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# Climate Change Risks and Opportunities: How Companies Can Develop Information to Comply with SEC Guidance Regarding Climate Change Disclosure

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The Securities and Exchange Commission (SEC) on 2 February 2010 issued guidance to public companies on the SEC's disclosure requirements as they relate to climate change. This guidance reflects a growing consensus that climate change legislation and regulation, in addition to the physical impacts of climate change, could affect the operating and financial decisions as well as the future performance of many publicly traded companies. Determining whether these effects are "material"—which would trigger disclosure—requires systematic processes for gathering, analyzing, and documenting a substantial amount of company-specific information, as the SEC guidance suggests.

The comprehensive empirical model that NERA Economic Consulting has developed to evaluate the financial effects of climate change policies—the NERA Carbon Financial Impacts Model—is ideally suited to assist a company in several ways:

- Helping the company to develop appropriate strategies for making investment and other major decisions, independent of any SEC disclosure requirements;
- Providing the systematic processes required to assess materiality in light of SEC guidance—including international and indirect effects as well as uncertainties on whether legislative and regulatory policies might be adopted and on what their provisions might be;
- Supplying a verified third-party set of procedures that can be disclosed to auditors requesting information on a company's internal compliance systems for identifying and quantifying potential effects of climate change on their operations; and
- Providing a rigorous due diligence review of other procedures the company has developed to comply with the SEC guidance.

NERA has used the NERA Carbon Financial Impacts Model to evaluate financial impacts and implications for key decisions for companies in many sectors, including electricity, oil and gas, refining, petrochemical, cement, pulp and paper, iron and steel, chemicals and aluminum.<sup>1</sup>

## Background on the SEC Disclosure Guidance

The SEC notes that its guidance document does not change disclosure regulations or standards, and it does not modify SEC or judicial interpretations. Rather, the guidance is intended to clarify how climate change issues should be handled within the SEC disclosure framework.<sup>2</sup>

## Climate Change Issues That May Trigger Disclosure

The SEC release discusses four specific topics as ways that climate change may trigger disclosure required by its rules and regulations: (1) impact of legislation and regulation; (2) impact of international accords; (3) indirect consequences of regulation or business trends; and (4) physical impacts of climate change.

### Impact of Legislation and Regulation

The SEC notes that there have been significant developments in federal and state legislation and regulation regarding climate change. These include programs and proposals such as the Regional Greenhouse Gas Initiative (RGGI) in Northeast and Mid-Atlantic states, the California Global Warming Solutions Act of 2006, the Western Climate Initiative, and the Midwestern Greenhouse Gas Reduction Accord, as well as legislation in Congress. The House of Representatives passed one version of a climate change bill in June 2009, and a similar bill was introduced in the Senate in September 2009. In addition, various regulatory approaches are being considered by the US Environmental Protection Agency (EPA).

The SEC notes that the major federal climate change bills would establish a greenhouse gas (GHG) emission “cap-and-trade” program, among other programs. Under the cap-and-trade approach, the government sets a limit on overall emissions (the “cap” element) and allows regulated facilities to buy and sell allowances, i.e., the right to emit a ton (the “trade” element). The cap-and-trade approach—which also is used in the major state and regional programs—is desirable both because it tends to minimize the costs of meeting GHG targets and because it provides greater certainty that environmental targets will be met.<sup>3</sup>

The SEC provides several examples of consequences of pending legislation or regulation:

- Costs to purchase, or profits from sales of, allowances or credits under a cap-and-trade program;
- Costs to improve facilities and equipment to reduce emissions in order to comply with regulatory limits or to mitigate the financial consequences of a cap-and-trade program; and
- Changes in profit or loss due to increased or decreased demand for the company’s goods and services directly due to the legislation or regulation or indirectly due to changes in costs.

Since conditions can change, the SEC notes that companies should regularly assess their potential disclosure obligations given new developments.

The SEC notes that the disclosure evaluation includes positive as well as negative effects. It provides the example of a cap-and-trade program in which a company may profit from selling excess allowances (i.e., if its allocation exceeds its emissions) or from selling offset credits. The SEC emphasizes that management should consider specific effects on the company rather than generic effects that could apply to any company.

