

# Climate Change, Sustainable Development, and Ecosystems Committee Newsletter

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## MESSAGE FROM THE CHAIRS

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This issue once again brings together three ABA committees from two Sections based on a shared interest in climate change and international law: the Climate Change, Sustainable Development, and Ecosystems, and International Environmental Law Committees of the Section of Environment, Energy, and Resources, and the International Environmental Law Committee of the Section of International Law. Consistent with the breadth and diversity of the three committees, the authors of the four articles included in this issue come from diverse geographic and professional backgrounds including several non-lawyers.

No environmental issue has required a greater comprehensive international response than climate

change. Greenhouse gas emissions have the same effect wherever emitted and much of the expected growth in emissions will come from China and other rapidly growing developing countries. Yet as the articles in this issue highlight, the design and implementation of national climate change programs will be key to the effectiveness of whatever may be agreed internationally. The first article, “Toward a U.S. Emission Trading System: Lessons Learned and Linkage to Other Systems,” by Matthew Low, Nathan Smith, and Daniel Waller, focuses on some of the most important lessons from the European experience with emission trading systems, including allocation of permits and other features currently being considered in the context of U.S. legislative proposals.

The next two articles provide insights into recent developments in two countries with contrasting circumstances and approaches to climate change. The first, by John Taberner, reviews “Climate Change Regulation in Australia,” a country currently dealing with record droughts and fires but with a closely divided government and an economy linked to coal production. Pending legislative proposals incorporate numerous interesting provisions, including compensation for power generation from coal. The second country focus is “The New Israeli Clean Air Law—A New League of Clean Air Protection,” by Tzvi Levinson, Julia Lietzmann, and Gil Dror. According to the authors, the law “revolutionizes the entire Israeli permit system,” creating a system consistent with global standards including a post-Kyoto approach to climate change.

**Climate Change, Sustainable Development, and Ecosystems Committee Newsletter**  
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**Gabriel Calvo and Alan Miller, Editors**

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The final article, by Kim Diamond, “Give New Applications of Piezoelectric Power a Chance,” highlights the importance of legal and financial issues in developing new energy technologies—another essential requirement for a successful global response to climate change. In addition to describing a new and relatively unknown potential source of clean energy, Diamond discusses some of the financial instruments best suited to attracting investment in the technology, a thought process relevant to other emerging technologies.

We and the editors wish to express our appreciation to Ellen Rothstein for help in producing the extensive use of tables and figures in this issue.

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**TOWARD A U.S. EMISSION TRADING SYSTEM: LESSONS LEARNED AND LINKAGE TO OTHER SYSTEMS**

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**Matthew Low  
Nathan Smith  
Daniel Waller**

**Introduction**

As the United States considers various regulatory or legislative approaches to mitigate the generation and release of greenhouse gas (GHG) emissions, there are many important considerations to be addressed. Two important considerations for any system that places a cap or tax on emissions and permits companies to trade emission allowances are:

1. lessons learned from previously implemented emission trading systems; and
2. ways to assure that the U.S. trading system can be linked to other trading systems.

The experience of the European Union Emission Trading System (EU ETS) and the United Kingdom’s efforts regarding its participation in that system provides a wealth of information from which important lessons can be drawn. It also provides a meaningful avenue for considering how best to link systems.

## Lessons Learned

- What were the key elements of EU ETS proposal?
- Why and how were the data and information systems so critical?
- What happened when the data and the policy were disconnected?

The EU ETS Proposal was designed to allocate allowed emissions. It was a cap and trade scheme with allowances to emit up to the country “cap.” As one commentator has suggested, the first phase of the EU ETS should be looked at as a trial system—intended more to test the trading concept in practice than to bring about significant emission reductions. (See D. Ellerman and P. Jaskow, The European Union’s Emission Trading System in Perspective (May 2008) (MIT) (for the Pew Center)). Phase I applied only to industry and electricity production, covered only carbon dioxide (CO<sub>2</sub>) emissions from combustion and some industrial processes (as opposed to all GHG emissions) and stipulated that 95 percent of the “allowances must be given away (as opposed to auctioned).” It covered 15,000 installations across twenty-seven countries and approximately 46 percent of CO<sub>2</sub> emissions in the EU. One critical component was that each country had to use its own data to allocate emissions caps to individual emitters.

Preparatory work provided each country with a planning window. An EU Directive was developed from 2002–2004. Caps were set in each country based on historic emissions and projections for 2005–2008. A National Allocation Plan (NAP) was established, based on a share for each sector (1998 to 2002—lowest year).

Throughout the EU, data were of uneven quality. The United Kingdom (UK) recognized that the quality of the data supporting the NAP could be a limiting factor. In the UK, baseline data were derived first from the National Atmospheric Emissions Inventory (NAEI) that has been available since 1950 for all sectors. This inventory included data on industrial energy use and power sector energy use. Another set of data came from a government sponsored program through which

participating industrial companies could enter into Climate Change Agreements (CCAs) specifying emission reduction targets they were prepared to meet. The CCA dataset contained plant-specific energy data from the year 2000 for 9,800 installations. These data were intended to be used to measure performance against energy efficiency targets and produced a wealth of independent GHG information on participating companies responsible for approximately 15 percent of UK CO<sub>2</sub> emissions. The analysis that set out the basis for the Climate Change Agreements, which in turn allowed the effective development of a UK allocation for the EU ETS, can be found in Industrial Sector Carbon Dioxide Emissions: Projections and Indicators for the UK, 1990–2020, A report produced for the Global Atmosphere Division of the Department of the Environment, Transport and the Regions, AEA Technology Environment, June 2000. The projections of energy efficiency improvements under business-as-usual and all-cost-effective scenarios were used in support of negotiations with energy intensive industries and helped to focus discussions on what practical measures could be taken to reduce energy consumption.

Finally, independent research on limited sectors was conducted to supplement and improve the quality of the data. Projections, using baseline data, were moderated by expectations of future growth and the actual emissions that were captured in the CCA targets, and by updating Energy Paper 68, a UK government forecast of energy use and emissions under low and high oil price scenarios to 2020.

The quality of the UK data was enhanced by a comprehensive Information Technology (IT) planning infrastructure that captured, managed and analyzed the disparate data sets and established sector and facility caps (Figure 1).

In September 2004, the combined datasets provided an estimate of emissions from traded sector of 736mtCO<sub>2</sub> (~245mtCO<sub>2</sub> pa) (million metric tonnes of CO<sub>2</sub> per annum) over the first three years of the scheme, 2005–2008. This was considered to be the “business-as-usual” scenario for the sector, which allowed the UK Government to allocate in accordance

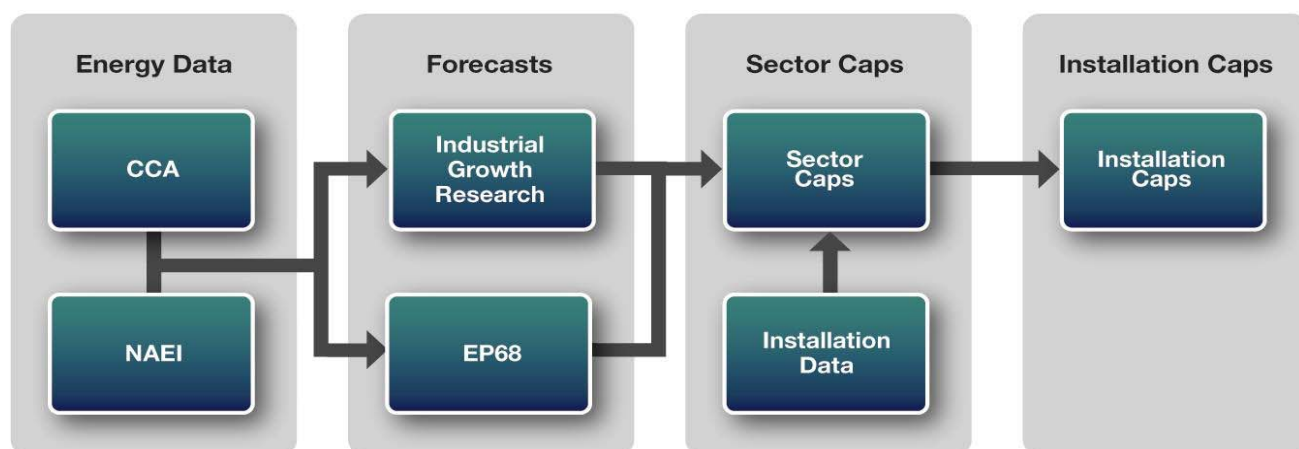


Figure 1

with industrial need. Based on this, the UK forwarded a draft NAP to the European Commission (EC). In May 2005, the UK provided updated figures to the EC, which showed an increase of 20 mtCO<sub>2</sub> pa over the business-as-usual scenario originally calculated. However, this revision was rejected by the EC. The UK's first year results, published in May 2006, showed that this request for upward revision of the cap was warranted. UK industrial sector emissions were 9mtCO<sub>2</sub> below the combined sectoral caps, while UK power sector emissions were 27mtCO<sub>2</sub> above their cap, leaving a net shortfall of 18mtCO<sub>2</sub>, just 2mtCO<sub>2</sub> away from the upward revision requested by the UK government. Ultimately, the UK planning inventory proved accurate to within one percent of actual UK emissions.

Allowances were distributed according to each country's NAP and the ETS went into effect on Jan. 1, 2005. However, a number of countries greatly over-estimated their emissions and, as a result, carbon prices crashed when most regulated entities found that they had no need to engage in trading. The evolution of EUA prices is illustrated in Figure 2. As Figure 3 shows, most EU member states gave away too many allowances.

This over-allocation has been addressed in the next phase of the EU ETS. As is evident from Figures 4 and 5, allocation of allowances in Phase II is much closer

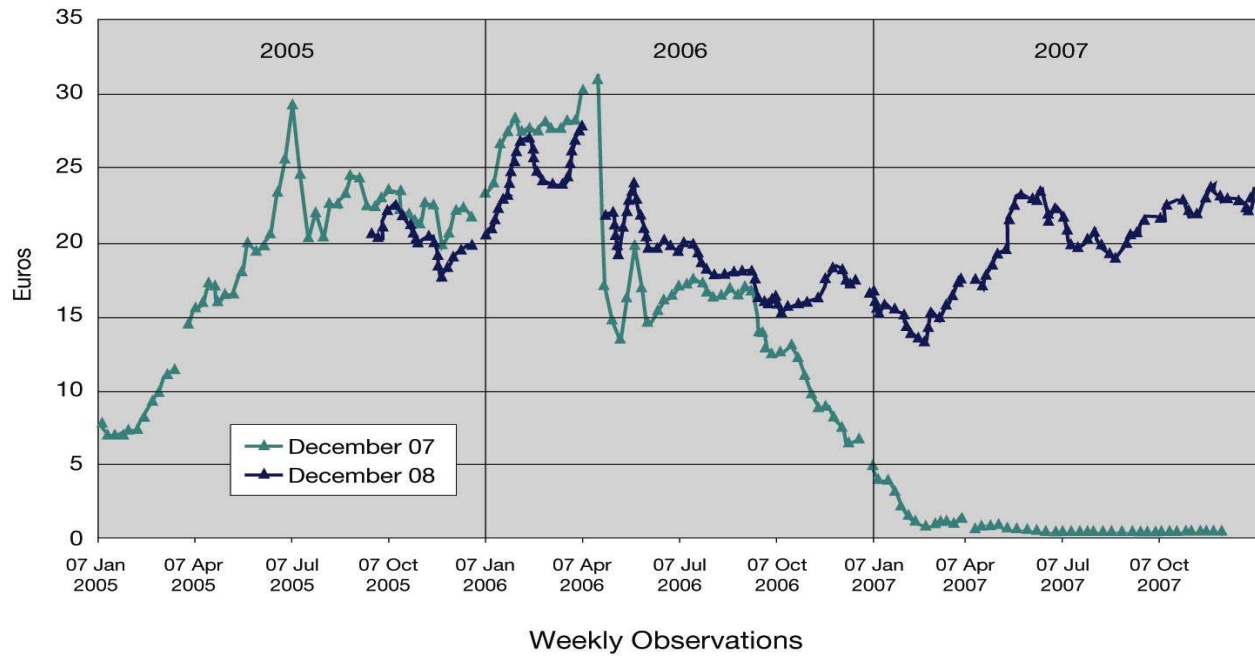
to verified emissions (this chart also shows how close the UK targets were to actual emissions in Phase I).

