphasized that the small sample size indicates that this data is not representative. For that reason, no aggregate figures or extrapolations are presented in this paper.

The first case study is one of the four major utilities in Germany whose twenty installations emitted about eleven million tons ("Mt") CO_2 in 2005. Due to the magnitude of the emissions and their direct relation to the firm's core business processes, corporate exposure to the EU ETS can be regarded as high. The company analyzed in the second case study is a typical medium-sized utility, which is active in municipal public services like water and gas supply. Its three installations are only used for district heating and reserve or peak load production. Therefore, less CO_2 is emitted which—in combination with the diversity of its operations—leads only to a medium exposure to the EU ETS. The third case study analyzes a major lime works company. The emissions of twelve installations add up to about two Mt CO_2 per year. As the added value per ton of CO_2 is low in mineral processing industries, emission levels result in a high exposure to the EU ETS.

TABLE 2: CASE STUDIES

	Case Study 1	Case Study 2	Case Study 3
	Major Utility (MU)	**Pubic Services Utility (PS)**	**Major Lime Works Co. (LW)**
Employees	18,000 (2005)	1,100 (2005)	900 (2004)
Installations	18	2	12
Total annual EUA [t CO_2]	1,000,000	62,000	2,000,000
Average EUA per installation p.a. [t CO_2]	600,000	31,000	150,000
Reported emissions in 2005 [t CO_2]	11,000,000	64,000	1,800,000
Surplus/shortage 2005	-1,000,000	-2,000	200,000
Exposure to EU ETS	High	Medium	High

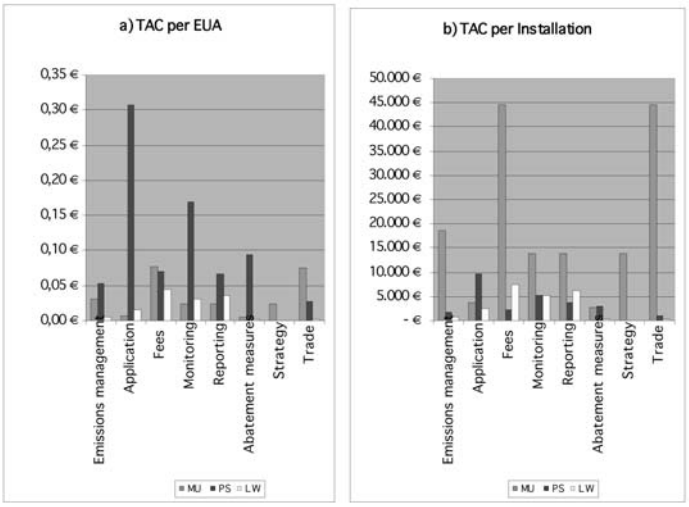
Results

In 2006, transaction costs for the major utility ("MU") totaled 2.8 million euro, 52,000 euro for the medium-sized public services utility ("PS"), and 270,000 for the major lime works company ("LW"). One-time costs, such as setting up the necessary corporate structures, quantifying historic emissions for the application process, and verifying the applications were aggregated, and then divided by the number of years in the first commitment period and then allocated to the year 2005. The transaction costs for the compilation and verification of the first emissions report were also attributed to 2005, although they arose in 2006, to ensure accordance with a cost-accrual concept. The figures in Table 3 relate to the EUAs assigned, and not to the EUAs returned in 2005, because this would have caused inconsistencies when accruing the cost partition of one-off[13] costs to the years 2006 and 2007. In regard to the different emissions levels of the installations, the results are presented as specific transaction costs per EUA and per installation.

The specific costs per EUA differ by a factor of five, from 0.14 euro to 0.79 euro. Surprisingly, the lime works company has the lowest transactions costs, which can only be explained by relatively low expenditures for abatement, strategy, and trade. The company's emission management set-up costs have been relatively moderate, which might be a result of the company's existing environmental management system that follows similar management routines. Unlike utility companies, the lime works company participates in a competitive market place and cannot, or can only to a limited extent, pass on the additional costs from the EU ETS to their customers. This fact might also have led to greater cost-consciousness.

The major utility's transaction costs are about twice as high than the lime work company's due to high allocation fees and frequent trade activities. The public services utility bears the lowest absolute transaction costs in all categories but the highest transaction cost per allocation at 0.79 euro. A comparison of the cost figures per installation in Figure 1(b) shows that the major utility bears highest costs as a result of high average emissions of 600,000 tons CO_2 (See Table 2). This reflects the curbing effect of frequency on the specific transaction cost per allocation.

Figure 1: Comparison of Transaction Costs



An analysis of transaction cost distribution clearly shows that the one-time costs for the set-up of the emission trade are a relatively low component (between four and twelve percent of the total costs). The latter could increase by the end of the first commitment period in 2008, when companies decide to acquire software for the automation of processes. This was not an attractive option in the beginning, as compatibility definitions for the software interface with the DEHSt were not available. Therefore, companies integrated the processes of the EU ETS in their existing software environment instead of purchasing additional ones.

The application's high cost share (37 percent) for the public services utility is astonishing. The category includes cost related to initial training in the emissions trading scheme and this adds up to a rather high amount. It is likely that the cost for the orientation in the new complex policy regime is of a similar magnitude in other small companies with few installations. Obviously, these learning costs will be much lower for the next

Table 3: Transaction Costs in 2005

		Emissions management	Application	Fees	Monitoring	Reporting	Abatement	Strategy	Trade	Total
EUA	MU	0.03 €	0.01 €	0.08 €	0.02 €	0.02 €	0.005 €	0.02 €	0.08 €	0.27 €
	PS	0.05 €	0.31 €	0.07 €	0.17 €	0.07 €	0.094 €	0.00 €	0.03 €	0.79 €
	LW	0.01 €	0.02 €	0.04 €	0,03 €	0.04 €	0.00 €	0.00 €	0.00 €	0.14 €
Installation	MU	18,519 €	3,648 €	44,612 €	13,889 €	13,889 €	2,778 €	13,889 €	44,444 €	155,667 €
	PS	1,633 €	9,583 €	2,158 €	5,288 €	3,800 €	2,917 €	0 €	869 €	26,248 €
	LW	857 €	2,530 €	7,375 €	5,116 €	6,073 €	233 €	78 €	233 €	22,496 €

commitment period as companies will be familiar with the function of the EU ETS and will have experiences in trading. Similarly, fees make up around one third of total transaction in the major utility and lime works company, both enterprises with high emissions levels. This is especially negative from a corporate point of view as there are limited possibilities to internally decrease this share through efficiencies or other mechanisms. A simplified allocation scheme with fewer combinations of application rules would have decreased the costs at the DEHSt administrational level resulting in lower fees for the participants.

The share of transaction costs due to monitoring and reporting is highest at the lime works company (23 percent and 27 percent, respectively), which can be explained by more complex monitoring procedures covering a wider product range, various fuels and different productions methods. The public utility also has a high transaction cost share for those two categories (twenty percent and fourteen percent), but they can likely be accounted to the low number of installations that prevent the company from profiting from learning effects in the compilations of monitoring schemes and emission reporting.

Approximately one third (29 percent) of the transaction costs observed at the major utility originate from trading permits, which significantly differ from the other firms examined (three percent for PS, one percent for LW). This is most likely due to similarities in the core business of larger utilities that constantly optimize their power generation capacities. The high amount of allocated permits certainly enhances corporate possibilities to take advantage of the emissions trade. The permit trade is part of the day-to-day business just as much as electricity trading at the major utility, and this compliments a higher transaction cost share. Another surprising finding is the low level of transaction costs at the lime works company that cannot be explained with transaction cost theory. The higher costs at the public services utility on the other hand are in line with theoretical assumptions regarding economies of scale, as there are only two installations and relatively few EUAs allocated. The level of transaction costs at the major utility can be well explained by the more pro-active emission management and the voluminous trading activities. Apart from that it can be stated that the amount of transaction costs corresponds well with other preliminary estimates, but no extraordinarily high transaction costs of greater than one euro per EUA was found.

Conclusion

The varying results in transaction costs should encourage companies to examine the structure of their emissions management and to look for optimization potentials. Generally, sinking transactions cost levels can be expected with increasingly amplifying learning effects, but this will not be self-evident. Usually, a simpler allocation scheme could contribute to decreasing transaction costs for the application and fees. Among the possibilities to achieve this are permit auctions or a de-minimis rule for reduced requirements for installations with low emissions level-both are currently discussed in the policy formulation phase for the second commitment period in Germany. Although the level of transaction costs overall is moderate, a decrease would be highly desirable—especially when they are compared to the current spot price of permits of about 1.50 euro.

Endnotes: Transaction Costs

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[11] Note, that this category comprises only the transaction costs of trading. Potential profits or losses are not taken into account in this analysis.

[12] The transaction cost categories relate partly to the framework legislation (TEHG), the allocation act (ZuG 2007) and systematics of the EU ETS.

[13] One-off costs are costs that arise only once during the first commitment period, e.g., the fee for an account in the registry at the DEHSt.

