Toward a U.S. Emission Trading System
Lessons Learned and Linkage to Other Systems

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Introduction

As the United States considers various regulatory or legislative approaches to mitigate the generation and release of greenhouse gas 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:

- What are the lessons learned from previously implemented emission trading systems
- What are ways to ensure 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 in regard to 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 Emissions Trading System (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.[1] Phase I applied only to industry and electricity production, covered only carbon dioxide (CO2) emissions from combustion and some industrial processes (as opposed to all greenhouse gas emissions), and stipulated that 95 percent of the "allowances must be given away (as opposed to auctioned). It covered 15,000 installations across 27 countries and approximately 46 percent of CO2 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 was of uneven quality. The United Kingdom (U.K.) recognized that the quality of the data supporting the NAP could be a limiting factor. In the U.K., the baseline data was derived first from the National Atmospheric Emissions Inventory (NAEI). This data has been available since 1950 for all sectors and 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

[1] "The European Union's Emission Trading System in Perspective," Denny Ellerman, Paul Jaskow, MIT, May 2008, (for the Pew Center)

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 U.K. CO2 emissions. The analysis which set out the basis for the Climate Change Agreements, which in turn allowed the effective development of a U.K. 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, by AEA Technology Environment in 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 U.K. government forecast of energy use and emissions under low and high oil price scenarios to 2020.

The quality of the U.K. 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.

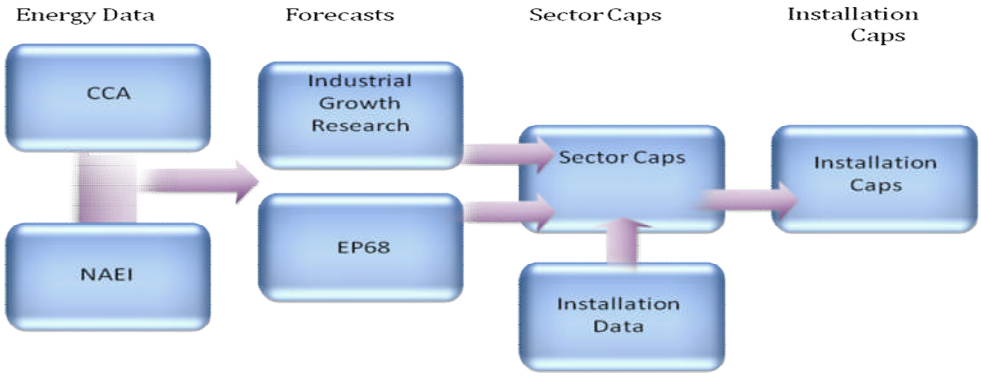

Figure 1 - Data Management and Analysis Framework

In September 2004, the combined datasets provided an estimate of emissions from traded sector of 736mtCO2 (~245mtCO2 pa). Based on this, the U.K. forwarded a draft NAP to the European Commission (EC). In May 2005, the U.K. provided updated figures to the EC that showed an increase of 2020 mtCO2 pa. However, the EC. rejected this revision. Ultimately, the U.K. planning inventory proved accurate to within one percent of actual U.K. emissions.

Allowances were distributed according to each country's NAP and the Emission Trading System went into effect on January 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.