In its guidance, the SEC specifically states how it expects its existing two-step procedure for determining whether a known trend or uncertainty may be material and require disclosure to be applied in evaluating pending legislation or regulation. First, management must evaluate whether the pending legislation or regulation is reasonably likely to be enacted. (The guidance notes that unless management determines that it is not reasonably likely to be enacted, it must proceed on the assumption that the legislation is reasonably likely to be enacted.) Second, management must determine whether the legislation or regulation, if enacted, would be reasonably likely to have a material effect on the company, its financial condition, or results of operations.

The SEC appears to recognize the complexities that lie behind this two-step procedure by noting that the company should explain difficulties in assessing the timing and effects of the pending legislation or regulation. Indeed, it is important to analyze the sensitivity of impacts to alternative policies and provisions—an important component of NERA’s modeling framework—in determining whether impacts are material and, if so, what materials should be disclosed.

### **International Accords**

The SEC notes that companies should consider the effects of international accords such as the Kyoto Protocol and the European Union Emissions Trading Scheme (EU ETS)<sup>4</sup> on their business and should disclose material effects. The general issues are the same as those for domestic legislation and regulation. Note that impacts of policies in other countries/regions—such as the EU ETS—can affect companies both directly (by affecting their own foreign operations) and indirectly (by changing the competitive position of domestic versus foreign producers). In addition, international climate programs could affect US climate programs if the programs are linked and thus allowances can be traded between them.<sup>5</sup> The NERA Carbon Financial Impacts Model accounts for these various potential effects, including the effects of international trade on the ability of domestic companies to pass on costs to their customers.

### **Indirect Consequences of Regulation or Business Trends**

The SEC guidance acknowledges the pervasiveness of potential indirect consequences of climate change on risks and opportunities for many companies. Climate change would change the pattern of demand, increasing demand for low-carbon goods and services and decreasing demand for high-carbon goods and services. The SEC also notes that indirect consequences could include reputational effects, particularly for companies whose businesses are sensitive to public opinion.

The SEC notes several possible indirect consequences of climate change:

- Decreased demand for goods that produce significant GHG emissions;
- Increased demand for goods that result in lower emissions than competing products;

- Increased competition to develop innovative new products;
- Increased demand for generation and transmission of energy from alternative energy sources; and
- Decreased demand for services related to carbon-based energy sources, such as drilling services or equipment maintenance services.

Disclosure is warranted if these (or other) indirect consequences could be sufficiently significant (i.e., “material”) for a company’s business, either positively or negatively. The SEC guidance emphasizes that companies need to consider their own particular circumstances in evaluating the materiality of opportunities or obligations. NERA’s modeling framework emphasizes the importance of company-specific information.

### **Physical impacts of Climate Change**

The physical impacts of climate change also can affect company profits and thus might be the subject of analysis. The SEC guidance notes the variety of ways that changes in weather patterns might affect businesses:

- Coastal properties could be damaged or disrupted;
- Increased frequencies of hurricanes or floods could disrupt supply chains or sales;
- Insurance claims and liabilities could increase; and
- Droughts or other climate-related events could decrease agricultural production.

The SEC guidance notes that companies whose businesses may be vulnerable to severe climate-related events should consider discussing material risks in disclosure documents. The NERA Carbon Financial Impacts Model can be modified to account for these effects.

### **NERA Modeling to Assess the “Materiality” of Potential Financial Impacts of Climate Change**

The SEC guidance emphasizes that “materiality”—and thus the triggering of potential disclosure—is an empirical issue that depends upon the specific circumstances of each company. NERA has developed a comprehensive empirical model to evaluate the financial impacts of climate legislation and regulation, including the international and indirect effects noted in the SEC guidance. A key element of the NERA model is the US Energy Information Administration National Energy Modeling System (NEMS), a state-of-the-art model used by the US federal government to provide information to Congress on the effects of major legislative proposals.