What are the lessons learned for the United States? First, an ETS must be based on consistent and integrated emission data. In the United States, voluntary reporting systems have been in place for a number of years and some states have begun requiring emission data reporting ahead of any federal reporting requirement. But ultimately, the United States will issue federal reporting rules, and voluntary, state and federal emission data sets will need to be reconciled. Methodologies used for estimating emission data will have to be harmonized. Data gaps will need to be filled, and the extent of research required to fill these gaps will need to be carefully thought through. Finally, a set of metrics will need to be developed to measure the success of the data-management efforts.

Secondly, the ability to forecast accurately will depend on predictive data that take into account industry restructuring, relocations, economic circumstances, and impacts. This is particularly challenging in a quickly shifting economic climate. In addition, forecasting will require consideration of the mix and maturation potential of new alternative energy sources.

Third, an optimum allocation method for an ETS will have to be selected. There are several options. The first—a free allocation based on past emissions—

## Evolution of EUA Prices



Source: Point Carbon

Figure 2

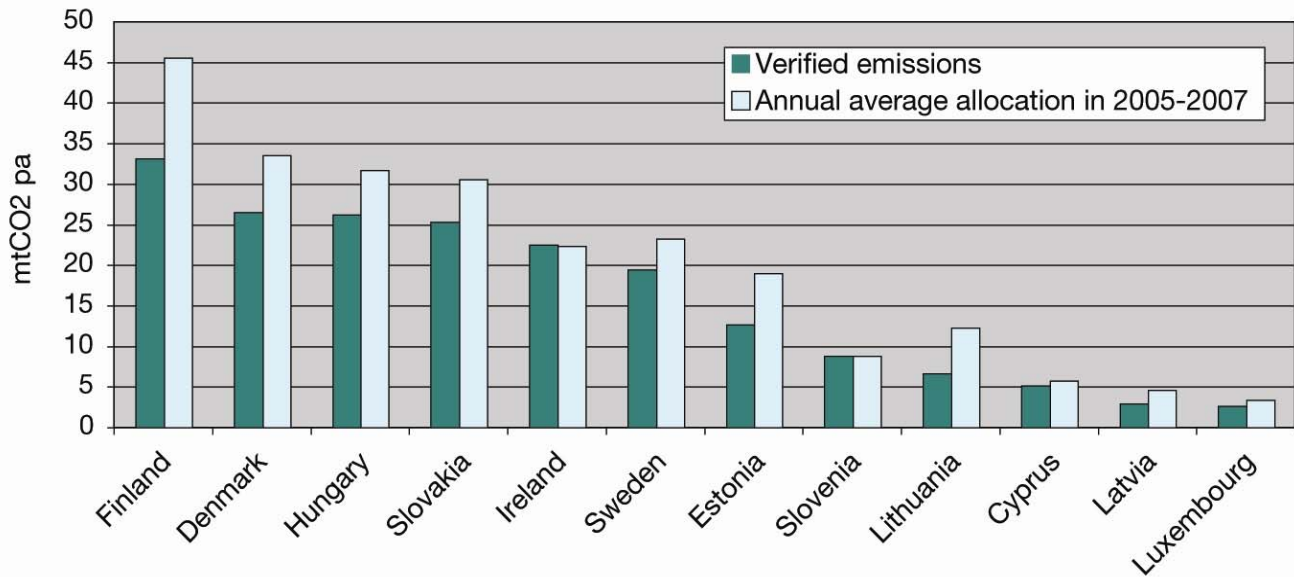


Figure 3

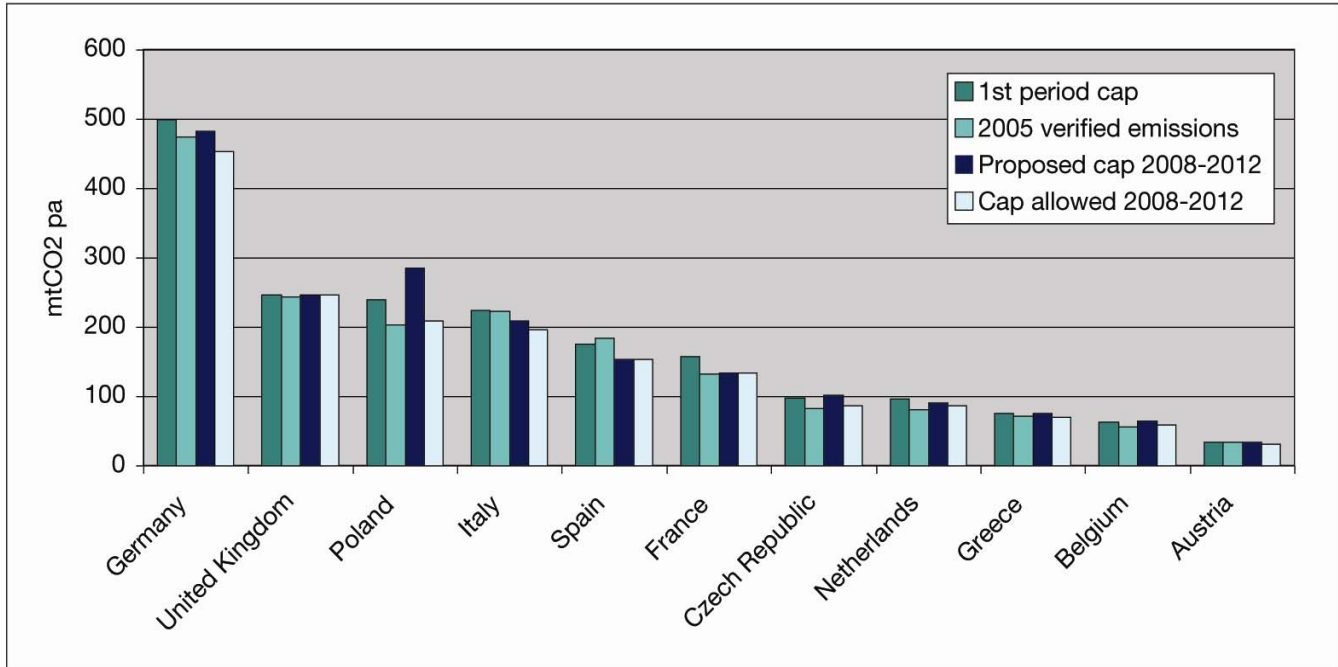


Figure 4—Allocations, Emissions, and Phase II Caps.

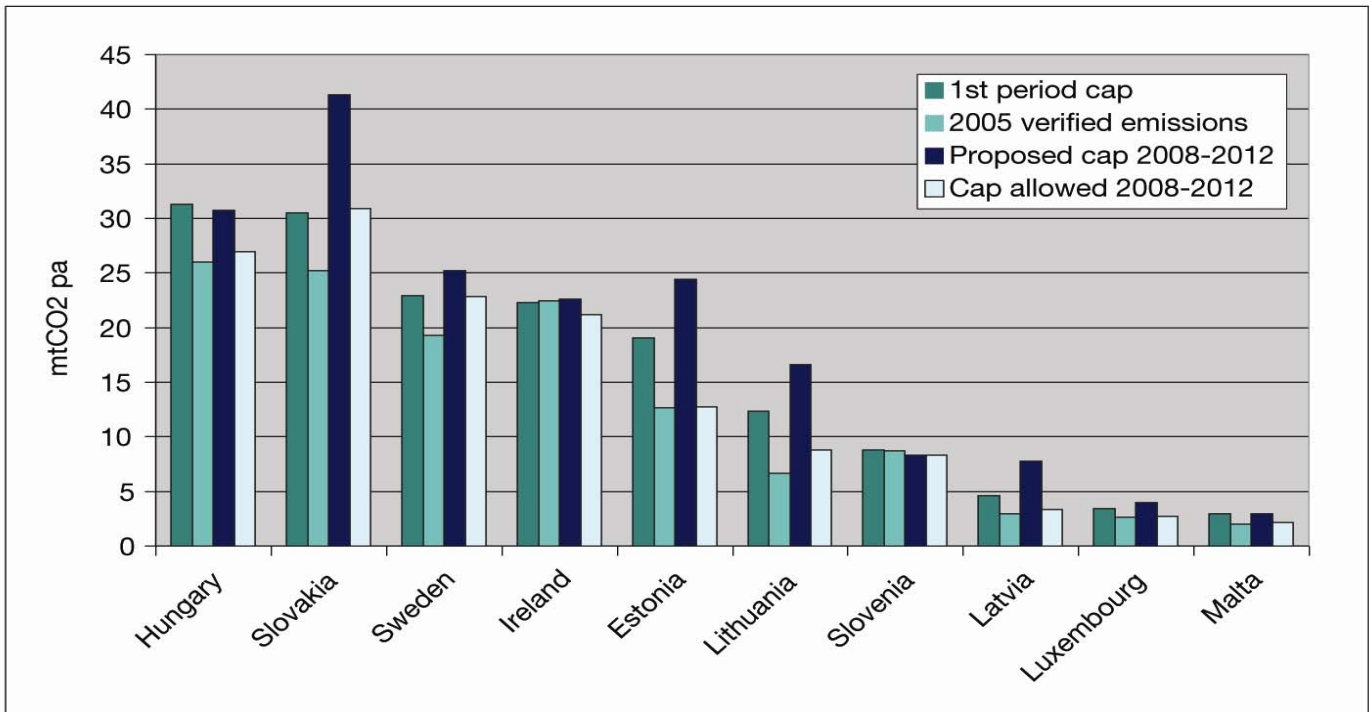


Figure 5—Allocations, Emissions, and Phase II Caps (continued).

offers simplicity, is palatable to businesses required to take part, and would be relatively inexpensive to implement. But, as shown in the EU experience, this method does not reward early action, would require some element of data integration (to generate accurate forecasts), and presents a real risk of over-allocation if caps are not set correctly. Free allocation based on the development of updated emission inventories (benchmarking) would, on the other hand, be more conducive to rewarding early action and offer a higher degree of transparency. But benchmarking for various industrial sectors would be complex and could be costly to develop. Requiring some or all allowances to be auctioned provides a much more stable price signal and creates a much stronger incentive to make emission reductions, while still rewarding early action and offering a high level of transparency. The same level of complexity would be present, and because an auction would likely create a potential for increased costs to regulated sectors, the pressure to accurately forecast demand would be heightened. Some would argue that a fully auctioned system would be the most economically efficient, although it also might prove to be the most costly of the options.

### **Designing a U.S. Emissions Trading Scheme to Allow Linking with the EU Scheme**

Another important consideration will relate to linking a U.S. ETS to the EU and other trading schemes. There are two overarching issues in linking different trading schemes:

- Confidence in the equivalence of the traded currency—is a ton a tonne?
- Balance of supply and demand between schemes to ensure equivalence of effort.

Confidence in the equivalence of the traded commodity will require compatible Monitoring, Verification and Reporting (MRV) to ensure that a tonne is a ton in both schemes. This will require a considerable degree of scheme transparency and reporting of key scheme data. For example, in the United States, this could involve state disclosure to the public of annual emissions levels. It also would require transparency in reporting, including allocations to sectors and facilities,

and reporting of emissions at the national level. Finally, there would be a need for information on the scope of a scheme, including source types, scheme entry thresholds, closure, transfer, and new entrant rules.

Ensuring a balance of supply and demand depends in part on the ability to forecast accurately future scarcity. This will involve developing emissions baseline projections and targets, emission reduction targets, and limits on use of project credits. It also will require an understanding of the different allocation methodology types and how the proportion of free versus auctioned allowances in differing schemes will evolve. If the proportions differ radically, this will increase the impact on competitiveness through increased costs for facilities with a higher proportion of non-free allowances.