Update on the Environmental and Legal Consequences of the Recent Lebanon-Israel War

*by Salah Husseini**

In addition to over 1,150 civilian deaths, 3,700 civilian injuries, and the creation of nearly one million refugees and internally displaced peoples,[1] the recent Lebanon-Israel war in the summer of 2006 left the Lebanese infrastructure and environment severely damaged.[2] According to "Lebanon Rapid Environmental Assessment for Greening Recovery, Reconstruction and Reform 2006," a report issued by the United Nations Development Programme, the war resulted in the "destruction of approximately 445,000 [meters squared] of road network, 92 bridges and overpasses, as well as the destruction or damage of an estimated total of 130,000 dwelling units in addition to water supply and wastewater infrastructure."[3] Lebanon's Council for Development and Reconstruction, a quasi-governmental organization, estimated that the destruction resulted in approximately U.S. $2.5 billion in damages, not including losses of revenue.[4] In addition to the massive devastation caused to the civilian infrastructure, the region's environment paid a heavy toll as a result of the war, the effects of which are still being dealt with today.

The region's environment paid a heavy toll as a result of the war.

The most widely publicized environmental consequence of the war was Israel's attack on the Jiyyeh power plant, located south of Beirut. A report by the United Nations Environmental Programme ("UNEP") stated that up to "75,000 cubic met[ers] of heavy fuel oil could have been burned, spilled or leaked into the ground after the Israeli air raids of 13 and 15 July 2006, though the exact amount is still unknown."[5] The attack resulted in the spill of 15,000 cubic meters of oil, which spread across the Mediterranean coast, reaching the Syrian coastal city of Tartus to the north and Tyre in the south.[6] Approximately 150 kilometers of Lebanon's coastline, out of a total 220 kilometers, was directly affected by this spill.[7] That Israel targeted the plant on three separate occasions and had even threatened to bomb the power plant again[8] clearly indicates that Israel's attack against the plant was willful and deliberate, and therefore could constitute a war crime based on principles of international humanitarian law ("IHL"), due to the civilian-use nature of the plant.[9]

Once the ceasefire went into effect on August 14, 2006, a coalition of organizations including UNEP, various NGO's and Lebanese Ministry of Environment ("MoE") took part in Phase I of the cleanup process along the coast.[10] Phase I involved "the removal of free floating oil and the bulk of the oil that can be remobilized from all heavily affected sites along the coast," and according to MoE, was successfully completed in January 2007, a full six months after the Summer War.[11]

Phase II, on the other hand, which is only just beginning, may prove to be a much more challenging task. The sea continues to deposit oil onto the shores of the country, and shifting sands continually expose large deposits of oil from the bombed power plant.[12] The remaining cleanup will be a much more costly and lengthy effort, and one which the government may not be able to handle. UNEP reports that the "disposal of toxic waste and other debris from Israel's bombing last July and August still poses a major environmental challenge to Lebanon. Unexploded cluster bombs, sacks oozing oil on beaches, mountains of rubble and bombed-out factories with stockpiles of chemicals all may have a far-reaching impact on people and their environment unless treated urgently."[13] The MoE reports that the first phase of the cleanup cost between U.S. $137 and $205 million dollars, and the "assistance that Lebanon has received to date is less than [five percent] of the needed financial resources" for these projects.[14]

Despite several proclamations by the Lebanese government that it intended to pursue legal action on an international level against Israel for the alleged war crimes committed, action on the part of the government has been minimal.[15] This is likely due both to internal political turmoil and the likelihood that Israel could pursue similar action against the Lebanese government because of Hezbollah's position in the government and its conduct during the war. The International Court of Justice has opened up its own investigation into whether war crimes were committed by either side, under the title *Expert Legal Inquiry into Possible Violations of International Humanitarian Law in the Armed Conflict in Lebanon*.[16] Whether either side can collect against the other for violations of IHL is yet to be seen.

Because of this, it is likely that Lebanon's only remedy to its environmental situation is to seek financial assistance from donor countries to continue the cleanup and reconstruction process, which, if the first six months are any indication, will likely take another six months to one year and several hundred million dollars to complete. The country has a long way to go before full environmental recovery is achieved.

Endnotes: Lebanon-Israel War *on page 76*

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Merging Environmental and Energy Sustainability With Opportunities for U.S. Corporations

*by Longmire Harrison**

Introduction

The world is becoming an increasingly urban place, creating problems that affect the environment, the poor, and the global economy. The urban population for developing countries by 2020 is forecasted to expand by 2.4 billion people.[1] In the People's Republic of China ("PRC" or "China") nearly all of the population growth over the last twenty years has occurred in urban settings.[2] The country's urban population was 72 million in 1952 and increased to 540 million in 2004.[3] It is predicted that an estimated 900 million will live in Chinese cities by 2020 if urbanization continues at the rate of one percent annually.[4]

China is not the only country experiencing rapid growth in urban settings. Over the next two decades, developing countries are projected to be home to 80 percent of urban dwellers.[5] Further, approximately 80 percent of East Asia's economic growth will occur in urban areas.[6] Thus, one of the challenges for this millennium is to develop an urban strategy for sustainable environmental and energy growth in current and emerging cities, with the goal of improving economic vitality and environmental livability for all.[7]

This article examines the relationship between urban population growth, municipal solid waste[8] ("MSW"), and energy sustainability challenges in the PRC. It also suggests that the United States could derive substantial benefits by assisting the PRC, and ultimately the world, in tackling these challenges.

The first section illustrates the challenges and relationships between urban growth, MSW, and sustainable development. It also provides a background of the current state of MSW in the PRC. The second section looks at the current methods of treatment for MSW, including promising waste-to-energy ("WTE") technologies as a means to achieving environmental and energy sustainability. The third section addresses the opportunities and benefits for the United States, and the U.S. environmental technology industry in the PRC. In conclusion, we find that the opportunities available in the PRC will simultaneously allow U.S. companies to reap economic benefits while providing solutions to critical environmental and energy problems that pose severe global consequences if not confronted today.

The Challenge: Urban Population Growth, Municipal Solid Waste, and Sustainable Development

Municipal Solid Waste in the PRC

The increased level of urban domestic wastes, occasioned by spectacular population explosion, has become a serious problem in the PRC. Due to China's rapid urban population and economic growth, MSW levels have increased approximately ten percent per year.[9] At present, the MSW treatment rate in the PRC is less than twenty percent, in comparison to over 90 percent in developed countries. Accumulated wastes in the PRC occupy 500 million square meters of space, weighing approximately six billion tons.[10] Currently, garbage surrounds two-thirds of the PRC's cities. For instance, Shanghai is surrounded by about 1,000 garbage dumping grounds[11] and Beijing has about 700 solid waste dumps surrounding the city in order to handle the 10,000 tons of urban solid waste generated every day.[12]

No country has ever experienced such a phenomenal increase in solid waste quantities that China is now facing. In 2004, China surpassed the United States as the world's largest waste generator and it is estimated that annual solid waste quantities will increase by 150 percent by 2030.[13] As a result, China's annual solid waste quantities will increase from 190,000,000 tons in 2004 to over 480,000,000 tons in 2030.[14]

The China Council for International Cooperation on Environment and Development, a nongovernmental advisory board working to strengthen environmental dialogue between China and the international community, recently released a report that summarized some of the land-use problems associated with MSW in China.[15] While currently a Chinese urban resident produces 740 pounds less waste per year than his/her American counterpart, Chinese waste production rates are rapidly rising. The report found that landfills of solid waste have clogged 50,000 hectares of land surrounding cities in China, rendering this land as useless.[16] Moreover, all urban landfills will reach capacity in another thirteen years.[17] Additionally, it is estimated the PRC's garbage pile-up will reach 400 million tons in 2020, which is equivalent to the volume generated by the entire world in 1997.[18] This report provides a dire glimpse into the future problems China will face while attempting to handle the increase in MSW that results from a soaring population.

According to the above statistics, China will be overflowing with MSW unless action occurs. China will need to develop systems to effectively handle two-and-a-half times more waste than current levels no later than 2030-and the sooner this technology

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is developed, the better.[19] China cannot ignore this problem due to the social, financial, and environmental impacts of its increasing waste production on domestic and international matters.[20]

The Role of Government Agencies in the PRC

China's State Environmental Protection Administration ("SEPA") began to promulgate regulations and legislation related to solid waste management in the 1990s.[21] In 1991, SEPA started a waste declaration and registration pilot project in seventeen cities.[22] Part of the goal of this program was to identify the type, characteristics, quantity, and danger of solid waste, including the hazardous types. Under this program, SEPA also conducted tests on waste exchange to evaluate how a comprehensive regional program could be adopted.[23] As a result of this experimental work, a solid foundation for waste exchange has been established in China.

In October of 1995, China passed the "Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Waste."[24] As China's first comprehensive law on solid waste, it authorizes the government to inflict solid waste discharge fees on entities that do not comply with certain environmental laws.[25] The Cleaner Production Law was passed in 2002 and put in force in 2003; the goal of this law is to provide incentives to industries to reduce, recycle, and reuse wastes.[26] Some local governments also have enacted regulations and standards for the prevention and control of pollution by solid waste.[27]

The PRC's New MSW Approach

In China, the municipal environmental sanitation administrative bureaus are responsible for daily garbage collection, transportation, and centralized garbage treatment, including landfills and incineration plants.[28] Based on the volume, it has become clear that the Chinese waste industry alone cannot meet the demand for waste management technology.[29]

China's waste management system is undergoing wholesale changes as the government tries to respond to the increase in production of waste.[30] Partly inspired by Japanese and German recycling economy laws, the Chinese Government is increasingly viewing the concept of a circular economy ("CE"), also known as a life cycle economy, as a means of balancing rapid economic development in China.[31] A basic definition of CE is the joining of manufacturing and service businesses seeking to improve economic and environmental performance by collaborating in the management of environmental and resource issues. One of the Chinese CE objectives is to diminish the growing waste problem by increasing the efficiency of resource utilization by a factor of ten by the year 2020.[32]

The conversion of municipal solid waste to energy can conserve valuable fuels and improve the environment by lessening the amount of waste in landfills.