The NERA Carbon Financial Impacts Model has allowed companies in numerous sectors to evaluate how they might be affected by different climate policies—including cap-and-trade, renewable portfolio standards, and energy efficiency requirements—and how the effects vary under different policies and policy parameters. Companies could use this third-party verified framework to help in making key decisions as well as in responding to requests from auditors and others on the compliance systems the company has in place for identifying and quantifying potential effects of climate change on their operations.

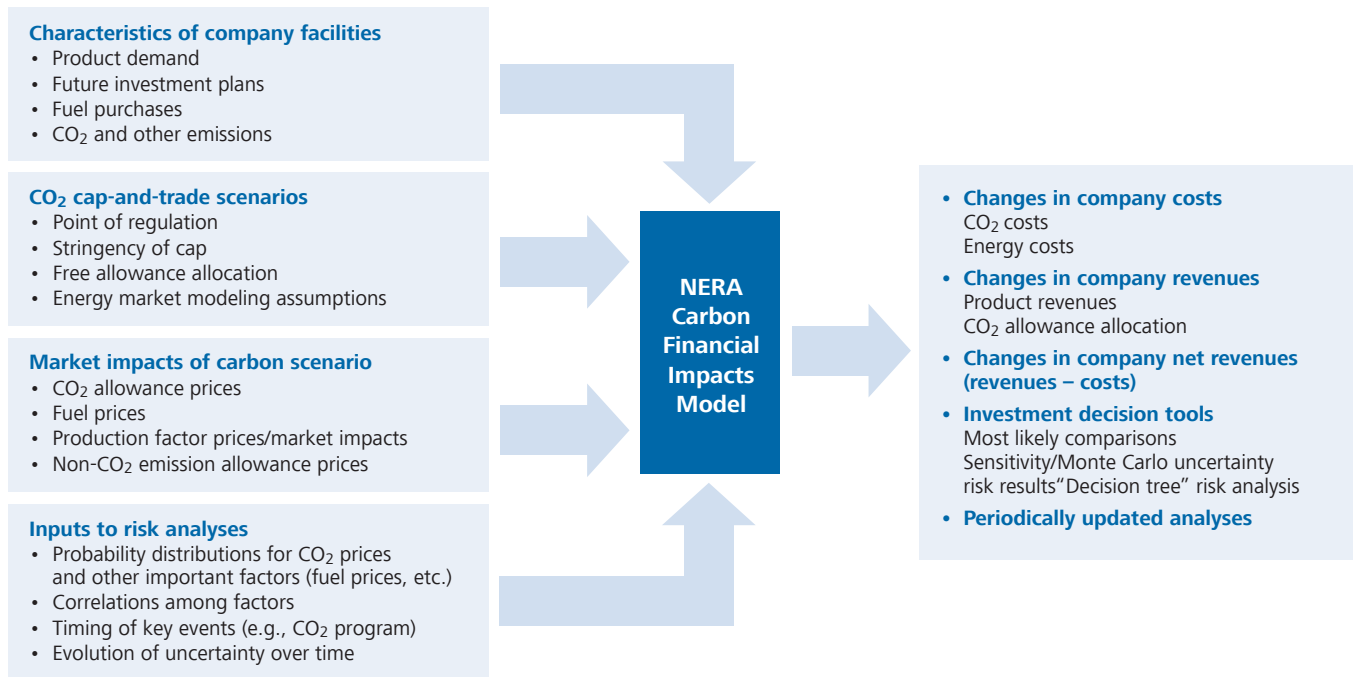
## NERA Carbon Financial Impacts Model

Figure 1 summarizes the structure of the NERA Carbon Financial Impacts Model. As shown in the figure, key inputs to the NERA model include the following:

1. *Company information*, including GHG and other emissions, electricity use, other energy use, and product demand and supply conditions.
2. *Climate policy scenarios*, including details of potential GHG cap-and-trade or related policies (e.g., renewable energy and energy efficiency policies).
3. *Market impacts from national/regional modeling of climate policy*, including the NEMS model to develop estimates of GHG allowance prices, as well as effects on energy prices and other product prices and quantities.