### **Making Progress in the U.S.: Key Components of the Proposed EPA Greenhouse Gas Reporting Rule and the American Clean Energy and Security Act of 2009**

The early months of 2009 marked two major steps forward for the integration of GHG emissions in the United States. In March, the Environmental Protection Agency (EPA) released the proposed Greenhouse Gas Reporting Rule for public comment, and in April, the House Energy and Commerce Committee released the Waxman-Markey Discussion Draft of the American Clean Energy and Security Act of 2009.

### **Greenhouse Gas Reporting Rule**

With the proposed Greenhouse Gas Reporting Rule, EPA is taking its first steps towards regulating GHG emissions under the Clean Air Act (CAA). In 2008, Congress directed EPA to publish a mandatory GHG reporting rule to collect data to support decision making in the development of climate policy. This rule has the potential to impact a significant portion of U.S. businesses and provide crucial data in support of an allowance distribution system.

As proposed, the rule would affect over 13,000 facilities, which account for 85 to 90 percent of U.S. GHG emissions. The rule would apply to:

- Suppliers of fossil fuel and industrial chemicals;
- Manufacturers of motor vehicles and engines; and
- Direct emitters with emissions greater than 25,000 metric tons per year.

To date, reporting of GHG emissions in the United States has been conducted strictly on a voluntary basis or more recently through regional initiatives such as the Regional Greenhouse Gas Initiative (RGGI), leaving the vast majority of U.S. companies free to operate without measuring GHG emissions. The GHG Reporting Rule will require much of the U.S. business community to measure and report emissions for the first time. Although not explicitly stated in the Notice of Proposed Rulemaking, the data submitted under the rule will likely feed into regulation and limitation of the GHG emissions from those businesses through a cap and trade regulation such as the one proposed by the American Clean Energy and Security Act.

Corporations that understand their GHG emissions and have a management plan in place will be able to quickly comply with this requirement and will ultimately be positioned to participate in regulatory cap and trade programs that may arise in the near future.

### **Waxman-Markey Discussion Draft of the American Clean Energy and Security Act of 2009**

The proposed American Clean Energy and Security Act of 2009 would establish the U.S.'s first CO<sub>2</sub> cap and trade system, set national standards for energy efficiency and renewable energy, and would seek to reduce energy demand by 15 percent by 2020.

The cap and trade portion of the bill sets graduated GHG reduction goals that are similar to those proposed by the Obama administration with reductions starting in 2012:

- 1.3 percent below 2005 levels in 2012
- 2.20 percent below 2005 levels in 2020
- 3.83 percent below 2005 levels in 2050

The 2005 baseline referenced in the act is from EPA's National Inventory, which is a "top-down" inventory,

relying on fuel consumption and energy use data to generate emissions from various sectors. What is not clear is how the extensive reporting required under the GHG reporting rule will be used to supplement this inventory, either for the purpose of issuing allowances or for measuring reductions from the baseline. If the UK experience is any indication, the "bottom-up" reporting data likely to come from the reporting rule will play an important role in assuring the accuracy of emission data for various industries and promoting price stability.

As drafted, the bill projects a carbon price of \$13 – \$17 per ton of CO<sub>2</sub> equivalent in 2015 and \$17–\$22 per ton of CO<sub>2</sub> equivalent in 2020. One of the key assumptions presented in the bill is that U.S. emitters will have access to and will be allowed to purchase international offsets for GHG emissions. For this assumption to work, the United States must ensure that the U.S. trading system is compatible with other trading systems and U.S. emitters are able to communicate with participants in other cap-and-trade systems internationally, using common data sets, common units, and similar criteria for the quality and reliability of offsets.

Debate over the specific details in the bill will likely result in some modifications to the reduction mechanism, but the goals set forth by the bill represent the United States' first step towards getting in line with other countries who have already adopted similar reduction targets (such as the UK).

### **Conclusion**

In conclusion, several points bear mentioning:

1. The EU has provided a window into the type of infrastructure of market institutions, registries, monitoring, reporting, and verification that need to be replicated in the United States.
2. As we move seriously into the regulatory or legislative process, there appears to be recognition that, with more accurate emissions data and a centralized cap-setting and reporting process, emission caps will more

accurately reflect actual emissions and create more confidence in binding caps. But the need to obtain accurate emission data will place added reporting obligations on the regulated sector. It will also require reconciliation of disparate data sets and different models estimating energy use, the projected maturation and cost of alternative energy sources, economic growth, and other relevant factors. At this date, it is not clear how the proposed GHG reporting rule will be used in determining emission allowances.

3. There appears to be a growing consensus around the need to reward early action and allow unrestricted banking of emissions, which, along with improvements in data quality and integration, should mitigate the likelihood of extreme volatility in the allowance prices.
4. In its implementation of Phase II EU ETS, the EU appears to have found a means to develop a more accurate allowance allocation process—overcoming considerable political pressure from various industrial sectors and member countries over allowance allocations. However, although the allowances in Phase II should more accurately reflect verified emissions, various sectors and countries are still pushing back against reduction targets, using data gaps or uncertainties as one means of mitigating a particular reduction requirement. In the United States, the political maneuvering will come not only from sectors, but from geographically diverse stakeholders and states—a particularly those that are rich in or dependent on high carbon emitting energy sources.
5. Developing trading systems will have to ensure the smooth linking and integration with other trading systems, keeping in mind that participating scheme administrators (and nations comprising the trading systems) may have different ideas about how various criteria need to be addressed. It is difficult to envision a world that will not have separate national

registries and some variances in methodologies for developing emission inventories and forecasts. Consideration of common standards reporting, verification, and monitoring—including, ultimately, enforcement—is of paramount importance in facilitating transactions between trading systems.

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#### **JOIN SECTION EFFORTS TO PLANT ONE MILLION TREES BY 2014**

The Section of Environment, Energy, and Resources announced at the Annual Conference on Environmental Law its ambitious nationwide public service project “One Million Trees Project.” This project calls on ABA members to contribute to the goal of planting one million trees across the United States in the next five years. In addition to planting trees, the Section also intends, through public outreach and partnering efforts, to raise the nation’s awareness of the multiple benefits of trees. A key component of the project is the Section’s partnerships with tree-planting organizations, including Alliance for Community Trees (ACT), The Arbor Day Foundation, Tree Link/Tree Bank, American Forest, and the Institute for Environmental Solutions. Members are encouraged to get involved in hands-on tree planting activities in their communities, but the partnerships will allow participation by simply purchasing a tree or trees through a dedicated Web page. To participate in the One Million Trees Project, please visit any of the information pages at our partners’ Web sites linked from: [http://www.abanet.org/enviro/projects/million\\_trees/home.shtml](http://www.abanet.org/enviro/projects/million_trees/home.shtml).

## CLIMATE CHANGE REGULATION IN AUSTRALIA

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**John Taberner**

A process of fundamental economic reform around climate change issues is under way in Australia. In particular, policy towards an Australian emissions trading scheme, to be known as the Carbon Pollution Reduction Scheme (CPRS), is well advanced. According to the Federal Government's announced timetable, legislation for the CPRS will be passed by July 2009. But the Federal Government does not control the Upper House of Federal Parliament, and will need the support of the Opposition Liberal and National Parties, the Green Party, or two independents from Victoria and South Australia. The initial reaction of the Green Party to the CPRS has been negative, and the Opposition has confirmed that it will oppose the CPRS.

Australian climate change legislative policy is currently in an active state of play. There are two recent and clear indicators of this: the release on April 30, 2009 by the peak intergovernmental body in Australia—the Council of Australian Governments (COAG)—of its communiqué on renewable energy and energy efficiency; and the announcement on May 4, 2009, by the Federal Government of significant departures from its CPRS policy as stated prior to that date. COAG has agreed to expand the current national Mandatory Renewable Energy Target. But the Federal Government has now dropped its commitment to a mid-2010 launch of the CPRS: it now proposes that the CPRS will not come into operation until July 1, 2011. It has committed itself to deeper emission cuts by 2020 than previously proposed if an ambitious international agreement emerges at United Nations talks in Copenhagen later this year, but it has also committed to making the first year of the CPRS a “fixed price” period in which unlimited emissions permits will be available for \$10, and to providing trade-exposed, emissions-intensive industries temporarily with a “global recession buffer” that will raise levels of assistance for these industries.

## Australia's Current Position on Climate Change

### ***Kyoto Protocol***

Australia ratified the Kyoto Protocol with effect from March 2009. Ratification makes binding in international law Australia's commitment to increase its emissions of greenhouse gases (GHGs) to no more than 108 percent of 1990 levels during the period 2008–2012. Ratification also means that, subject to Australian law, Australian companies can now participate directly in the “flexibility mechanisms” under the Kyoto Protocol.

### ***Emissions Reduction Target***

The Federal Government has committed itself to a long-term target of 60 percent reduction relative to 2000 levels by 2050, but has yet to set any shorter-term targets or any emissions budgets.

### ***Emissions Reporting Legislation***

The National Greenhouse and Energy Reporting Act 2007 (Cth) (NGER Act) is in operation and requires a broad range of corporations to submit annual reports concerning their operations' emissions of GHGs and their production and consumption of energy.

### ***Emissions Trading***

The Federal government is committed to the establishment of a cap-and-trade emissions trading scheme in Australia, in the form of the CPRS.

On March 10, 2009, the Federal Government published its exposure draft legislation for the CPRS (CPRS Draft Legislation). On June 1, 2009, the Federal Government introduced legislative bills into the Lower House of Federal Parliament (CPRS Bills), and the CPRS Bills were passed there on June 4, 2009.

### ***Expanded Renewable Energy Target***

On April 30, 2009, the Federal Government and the states and territories agreed to an extended national

Renewable Energy Target. The target will underpin the Federal Government's election commitment to achieve 20 percent of electricity generation from renewable sources by 2020. The existing Victorian and the proposed New South Wales renewable energy schemes will be folded into the expanded national scheme.

### ***Other Complementary Schemes?***

The Federal Government has yet to commit itself to a regulatory regime that would mandate, or reward, improved energy efficiency, particularly in buildings. However, the Federal Government has recently agreed with the governments of the Australian states and territories to extended initiatives in relation to energy efficiency, and on May 4, 2009 it committed to the establishment of funds to assist energy efficiency in commercial buildings and businesses.

### **Fundamental Economic Reform**

These developments amount to a process of fundamental economic reform around climate change issues in Australia. This process has two important and ongoing categories of consequences for corporations. The first arises in the new climate change-related policy and legislative responses that Australian governments will implement.

Those responses, it now seems clear, will include stringent carbon accounting and reporting requirements and progressively more stringent caps on GHG emissions. They will affect corporations in all sectors of the economy, not just those sectors with direct obligations under the carbon regulatory schemes. This is because the changes will result in higher costs for all corporations for fuel and for energy and commodity inputs.

The responses will also open new opportunities in domestic and international markets, particularly for non-carbon-based energy projects and secondary trading in permits and derivative products under the proposed regulatory responses.

The second category of consequences arises from the impact that climate change issues will have on a wide

variety of existing corporate obligations under statute and in contract. Particularly relevant are the reporting and disclosure obligations under the Corporations Act 2001 (Cth) and under the stock exchange listing rules under that act. Also relevant are obligations under existing contractual arrangements such as long-term supply agreements (which may omit provisions sufficient to allow carbon-cost pass-through) and joint venture and other agreements (which may omit provisions appropriately allocating responsibility for carbon-related matters such as information gathering and reporting).

### **National Greenhouse and Energy Reporting Act 2007 (Cth)**

The NGER Act came fully into effect on Sept. 29, 2007 under the previous Howard Government. On June 24, 2008, the current Rudd Government issued regulations giving operative content to the act. The central feature of the NGER Act is its obligation on "controlling corporations" to register and report where "group-wide" or "facility-specific" criteria are met (regarding the energy use, energy production, or greenhouse emissions) in relation to facilities which are under the operational control of that corporation or any member of its corporate group. These obligations are supported by provisions requiring the keeping of relevant records, the exposure of those records to audit, the publication of emissions information, and personal CEO liability. The first information gathering period under the act commenced on July 1, 2008. The first reports under the legislation are due to be submitted in October 2009.