Factors, such as hosting the 2008 Olympic Games and the 2010 International Expo, mounting health hazards such as Severe Acute Respiratory Syndrome ("SARS"), and trying to manage growing stockpiles of solid waste are increasing external pressures on the Chinese Government to safely manage its solid waste. As a result, the government has begun encouraging the development of a solid waste management industry. Unfortunately, the local industry lacks the experience and technology to satisfy the rapidly growing demand.[33] As a result, China designated environmental protection as a key investment area, making it a new, market-oriented point of economic growth in the country and directing more foreign capital into this sector. This has resulted in China's environmental industry quickly becoming one of the most dynamic segments of its economy. Increasingly, international partnership projects, cleaner production, energy efficiency, and carbon dioxide emissions reduction are opening the market in China to highly diversified environmental technologies and services.

The Sustainability Solution: Municipal Solid Waste and Waste to Energy Conversion Technology

China needs an integrated sustainable waste management approach with the long-term objective of waste segregation. This approach requires involving key stakeholders, such as the 82,000 rural migrants making their living as garbage pickers in Beijing,[34] in the planning and decision-making process. China must also take a holistic view of the complete waste management system, including waste minimization, collection, transfer, treatment, recycling, resource recovery, and disposal.[35] Some MSW management techniques include source reduction, recycling, composting, landfills, and incineration. Source reduction involves altering the design, manufacture, or use of products and materials to reduce the amount of toxic materials that become waste. Recycling diverts items, such as paper, glass, plastic, and metals from the waste stream.

China currently uses the following three principal treatment methods for managing MSW: (1) landfills (70 percent); (2) high-heat composting (twenty percent); and (3) incineration (ten percent).[36]

Landfill: Turning Municipal Waste Methane into Energy

Most cities use centralized stacking and simple landfill treating methods to dispose of waste. The majority of these treatment facilities are not able to meet international standards and pose significant environmental hazards, particularly associated with leachate from the site.[37] Water percolating through landfills produces

leachate, which often contains toxic chemicals. Very few landfill sites in China are equipped with leachate collection and treatment systems, which are required in the developed world.

The biodegradation of organic matter creates landfill gas, which is about fifty percent methane.[38] The abundance of landfills has given China the distinction of producing more methane than any other developing country. This dubious distinction, since methane is a greenhouse gas, can be turned into a positive in that methane can be used as fuel for industry and vehicles.[39] Along this line of thought, China implemented several landfill gas capture projects. For example, one project included three technology demonstrations on how to use landfill gas for electric power generation, incineration of medical wastes, and vehicle fuels.[40] In addition, besides helping energy-starved cities in China, according to a World Bank report, "carbon credits from turning methane into energy could generate as much as [U.S.] $1 billion per year for Chinese cities."[41]

After the United States, China is the world's greatest energy consumer and largest emitter of greenhouse gases that contribute to global climate change.

High-Heat Compost

Composting decomposes organic waste, such as food scraps and yard trimmings, with microorganisms (mainly bacteria and fungi).[42] Composting may increase in importance due to the possible sale of carbon emission reductions under the Clean Development Mechanism of the Kyoto Protocol; however, this would entail establishing a marketing program and a review and testing of compost quality.[43] Currently, high-heat compost is not the focus of the Chinese Government.

WTE Technology

In many Chinese cities, WTE has been selected as a primary treatment method for MSW volume reduction and as a source of energy.[44] The conversion of MSW to energy can conserve valuable fuels and improve the environment by lessening the amount of waste in landfills.[45] The importance of utilizing WTE was recognized in the 1991 U.S. National Energy Strategy, which sought to support the conversion of MSW to energy.[46]

One way to utilize the energy value of MSW is to burn it in a steam power plant to generate electricity. In addition, the co-combustion of coal and MSW is an option. Coal has long been the predominant source of energy for electricity production in China and around the world. The same combustion principles apply to both energy sources, and the technologies for controlling emissions are similar in both the combustion of coal and WTE.[47] More than half of the electricity generated in China is produced in coal-fueled power plants. Thus, the co-combustion of coal and MSW as an energy resource can help mitigate the MSW disposal problem, conserve valuable fuels, and reduce emissions of CO_2.[48] This type of combustion reduces waste volume by 90 percent, resulting in sizable landfill capacity savings, even when the resulting ash is landfilled. Land filled ash weighs about one-fourth to one-third as much as processed trash and can be used as aggregate material for road building and other construction.[49]

In China, MSW incineration technology was initially used at the end of the 1980's, and was rapidly developed in the 1990's. Incinerators are growing in popularity but their "growth is often driven by artificial and non-sustainable subsidies and non-transparent financing structures, as well as lack of understanding and experience about incineration facilities."[50] It is encouraged that all new incinerators should meet Japanese-EU emission standards for dioxin and mercury, and that all operators should receive a significant level of training.[51]

China currently operates nineteen municipal waste incinerators with a total daily capacity of approximately 7,000 tons (December 2002 status).[52] This is about two percent of all the municipal solid waste produced in China.[53] More than 30 enterprises, research institutes, and universities are now concentrating on the research and development of incineration technology and its integrated equipments, and more than 30 large- and middle-scale cities have constructed or are constructing MSW incineration plants. Many new constructions are in conjunction with Japanese, German, French, and Canadian companies.[54]

The Opportunity: Benefits for the U.S. Environmental Technology Industry and U.S. Companies

China, with a current population of over 1.3 billion people, is one of the fastest growing economies of the world. This rapid growth will propel a dramatic increase in the demand for energy and other resources, with increasing demand over the next 40 years. In order to meet the increasing needs for proper MSW management, the Chinese Government is working with foreign partners to import technology. This creates great business opportunities for countries like the United States. The United States is a major exporter of MSW management technology, permitting it to provide guidance and gain financially from exchanging development technology with countries like China.

For example, effective alternatives to the MSW disposal and conversion technologies currently available in the PRC have been developed by the global environmental technology industry. Some of these technologies have still not been commercially exploited. However, each of these technologies will be able to convert MSW into usable raw material for other industries, and, at best, will completely eliminate contaminants in the air waste stream. The use of such technologies will create true sustainability in places like the PRC. Thus, the market for environmental goods and technology is rapidly increasing.

Despite the obvious opportunities for U.S. companies to continue to develop and deploy new technology in markets like the PRC, many companies allege that more stringent emission reductions standards cannot be achieved or that doing so would be devastating to the national economy. While these claims are met with sympathy in some circles, it is instructive to note that similar arguments were made by the U.S. automobile industry in the 1970s when they insisted that greater gas mileage or fuel economy could not be achieved. While the U.S. automobile industry, their lobbyists, and politicians were playing bipartisan politics and a game of "chicken," the Japanese simply developed and tested the technology, and built fuel efficient automobiles. The U.S. automobile industry has never recovered and has never been the same. Thus, this lesson should caution those who claim new MSW technology could not conform to stringent environmental standards.

Conclusion

Sustainable economic growth and development is critical in every part of the world. As urban populations increase and mega-cities become the norm, political leaders will increasingly be called upon to develop policies and procedures that promote economic viability while enhancing the environment. Such growth also provides opportunities for foreign companies to reap economic benefits while providing solutions to critical environmental and energy problems, such as the possible role of U.S. MSW management technology in the PRC.

Current MSW treatment and disposal methods in the PRC lag far behind international standards. This lag, if unchecked, will lead to dire consequences for the global community. After the United States, China is the world's greatest energy consumer and largest emitter of greenhouse gases that contribute to global climate change. New and existing MSW and WTE technologies have the ability to revolutionize the WTE industry in the PRC. The merger of new technology and existing experience-based practices could create a powerful partnership between respective organizations in the PRC and global environmental technology companies as the two work together to deliver the benefits of strong sustainable environmental and economic development to the citizens of the PRC and the world.

Endnotes: Merging Environmental and Energy Sustainability

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Endnotes: Merging Environmental and Energy Sustainability
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The Forest and the Trees:

Biomass and Certification Procedures

*by Stephen Medlock**

On December 7, 2005 the European Union published its Biomass Action Plan.[1] The EU's goal of promoting the use of biomass energy, generally defined as energy that comes from processing any form of harvested biological life such as forest products and plant life, is part of an increasing trend.[2] Biomass emerged on the international market as a major renewable energy source during the last fifteen years.

While biomass has the potential to be a sustainable, renewable, and economic source of energy, it has drawbacks that must be managed. For example, biomass production could compete with food production.[3] Cultivation of cash crops to produce biomass energy could also lead to deforestation or the take-over of traditionally indigenous lands by multinational corporations.[4] Furthermore, the trade in biomass fuels crosses state boundaries and is largely the purview of multinational corporations. Hence, states are unable to effectively regulate this trade. Civil society actors, such as international regulatory organizations, have attempted to fill this governance gap by providing incentives for multinational corporations to adopt policies that reduce the potential negative impacts of biomass cultivation. Forest certification was one of the first incentive structures devised. Forest certification is the process by which an independent third-party assesses the management of biomass cultivation by a firm in relation to standards set by a regulatory organization.[5] If the management of the resource complies with these organizational standards, the firm may display a label signifying they have conformed to the standards.[6]

While certification procedures are likely to marginally raise the cost of grossly violating the norms of a regulatory organization, these policies fall far short of the goal of ensuring biomass fuels do not negatively impact sustainable development. Certification procedures are not efficacious because they fail in two critical regards. First, they do not enforce accountability because of the limited resources of many regulatory organizations. Second, the broad language of the standards used to assess firms incentivizes compliance that often violates the spirit of the norms themselves.