This information can be used to estimate the potential financial impacts of climate legislation or regulation for a wide range of companies. As shown in the figure, other inputs supplement the modeling to provide assistance with regard to investment decisions and ongoing analyses.

Figure 1. Overview of the NERA Carbon Financial Impacts Model



## Illustrative Financial Impact Estimates

Cap-and-trade is a key element of most of the major climate programs and proposals (including the EU ETS, RGGI, and most Congressional bills). Thus, we use cap-and-trade to illustrate how the NERA Carbon Financial Impacts Model can evaluate climate-related effects.

A key driver of the financial impacts of a cap-and-trade program is the allowance price trajectory. Figure 2 provides an illustration of estimated allowance prices under three potential cap-and-trade programs. The three trajectories illustrate the range of uncertainty regarding potential allowance prices and underscore the importance of sensitivity analyses and quantitative risk analysis in clarifying what is at stake due to future climate change policies.

Figure 2. **Illustrative GHG allowance prices in three scenarios**

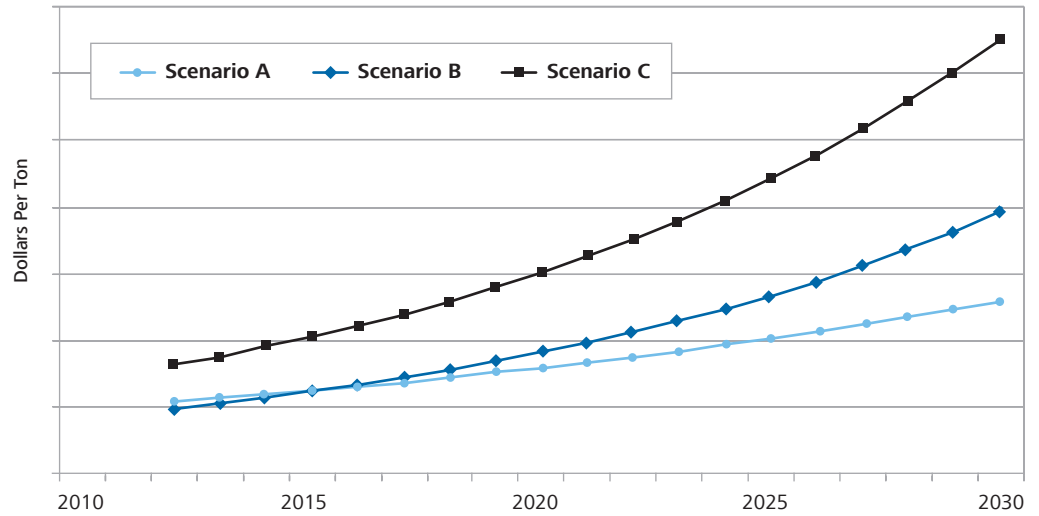
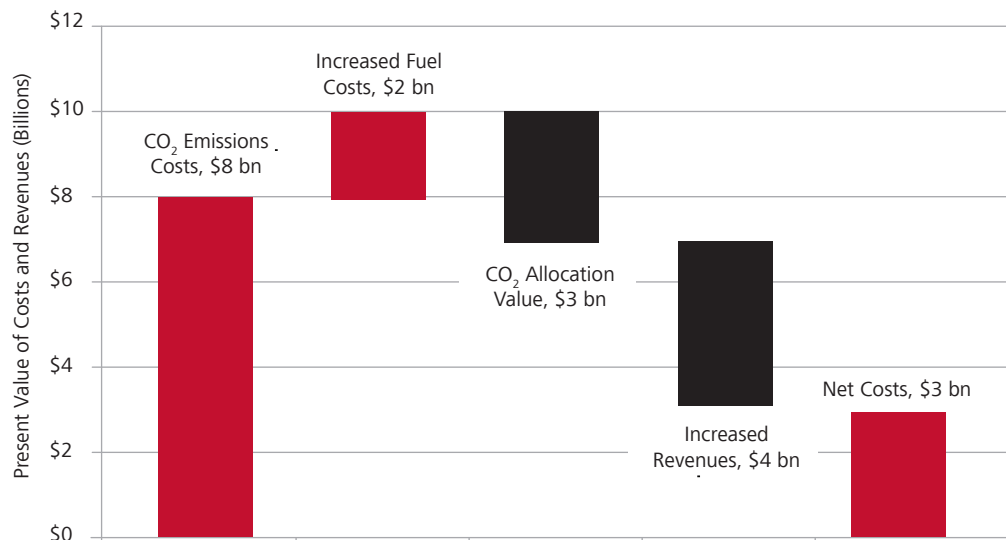