One set of amendments has been made to the NGER Act since Sept. 29, 2007. These were made by the National Greenhouse and Energy Reporting Amendment Act 2008 (Cth) and they came fully into force on March 15, 2009. The relevant amendments are mostly technical in nature, but include an amendment that will allow the Greenhouse and Energy Data Officer (GEDO) (the present administrator of the NGER Act) to publish information on the GHG emissions, energy consumption, and energy production of a corporate group broken down by companies or business units.

<b>Committee</b>	<b>Subject of Inquiry</b>	<b>Report Handed Down</b>	<b>Report Due</b>
Senate Standing Committee on Economics	CPRS Draft Legislation	April 16, 2009	–
Senate Standing Committee on Economics	CPRS Bills	–	June 15, 2009
Senate Select Committee on Climate Policy	CPRS Draft Legislation, CPRS Bills and climate policy	–	June 15, 2009
Senate Select Committee on Fuel and Energy	Various issues concerning fuel and energy, including the impact of the CPRS Draft Legislation and the CPRS Bills	May 7, 2009 (Interim Report)	October 21, 2009

**Figure 1**

A set of amendments has also been made to the regulations under the NGER Act since Sept. 29, 2007. These were made by the National Greenhouse and Energy Amendment Regulations 2009 (No. 1) (Cth). Again, these all came into force on March 15, 2009.

Further amendments to the NGER Act are before Parliament. The National Greenhouse and Energy Reporting Amendment Bill 2009 (Cth) was introduced into Federal Parliament on March 18, 2009. The amendments proposed by this bill are mostly of a minor nature. However, one of the bills forming part of the CPRS Bills—the Carbon Pollution Reduction Scheme (Consequential Amendments) Bill 2009 (Cth)—proposes to make extensive amendments to the NGER Act so as to integrate its operation with that of the CPRS.

One set of amendments is to come into effect at the same time as the Carbon Pollution Reduction Scheme Bill 2009 (Cth). Those amendments are, for the most part, replacements of all references to the GEDO with references to the proposed new Australian Climate Change Regulatory Authority (ACCRA) as the common regulatory authority for the NGER Act and the CPRS.

Another set of amendments is to come into effect on July 1, 2011, the same date that the CPRS itself is due to commence. This set of amendments is extensive and

includes the insertion into the NGER Act of a new Part 3A “Reporting obligations of liable entities,” which will place a reporting obligation on all entities (and not only “controlling corporations”), which face a liability to surrender emissions permits under the CPRS.

Another set of amendments to come into effect on July 1, 2011 is as follows. Prior to July 2011, a corporation’s “group” consists of: the corporation itself, its subsidiaries; the joint ventures in which the corporation or any of its subsidiaries participate, and the partnerships in which the corporation or any of its subsidiaries participate. After July 2011, a corporation’s “group” will consist only of: the corporation itself and its subsidiaries. The amendments will make it obligatory (on pain of civil penalties), in a case where more than one person could be said to have operational control of a facility, for one such person to be nominated as bearing relevant liabilities under both the NGER Act and the CPRS.

## **Draft CPRS Legislation**

### ***Introduction***

The CPRS Draft Legislation and the CPRS Bills have been or are the subject of enquiries and, in some cases, completed reports by Senate committees, as demonstrated in Figure 1. The first report of the Senate Economics Committee was handed down on April 16,

2009. In brief, the majority opinion of the committee was that the bills should be passed in their current form. A dissenting report by the Coalition Senators urged that the bills not be presented to Parliament, and that an alternative plan should await the outcomes of the Copenhagen meeting of the Parties to the United Nations Framework Convention on Climate Change and the Kyoto Protocol in November–December 2009 (Copenhagen Climate Change Conference). A minority report by the independent Senator Nick Xenophon considered the CPRS as set out in the draft bills to be “ill equipped to initiate sustainable domestic reform in the realm of climate change policy.” A minority report by the Australian Greens withheld final comment but signaled that “the CPRS as currently proposed is not designed to drive the transition to a zero carbon economy, but rather is intended to maintain the profitability of existing fossil fuel based industries.”

## **Overview**

The principal bill in the CPRS Bills, the Carbon Pollution Reduction Scheme Bill 2009 (Cth) (Scheme Bill) would commit Australia to a cap-and-trade emissions trading scheme (ETS) to commence on July 1, 2011. The ETS that the Scheme Bill proposes is a thoroughgoing cap-and-trade system having no baseline-and-credit features and no carbon tax features. It will cover all six of the GHGs that are widely recognized internationally with provision for regulations to specify further GHGs. In a policy paper that the Rudd Government released on Dec. 15, 2008, in the lead-up to the Scheme Bill (White Paper), it was stated that the ETS would cover most sectors of the economy that are implicated in the production of GHGs and would account for approximately 75 percent of Australia’s GHG emissions, directly involving upwards of 1,000 firms (excluding forestry operators who may choose to opt-in to the system). The Scheme Bill creates two general categories (and two subcategories) of entities that will be liable under the CPRS: direct emitters (from landfill facilities; and from facilities other than landfill facilities); and importers, producers and suppliers of “eligible upstream fuel” and “synthetic greenhouse gases.”

The Scheme Bill does not contain a statutory “costs pass-through mechanism.” It states as an objective: the Federal Government’s long-term target of a 60 percent reduction in national GHG emissions from 2000 levels by 2050; and its mid-term target of a reduction by between 5 percent and 15 percent below 2000 levels by the end of 2020, and to 25 percent below 2000 levels by the end of 2020 if and when there is a comprehensive international agreement capable of stabilizing GHG concentrations at around 450 parts per million or lower. Precise annual caps will be prescribed under the Scheme Bill by regulation. That the Scheme Bill takes this approach to the specification of targets and caps is significant: in fact the Scheme Bill sets no targets or caps; rather, it contemplates that they will be set later. The first caps will be prescribed most probably in early 2010 after the results of the Copenhagen Climate Change Conference are known.

The Scheme Bill states that the CPRS will have a price cap for the first five years of its operation. Consistent with the announcements on May 4, 2009, the price cap will be \$10 per tonne of carbon dioxide equivalent (CO<sub>2</sub>e) at commencement of the CPRS, and \$40 per tonne of CO<sub>2</sub>e in the second year of the CPRS rising after that at roughly 5 percent per annum. An upshot of the May 4, 2009 announcements is that, when the first caps are prescribed after the results of the Copenhagen Climate Change Conference, they will necessarily not relate to the “fixed price period” of the first year of the CPRS.

The CPRS will have linkages with international carbon markets. In particular, no quantitative restrictions will apply to the use of eligible international units (including “Kyoto Protocol units”) for compliance in the CPRS.

## **General Outline of the ETS**

The general shape of the ETS to which the Scheme Bill would commit Australia is as follows. The Federal Government will set by regulation caps on emissions of covered GHGs by liable entities during successive compliance periods (annual, by reference to financial years) except, as mentioned, for the “fixed price period” of the first year of the CPRS. A range of “consideration factors” is set out in the Scheme Bill,

some of which must, and others of which may, be taken into account in formulating the regulations. The Federal Government will issue Australian emissions units (AEUs) (freely and by auction). An AEU will, effectively, give its holder the right to emit a certain quantity of GHGs during a compliance period, and the total of the quantities covered by the AEUs issued in respect of the compliance period will equal the cap for the compliance period. In this way, the quantity of allowable total emissions is limited to the amount of the cap.

For any particular compliance period, a liable entity must avoid a unit shortfall by surrendering a suitable number of AEUs to cover its emissions of GHGs in that period. Once surrendered, an AEU cannot be re-used for any purpose. Liable entities will be able to trade AEUs among themselves and on secondary markets, so that a liable entity that does not hold sufficient AEUs to cover its emissions of GHGs in a compliance period may buy AEUs from another entity that holds more AEUs than that entity needs (because, for instance, it has managed to reduce its own GHG emissions) or from others. In theory, such an arrangement will mean that the market will ensure that the required emissions reductions are achieved at the lowest possible marginal cost.

AEUs will be created as personal property and will be fully fungible, but only on the registry established under the Scheme Bill (Registry). The Scheme Bill contains no power to extinguish AEUs (except in the case of fraud). Also, AEUs will be designated as “financial products” for the purposes of the provisions in the Corporations Act 2001 (Cth) and the Australian Securities and Investment Commission Act 2001 (Cth) (ASIC Act) regulating such products, particularly the marketing of them, but a person providing services in relation to AEUs will not on that account alone be providing “financial services” for the purposes of the ASIC Act. The Trade Practices Act 1974 (Cth) will also apply in respect of AEUs, particularly the marketing of them.

The Scheme Bill indicates that a liable entity will be able to bank without limit AEUs that it does not require during a particular compliance period so that it can surrender them during a subsequent compliance

period. The announcements of May 4, 2009, now make it clear that AEUs issued during the “fixed price period” for the first year of the CPRS will not be capable of being banked. The Scheme Bill also indicates that a liable entity will be able to meet up to 5 percent of its liabilities in any one compliance period by borrowing the following year’s vintage permits. Liable entities that fail to avoid a unit shortfall for a compliance period will incur pecuniary penalties, including obligations to “make-good” the shortfall in the subsequent compliance period. Under the Scheme Bill, no scheme of domestic offsets will form part of the CPRS.

### ***Targets, Caps, and Trajectories***

The Scheme Bill commits the Federal Government to the “trajectories mechanism” foreshadowed in the White Paper. There are two elements to that mechanism: “caps” and “gateways” for future caps.

“Caps” will be determined by regulation annually at least five years in advance. “Gateways” (or ranges within which future caps will lie up to a further 10 years in advance) will be determined by regulation every five years. The caps will be extended by one year every year. The “gateways” will be extended by five years every five years. The Scheme Bill obliges the Federal Government to “take all reasonable steps to ensure” that the first three years of caps beginning on July 1, 2012, are put in place in regulations by July 1, 2010, and that caps for each subsequent year are put in place at least 5 years before of the end of the year. The Scheme Bill obliges the Federal Government to “take all reasonable steps to ensure” that caps are within relevant gateways.

### ***Price***

The Scheme Bill contains no details as to likely prices of AEUs. Figure 2 presents the White Paper’s predicted carbon price.

### ***Price Limits***

As mentioned, the Scheme Bill states that the CPRS will contain an upper limit on the price of AEUs in respect of the first five years of operation of the CPRS.

Carbon Price A\$/tCO <sub>2</sub> e		
	5 percent target	15 percent target
Commencement – in 2010	23	32
Medium-term – in 2020 (in 2005 prices)	35	50

**Figure 2**

The price limitation mechanism will be as follows: in each period between Oct. 31 (the emissions reporting deadline) and Dec. 15 (the permit surrender deadline) in respect of the first five years of operation of the CPRS, an unlimited number of special (“fixed price”) permits will be available (starting at \$10 per tonne of CO<sub>2</sub>e in the first year and rising as described above) to parties having obligations under the CPRS. Unlike “ordinary” permits, “fixed price” permits will be incapable of being banked or traded. Indeed, automatic surrender of a “fixed price” permit occurs on its acquisition. The market for eligible international units will also operate as a ceiling on the carbon price in Australia if the price of AEU’s rises above the price of these units.

### ***Fundamental Obligation and Process***

The fundamental obligation that the Scheme Bill will impose on liable entities is contained in clause 132 of the Scheme Bill. It is an obligation to avoid a “unit shortfall” by surrendering a suitable number of AEU’s or eligible international emissions units. The obligation is underpinned by a requirement, in the case of a unit shortfall, to pay an administrative penalty whose maximum rate will be (in the first year of the CPRS) \$11 and (in any other case) the number of units in the unit shortfall (that is, the number of emissions units that should have been surrendered but were not) multiplied by 110 percent of the benchmark average auction price of an AEU in the previous financial year. There will be an additional penalty for late payment of the administrative penalty, at a maximum rate of 20 percent of the unpaid amount per year. Relevant dates in each year in relation to this procedure are: Oct. 31—the date by which the report under the NGER Act is due,

Dec. 15—the date by which emissions units must be surrendered, and Jan. 31—the date by which any administrative penalty must be paid.