Forest certification is not effective in realizing the goal of sustainable energy development because the organizations enforcing these norms lack the reach and resources to compel multinational corporations to comply.[7] The funds necessary for continued monitoring of biomass firms are heavily reliant on the revenue generated by the certifications procedure itself.[8] These limited resources make it difficult to ensure some compliance on the part of firms that have not sought certification. This leads to a basic selection problem. The only firms that will comply with certification procedures are those who have an interest in doing so.[9] As a result, the firms that are most likely to opt out of these procedures are the firms whose behavior civil society would most like to influence.[10]

The certification process itself has the potential to undermine the stated goals of the regulations. Since certification is the primary way organizations receive revenue, the certification process can be influenced by pecuniary interests.[11] Firms pay independent certifiers for their services. Certifiers who have a track record of certifying firms are more likely to be hired. If track records play a role in the selection of certifiers, this decision risks the creation of a negative feedback loop where firms select certifiers who interpret regulations more loosely and other certifiers lower their standards to compete for employment. In addition, few institutional safeguards exist to ensure that certifiers will remain truly independent.[12] Regulatory organizations that promote certification procedures without ensuring that certifiers have a safeguarded fiduciary responsibility run the short-term risk of entrenching this negative feed-back loop.

Despite the short-term limitations of biomass certification programs, it is important to see the forest through the trees. Virtually all stakeholders viewing the issue of biomass through the prism of sustainable development agree that some regulation is needed. Not all agree that certification programs alone will be the most effective method of achieving the stated goals of regulation. While all certification regimes face drawbacks, many other certification regimes benefit from state-level regulations that have established a baseline of acceptable corporate behavior. The nascent nature of international biomass trade means that there are few supplementary regulatory frameworks to create a baseline of permissible practice. While certification procedures may be effective in the long-term despite these problems, they cannot be effective alone in the short-term. In fact, the use of these procedures without other safeguards and supplementary forms of regulation risks the creation and entrenchment of policies that run counter to the ultimate goal of ensuring that biomass energy production is sustainable, renewable, and economic.

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The Development of Biofuels Within the Context of the Global Water Crisis

*by Sara Hughes, Lena Partzsch, and Joanne Gaskell**

Introduction

Agricultural and energy policies that are seemingly unrelated to water use, such as institutionalized support of biofuel production, can have major water-related impacts. For instance, expanding agriculture to meet countries' growing demand for biofuels could place extreme stress on global water resources. Clean and reliable water resources are necessary for nearly all social-industrial processes. Currently, agricultural production is the world's largest user of water.[1] However, agriculture is not the only sector straining global water supplies. Water demand continued to rise in nearly every component of global society over the last twenty years despite limited supplies, particularly in the world's expanding arid and semi-arid regions.[2]

Mounting evidence has prompted a nearly universal declaration of the existence of global water scarcity-coined the "global water crisis."

Utilizing biofuels has numerous positive results, such as reducing greenhouse gas ("GHG") emissions, improving countries' energy security, and providing economic opportunities in the world's impoverished rural areas. However, this renewable energy source also comes with a price. Biofuels compete with food crops for scarce arable land. For example, Europe's pledge to replace 5.75 percent of their fuels with biofuels by 2010 and the United States' proposal to substitute fifteen percent of U.S. gasoline use with biofuels by 2017 will place enormous demands on existing cropping systems. The U.S. plan alone would require 35 billion gallons of alternative fuel: the equivalent of 13.5 billion bushels of corn (using current technologies). The water-related consequences of large-scale biofuel production and the potential need for policy guidance in this area have yet to be fully explored.

This article has two major goals. The first is to establish that, in the context of the "global water crisis," water accounting is a useful tool with which to evaluate the international impacts of producing and trading biofuel stocks. The second idea to be conveyed is that the international community must move towards a more integrated understanding of the development of biofuels within the context of the global water crisis.

The Rise of Biofuels

Countries around the world are currently employing (or exploring) biofuels as cleaner, more secure alternatives to gasoline in meeting their transportation energy needs. Current biofuels technologies rely on converting crops that farmers have traditionally grown for feed purposes (i.e. corn, soybeans, sugar, and palm oil) into ethanol or biodiesel that could displace fossil fuels in motor vehicles, a significant source of carbon dioxide emissions.[3] Ethanol is produced from crops with high sugar content, such as wheat, beets, and sugar cane. These sugars are fermented into ethanol either by biologic or chemical means.[4] Biodiesel is made from oil crops such as rapeseed, soybeans, and jatropha; fuel derived from vegetable oils can be blended with oil-based diesel or used directly.[5]

Biofuels present a way to meet Kyoto Protocol commitments for GHG emission reductions, decrease air pollution for domestic reasons, and/or generate greater domestic energy security in non-oil producing countries.[6] Another reason for encouraging growth in the biofuels sector is to revitalize a deteriorating agricultural sector, both in developing and developed countries.[7] Some farmers see biofuels as the answer to often inaccessible and unpredictable global agricultural markets. For example, some individuals in South Africa believe that "the whole bioethanol revolution will save maize farmers" in this country.[8]

Beyond land and water constraints, concerns exist regarding increases in the production of biofuels. Developing countries will likely become the primary producers of biofuel feedstocks with developed countries as the primary consumers. A large group of international nongovernmental organizations ("NGOs") have expressed concern that increasing biofuel production may create a scenario reminiscent of earlier colonialism based on

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resource extraction and exploitation.[9] These groups recognize that there are likely short-term benefits to the agricultural sector in producing countries. Nonetheless, these NGOs worry that poorer countries will continue to be dependent on primary resource exports and may forgo opportunities to invest in increases in food production for their citizens. In contrast, biofuel expansion in developing countries is also viewed as a way to help reduce commodity dependency in these countries and support infrastructure development that will help with the distribution of crops.[10] In addition, there is concern about the implications of increasing monoculture farming practices for biodiversity in the surrounding ecosystems.

Obviously, there is much debate over these issues because specific threats and benefits for local communities are extremely difficult to predict with accuracy. As a result of these issues, some NGOs, Indigenous Peoples Organizations, farmer's movements, and individuals went as far as to publicly and formally oppose the use of biofuels to the Conference of the Parties of the Framework Convention on Climate Change.[11] Stating that "[b]iofuels are a disaster in the making," those opposing biofuels called for immediate suspension all subsidies and other support for trade.[12] However, whether or not such a North-South disaccord will exist within the biofuel trade regime may only be discovered through experience.

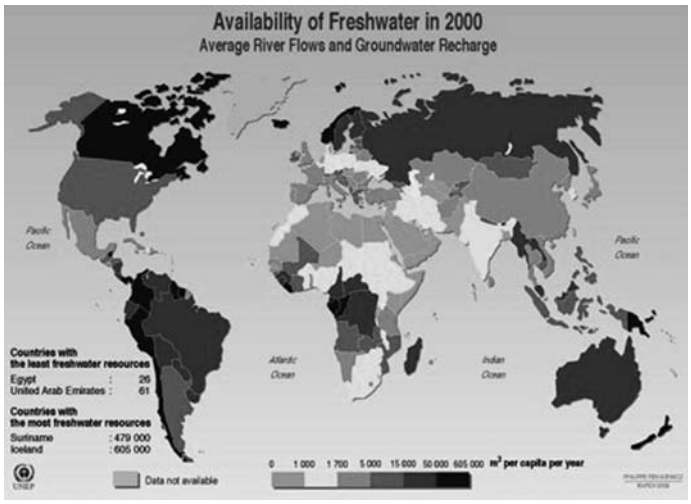
Global Water Crisis

Mounting evidence has prompted a nearly universal declaration of the existence of global water scarcity- coined the "global water crisis."[13] Such evidence includes the fact that more than two billion people are affected by water shortages in over forty countries.[14] The global water crisis is particularly evident when trends are examined with an eye toward the future, as water shortages experienced throughout the world often impose serious risks to long-term sustainability of linked socio-ecological water systems.[15] More specifically, several studies have concluded that the world's freshwater ecosystems have already been significantly degraded in form and function due to water overuse and contamination.[16] Further, a report initiated by the United Nations Environment Programme predicts that freshwater shortage will increase in severity in over two-thirds of the freshwater systems by 2020.[17]

At the root of the water crisis are inappropriate economic incentives for water use[18] and insufficient social institutions and legal frameworks for water management.[19] Whether scholars agree with the trend or not,[20] the global community is playing a significant role in the outcomes of local water scarcity issues. For example, international aid and development strategies have increasingly focused on addressing the critical nexus between global water scarcity and poverty, allocating funds for this problem at local levels, and further integrating global economic and political networks with water scarcity issues.[21] Additionally, the UN Millennium Development Goals challenge the world to decrease by one-half the proportion of people without access to potable water and sanitation by 2015.[22] However, "[w]ater is not only becoming scarce because of increased demand, but also because of higher pollution levels and habitat degradation."[23] Worldwide, only five percent of waste water is treated before entering the receiving fresh water bodies.[24] This has resulted in significant pollution levels in aquatic systems, especially surrounding mega-cities. For example, 200 million liters of raw sewage and twenty million liters of waste from Delhi are dumped into the Yamuna River every day.[25]

Water scarcity problems are also fundamentally due to geographic and temporal distribution, resulting in excess water in certain locations at a given time and too little water in other areas at a given time (see Figure 1). For example, many countries in sub-Saharan Africa or the Middle East must continually place water scarcity issues at the top of their policy agendas regardless of the existence of a current political crisis. In contrast, other regions struggle to cope with seasonal flooding and storage issues as well as groundwater intrusion.[26]

Figure 1: Global distribution of per capita freshwater resources



Source: World Resources 2000-2001, People and Ecosystems: The Fraying Web of Life, World Resources Institute (WRI), Washington D.C., 2000.