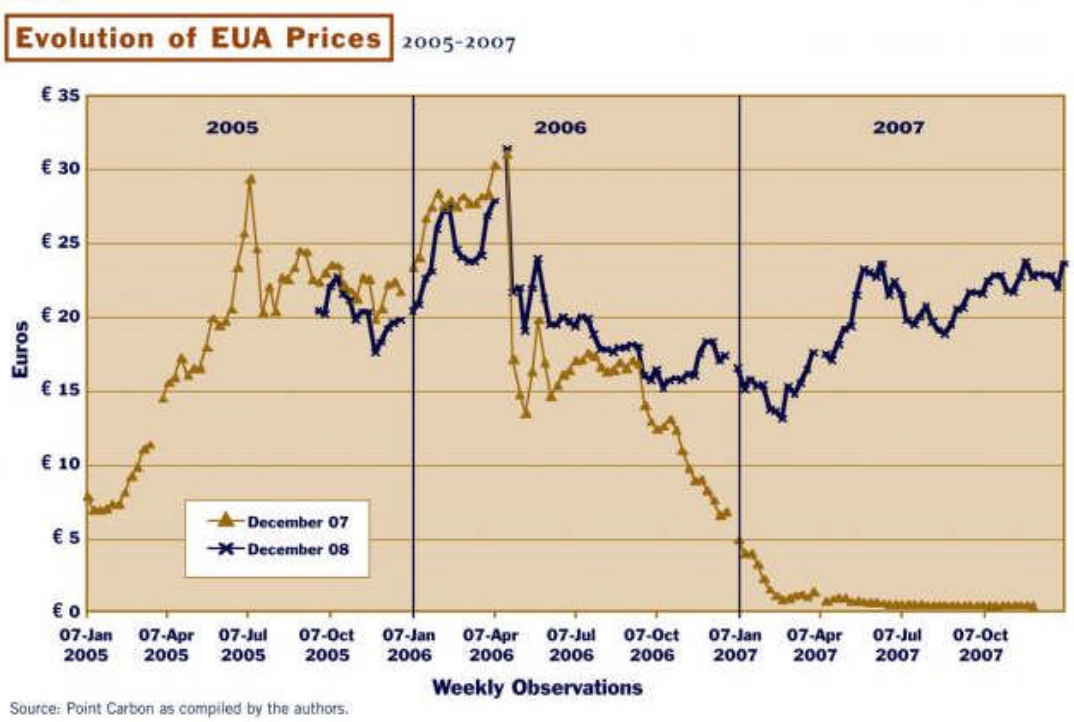

Figure 2 - Evolution of EUA Prices 2005-2007

As the chart below shows, most EU member states gave away too many allowances.

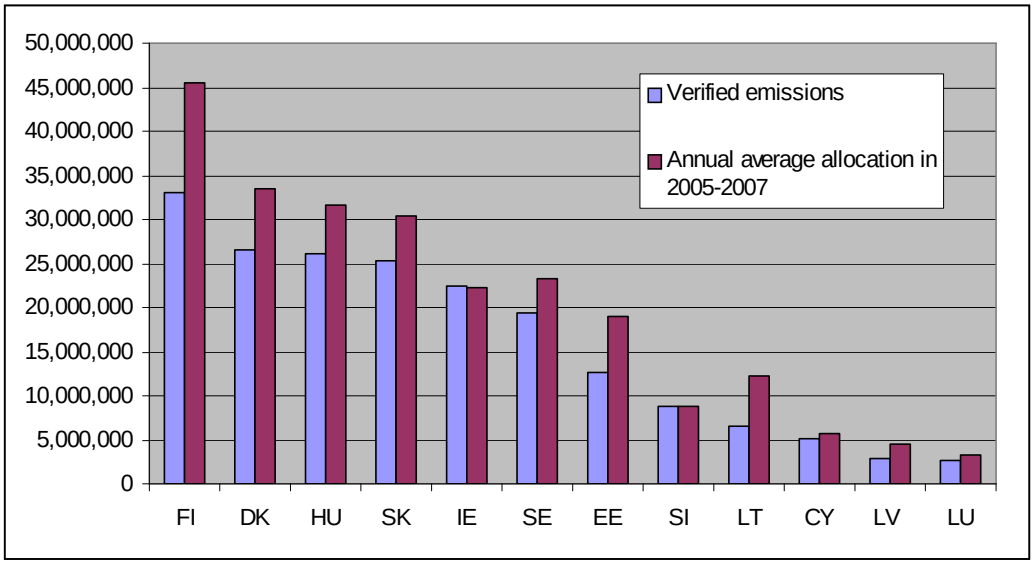

Figure 3 - Comparison of verified emissions and annual average allocation in 2005-2007

This over-allocation was addressed in the next phase of the EU ETS. As can see from the chart below, allocation of allowances in Phase II is much closer to verified emissions (this chart also shows how close the U.K. targets were to actual emissions in Phase I).