Payment of the administrative penalty does not expunge the unit shortfall: sufficient emissions units to discharge the unit shortfall will still need to be surrendered in the succeeding financial year. The Scheme Bill also imposes personal liability, in relation to its civil penalty provisions, on “executive officers of bodies corporate,” defined to include directors, chief executive officers, chief financial officers, and secretaries of corporations. The personal liability is imposed if the corporation contravenes a civil penalty provision and the relevant officer: knew that, or was reckless or negligent as to whether the contravention would occur, was in a position to influence the conduct of the corporation in relation to the contravention, and failed to take all reasonable steps to prevent the contravention.

The Scheme Bill contains a non-exclusive list of matters to which the court must have regard in determining whether the officer failed to take all reasonable steps to prevent the contravention.

### ***Liability of Direct Emitters (Landfill)***

The White Paper indicated that emissions from landfill waste sites that closed prior to July 1, 2008, will not be included in the CPRS. This is reflected in the Scheme Bill. The White Paper also indicated that emissions from waste deposited at such sites prior to Jan. 1, 2009, would be excluded from the CPRS until 2018. The Scheme Bill departs from this. Rather, a proportion (to be specified by regulation) of emissions

between July 1, 2008, and June 30, 2018, will be attributed to emissions prior to July 1, 2008.

### ***Liability of Direct Emitters (Non Landfill)***

The Scheme Bill does not itself specify non-landfill sectors that will face a liability for direct emissions under the CPRS. Rather, the Draft CPRS Legislation contemplates regulations that will specify the covered non-landfill sectors. The Commentary accompanying the Scheme Bill indicates that the following emissions will attract direct emitter liability (non-landfill) under the CPRS by this regulatory means: fugitive emissions, industrial process emissions, emissions from a waste source, and emissions from the combustion of energy sources.

The point of liability for surrendering AEU's will generally be the point at which the emissions actually occur, and there will generally be an annual threshold of 25,000 tonnes of CO<sub>2</sub>e of emissions before any liability is imposed. Entities with operational control over covered facilities or activities will be liable. For corporations, obligations will be placed on the "controlling corporation" of a corporate group where either the controlling corporation or a member of the group has operational control over a covered facility or activity. Up to July 1, 2011, a joint venture is a member of the corporate group of a "controlling corporation" if the controlling corporation or any subsidiary of that corporation participates in the joint venture.

The White Paper foreshadowed that, with the approval of ACCRA, controlling corporations would have "some flexibility to *shift* Scheme obligations *to* another legal entity within their group" (emphasis added) on certain conditions. This proposal was stated to be in response to submissions that had identified contracts that would otherwise allow for carbon-cost pass-through but that would be ineffective because the contracting party, not being a controlling corporation, did not have any carbon costs to pass through. In a subtle difference of detail, the Scheme Bill proposes instead that a subsidiary will be enabled to *apply* to ACCRA for a "liability transfer certificate" so as to have Scheme obligations *transferred from* its

controlling corporation to itself. (A similar provision will allow an entity with "financial control" to apply to have liability transferred from the controlling corporation of the entity with operational control of the facility to itself.) This proposal raises several issues. In at least some cases, it may be that directors of a subsidiary corporation that voluntarily seeks to have CPRS liabilities transferred to itself will be in breach of their fiduciary duties toward the (subsidiary) corporation. In some contracts, a voluntary assumption of CPRS liabilities by a contracting party that wishes to pass through the resulting costs may be a breach of an express term of the contract. In some contracts, there may be effective provision for the pass-through of costs that are *imposed* on a contracting party but not of costs that are *assumed* voluntarily. The Federal Government has since recognized these matters as deficiencies in the liability transfer certificate (LTC) mechanism as proposed in the Scheme Bill and has indicated that the mechanism will be amended to return it to the proposal as outlined in the White Paper.

### ***Liability of importers, producers/ manufacturers, and suppliers***

In certain sectors where there are many small emitters, such that it would be inefficient and uneconomical to assign direct liability to those emitters, the Scheme Bill identifies "proxies" and makes them directly liable for surrendering AEU's, the costs of which are expected to be passed downstream, ultimately to consumers. This will be the situation (for example) in relation to the supply of "eligible upstream fuels" and of "synthetic greenhouse gases." In these cases, the point of liability lies with the upstream suppliers and there is no volumetric threshold for liability. The scheme of liability operates, in summary, by the allocation to the proxy of "potential greenhouse gas emissions" in the relevant fuel. The potential GHG emissions of a quantity of fuel are the GHG emissions that would be released into the atmosphere as a result of the combustion of that quantity of the fuel. Importantly, even when the supplier is a corporation that is a member of a controlling corporation's group, liability does *not* fall on the controlling corporation: liability falls on the supplier itself.

The Scheme Bill also foreshadows an important administrative mechanism—the Obligation Transfer Number (OTN) mechanism. The OTN mechanism will, in some cases, enable and, in other cases, require the obligation to surrender AEU's under the CPRS to be transferred from one “liable entity” to another.

The following entities *must* use an OTN and assume CPRS liability: “large users” of fossil fuels (other than petroleum liquids), namely: entities with operational control of any facility that emits 25,000 tonnes of CO<sub>2</sub>e per annum (or more) from combustion of a single fuel), retailers of natural gas and other pipeline gases, and liquified petroleum gas marketers.

The following entities *may* use an OTN and assume CPRS liability: entities that use fossil fuel as feedstock in a chemical transformation or consume fossil fuels other than by combustion; entities undertaking solid fuel transformation (making coal char, coke, briquettes, and by-products); upstream suppliers of natural gas, liquified natural gas, compressed natural gas, ethane, coal seam gas, underground coal gas, and town gas that acquire gaseous fossil fuels from another entity to manufacture those gases; intermediate suppliers of fossil fuels; entities using fuel for international voyages or for other purposes that do not result in domestic emissions; and large users of petroleum liquids.

Whether these entities choose to assume direct responsibility for the CPRS liability of the fuels they use will depend on their particular circumstances.

The civil penalty provisions of the Scheme Bill include failure to quote an OTN when so required, quotation of a false OTN, and failure to make certain required notifications. Notably, however, the administrative penalty described above in relation to failure to avoid a unit shortfall is *not* a civil penalty provision.

### **Method of Permit Allocation**

AEU's will be “stamped” (by means of an “identification number”) with the first year (known as a “vintage year”) in which they are capable of being surrendered. (In fact, there will be no physical permits or certificates at all, but rather entries in the Registry). The White Paper foreshadowed that AEU's would be

sold by monthly public auction, commencing (before the CPRS start date) in April 2010, and that one of the twelve auctions per year (namely, the one held in July) will include the sale of AEU's for future years (up to 3 years in advance). The Scheme Bill does not deal with these matters except to provide that the Minister and ACCRA may each, by legislative instrument, determine relevant procedures, policies and rules.

The White Paper foreshadowed that special transitional assistance would be given to industries identified as emissions-intensive trade-exposed (EITE) industries. The Scheme Bill does not deal with these matters except to create special auctioning mechanisms for AEU's that have been allocated freely to EITE industries and that have not been transferred (expiring on Dec. 31, 2012) and to enable the formulation by regulation of an “emissions-intensive trade-exposed assistance program,” some (but by no means all) of the characteristics of which are broadly described in the Scheme Bill (EITE Assistance Program).

The White Paper also indicated that approximately 25 percent of AEU's would be allocated free of charge to certain EITE industries, in the following manner. Activities that have an emissions intensity between 1,500 tonnes of CO<sub>2</sub>e per million dollars of revenue and 2,000 tonnes per million dollars of revenue will get a free allocation to cover 60 percent of their emissions. Activities that have an emissions intensity above 2,000 tCO<sub>2</sub>e per million dollars of revenue will receive a free allocation to cover 90 percent of their emissions. In calculating the emissions intensity of an EITE industry, both direct and indirect emissions will be taken into account.

The White Paper also indicated that assistance will be provided until 2020 unless broadly comparable carbon constraints in other countries, or sectoral agreements, are developed. After 2020, assistance will be phased out over 5 years, assuming an acceptable global agreement is in place. The Scheme Bill does not specify that these matters must form part of the EITE Assistance Program.

The announcements of May 4, 2009, have given further indications of what the EITE Assistance Program will contain. An additional “Global Recession

Buffer” will be provided for EITE industries for the first five years of the CPRS. This Buffer will provide an additional 5 percent free permits for EITE activities eligible for 90 percent assistance, giving an effective rate of assistance of almost 95 percent to these highly EITE activities in the first year of the scheme. The Buffer will provide an additional 10 percent free permits for EITE activities eligible for 60 percent assistance, giving an effective rate of assistance of 66 percent to these moderately EITE activities in the first year of the scheme.

Finally, the White Paper indicated that agriculture, if and when it is brought into the scheme, will receive comparable assistance and that the proportion of AEU's allocated free of charge will rise to approximately 35 percent of the total.

### **Coal Compensation Arrangements**

The White Paper indicated that there would be specific direct assistance, possibly in the form of free permits, for the coal-fuelled electricity generation sector. It also stated that only a limited amount of direct assistance would be provided, the quantum of that direct assistance to be determined only after the medium-term national emissions target range is established. That direct assistance would be given on an “up front” and “once-and-for-all” basis before the CPRS begins. The Scheme Bill embodies in its Part 9, without so naming it, the Electricity Sector Adjustment Scheme foreshadowed in the White Paper. The principal features of Part 9 of the Scheme Bill are the following. Assistance is limited to those assets that were in existence on June 3, 2007, the date when former Prime Minister John Howard announced the then Coalition Government’s support for an emissions trading scheme. Assistance is limited to the first 5 years of the CPRS. Assistance will be in the form of the issue of free AEU's, the number of which will be capped. Free AEU's will not be issued if generation assets do not pass the “power system reliability test” for the relevant financial year. Free AEU's may be withheld in the 2013-2014 and the 2014-2015 financial years if a “windfall gain declaration” is in force in relation to a particular generation asset.

### **Climate Change Action Fund**

The White Paper foreshadowed the establishment within Treasury of a Climate Change Action Fund (CCAF) to assist industries (other than coal-fuelled electricity generation) that do not qualify as EITE industries. The Scheme Bill does not address any of these matters. The announcements of May 4, 2009, confirm that the Federal Government has allocated up to \$200 million to the CCAF in 2009-10 to support businesses and community organizations to take action to reduce carbon pollution through energy efficiency before the CPRS starts. The May 4, 2009 announcements commit the Federal Government to comprising the following in the \$200 million tranche of the CCAF for 2009-10: \$20 million for a business information package to provide advice to businesses on how the CPRS will work and what impacts and opportunities may arise, up to \$100 million for Early Action Energy Efficiency Strategies for Business, including energy audits and capital investment, and \$80 million for capital investment grants for businesses and community organizations.

### **Renewable Energy and Energy Efficiency**

#### **Introduction**

On April 30, 2009, COAG released a communiqué that outlined significant agreements between the Governments of the Commonwealth, the states, and the territories in relation to renewable energy and energy efficiency.