Virtual Water: Rethinking a Resource

Virtual Water Accounting

Global trade in agricultural and other commodities influences how water is consumed among countries; however, international commodity trade has an under-recognized role in redistributing global water resources. This is especially true for trade in crops, which often require large quantities of water to grow. The volume of water that farmers use to grow a crop, which is not physically embodied in the final product, is dubbed the crop's "virtual water" content.[27]

Table 1 demonstrates how virtual water accounting has been developed as a useful empirical tool for quantifying the flows of water between countries as well as explaining the social, economic, and environmental consequences of the trends. This virtual tool can even be used to identify valuable policy levers; for instance, specific crop trading practices that would put undue burden (or provide relief) in instances of water scarcity. Virtual water accounting emphasizes the important role of social and political institutions—in addition to the relative availability of water resources—in determining how water is used and distributed around the world.[28]

Table 1: Global Virtual Water Flows Between Nations By Product (Adapted from Hoekstra and Hung 2005)

Product	% Global Virtual Water Flow
Wheat	30.2
Soybean	17.1
Rice	15.4
Maize	8.9
Raw Sugar	7.2

Virtual Water Content and Trade

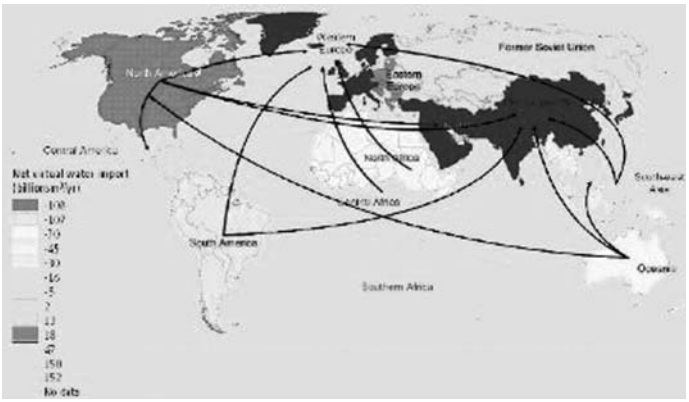
Relying on irrigated crops to produce biofuels would significantly strain global water resources. The global average virtual water content of wheat, sugar cane, and rapeseed is 1300, 175 and 1600 m3/ton, respectively.[29] These crops are generally grown under rain-fed conditions, but expanding production may push crops into more marginal areas that require irrigation. Depending on system configuration, the processing is less water-intensive but can cause major pollution loads on aquatic systems, and hence an environmental burden shift to producing countries.[30]

International trade in biofuels or in their ingredients will cause additional virtual water flows, above and beyond existing crop trade and its impact on global water resources as trade volumes increase. For example, if South Africa increases biofuel exports it will increase its net virtual water trade deficit. However, just as water is differentially distributed around the globe, so is the capacity for countries to increase their production of biofuels. For instance, the United States and Brazil are currently the world's leading ethanol producers. Brazil represents 50 percent of global ethanol exports, exporting primarily to the United States and India.[31] The United States and Brazil are also major consumers, but their level of trade in ethanol is small relative to ethanol production levels.[32] Interestingly, trade in cane sugar and maize has not risen along with the ethanol boom. Most likely this results from subsidies in developed countries favoring domestic ethanol production. On the other hand, biodiesel represents an emerging new force in oilseeds trade. For example, a spike in palm oil exports from Malaysia and Indonesia to the European Union is most likely attributed to biodiesel demand.

It is forecasted that the commitment of the EU to a 30 percent increase in biofuel use by 2025 will require imports of biofuel feedstock from other countries. Even without considering the needs of other countries, virtual water flows lead one to believe that there possibly might be a shortage of available, arable land to meet the demand created by this target unless significant changes in crop selection and cultivation are instituted. Implementing such changes would require political and technical exchanges, such as subsidization policy changes and technology transfers. Such exchanges have thus far been avoided in the international arena. Innovations have lead to potential decreases in water competition. For example, the use of jatropha, a plant able to grow quite easily in arid regions, has the potential to significantly reduce the volume of water resources needed to sustain biofuel production.[33] Regardless, water availability will likely still be a problem.

As shown in Table 1, four of the five crops most responsible for the global flow of virtual water are also used in the production of ethanol and biodiesel. Also, global trade in wheat alone is responsible for 30 percent of global virtual water flows.[34] If the trade in these commodities is to greatly increase in the future to meet the growing demand for biofuels it seems more than reasonable to propose an assessment of how this will impact the water resources in producing and consuming countries. Additionally, there is the need to address these concerns in the policy frameworks which will undoubtedly arise around the trade regimes. New biofuel crops may add themselves to the list of "top five" virtual water crops, and those crops that are currently responsible for most of the world's virtual water trade will continue to grow in importance. If the global community agrees that: (1) there is a global water crisis; (2) it is possible to calculate the virtual water flows of agricultural crops; and (3) there is the desire to maximize our ability as a global community to produce low-carbon emissions fuels, then such measuring of virtual water flows is imperative.

Figure 2: Net virtual water imports around the world (Source: UNESCO 2006)



Regional virtual water balances and net interregional water flows related to trade in agricultural projects. Period 1997-2001.

The Role Virtual Water Can Play in InterNational Biofuels Policy

As trade in biofuels increases, virtual water metrics should be used to improve global water governance. Achieving integration in governance systems at the global level is a daunting task, but one that is necessary to ensure sustainable and equitable futures as the global community move toward the use and development of alternative energy sources. Innovative perspectives to this problem are needed and it would positively serve the global community think creatively about the types of governing institutions and policies that would be capable of addressing linked water scarcity problems to causes and solutions. Thus far, policy proposals have addressed virtual water balances and biofuels trade in isolation. Considering these issues simultaneously could lead to three types of policy proposals: (1) domestic regulation; (2) international regulation; and (3) self-regulation within the industry.

Domestic Regulation

A straightforward solution to tackling water-related concerns in biofuel production is regulation at the domestic level. For example, countries may be able to limit irrigation licenses depending on water availability or to set regulative priorities for food over biofuel production when necessary. This strategy will depend in part on a government's ability to collaborate with often powerful agricultural lobbies. Moreover, in many cases the capacity of a single nation-state to handle water issues is limited when water crosses national frontiers. For example, more than thirty percent of all states meet thirty percent or more of their domestic water needs from sources in neighboring countries.[35] Therefore, international agreements are likely needed in many cases in order to achieve sustainable solutions.

International Regulation

International regulation means either modification of current international regimes, especially global trade rules, or developing a specific international water regime able to address biofuel trade. In the former case, an obvious option is to integrate biofuel trading into existing international trade regimes in an attempt to harmonize its regulation with other agricultural and energy-related commodities. Biofuels must first be formally classified within General Agreement on Tariffs and Trade ("GATT") framework; however, the lack of commodity classification of biofuels may be significant barrier in incorporating of biofuels into the GATT.[36]

Additionally, current trade regimes such as the GATT only consider standards which refer to the traded products themselves, without standards regulating the production process. For example, imports of bottled water can be rejected if the quality of the bottled water implies health threats. There is no way to ban imported bottle water from ground water aquifers that are threatened in terms of water over-use. Modifying current trade rules to internationalize such environmental and social costs related to water use for biofuel production could improve the sustainability of some water systems being used for biofuel production. However, suggesting such modifications are easier than implementing them. Parties to trade agreements must become aware of the importance of integrating environmental concerns into trade agreements.