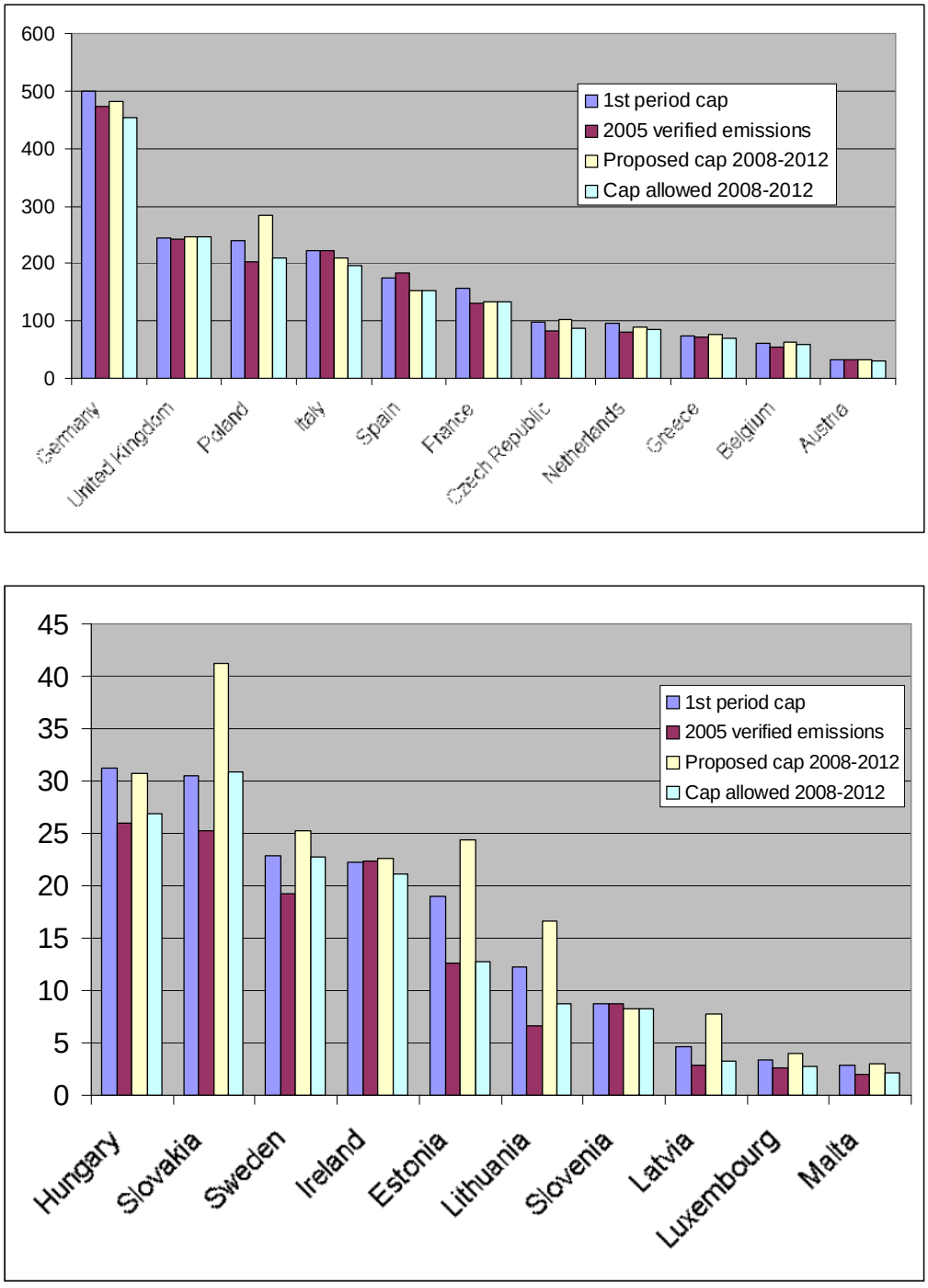

Figure 4 - Allocations, Emissions, and Phase II Caps

What are the lessons learned for the United States? First, an ETS must be based on consistent and integrated emission data. In the U.S., 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. Ultimately, the U.S. 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 in order to measure the success of the data management efforts.

Secondly, the ability to accurately forecast 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 Emission Trading Scheme will have to be selected. There are a number of options. The first -- free allocation based on past emissions -- offers simplicity, is palatable to businesses required to take part, and would be relatively inexpensive to implement. However, as shown in the EU experience, this method does not reward early action, would require some element of data integration (in order 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. However, 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. Emission 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 be compatible to ensure that a ton 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 U.S., 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 accurately forecast 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 competiveness through increased costs for facilities with a higher proportion of non-free allowances.