#### **Agreement on Single National Expanded Renewable Energy Target**

COAG agreed to expand the current Mandatory Renewable Energy Target (MRET). The expanded Renewable Energy Target (RET) will continue until 2030. The RET will require a progressively greater proportion of Australia’s electricity to be generated from renewable sources, rising to 20 percent (or approximately 45,000 gigawatt-hours (GWh), as contrasted with the currently applicable 9,500 GWh) in 2020 and maintaining that level until 2030. The expanded targets will commence from Jan. 1, 2010,

with a target for that year of 12,500 GWh. The shortfall charge payable by a liable entity that fails to meet its target will increase from the current \$40 per megawatt-hour to \$65 per megawatt-hour (unindexed). All existing projects that are eligible to generate Renewable Energy Certificates (RECs) under the MRET will remain eligible to participate in the RET, and the same eligibility criteria for new projects will apply. There will be additional transitional incentives for small-scale solar, wind, and hydro-electricity systems in the form of a “multiplier” by which such activities will be able to create (in relation to the first 1.5 kW of system capacity) a fixed multiple of the RECs to which they would otherwise be entitled. The multiplier would be 5 from 2009–2010 to 2011–2012, decreasing to zero in 2015–2016. There will be transitional assistance for activities that are identified as “emissions-intensive trade-exposed” (EITE) under the proposed CPRS. Activities that will receive 90 percent or 60 percent EITE assistance under the CPRS will receive a 90 percent or 60 percent exemption respectively from liability under the MRET, but only in relation to the expanded RET (that is, the portion beyond the current 9,500 GWh target). The RET will be reviewed in 2014 (at the same time as the CPRS will be due for review). That review will be extended to the transitional assistance measures for EITE activities. The RET will absorb all existing and proposed state and territory renewable energy schemes, including the existing Victorian Renewable Energy Target (VRET) and the proposed New South Wales Renewable Energy Target (NRET). Implementation of the RET as agreed by COAG will require the substantial amendment or replacement of the Renewable Energy Amendment (Increased Mandatory Renewable Energy Target) Bill 2008, currently before the Senate, as well as legislative action by (at least) Victoria.

### ***National Strategy for Energy Efficiency***

COAG finalised a draft of the National Strategy for Energy Efficiency (the “National Strategy,” which COAG agreed in October 2008 to develop) and signed a Memorandum of Understanding for implementing the National Strategy, with a commitment to consider signing an Intergovernmental Agreement on

the National Strategy at its next meeting in Darwin on July 2, 2009. As a first step, COAG agreed to five measures to improve the energy efficiency of commercial and residential buildings.

The measures are as follows: an increase from the beginning of 2010 in the energy efficiency requirements for all classes of commercial buildings in the Building Code of Australia (BCA); the phase-in in 2010 of mandatory disclosure of the energy efficiency of commercial buildings and tenancies; an increase in the energy efficiency requirements for new residential buildings to six stars or equivalent nationally in the 2010 update of the BCA, to be implemented by May 2011; new efficiency requirements for hot-water systems and lighting; and the phase-in of mandatory disclosure of residential building energy efficiency, greenhouse, and water performance at the time of sale or lease, commencing with energy efficiency by May 2011.

### ***Australian Carbon Trust***

Neither the White Paper nor the Scheme Bill nor COAG’s April 30, 2009 communiqué foreshadowed the establishment, announced on May 4, 2009, of an Australian Carbon Trust (Carbon Trust). The Carbon Trust will incorporate an Energy Efficiency Trust (EET) to promote energy efficiency in the business sector. The EET will work by putting proposals to businesses to undertake energy efficiency measures that will save money over time. The EET would cover the capital costs of undertaking energy efficiency investments and would put in place arrangements for business to repay the capital costs at a commercial rate as energy cost savings occur. For example, the EET could identify lighting improvements in a business that would cost \$2 million to undertake. The EET would cover this \$2 million cost, and the business would then pass the energy cost savings from the lighting improvements back to the EET at a commercial rate until the full \$2 million with interest is paid back. The Federal Government will provide \$50 million in seed-funding for the EET.

The Carbon Trust will also incorporate an Energy Efficiency Savings Pledge Funds (EESPF). Under the

EESPF, a new Web site will provide a one-stop shop for individuals and households to pledge funds that will be used by the EESPF to buy and retire AEU's under the CPRS.

## Next Steps

As mentioned above, the CPRS Bills (including the Scheme Bill) were passed by the Lower House of Federal Parliament on June 4, 2009. Debate on the CPRS Bills will commence in the Senate on June 15, 2009. The Federal Government does not control the Senate. Parliament is scheduled to rise for the winter recess on June 25, 2009.

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## ABA SECTION OF ENVIRONMENT, ENERGY, AND RESOURCES

### *Calendar of Section Events*

#### **17th Section Fall Meeting**

Sept. 23-26, 2009  
Baltimore

#### **28th Annual Water Law Conference**

Feb 17-19, 2010  
San Diego

#### **39th Annual Conference on Environmental Law**

March 18-21, 2010  
Salt Lake City

***For more information, see the  
Section Web site at  
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## THE NEW ISRAELI CLEAN AIR LAW—A NEW LEAGUE OF CLEAN AIR PROTECTION

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**Tzvi Levinson  
Julia Lietzmann  
Gil Dror**

In July 2008 the Knesset, Israel's parliament, passed a new Clean Air Law that makes significant changes to the way air pollution is regulated in Israel. The law passed after three years of discussions in the Knesset's Committee of the Interior and the Environment and the submission of numerous documents by stakeholders and the public. The bulk of the statute will become effective in January 2011—too late in the eyes of a number of non-profit organizations (NGOs) that wanted it to become effective immediately—or at least in the same year of its promulgation, and too early from the point of view of the Ministry of Environmental Protection (Ministry). In fact, the former Israeli Environment Minister claimed his ministry lacked the resources necessary to draft the necessary regulations in time. (According to the Ministry, its 2008 budget represented only 0.008 percent of the total government budget, the lowest of all government ministries.)

The new law replaces the provisions of the 1961 Abatement of Nuisance Law, which forbade nuisances resulting from air pollution, and parts of the 1968 Business License Law, which provided for certain administrative measures and penalties.

Against this backdrop, the Clean Air Law introduces a dramatic change regarding the scope of protected interests. Whereas the Abatement of Nuisance Law protected only human health, the new law aims more broadly to "improve air quality and prevent and reduce air pollution, inter alia, by establishing prohibitions and obligations according to the precautionary principle, in order to protect human life, health and quality of life and to protect the environment including natural resources, ecosystems and biodiversity, for the public and for future generations, while considering their needs." The existence of a nuisance to humans is no longer the sole trigger for enforcement.

The new ninety-seven-clause law, moreover, provides a comprehensive framework for the control and prevention of air pollution by setting responsibilities and imposing obligations on the government, local authorities, and industry. These obligations include—among others—new stationary and ambient emission standards, preparation of a national plan for the reduction of air pollution, monitoring procedures, and stricter penalty frameworks, which will be administered by one governmental entity. It also requires that future regulations be promulgated according to standards established in developed countries and the European Union (EU), and by the Organization for Economic Cooperation and Development (OECD), the World Health Organization (WHO), and international conventions.

### **New Permit System**

The Clean Air Law revolutionizes the entire Israeli permit system. Today, an operator has merely to apply for a business license. From there, it is then up to the Ministry of Environmental Protection to impose terms regarding pollution control in the permit. If it does not, the project is subject to few emission restrictions. In contrast, the new law requires parties to apply for an emission permit; without it, an operator may not pollute. Thus, the burden has shifted from the government to the operator. The operator must, moreover, take into account not only human health, but rather the surrounding ecosystem in his application. At the same time, not every installation will need an emissions permit. Annex III explains which industries will need one. They include, among others, the petrochemical and chemical, metal and cement production, and waste treatment industries.

That said, industries that are not listed in the annex will still be affected by the law: the terms for their business license become more stringent, and a substantial administrative penalty was introduced that can be enforced against the company itself as well as the management.

Provision has also been made for additional public involvement. For instance, when a company has applied for an emission permit, the application,

including annexes, as well as the preliminary decision of the Ministry, will be published on the Ministry's Web site prior to the public hearing. This is a new mechanism. Public stakeholders then have 100 days to comment on the application. The law also provides for the option of a hearing at a round table-like arrangement, permitting more two-way communication between the public and the applicant.

The whole procedure can take 18-24 months. Again, due to a lack of resources, the Minister has said that application submission will begin in January 2010.

In sum, the Clean Air Law is the first Israeli environmental law to have an impact on such a large variety of businesses while simultaneously providing for administrative penalties against both companies and their management in case of violations.

### **Polluted Areas**

It should also be said that under the new law the Minister of the Environment has the authority to declare certain areas "adversely affected by air pollution" (similar to "Non-Attainment Areas" under the United States Clean Air Act). After such a declaration, the local authorities within this area have to promulgate specific plans to combat pollution, and emission permits in this area will be issued only under certain circumstances. In addition, after such a declaration, the approval of a new installation in those areas will only be given based on specific reasons that will be elaborated by the official in charge.

### **Climate Change**

Last but not least, its approach to climate change shows that the Israeli Clean Air Law is a modern, post-Kyoto law. Article 2 of the statute defines the term pollutant to include biological or chemical substances, the presence of which causes or can cause a climate, weather or visibility change.

As a party to the United Nations Framework Convention on Climate Change (UNFCCC) since May 1996 and to the Kyoto Protocol since March 2004, Israel as a non-Annex I country is committed to

monitoring greenhouse gas emissions (GHGs). An inter-ministerial committee on climate change, including representatives of relevant government ministries, industries, and NGOs, was established at the time of ratification. The committee is charged with formulating national policy on the reduction of GHGs and preparing reports on national GHG inventories, policies, measures, and future forecasts.

Israel has set its baseline year for compliance with the obligations of the UNFCCC as 1996 due to unprecedented growth in both its population and economy occurring during the first part of the decade. During this period, nearly one million immigrants arrived in the country, bringing about a sharp increase in energy use, and consequently also GHGs.

Although Israel was classified as a developing country under the UNFCCC, a comparison of carbon dioxide (CO<sub>2</sub>) emissions from fuel combustion between Israel and other countries shows that Israel is not far behind some of the more developed countries listed in Annex I.

Based on Central Bureau of Statistics data, Israel emitted nearly 74 million tons of GHGs per year (CO<sub>2</sub> equivalent) in 2006, a rise of 17 percent since 1996. In contrast to many developed countries, whose GHG emissions are decreasing, Israel's emissions are expected to continue to increase under a "business as usual" scenario, largely because of an increase in its population (mostly due to immigration) and higher standards of living. Clearly, the challenge lies in stabilizing emissions and reversing this trend.

Fuel combustion accounts for about 75 percent of Israel's GHG emissions, of which some 56 percent flow from electricity and energy production (some 40 million tons) and another 19 percent in vehicular emissions. Carbon dioxide is the main component of GHG emissions (some 88 percent), followed by methane, which is largely emitted at landfills, and nitrous oxide, from agriculture and industry.

The inclusion of substances that change or can change the climate into the definition of "pollutants" in the Clean Air Law is tantamount to changing Israel's status

from that of a "developing" to a "developed" country under the UNFCCC. This may complicate matters by impacting future clean development mechanism (CDM) projects, a few of which have already been approved by the UNFCCC Secretariat. Before the new law, there were hardly any legal restrictions on emissions of GHGs. In the future, it will be hard to prove the required additionality for approval of a CDM project in Israel.

## **New Cars**

Finally, the only provision of the new Clean Air Law that was meant to be effective immediately is Article 38. It requires sellers of new cars to inform potential customers of the pollutants emitted by the vehicle, as well as its fuel consumption. The Ministry, however, did not meet the Nov. 30, 2008 deadline for publishing the necessary regulations. In May 2009 were they signed by the newly appointed Minister, Mr. Gilad Erdan. The regulations were then submitted for approval by the relevant Knesset committee, and are expected to be published in June 2009.

## **Summary**

The Israeli legislature decided to bring Israel's emission control legislation into alignment with worldwide standards. Because the burden of filing an application for an emission permit has been shifted to industry, operators can no longer relax in the hopes that the Ministry will not impose any terms on their business license restricting their emissions. For their applications, they will have to take various aspects of air quality protection into account, including GHGs.

**Tzvi Levinson** is a partner, and **Julia Lietzmann** and **Gil Dror** are attorneys with the Levinson Environmental Law Firm in Haifa, Israel. For more information about the firm, please visit the firm's Web site at: <http://www.environment.co.il/english.asp>.