The development of standards and numerical criteria will also play a key role in determining not only where within the GATT biofuels are placed, but how water-related criteria are able to be applied and how subsidy schedules will need to be adjusted within and between countries. This is an area where basic and applied research can significantly improve the global community's ability to address the global trade of biofuels from a virtual water perspective because the potential trade flows will be more predictable once standards allow classification.[37]

Ensuring that trade in biofuels proceeds in a way that maximizes benefits for those who need them most is critical. The World Food Programme, a UN organization dedicated to ensuring food security worldwide, has recognized the potential that trade in agricultural commodities can have for these communities. Their support of trade as a tool for development is not without reservations, as the achievement of key goals is critical if trade regimes are to benefit a greater number of countries than currently. As expressed in a 2002 WFP report:

> While there are potential gains from freer trade in farm products, the actual progress made in the ongoing negotiations has been limited so far, and the benefits remain modest. If further liberalization focuses too narrowly on a removal of OECD subsidies, the lion's share of gains will accrue to developed country consumers and taxpayers. More important for developing countries are: a removal of trade barriers for products in which they have a comparative advantage and a reduction or reversal of tariff escalation for processed commodities; more and deeper preferential access for the poorest of the least developed countries; open borders for long-term foreign investments (FDI); and improved quality assurance and food safety programmes that enable developing countries to compete more efficiently in markets abroad. The resources gained by trade liberalization and reductions in domestic protection could be channeled into additional development funding.[38]

An alternative at the international level to the modification of existing international rules is to address water distribution problems through a separate multilateral agreement, such as the proposal of an "International Virtual Water Trading Council."[39] Such proposals suggest that virtual water council could play a role in ensuring that the basic nutrition requirements of people are met through securing food imports and the water saved by these imports could subsequently be used to meet their basic water requirements. This entity could act as an independent arm of the World Trade Organization and coordinate international aid efforts with its goals.[40] This would be a very valuable contribution to efforts to incorporate virtual water accounting in emerging biofuel trade regimes, as the assurance of basic food and water requirements could serve as a foundation for assessing the capacity for biofuel feedstock cultivation in a given country. In addition, international compacts or conventions among countries to agree to reduce "water footprints," (the extent of water use internally and externally in relation to consumption) could provide incentives for countries to create water-efficient trade regimes for biofuel stocks.[41] Such a compact could be loosely modeled on previous agreements such as the Kyoto Protocol, which governs countries' emissions of carbon dioxide.

Self-Regulation Within the Industry

A final proposal is voluntary self-regulation by the biofuel industry through greater attention to corporate social responsibility ("CSR"). CSR appears in many forms, including internal codes of corporate conduct, which serve as important barometers for raising awareness and changing behavior. One CSR approach is for biofuel companies to establish voluntary water saving and cost saving standards, and commit to the application of water-saving irrigation technologies. A second approach is sector-wide agreements on best management practices among companies, like those existing in the coffee sector. Another approach

is the creation of general corporate and government adopted codes that are not specific to particular organizations or industries, but rather apply to a suite of issues (e.g., the Global Compact or the Coalition of Environmentally Responsible Economies). These three CSR approaches could establish criteria on water use and re-use including water efficient technology and pollution prevention made visible to consumers through product labelling. Additionally, such measures may provoke a diffusion of sustainable water management measures.

Need for More Information on Global Water Requirements

The above types of policy proposals are complementary and far from mutually exclusive. Efforts can be made at all levels to begin to incorporate water-related concerns in trade and development policies using virtual water accounting. Common to all solutions addressing sustainable development of biofuels is the need for more information on global water requirements. Currently, significant information exists on global land use competition between biofuels and food crops and in varying future scenarios, as does the quantification of global virtual water flows within and between regions due to trade in food crops and livestock.[42] The necessity of changing the global distribution of freshwater resources to meet the needs of the poorest people and endangered aquatic ecosystems is also well established.[43] However, much of these data are currently reported at a highly aggregated global level and are not directly applicable to particular countries. Additionally, there are not sufficient data on the trade (real or potential) in biofuel crops.[44] Evaluating these areas is an important first step for all of the sectors and interests involved, including those hoping to mainstream biofuel trade, virtually redistribute water, and secure resources for impoverished people and ecosystems. Such an effort should come from the global community in order to fulfill its own commitments and interests. However, academics and NGOs may also have a significant role to play in securing the data and interpreting the information to promote sustainable global water use.

Conclusion

Virtual water accounting is a useful way to think about, and empirically assess, the global chain of events that contribute to particular patterns of water use, scarcity, and the implications of the production of biofuels. As mentioned above, establishing causal links in a global chain is difficult to do through thought experiments, let alone as an empirical exercise. However, virtual water accounting has been developed as a quantitative tool that can and should be used as a criterion for trade and development regimes.

Such quantification is not the end of the story. Virtual water can give us the "what," of global water distribution, but it is still up to us to discover the "why."[45] Underlying political and economic conditions may or may not be persuaded by virtual water methods. Incorporating these values into decision making is a worthy goal and should be viewed as an opportunity for future problem solving. It would also be valuable to evaluate not only the virtual water content of agricultural products, but the whole production chain for biofuels and how virtual water flows and distribution may coincide with other resource use such as "virtual land" or "virtual timber." Ultimately, it should be recognized that there are externalities to most of the actions we take as individuals or collectively within market economies and as we continue to develop new energy sources such as biofuels, internalizing these externalities at the global level is a difficult but important task.

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Litigation Update

The Ninth Circuit Confronts the Aftermath of the Western Energy Crisis

*by Lucy Wiggins**

Introduction

In December 2000, the Federal Energy Regulatory Commission ("FERC") responded to the rising Western Energy Crisis by issuing an order encouraging local utilities to enter into long-term contracts, while promising to monitor the market-based rates ("MBR") on which the contracts were based to ensure that the rates met the statutory "just and reasonable" standard.[1] The order resulted in a pressurized environment requiring local utilities to hastily negotiate expensive five-to-ten year supply contracts or risk having to shut down.[2] Following stabilization of the western energy markets, the local utilities petitioned FERC to permit alteration of their long-term contracts to obtain lower rates, arguing that the rates obtained during the crisis were unjust and unreasonable.[3] FERC denied their petitions and the utilities subsequently filed complaints in federal court pursuant to Section 206(a) of the Federal Power Act ("FPA").[4] At the end of last year, the Ninth Circuit issued two opinions that overturned FERC's decision and have the potential to significantly influence the way FERC addresses the aftermath of the Western Energy Crisis.[5]

In rejecting the utilities' petition, FERC based its decision largely on the *Mobile-Sierra* doctrine.[6] Taken together, the *Mobile-Sierra* cases establish a presumption that energy contracts are just and reasonable under the FPA, which may be rebutted by a showing that the contract is against the public interest.[7] Because this presumption is "practically insurmountable,"[8] FERC's application of the *Mobile-Sierra* doctrine to the utilities' long-term energy contracts made it virtually impossible for the local utilities to overcome the public interest presumption.

The Ninth Circuit's December 2006 companion cases limit FERC's application of the Mobile-Sierra doctrine to the contracts arising from the long-term MBR contracts.

The Ninth Circuit Cases

The Ninth Circuit's December 2006 companion cases limit FERC's application of the *Mobile-Sierra* doctrine to the contracts arising from the long-term MBR contracts. In *Public Utility District No. 1 of Snohomish County v. Federal Energy Regulatory Commission* ("PUD") and *Public Utilities Commission v. Federal Energy Regulatory Commission* ("PUC"), the court held that the *Mobile-Sierra* presumption comes into play only when three "prerequisites" exist: (1) the contract cannot have a clause that permits unilateral changes; (2) "the regulatory scheme in which the contracts are formed must provide FERC with an opportunity for effective, timely review of the contracted rates;" and (3) the just and reasonable analysis must include a consideration of the market conditions at the time of the MBR contract formation.[9] Applying the prerequisites to the MBR contracts, the court quickly dispatched the first prerequisite and then turned to examine FERC's regulatory review.[10] By failing to fulfill its promise to the local utilities to oversee the MBR contracts and then peremptorily applying the tough *Mobile-Sierra* presumption, "without any direct inquiry into whether the resulting rates were in fact 'just and reasonable,'" FERC committed a "fundamental procedural error."[11] The lack of "meaningful opportunity to institute a challenge" to the rates that the sellers charged the local utilities before they entered into the disputed contracts con-

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stituted "the fatal flaw in FERC's approach to 'oversight' . . . preclude[ing] timely consideration of sudden market changes and offer[ing] no protection to purchasers victimized by the abuses of sellers or dysfunctional market conditions that FERC itself only notices in hindsight."[12] Next, the court examined market conditions at the time the contracts were formed and found fault with FERC's lack of consideration of the relationship between the high "spot" market prices and the pressure brought to bear on the utilities to enter into long-term MBR contracts to obtain lower rates.[13]

The court also questioned whether *Mobile-Sierra* applied at all. However, if *Mobile-Sierra* applies, the Ninth Circuit found that FERC incorrectly applied "low-rate" challenge factors to "high-rate" cases because the public interest in each type is profoundly different.[14] In "low-rate" challenges, such as *Mobile* and *Sierra*, the public interest "is in keeping utilities in operation so that the public is not deprived of services;" whereas in "high-rate" challenges, the public interest lies in making sure the "public pays fair rates for the very energy covered by the challenged contracts."[15] Therefore, where a contract at issue "imposes any significant cost on ultimate customers because of a wholesale rate too high to be within a zone of reasonableness, that contract affects the public interest."[16] With these new instructions, the court remanded back to FERC for a determination as to whether the *Mobile-Sierra* prerequisites exist, and if so, to consider the correct "high-rate" public interest factors.[17]

Taken to the extreme, the decisions might even require FERC to return to a case-by-case review of electricity supply contracts.

Conclusion

The decisions are likely to have wide-ranging implications. For example, close to two hundred MBR contract appeals are still pending in the Ninth Circuit and the decisions will likely induce some cases to settle.[18] Taken to the extreme, the decisions might even require FERC to return to a case-by-case review of electricity supply contracts.[19] The decisions could also have implications beyond MBR cases: to date, at least one FERC Administrative Law Judge has applied the *PUD/PUC* prerequisites in a settlement context, finding that the parties' energy-related agreement violated the third prerequisite because it did not properly account for potential changes in market conditions.[20] However, the full implications of the court's decisions have not yet fully materialized.