Figure 3 illustrates how allowance price and other modeling results are combined to estimate the likely net financial impacts due to the GHG cap-and-trade program. The figure shows the financial impact of four major factors that are typically included in the analyses<sup>6</sup>:

- *CO<sub>2</sub> emissions costs*, including the cost of reducing emissions as well as the costs for allowances required to cover the companies' remaining direct CO<sub>2</sub> emissions.
- *Increased fuel/energy costs*, due to changes in prices from the cap-and-trade program.
- *Free allocation*, the implicit revenues due to the free allocation the company receives.
- *Increased product revenues*, due to the "pass-through" of increased costs to consumers.

The results are reported in terms of the present value of costs and revenues over the time period covered by the modeling (e.g., from 2012, when the program is assumed to start, to 2030, when the 2009 version of the NEMS model ends). In this illustrative example, the company would incur costs over this period of \$8 billion to reduce its emissions and cover remaining CO<sub>2</sub> emissions and \$2 billion for increased energy (fuel and purchased electricity) expenses. Offsetting these increased costs would be \$3 billion in allowances allocated for free and \$4 billion in increased product revenues (reflecting the pass-through of costs to the company's customers). The net costs in this case would be \$3 billion (i.e., \$8 billion + \$2 billion - \$3 billion - \$4 billion = \$3 billion). Note that the model also provides annual results so one can see how these cost and revenue components change over time.

Figure 3. **Hypothetical financial impacts of US GHG cap-and-trade program for an illustrative company using the NERA Carbon Financial Impacts Model**



Note: All numbers are illustrative estimates of present values (2012-2030) and do not reflect modeling for any individual company.

### Results Illustrating Sensitivity to Alternative Climate Policy Parameters

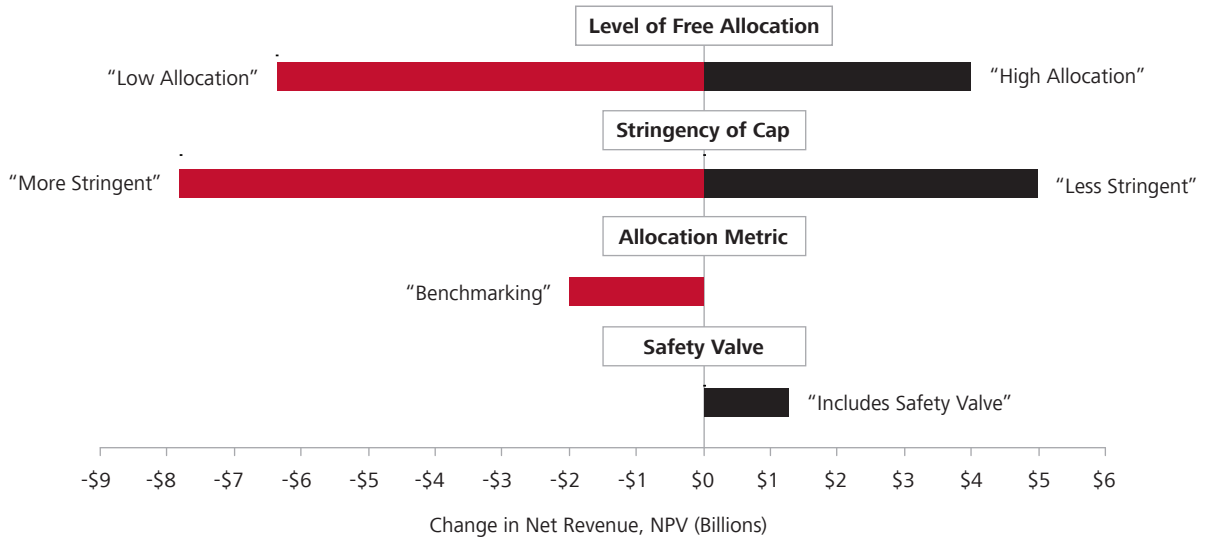
Financial impacts of climate policy depend upon the specifics of the climate change policy, as the SEC disclosure notes, as well as on the characteristics of the company. The NERA Carbon Financial Impacts Model provides the flexibility to develop sensitivity results—how the potential impacts depend upon parameters of the policy and other factors.