## **GIVE NEW APPLICATIONS OF PIEZOELECTRIC POWER A CHANCE: TECHNOLOGICAL INNOVATIONS FROM AN EVOLVING ALTERNATIVE ENERGY AREA OFFER OPPORTUNITIES IN THE ENVIRONMENTAL AND FINANCIAL MARKETS**

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**Kimberly E. Diamond**

A science fiction-like alternative energy called piezoelectricity is endeavoring to become mainstream. Globally, recent groundbreaking scientific achievements in piezoelectric technology have enabled the kinetic energy produced from pedestrians and vehicles alike to be transformed into clean energy. Innovations in this area could have a profound impact in the sustainable development space, as well as in the project finance and investment banking arenas. Unfortunately, certain skeptics from the scientific community—particularly the engineering sector—are stampeding to quash international interest and support for these state-of-the-art developments, calling these breakthroughs and the piezoelectric technology behind them rubbish and a complete hoax. True, the quest to improve the revolutionary developments in piezoelectric flooring, as well as piezoelectric roadways, railways, and runways (collectively, “vehicular thoroughfares”), by making them more efficient and commercially viable for consumer consumption may be time- and research-intensive, causing the race to refine this technology to be more akin to a cross-country marathon than a mere sprint. The current evolution of piezoelectric technology, though, is arguably similar to that of solar power. For this reason, inventions such as piezoelectric flooring and vehicular thoroughfares may have a bright future, rather than merely being classified as nonsensical gadgetry responsible for draining the scientific community and investors alike of resources that could be better directed elsewhere. Moreover, in the future, loans used for the financing of piezoelectric projects domestically and abroad could potentially serve as the collateral foundation for the creation of novel breeds of asset-backed securities, using structuring, techniques, and methodologies from the securitization area. By providing background about scientific advances in piezoelectrics worldwide,

analogizing the state of piezoelectrics today to that of solar power during yesteryear, and addressing the primary arguments of the aforementioned skeptics and like-minded cynics (collectively, the “Piezoelectric Pessimists”), this article argues that the allegations from the Piezoelectric Pessimists generally lack merit, and that advances enabling piezoelectric devices to be incorporated into today’s infrastructure as sustainable building materials are worthy of public endorsement.

### **Status of Scientific Research in Piezoelectrics Globally**

Physicists and scientists actually have known about piezoelectricity for decades, as French scientists discovered this technology in the 1880s. The term “piezoelectricity” originates from the Greek words “piezo” or “piezein,” which mean “to squeeze or press.” In simplistic terms, piezoelectricity is the ability of certain materials, such as quartz crystals and select ceramics, to generate an electrical charge when a form of mechanical pressure is applied. From the applied charge, voltage is generated across the material. When no force is applied to these materials, no electric charge is generated. Examples of ordinary devices that use piezoelectrics are quartz watches, motion detectors, and sonar.

Technology in the field of piezoelectrics has evolved rapidly during the last several years in the United States and abroad, particularly in the areas of piezoelectric pedestrian tiles and flooring and vehicular thoroughfares. Within the last five years alone, prestigious academic institutions in the United States, including Duke University, the University of Michigan, and Massachusetts Institute of Technology (MIT), have been homes to breakthroughs in piezoelectric flooring technology. For instance, in July 2004, Duke University’s Andrew Katz, an engineering student, published a paper summarizing the results of a physics project entitled “Residential Piezoelectric Energy Sources.” The paper, which hypothesizes the DELTA Smart House, a structure built with piezoelectric cable in its floors, concludes that the use of a piezoelectric transducer can act as a voltage source and can multiply voltage by several orders of magnitude when certain circuits are used. In summer 2007 at MIT’s School of

Architecture and Planning, graduate students James Graham and Thaddeus Jusczyk applied their research to design a piezoelectric floor that won first place in a competition by Holcim Foundation for Sustainable Construction in Zurich, Switzerland. Graham and Jusczyk are attributed with coining the phrase “crowd farm” to refer to harvesting energy from groups of people by accessing the mechanical energy they generate when walking or jumping onto an electricity source. Perhaps most notably, in 2006, the University of Michigan’s School of Art and Design’s Elizabeth Redmond based her design thesis on a piezoelectric flooring project. This project has now grown into POWERleap, an alternative energy company that Ms. Redmond co-founded with Mr. Katz. The company designs piezoelectric flooring that generates electricity from pedestrian foot traffic. To assist in the further research and development of its product, POWERleap recently has teamed up with the University of Michigan’s Department of Materials Science and Engineering’s Professor Max Shtein, a scientist who has been honored by the U.S. Office of Science and Technology for developing novel ways to make the next generation of energy-efficient lighting devices.

Similar revolutionary breakthroughs in piezoelectric devices have also occurred within the last several years at highly respected institutions of higher education in Japan and Israel. As illustration, in 2006, the East Japan Railway Company (JR East) launched a collaborative effort with researchers from Keio University—one of the most esteemed universities in Japan—to develop piezoelectric pads that could be embedded in floors under the ticket gates in Tokyo Station. More recently, at Technion—Israel Institute of Technology, Professor Haim Abramovich, a member of the Faculty of Aerospace Engineering, and Dr. Lucy Edery-Azulay spearheaded Innowattech, a company that has developed new breeds of piezoelectric generators for roadways, railways, runways, and pedestrians that are capable of harvesting kinetic energy from weight, motion, vibration, and temperature changes. These generators can also transfer this harvested energy directly into existing power lines for street lighting, or channel it into the energy grid. Currently, Innowattech is designing a hybrid system for

cities with heavy foot traffic and busy intersections, wherein energy from pedestrians and vehicles alike can be harvested simultaneously.

In terms of taking piezoelectric devices out of a pure laboratory environment and placing them in public forums, dynamic strides from the scientists, designers, and researchers noted above have been made worldwide within the last several years alone. Examples of domestic installations of these devices include Ms. Redmond’s successfully installing in a stretch of sidewalk at the University of Michigan piezoelectric flooring containing LED lights that flicker when stepped upon. Ms. Redmond has also installed the POWERleap piezoelectric flooring product in a store in Chicago. Mr. Katz and Ms. Redmond plan to pilot test this flooring product in a high profile venue on the West Coast later this year. According to POWERleap estimates, the amount of energy that can be generated using this flooring is 1–5 watt hours per person, per square foot. This means that over a 100 meter stretch of sidewalk, in cities with heavy daily foot traffic, pedestrians can generate approximately 1 kilowatt (kW) (an amount equal to 1,000 watts) of electricity each hour.

Overseas, equally impressive piezoelectric installations have appeared. In early 2008, Japan witnessed JR East and Keio researchers reach their goal of successfully installing piezoelectric pads under ticket gates in Tokyo Station. Now, because of the heavy foot traffic from the high volume of passengers going through these gates, lamps in this station are lit with converted piezoelectric energy. Currently, Innowattech plans on debuting its first pedestrian project at the Tel Aviv railway station within the next few months, and subsequently unveiling similar projects elsewhere in the world. While the first stretch of electric roadway is still in the development and testing stages at Technion, Innowattech has stated that, based on its research, the company’s piezoelectric roadway system works optimally when there are at least 600 vehicles per hour in car and truck traffic, producing approximately 400 kilowatt-hours (kWh) of electricity from a 1 kilometer stretch of dual roadway traffic—enough energy to power 600–800 homes annually. Innowattech also has developed piezoelectric generators and storage

systems for piezoelectric railways and runways, so that energy from other types of large, moving vehicles such as trains and airplanes can be harnessed.

## **Solar Power Experienced a Similar Evolution**

Comparatively, piezoelectric flooring and vehicular thoroughfares are experiencing an evolution similar to that which solar energy experienced. For approximately 100 years, solar energy devices were viewed with skepticism and were not well-received. The earliest known record of the conversion of solar radiation into mechanical power is attributed to the French mathematics instructor Auguste Mouchout, who began his solar work in 1860. Although Mouchout refined his device for over the next 20 years, the French government deemed his device a technical success, but a practical failure attributable to its cost relative to its efficiency. Because of a lack of funding, Mouchout returned to other academic pursuits. In 1870, one of the most influential engineers of the nineteenth century, John Ericsson, invented a novel, parabolic trough-shaped solar rays reflector. Though less expensive to construct than its dish-shaped counterparts, this device was also less efficient than such counterparts. In the early 1900s, Henry Willsie attempted to sell his flat-plate solar collectors on the open market. Plentiful amounts of oil and coal, stable markets, and an already-in-place infrastructure made solar power devices seem inconsequential. Concerns relating to durability, the high ratio of machine size to power output, and the initial investment cost caused potential investors to be deterred from purchasing Willsie's product.

Almost 50 years later, while conducting research on the potentialities arising from the use of silicon in electronics, in the mid 1950's, scientists at Bell Laboratories inadvertently created a solar cell far more efficient than other solar collectors that had been built to date. Unlike its predecessors, this solar cell could convert enough solar energy to power everyday electrical equipment. Through scientists' continued research, the Bell solar cell doubled in efficiency in under two years. Nevertheless, this device remained commercially unsuccessful because of its still less than

ideal efficiency and relatively high cost. For instance, in 1956, a one-watt cell cost approximately \$300. It was not until the Army, the Air Force, and NASA viewed solar cells as valuable for satellites and space ventures in the 1960s that the public took an active interest in solar power and its development. It was not until the early 1970s that with further funding, research, and design refinement the price of a solar cell was lowered from approximately \$100 per watt to \$20 per watt. Almost 40 years later, the solar power industry has grown exponentially. Today, due to their price of solar cells continued to drop, solar cell devices are now the least expensive electric power source for small-scale usage in areas located away from utility lines. Whereas solar devices were only approximately 1 percent efficient back in the late 1800s, they evolved to being approximately 24 percent efficient in 2000, and are today approximately 25 percent more efficient than they were 10 years ago.

Similar to solar energy pioneers, innovators of piezoelectric flooring and vehicular thoroughfares bear the challenging task of convincing skeptics that piezoelectric energy as well as piezoelectric flooring and vehicular thoroughfares themselves are more than a curiosity. People living in society today expect to see immediate, tangible results and a proven track record before putting their trust into the visionary concepts of pioneers in modern piezoelectrics. Just as solar power was discovered over a century ago, so was piezoelectricity. Like solar power years ago, piezoelectrics is a non-mature technology. Consequently, high-tech piezoelectric devices lack a long test history. Also, reminiscent of solar power devices during their developmental stages, certain piezoelectric devices are not yet highly efficient, particularly with respect to the flooring products. For this reason, the price of materials and up-front initial investment relative to these products' energy output may make these products seem cost prohibitive and not economically feasible at this time.

Also similar to solar power, there are many positive attributes associated with piezoelectric devices. Like solar power, piezoelectric flooring and vehicular thoroughfares derive their power from reliable, replenishable energy sources. They can also be

installed in urban settings, where they preserve the established environment in its original state, do not occupy any additional public space, and do not contribute additional pollutants to the atmosphere as they generate power. Because of the world's continuing energy demands, these considerations should weigh favorably, given the waning supply, pollution and carbon emissions potential, and ever-increasing price of oil, natural gas, and coal. Moreover, while state-of-the-art developments in piezoelectrics may not have garnered the attention of the general public or scientists years ago, the expanded global interest by researchers in developing and testing piezoelectric technology is reminiscent of the heightened scientific interest in developing solar cells that occurred in the 1950's. If the level of pooled scientific interest and fervor to make piezoelectric flooring and vehicular thoroughfares more efficient is analogous to that for solar cells during its Bell Laboratories phase and thereafter, then potentially we should hope to see in the near future a burst of scientific breakthroughs in improved efficiency, lower materials cost, and commercial accessibility for these inventions. In support of this proposition, even with the refinements it is making to its vehicular thoroughfare products currently, Innowattech estimates that its current roadway, railway, and runway products will generate a return on a customer's initial investment over short a payback period of six to 12 years, depending on the traffic volume. Indeed, given the apparent mounting scientific interest in piezoelectrics, with the appropriate support from investors and strategic partners such as large energy firms and infrastructure managers, we may witness a push to deploy this technology within the next few years akin to that which solar power only experienced within the last few decades.