Endnotes: Litigation Update

[1] *See* Pub. Util. Dist. No. 1 of Snohomish County v. Fed. Energy Regulatory Comm'n, 471 F.3d 1053, 1069 (9th Cir. 2006) [hereinafter PUD]; Jeffrey McIntyre Gray, *Reconciling Market-Based Rates with the Just and Reasonable Standard*, 26 Energy L. J. 423, 424 (2005).

[2] PUD, *supra* note 1, at 1058 (detailing the federal versus state regulatory authority); Jeffrey McIntyre Gray, *supra* note 1, at 425 (summarizing FERC's December 2000 order).

[3] Joel Kirkland & Esther Whieldon, *Court Rejects FERC Orders on Western Energy Crisis Contracts, Sees Oversight Failure*, Inside F.E.R.C., Dec 25, 2006, at 1. Pursuant to sections 205 and 206 of the Federal Power Act ("FPA"), FERC must ensure that wholesale rates are "just and reasonable." 16 U.S.C. §§ 824d, 824e (2006).

[4] Kirkland & Whieldon, *id.*

[5] Kirkland & Whieldon, *id.*

[6] The two companion cases that form the *Mobile-Sierra* doctrine are *United Gas Pipe Line Co. v. Mobile Gas Services Corp.*, 350 U.S. 332 (1956) and *Federal Power Comm'n v. Sierra Pacific Power Co.*, 350 U.S. 348 (1956).

[7] Cal. Pub. Util. Comm'n v. Fed. Energy Regulatory Comm'n, 474 F.3d 587, 590 (9th Cir. 2006).

[8] Daniel G. Tewksbury & Stephanie S. Lim, *Applying the Mobile-Sierra Doctrine to Market-Based Rate Contracts*, 26 Energy L. J. 437, 445 (2005) (quoting Potomac Elec. Power Co. v. FERC, 210 F.3d 403, 407 (D.C. Cir. 2000)).

[9] PUD, 350 U.S. at 1061, 1075, 1077.

[10] PUD, *id.* at 1077.

[11] PUD, *id.* at 1082, 1086.

[12] PUD, *id.* at 1084, 1086.

[13] PUD, 350 U.S. at 1086.

[14] PUD, *id.* at 1087.

[15] PUD, *id.* at 1088-89.

[16] PUD, *id.* at 1089 (internal citation omitted).

[17] PUD, 350 U.S. at 1091.

[18] Kirkland & Whieldon, *supra* note 3.

[19] *Court Shakes Up FERC Power Contracts Rule*, Coal Energy Trader, Dec. 21, 2006, at 11.

[20] In re Bridgeport Energy, LLC, 118 F.E.R.C. P63, 018, at *38 (Jan. 23, 2007).

Book Review

Energy Law and the Environment

by Rosemary Lyster & Adrian Bradbrook, Cambridge University Press

*Reviewed by Jon Feldon**

As issues such as the depletion of fossil fuels and climate change rise to the forefront of modern international problems, energy law has become increasingly important in the modern world. In *Energy Law and the Environment*, authors Rosemary Lyster and Adrian Bradbrook paint a detailed picture of where Australia has been, and where it is headed in its efforts to adapt its energy policies to suit the needs of its population, as well as stave off the environmental problems that will result from climate change and current non-sustainable energy practices.

Authors detail how the Australia federal government's role in energy management has evolved over time.

The authors describe an Australia that is, and will likely remain, a country heavily dependent on fossil fuels. Australia, rich in coal, will likely continue to utilize coal as a majority fuel source for electricity, along with oil. Although Australia's federal government has refused to ratify the Kyoto Protocol, arguing that without the participation of the United States or developing nations the Protocol will fail and uselessly jeopardize the Australian economy, the country has a number of vulnerabilities that will provide strong incentives for change. Examples of such vulnerabilities include: water resources already stressed by overuse and increasing salinization; a food production sector highly sensitive to changes in rainfall; increased population centers in areas vulnerable to the increased cyclones and storm surges of a warmed Earth; and sensitive ecosystems that could be irrevocably harmed or destroyed by climate change, including the Great Barrier Reef, on which thousands of tourism-related jobs depend. All of these susceptibilities provide incentives for Australia to make policy changes.

Lyster and Bradbrook also describe how Australian energy law is governed. In addition to describing the reform efforts of individual states, the authors detail how the federal government's role in energy management has evolved over time. The Australian Constitution, established in 1900, grants individual states the right to manage their own natural resources. In the 1970s, as international law began to pay more attention to environmental and energy issues, the Australian federal government began legislating definitions for its own environmental powers. For instance, the Environmental Protection Act of 1974 required all Commonwealth officers to consider the environmental impact of their actions. Similarly, the Great Barrier Reef Marine Park Act of 1975 gave the federal government the authority to federally regulate the management of the reef. Slowly, a federal right to legislate on environmental matters emerged over time, as confirmed in the case *Commonwealth of Australia v. State of Tasmania*, also known as the Tasmanian Dams case. In 1993, after years of constitutional litigation between the states and the federal government, the federal and state Australian governments enacted the 1993 Intergovernmental Agreement on the Environment, which established areas of regulatory responsibility, and assigned responsibility for pollution, national energy concerns, and heritage protection through the Council of Australian Governments ("COAG"), and the Ministerial Council on Energy.

As explained in the book, energy supply in Australia traditionally functioned by means of a state monopoly. As the energy industry privatized over time, the accompanying legal restructuring focused primarily on issues of competition and fair pricing rather than environmental sustainability. Even major reforms enacted as recently as 2005 by COAG to adjust the National Energy Market ("NEM") have failed to address climate change or greenhouse gas emissions. The authors compare Australia's efforts to those of other countries, and suggest that a deliberate pursuit of sustainable and environmentally-friendly policies

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must be taken, because natural competition and market forces will not push Australia's energy system in those directions by themselves. In addition, the authors discuss the concern that policies adopted by COAG are technically unconstitutional, because they are actions taken outside of normal governmental processes. Lyster and Bradbook note that the formation of the NEM in 1998 was accompanied by a spike in greenhouse gas emissions, a clear sign that economic efficiency would not address environmental energy issues. Although a number of positive reforms have been made on a national level to improve the environmental sustainability of the NEM, such as a nationally-applicable emissions-trading system, no amendments were added to the National Electricity Law to ensure achievement of both a restructured electronic industry and the reduction of greenhouse gas emissions.

Although Australia's federal government has refused to ratify the Kyoto Protocol, the country has a number of vulnerabilities that will provide strong incentives for change.

In addition to analyzing the various efforts of the federal government and state governments to regulate both the electricity and the gas markets, the authors discuss the effectiveness of such efforts as compared to those of other countries, as well as the industry response in Australia. Moreover, alternative electricity options are weighed as well. For example, although Australia sits on forty percent of the world's uranium reserves, nuclear power is not an attractive alternative because the cost of building nuclear plants: (1) would not be cost-effective; (2) creates other waste-related problems; and (3) might distract attention away from the country's development of solar, hydro, and wind energy technology, for which Australia is a world leader in some respects.

Ultimately, Lyster and Bradbook contend that Australia must pursue a variety of new energy-creation strategies, as there will not be one particular "magic bullet" technology that will suddenly make Australia's energy structure environmentally sustainable. However, a general theme throughout the book is that sustainability must be made the highest priority for energy regulation on every governmental level, because without a legislative push, market forces will not take heed of looming environmental problems, like climate change, until it is too late.

World News

*by Cari Shiffman**

Africa

Budding Biofuels Industry in South Africa

South Africa recently joined a partnership with India, the United States, China, Brazil, and the European Union to explore the production and development of biofuel options.[1] In addition to its involvement in this alternative energy partnership, the South African government has approved a "Draft Biofuels Industry Strategy."[2] The goal of this strategy is for biofuels to eventually make up 75 percent of South Africa's renewable energy supply.[3] Maize, sugar, soya beans, sunflowers, and other similar crops will be harvested to create the biofuels.[4] However, some critics have decried the use of such traditional foods that are needed for "food security" in South Africa.[5] Still, some commentators laud the push for biofuels, suggesting that the biofuel market will actually increase food security in South Africa.[6] Additionally, South Africa hopes that a burgeoning biofuels industry will create more opportunities for employment.[7]

The use of biofuels for renewable energy is already occurring in some regions of South Africa. For example, the government in South Africa's Eastern Cape is undertaking a project to create a biofuel industry in the region.[8] The biofuel would be produced mainly from canola crops, as well as sugarbeet, combined with diesel or ethanol fuels.[9] Several billion rands will be invested in the project to grow the crops and to synthesize the biofuel.[10]

Americas

U.S. Supreme Court Rules EPA May Regulate Greenhouse Gas Emissions

In a landmark case on global warming, *Massachusetts v. EPA*,[11] the U.S. Supreme Court, in a 5-4 decision, ruled that the Environmental Protection Agency ("EPA") violated the Clean Air Act ("CAA") by failing to regulate greenhouse gases from motor vehicles.[12] In 1999, several groups petitioned the EPA to "regulate 'greenhouse gas emissions from new motor vehicles under § 202 of the [CAA].'"[13] After the EPA declined to pursue the rulemaking, Massachusetts and several other state and local governments brought suit against the EPA.[14]