Lessons Learned: 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 greenhouse gas emissions in the U.S. In March, the 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, the EPA is taking its first steps towards regulating greenhouse gas (GHG) emissions under the Clean Air Act (CAA). In 2008, Congress directed the 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
- Direct emitters with emissions greater than 25,000 metric tons per year

The rule would require these affected facilities to account for all of the "Kyoto" greenhouse gases (CO_2, CH_4, N_2O, HFC, PFC, SF_6, NF_3, and HFE). The inclusion of gases beyond CO_2 represents the incorporation of lessons learned from the EU system, which focused trading on CO_2 only. Under the rule, the first reporting year would be 2010.

To date, reporting of GHG emissions in the U.S. 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 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_2 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:

- 3 percent below 2005 levels in 2012
- 20 percent below 2005 levels in 2020
- 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 U.K. 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_2 equivalent in 2015 and $17 - $22 per ton of CO_2 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 U.S. 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 U.S.'s first step towards getting in line with other countries who have already adopted similar reduction targets (such as the U.K.).

Conclusion

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 U.S.
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. However, 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 the 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, while 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 U.S., the political maneuvering will come not only from sectors, but also from geographically diverse stakeholders and states – 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.

About the Authors

Matthew A. Low, Vice President, Energy and Environmental Programs

With over 32 years of professional experience in environmental and energy law and policy, Matt Low has been involved in over 100 major cases and numerous policy, regulatory, or statutory negotiations. He has led environmental due diligence efforts for major acquisitions and is nationally recognized for his work as an arbitrator, mediator, and expert witness. Mr. Low has developed policy recommendations, mediated negotiations and facilitated dialogues on a diverse range of environmental and energy issues, including carbon emission trading programs under the Kyoto Protocol, high-level nuclear waste siting, acid rain policy and legislation, hazardous waste capacity assurance guidance, stratospheric ozone policy options, toxic release inventory, and energy efficiency initiatives. For the Environmental Protection Agency (EPA), he has developed case studies used to train other countries in compliance and enforcement techniques. He formerly served as a branch chief and senior litigation counsel for EPA's Office of Enforcement, Director of Policy for the National Commission on Air Quality, partner in a private law firm, and president of TechLaw, Inc.

Nathan Smith, Senior Principal, Energy and Environmental Programs

Mr. Smith leads Project Performance Corporation's Energy and Environment practice, where he provides strategic consulting in the areas of water quality management, greenhouse gas management, energy efficiency and renewable energy, environmental due diligence, and environmental program development. He supports commercial, public-sector, and non-profit clients. Mr. Smith supports multi-national corporations in the design and creation of greenhouse gas baselines to understand the emissions footprint of global operations. He also assists a major hospitality services vendor in its efforts to reduce waste and increase reuse and recycling through an environmental management program. Mr. Smith consults with major financial organizations to evaluate and reduce the waste and greenhouse gas emissions associated with consumer banking. He also works with the EPA's Office of Water to evaluate the potential policy and regulatory implications that will result from climate change and the emergence of new contaminants. Prior to joining PPC, Mr. Smith was an Environmental Scientist at the Research Triangle Institute (RTI), where he specialized in spatial data analysis for the EPA's water quality monitoring and assessment program. He holds a Master of Environmental Management (MEM) from Duke University's Nicholas School of the Environment and Earth Sciences and a BA in Environmental Sciences from the University of Virginia.

Daniel Waller, Energy Policy Expert

Daniel Waller is an energy policy expert, experienced in assessing policies and their impact on energy market conditions and behavior. He has a M.Sc. in Energy Policy from Imperial College and has worked in the energy and environment sector for the last 12 years. His recent work focus has been on helping public and private sector clients influence and adapt to a changing energy and environment legislative agenda; this has included:

- Helping private and public sector organizations understand and plan for the arrival of the Carbon Reduction Commitment (CRC)
- Helping private sector clients develop strategies to opportunise the EU's Emissions Trading Scheme, the Large Combustion Plant Directive, and the U.K.'s Renewables Obligation
- Helping private sector companies develop and implement energy policies, supported by the implementation of energy management procedures
- Leading the delivery of Carbon Management projects to clients in the private sector
- Carrying out organizational and product based carbon footprints
- Helping private sector companies develop strategies to comply with Climate Change Agreements and the Carbon Reduction Commitment

Other policy analysis work includes the use of the UKCIP projections and their application to businesses in both the private and public sector. This has helped clients understand how their assets and liabilities may change under varying degrees of climate change.

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