Figure 4 illustrates how changes in various parameters would affect the net impacts of a given climate change policy.

- *Allocation and allocation metric.* Free allocation provides a revenue stream that can compensate for climate policy costs. A company's allocation depends upon various factors, including the trajectory for overall allocation (versus auctioning) as well as the formulas for distributing free allocations to sectors and to facilities/companies.<sup>7</sup>
- *Cap stringency.* A more stringent cap trajectory would lead to higher allowance prices. In this example, higher allowance prices lead to larger negative effects, but the effects could be different for other companies (e.g., companies whose products would see greater demand with higher allowance prices).
- *Safety valve.* A safety valve would set a maximum allowance price (or allowance price trajectory) and thus could lead to lower allowance prices.

The company can use these types of results to clarify how different policy alternatives might affect the financial impacts. These results in turn can be used, in conjunction with assessments of the likelihood of various policies and provisions being adopted, to provide assessments of materiality.

Figure 4. **Range of possible net costs for illustrative company under alternative climate policy parameters**



Note: These are illustrative results in a pattern consistent with findings from various studies.

## Conclusions

The recent SEC disclosure guidance highlights the potential impacts of climate change on company decisions and financial prospects. Mandatory government policies to deal with climate change would affect companies in virtually every sector, particularly those in energy-intensive industries. As the SEC notes, impacts could be positive as well as negative, since climate policy would create demand for low-carbon products and technologies.

The SEC guidance on climate change disclosure means that companies should consider these potential impacts and determine whether disclosure of material impacts is warranted. Purely from a strategic planning perspective, however, companies should be undertaking these analyses anyway. In particular,

- *Every company should evaluate the financial impacts of alternative climate change policies.* Potential policies include cap-and-trade programs, renewable and energy efficiency programs, and regulatory requirements. Alternative scenarios should include key uncertainties that affect results (e.g., allocation of allowances, level of allowable international offsets). These analyses can clarify what is at stake for the company under different potential policies.
- *Climate policy effects should be included in planning for investment and other major decisions.* Climate policy can affect the costs and revenues of major investments, both directly through emissions costs and indirectly through changes in energy prices and product prices. Economic modeling can help clarify these impacts and point the way to superior decisions.
- *Assessing climate policy impacts is an ongoing task.* Companies will need to address the effects of climate policy in numerous ongoing decisions, including pricing decisions. Economic modeling is thus an ongoing task to make sure the right information is available for these decisions.

- *Determining whether climate change risks and opportunities are “material” and, if so, what information should be disclosed is challenging, but engaging in the assessments is important nonetheless.* The large number of uncertainties involved—including the provisions and timing of mandatory federal policies—mean that it will be difficult to quantify the risks and opportunities with precision or determine what information to disclose with assurance. Determining the proper response to SEC disclosure requirements will involve legal counsel. But developing the capacity to make these assessments is important. Indeed, it may be as important for investors to know that management is engaged in these assessments as it would be to have the results of the assessments disclosed at any point in time.

The modeling tools that NERA has developed and applied in numerous applications using the NERA Carbon Financial Impacts Model can assist companies in various ways. These include helping to make key decisions affected by climate change, developing the assessments called for by the SEC and likely to be requested by auditors, and providing a due diligence review of analyses and procedures the company has developed on its own.