Justice Stevens, writing for the majority, began the opinion by asserting "[a] well-documented rise in global temperatures has coincided with a significant increase in the concentration of carbon dioxide in the atmosphere."[15] The Court held that the states did have standing to sue.[16] It further reasoned that the EPA did have the authority to regulate greenhouse gas emissions for vehicle emissions,[17] and by only providing a "laundry list of reasons not to regulate,"[18] the EPA violated the CAA's statutory mandate.[19] The Court additionally ruled that the greenhouse gases, such as carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons, are air pollutants under the CAA, despite the EPA's argument to the contrary.[20] The majority held that the EPA may not decline to regulate greenhouse gas emissions under the CAA, unless it provides a "reasoned explanation."[21] Chief Justice Roberts, in a dissenting opinion, lamented that the Court should have never found standing for Massachusetts and the other states.[22]

Environmental groups hope that the opinion will push the U.S. government into action to support climate change mitigation measures.[23] Even since the Supreme Court decided to hear the case in mid-2006, there has been an emergence of state and Congressional plans to curb greenhouse gas emissions.[24] Many industry groups have also sought to create laws to limit greenhouse gas emissions.[25]

Asia

Singapore to Invest in Clean Energy

The Singapore government recently announced plans to invest U.S. $250 million over the next five years in clean energy.[26] The government aims to become a leader in clean energy—a "global green energy hub"[27]—with its investment in clean energy technologies, through research and development projects.[28] It further hopes that its focus on clean energy will attract groups to Singapore wishing to develop clean energy projects.[29] The clean energy projects, driven in part by the rising price of fuel,[30] will include, for example, solar panels, biofuels, fuel cells, and wind power.[31] Solar power is especially important for some segments of the Singapore population, and other Southeast Asians, that live off-the-grid, i.e. in areas that are not served by traditional power lines.[32] Singapore plans to launch the project by utilizing clean energy in several government buildings.[33] Furthermore, a fuel cell car prototype is already being tested in Singapore.[34]

The government plans to carry out its clean energy plans by attracting businesses to Singapore, investing in domestic clean

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energy research, and by exporting its new technologies globally.[35] Singapore's push for clean energy technology will also create over 7,000 new jobs, and in less than ten years account for approximately 0.6 percent of Singapore's GDP.[36] Singapore's decision to heavily invest in green energy technology compares with worldwide investment of U.S. $63 billion dollars in clean energy in 2006.[37]

Europe

Portugal Launches Solar Power Plant Operations

In line with Portugal's bid to invest in renewable energy projects,[38] the country began operating a major solar power plant in the southern town of Serpa that will be able to serve 8,000 homes.[39] Portugal also plans to build an additional solar power plant in Moura, a town neighboring Serpa.[40] Recognizing the need to cut down on greenhouse gas emissions, over 77 percent of the Portuguese population supports the move towards increased solar power.[41]

The utilization and acceptance of solar technology signals a step towards Portugal's push for renewable energy to make up 45 percent of all of its power usage by 2010;[42] an important move as Portugal's greenhouse gas emissions have increased almost 37 percent since 1990.[43] Portugal also has a regional obligation because it takes part in the European Union "burden sharing" agreement, where the EU member States collectively seek to reduce their greenhouse gas emissions under the Kyoto Protocol to the United Nations Framework on Climate Change.[44] To further reduce their emissions, Portugal is also pursuing other renewable energy projects such as wind power and biomass plants.[45]

Middle East

OPEC Supports Exploration of Climate Change Mitigation

The Organization of Petroleum Exporting Countries ("OPEC"), which includes many countries in the Middle East, as well as Africa, South America, and Southeast Asia, has indicated its support of exploration of climate change mitigation options.[46] OPEC, which distributes more than one third of the global oil supply, is interested in exploring new technologies for carbon capture and storage to help address climate change.[47] The organization wishes, in part, to promote carbon storage technologies so that it can continue to utilize and export oil and gas resources, yet help alleviate problems in a future "carbon-constrained environment."[48] OPEC's President, Mohammed al-Hamili, reported that member countries currently carry out climate change studies and participate in international talks to find climate change solutions.[49] OPEC's Secretary General Abdalla el-Badri, stressed that the organization is committed to the environment and "a cleaner, safer world."[50] Further, OPEC avowed that it aspires to stabilize its oil supply without harming the environment.[51]

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18 Massachusetts v. EPA, 2007 WL 957332, at *20.

19 Greenhouse, *supra* note 17, at A1.

20 Massachusetts v. EPA, 2007 WL 957332, at *10, *18.

21 Massachusetts v. EPA, *id.* at *21.

22 Greenhouse, *supra* note 17, at A1.

23 Barnes & Eilperin, *supra* note 12, at A1.

24 Barnes & Eilperin, *supra* note 12, at A1; Greenhouse, *supra* note 17, at A1.

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[9] The United States Climate Action Partnership is a "group of businesses and leading environmental organizations that have come together to call on the federal government to quickly enact strong national legislation to require significant reductions of greenhouse gas emissions." U.S. CAP members include: Alcan Inc., Alcoa, American International Group (AIG), Boston Scientific Corporation, BP America Inc., Caterpillar Inc., ConocoPhillips, Deere & Company, The Dow Chemical Company, Duke Energy, DuPont, Environmental Defense, FPL Group, General Electric, General Motors Corp., Johnson & Johnson, Marsh, National Wildlife Federation, Natural Resources Defense Council, The Nature Conservancy, PepsiCo, Pew Center on Global Climate Change, PG&E Corporation, PNM Resources, Shell, Siemens Corporation, and World Resources Institute. *See* U.S. Climate Action Partnership, http://www.us-cap.org/

[10] *See* 42 U.S.C. 7475(a)(4) & 7479(3). Long before *Massachusetts v. EPA*, carbon dioxide emissions were subject to regulation under the Clean Air Act. *See*, *e.g.*, Sec. 821, Pub. L. No. 101-549 (1990) (requiring electric generating units to monitor and report carbon dioxide emissions).

[11] *See* 42 U.S.C. 7521(a)(1) (provides for new motor vehicle emission standards applicable to "any air pollutant" reasonably anticipated to endanger public health or welfare); 42 U.S.C. 7521(a)(3)(B) (heavy-duty vehicles or engines); 42 U.S.C. 7521(a)(3)(E) (motorcycles); 42 U.S.C. 7547(a)(4) (nonroad engines and vehicles); 42 U.S.C. 7571(a)(2) (aircraft emission standards).

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environmental aspects and takes their views into account. The borrower initiates such consultations as early as possible. For Category A projects, the borrower consults these groups at least twice: (a) shortly after environmental screening and before the terms of reference for the EA are finalized; and (b) once a draft EA report is prepared. In addition, the borrower consults with such groups throughout project implementation as necessary to address EA-related issues that affect them."); Intl. Fin. Corp. Standard 1, *supra* note 23, at para. 19 ("Community engagement is an on-going process involving the client's disclosure of information. When local communities may be affected by risks or adverse impacts from a project, the engagement process will include consultation with them. The purpose of community engagement is to build and maintain over time a constructive relationship with these communities. The nature and frequency of community engagement will reflect the project's risks to and adverse impacts on the affected communities. Community engagement will be free of external manipulation, interference, or coercion, and intimidation, and conducted on the basis of timely, relevant, understandable and accessible information.").

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27 The five accountability mechanisms at multilateral development banks include: (1) the World Bank Inspection Panel; (2) the International Finance Corporation's Compliance Advisor and Ombudsman; (3) the Asian Development Bank's Accountability Mechanism; (4) the InterAmerican Development Bank's Independent Investigation Mechanism; and (5) the European Bank for Reconstruction and Development's Compliance Office.

28 The three bilateral financial institutions are (1) the Japan Bank for Investment Cooperation's Compliance Examiners; (2) the Export Development Canada's Compliance Officer; and (3) the U.S. Overseas Private Investment Corporation's Ombudsman.

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32 United Nations Framework Convention on Climate Change art. 21(3), May 9, 1992, 31 I.L.M. 849.

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34 Durbin et al., *supra* note 15, at 29-35.

35 World Bank, Operational Policy 4.01, *supra* note 24, at para. 3, fn. 4 (explicitly including climate change impacts among the transboundary and global impacts that must be assessed); *see also* World Bank, Environmental Assessment Sourcebook Chp. 2, § 28 (1999) (published online at www.siteresources.worldbank.org) ("Options to reduce a project's contribution to global change without adversely affecting the cost or success of the project should be evaluated... When evaluating various alternative projects, not only should potential total gas emissions be considered, but also the particular gases that are released since not all the gases are equally efficient in terms of their greenhouse and ozone depletion capacity alternatives with lower greenhouse gas emissions to be included in any alternatives assessment under the World Bank policy"); Intl. Fin. Corp., Performance Standard 3: Pollution Prevention and Abatement (2006) [hereinafter Intl. Fin. Corp., Standard 3] (requiring the borrower to "evaluate technically and financially feasible and cost-effective options to reduce or offset project-related GHG emissions during the design and operation of the project. These options may include, but are not limited to, carbon financing, energy efficiency improvement, the use of renewable energy sources, alterations of project design, emissions offsets, and the adoption of other mitigation measures such as the reduction of fugitive emissions and the reduction of gas flaring").

36 Intl. Fin. Corp., Standard 3, *supra* note 35, at para. 10.

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