There are certain additional benefits to piezoelectric energy that other alternative energies, including solar power, currently do not offer. Certain geographic, topographic, and climatic factors are instrumental in determining where wind farms and solar cells are located. In contrast, because piezoelectric devices can be built into existing high traffic vehicular thoroughfares, these factors are inconsequential for determining the locations in which piezoelectric floors, roadways,

railways, and runways can be installed. Unlike wind and solar power whose energy capturing devices may be adversely impacted by severe, inclement weather, these piezoelectric devices can function in all weather conditions.

### **Implications for Opportunities to Structure and Invest in a New Breed of Asset-Backed Financial Products**

The potential increased demand for piezoelectric projects could have profound investment banking implications in the future for investors and product structurers at investment banks alike. As piezoelectric flooring and vehicular thoroughfares become more economically efficient and feasible, more reliable, and more durable in terms of life expectancy, heightened demand for these products may potentially occur globally, resulting in increased mandates for large-scale piezoelectric projects. Presuming the international economic crisis improves from its current condition and institutional lending becomes prevalent once again, infrastructure loans, or commercial real estate loans, relating to the financing of large piezoelectric projects could be made. These loans could form the basis for formulating new fixed income piezoelectric project financial instruments, such as asset-backed bonds, that draw upon project finance practices, securitization methodologies, and other financing techniques for their structuring.

### **Three Hypothetical Scenarios, Taking Collateral Diversity into Account**

The repayment scenario on the piezoelectric project loans would form the foundation on which the structuring of the currently hypothetical asset-backed bonds rest. The underlying loan obligations used to finance a large piezoelectric project have associated with them future income streams in the form of principal and interest payments to pay back the original borrowed debt. These receivables are due and payable in set intervals (monthly or quarterly, for instance) over a fixed period of time (generally, in years). Similar to other project financing endeavors, most of the financing for a large piezoelectric project would likely be repaid primarily from the income

stream generated by the expected cash flow and assets that the project itself generates.

There are several different ways the collateral structures supporting piezoelectric bonds could evolve, including the following hypothetical groupings: (1) the underlying loan obligations from the individual piezoelectric project, (2) the pooling of loan obligations from multiple piezoelectric projects, or (3) the pooling of loan obligations from one or more piezoelectric projects, together with the loan obligations from other types of financing projects, which could include other categories of renewable energy projects.

In the case of an individual piezoelectric project, the envisioned financing construct and its related securities could look as follows. Drawing upon securitization methodologies, the property right associated with the collection of the receivables for repayment of the loan to finance the piezoelectric project could undergo a “true sale” from the original owner of this right to a third party issuer. The issuer could then issue a new series of bonds in the form of asset-backed securities, with the income stream from the receivables associated with the repayment of the outstanding project loan serving as collateral, or, rather, “backing” these securities. This asset-backed series of securities need not have an extensive capital structure with multiple tranches holding different levels of seniority relative to one another. Rather, only one or two tranches of this new series could be issued, with the senior-most tranche being rated investment grade by two or more credit rating agencies, each of which the SEC has designated as a Nationally Recognized Statistical Ratings Organization (NRSRO or rating agency), such as Moody’s Investors Service, Inc. (Moody’s), Standard & Poor’s Ratings Services, a division of The McGraw-Hill Companies, Inc. (S&P), or Fitch, Inc. (Fitch). Even if these securities receive a non-triple-A investment grade rating, investors with a high risk tolerance may evaluate the risk-reward ratio for investment in such securities, and believe that they will be able to benefit from this investment in the long run. A downside of this hypothetical is that if a completed piezoelectric project does not perform as well as originally expected, it may be difficult for the outstanding loan on the project to be repaid, and the

loss severity to investors who purchased the asset-backed securities collateralized by the repayments of debt on this project could be significant.

This is why the proposed second case of having the debt from multiple piezoelectric projects pooled together may be more attractive. Generally, rating agencies look favorably upon collateral portfolios that are assembled with an eye toward collateral diversity. The thought is that the more diverse the collateral portfolio, the lower the cumulative probability of loss on such portfolio. The multiple piezoelectric projects case envisions a scenario in which the loan obligations from a group of piezoelectric projects are pooled together. These projects could be located either in the same country, or throughout multiple countries, presuming that similar loan underwriting standards are used for all loans in the portfolio, and that other risk factors are considered that relate to the likelihood of repayment of the debt for each of these projects (such as country risk, the project’s geographical location, size, expected traffic, etc.). Under this construct, for instance, loans from large piezoelectric projects in the United States, Israel, Japan, and elsewhere in the world could be pooled to form one integrated collateral pool.

The creation of such a diverse collateral pool could be advantageous insofar as it could spread the risk of repayment across multiple projects. This hypothetical situation could be preferable to one in which the risk of repayment is solely dependent and concentrated on a single piezoelectric project. Having multiple, diverse piezoelectric projects and the income streams on their related loan obligations in the collateral pool backing the vintage of asset-backed bonds issued could dilute the risk that could be associated with a poorly performing single project. Potentially, this type of collateral pool could provide sufficient support for asset-backed bonds with a more robust capital structure—one having multiple tranches of securities in several or more different levels of seniority relative to one another. Using a structuring methodology similar to that used in structuring cash collateralized debt obligations or securitizations, issuing multiple classes of subordinated securities, is a means of creating credit enhancement for the more senior tranches. Because

losses are absorbed in reverse order of tranche seniority, the most senior tranche in the capital structure benefits from this form of credit enhancement, as it is the last tranche to be affected by an interruption of cash flow from repayment of the underlying collateral loans. Generally, rating agencies assign ratings to different tranches in the capital structure based on each tranche's expected risk of loss due to its location and level of subordination in that capital structure. Having a multi-tranche capital structure could be beneficial for investors insofar as this structure could potentially increase the likelihood of having at least the senior-most tranche of securities be associated with a high probability of being able to pay scheduled distributions to holders of such securities, and having such securities receive a triple-A rating from the rating agencies.

To increase diversity and minimize default risk further, as the third case envisions, the collateral pool could be expanded to include other non-piezoelectric project debt, such as debt from other renewable-based projects, such as wind or solar projects, or debt from industries other than those in the energy field. Each industry group from which financial assets are originated is presumed to have zero correlation with other industry groups. Accordingly, the more diverse the collateral portfolio, the less risky the portfolio should be in terms cumulative defaults on the collateral securities backed by the receivables on this portfolio. Broadening the range of collateral pools into which piezoelectric loans could be inserted so that the loan from an individual piezoelectric project constitutes a relatively small percentage of the overall collateral portfolio could minimize the potential risk associated with this project, thereby making the bonds or other securities backed by this collateral pool have a lower degree of piezoelectric debt concentration risk than the case of bonds collateralized by an individual piezoelectric project or by multiple piezoelectric projects alone. Moreover, if such a collateral pool were managed by a collateral manager using techniques historically employed for managed, rather than static, collateralized loan obligation pools, then the sub-performing or non-performing loan obligations associated with a particular piezoelectric project could potentially be rotated out of the collateral pool at fixed intervals, and replacement financial assets that satisfy the eligibility criteria and other requirements could be

selected and inserted in its place in the collateral pool. Purchasing bonds backed by such a diverse collateral pool could be an option that certain investors who value diversity across multiple sectors may find attractive, depending on their level of risk tolerance.

As the above illustrates, new forms of asset-backed securities partially or fully collateralized by piezoelectric debt could be used as the basis for formulating novel fixed income securities or products, or could be integrated into existing, already established types of fixed income products. For those willing to invest in structured securities backed by piezoelectric debt, the risks may be high, but the benefits and rewards could potentially be great.

### **Rating Agencies and Issues Relating to Default Probability, Recovery Rate, and Default Correlation**

Assigning ratings to bonds backed by piezoelectric projects may be something that rating agencies may be hesitant to do. This is because given the ultra-newness of piezoelectric projects, there is no performance history associated with these types of projects. This could be problematic for a number of reasons. First, rating agencies use the performance history of an asset type as a benchmark to predict future performance of similar assets. For instance, to estimate a portfolio's collateral quality under Moody's criteria, there are three main factors that drive the loss distribution of a collateralized debt obligation portfolio: default probability, recovery rate, and default correlation. Default probability relates to the likelihood of a tranche's inability to meet its debt payments and default, based on historical data of actual default experience for corporate debt. The default rates are calculated by rating category and by term to maturity, so that a direct relationship exists between the likelihood that a collateral security will default and its rating. Notably, S&P measures a tranche's credit quality primarily by using default probability. Absent a performance history, it will be difficult for rating agencies to estimate default probability for piezoelectric asset-backed bonds, and, consequently, it will be challenging for rating agencies to assign ratings to tranches of these bonds.

Arguably, bonds backed by piezoelectric project receivables as well as receivables from other projects and sectors could hold the most promise for purposes of obtaining a rating on bonds backed in part by piezoelectric projects. Although receivables on piezoelectric projects may lack an established history for purposes of default probability calculation, other receivables in such a portfolio may possess a more established and promising history. Also, the recovery rate represents the percentage of par value of the recovery amount on the defaulted asset. As a result, the recovery rate varies across industry sectors, asset type, and different periods of time. Because this percentage of recovery amount may be difficult to project relative to piezoelectric debt, calculating the recovery rate based on the other loans in the collateral portfolio may compensate for the absence of a piezoelectric recovery rate. Default correlation is one of the most difficult things to measure, as it measures the tendency of assets to default together. This means that for highly correlated collateral securities, if one obligor defaults, it is likely that similarly situated obligors in the same asset category will also default. Extrapolating this to highly correlated piezoelectric project loans, if one obligor defaults on such a loan, it is likely that similarly situated obligors will also default. When evaluating the risk profile of a loan portfolio, one therefore needs to understand both the default behavior of the individual collateral security as well as whether multiple assets in the same collateral portfolio are likely to default simultaneously. The pricing of each asset-backed tranche would take into account this correlation risk. Moreover, to address and minimize default correlation issues, concentration limitations are imposed on the collateral portfolio, so that only a capped maximum percentage of a certain type of financial asset—such as piezoelectric project loans - relative to the entire collateral pool itself, is permitted to be a collateral security. By limiting the concentration of piezoelectric project loans in a particular loan pool, rating agencies may be more likely to be less hesitant to assign ratings to asset-backed bonds that possess such loans as a collateral component.

## Conclusion

Although piezoelectric flooring and vehicular thoroughfares have their share of critics, as a matter of

policy, these products are worthy of further public encouragement and support on a global scale. Like solar power years ago and many other evolving technologies, these piezoelectric devices may be novel, yet functional. Better yet, if the current research being conducted globally at prestigious universities continues to be encouraged and is supplemented through the efforts of outside investors and other strategic partners, these devices' product efficiency and ability to be rolled out for commercial use will likely improve within a relatively short time. Piezoelectric project finance transactions or other types of finance and technology endeavors could be available in the not too distant future, yielding opportunities around the world for investment bankers to draw upon established methodologies and techniques to create novel securities, and for savvy investors to potentially reap the rewards of these new financial products. Hopefully, policymakers and others will recognize the folly of Piezoelectric Pessimists' arguments, the value unique piezoelectric devices offer globally to the environment and the financial world, and the potential piezoelectric power holds as another promising alternative energy source worthy of continued public support and scientific development.

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**FROM ABA PUBLISHING AND THE SECTION OF ENVIRONMENT, ENERGY, AND RESOURCES**

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# **Global Climate Change and U.S. Law**

## **Michael B. Gerrard, Editor**

Because global climate change presents extraordinary challenges to the environment and the economy of United States as well as those of other nations, the debate about how to effectively implement more climate-friendly policies is sure to continue and amplify. The scientific case for strong action is becoming more compelling every month, and opinion polls show that the American public increasingly agrees. The law will play an important part in developing mechanisms to protect the climate, such as conserving energy, using renewable sources of energy, and implementing emission caps and trading programs.



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