## The Authors

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Dr. Harrison is Senior Vice President and head of NERA's Environment Group. Building upon more than 25 years of experience with emissions trading programs, he has participated in the development or evaluation of major climate change policies and proposals in the United States, including numerous federal initiatives and those in California, the Northeast, and the Midwest, as well as programs and proposals in Europe and Australia. He and his colleagues have assisted the European Commission and the UK government with the design and implementation of the European Union Emissions Trading Scheme. He has directed numerous projects for individual US companies and trade associations—including those in electricity, oil and gas, refining, petrochemicals, cement, pulp and paper, iron and steel, chemicals, and aluminum—using the NERA Carbon Financial Impacts Model. He has lectured frequently on climate change and related topics at numerous conferences in the US and abroad.

Before joining NERA, Dr. Harrison was an Associate Professor at the John F. Kennedy School of Government at Harvard University, where he taught energy and environmental policy, microeconomics, and other courses. He also served as a Senior Staff Economist on the US President's Council of Economic Advisors, where he had responsibility for environment and energy policy issues. He is the author or co-author of two books on environmental policy and numerous articles in professional journals. Dr. Harrison received a PhD in economics from Harvard University, where he was a Graduate Prize Fellow. He holds a BA, magna cum laude, in economics from Harvard College, where he was a member of Phi Beta Kappa, and an MSc in economics from the London School of Economics, where he was the Rees Jeffreys Scholar.

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Andrew Foss is a Consultant in the NERA Environment Group. He has participated in various projects on addressing climate change through cap-and-trade programs and other policy instruments, including renewable energy and energy efficiency programs. He has been involved in several projects evaluating the market and industry impacts of greenhouse gas programs and proposals with the NERA Carbon Financial Impacts Model, including projects related to electricity generation, refining, pulp and paper, iron and steel, chemicals, and aluminum. He also has significant experience evaluating the potential costs and benefits of other forms of environmental, health, and safety regulations.

Mr. Foss holds a Master in Public Policy with a concentration in Environment and Natural Resources from the John F. Kennedy School of Government at Harvard University. He earned a BA, magna cum laude, in physics from Amherst College. After graduating from college, he studied resource management at the Norwegian University of Science and Technology in Trondheim, Norway, on a Fulbright Scholarship.

## Notes

- <sup>1</sup> Various NERA staff contributed to the development and maintenance of the NERA Carbon Financial Impacts Model; see Harrison and Johndrow (2009). We would like to thank in particular James Johndrow and Samuel Grausz for their contributions to the most recent versions of the NERA Carbon Financial Impacts Model. In addition, we would like to thank the following for helpful comments (alphabetical order): Gregory Bibler, Elaine Buckberg, Simone Cote, Jonathan Falk, Adam Findeisen, Samuel Grausz, James Johndrow, Wayne Olson, Hethie Parmesano, and Daniel Radov. Although grateful for these contributions, the authors alone are responsible for the content of the article and any errors or omissions it might contain.
- <sup>2</sup> Substantial administrative and legal issues are involved in responding to these SEC disclosure requirements, as many legal experts have pointed out. See, e.g., Goodwin Procter (2010), Latham & Watkins (2010), and Van Ness Feldman (2010).
- <sup>3</sup> See Ellerman et al. (2003) for a summary of the experience with the cap-and-trade approach and its applicability to GHG emissions.
- <sup>4</sup> For an overview of the EU ETS, see, e.g., Harrison et al. (2007) and (2008).
- <sup>5</sup> For an overview of the effects of cap-and-trade program linkages, see Harrison et al. (2006).
- <sup>6</sup> Other components include changes in costs related to other pollutants (e.g., sulfur dioxide).
- <sup>7</sup> See Harrison et al. (2007) for discussion of the effects of alternative methods of allocating allowances in a cap-and-trade program.

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### **About NERA**

NERA Economic Consulting ([www.nera.com](http://www.nera.com)) is a global firm of experts dedicated to applying economic, finance, and quantitative principles to complex business and legal challenges. For half a century, NERA's economists have been creating strategies, studies, reports, expert testimony, and policy recommendations for government authorities and the world's leading law firms and corporations. We bring academic rigor, objectivity, and real world industry experience to bear on issues arising from competition, regulation, public policy, strategy, finance, and litigation.

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