

THE ESSENTIAL ROLE OF COMPLIANCE IN EMISSIONS TRADING SCHEMES

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SUMMARY

Emissions trading schemes represent a promising strategy to pursue economically efficient solutions to environmental problems, especially in regard to climate change. But high compliance rates are essential to realizing the benefits of emissions trading schemes, which can require continuous monitoring of both participating firms' emissions and permit trading activity. Low or even mediocre compliance levels can undermine the markets that drive the incentives for new technologies and other benefits. As market-based incentives continue to proliferate, regulators should consider what resources are required to ensure full compliance.

1 INTRODUCTION

Emissions trading is a market-based mechanism designed to allow firms to choose the least expensive strategy to meet environmental standards. The success of emissions trading schemes – notably in Europe and the United States in reducing the sulfur dioxide emissions that cause acid rain – makes them a promising tool to achieve the large-scale cuts in greenhouse gases necessary to stave off some of the worst effects of climate change in the 21st century.¹

As more and more countries accept the need to address climate change on a priority basis, emissions trading will play an increasingly significant role as an approach that not only creates incentives for firms to cut greenhouse gases emissions but also spurs technological innova-

tion that ensures that this is done at the lowest cost. In this way, emissions trading capitalizes on the "Porter Hypothesis" advanced by Michael Porter and Claas van der Linde – where the application of strict but flexible environmental standards fosters innovations in technology whose value meets or exceeds the costs of compliance.² But the development of these "innovation offsets" hinges on regulations that specify performance standards, such as an emissions trading scheme, rather than regulations that impose technology standards or otherwise limit flexibility.³

For example, early efforts by the United States to cut acid rain-causing emissions by mandating specific technologies cost approximately \$7 billion per year. Once the regulations were amended to include an emissions trading scheme in 1990, the costs of compliance fell drastical-

ly, and nearly one-fourth of the firms were able to comply with the standard at a profit.⁴ The European Union Emissions Trading Scheme (ETS)⁵ – the world’s first mandatory international scheme, which commenced operations in January 2005 – is expected to allow the EU to achieve its target under the Kyoto Protocol⁶ at a cost of between €2.9 and €3.7 billion annually.⁷ This is less than 0.1% of the EU’s GDP. Without the scheme, compliance costs could reach up to €6.8 billion a year.⁸

But it is important to note that emissions trading schemes are not appropriate for toxic emissions that can be hazardous to public health in the area surrounding a facility. The U.S. EPA cautions against trading schemes for toxics, where “[a]llowing such a facility to buy allowances ... may make a situation worse by causing a ‘hotspot’ if the cap does not require sufficient reductions to minimize or prevent local impacts.”⁹

2 BASIC DESIGN AND BENEFITS OF EMISSIONS TRADING SCHEMES

Emissions trading schemes begin with a hard “cap” or ceiling on total emissions and the allocation of permits that entitle participating firms to produce a specified amount of emissions. Permits may be allocated by auction, by predetermined criteria, or by historic levels of emissions, although the latter is generally the most common.¹⁰ Firms then use their allocated permits to cover their existing emissions, and firms whose emissions exceed their allocated amount will seek to buy additional permits from firms who have succeeded in reducing their emissions. If the scheme involves enough firms, and if there are no serious institutional barriers to buying and selling permits, then a market will emerge that determines the cost of the permits. At this point, firms are free to choose between cutting emissions and selling excess permits or maintaining (or even increasing) emissions through the purchase of additional permits on the market.

In a competitive market, the permits will flow toward their highest valued

use.¹¹ Firms that would receive lower value from their permits (due to higher costs, for example), have an incentive to sell them to firms that would value them more.¹² As Tom Tietenberg points out, this basic logic is true irrespective of how the permits are initially allocated. “Whatever the initial allocation, the transferability of the permits allows them to ultimately flow to their highest valued uses. Since those uses do not depend on the initial allocation, all initial allocations result in the same outcome and that outcome is cost effective.”¹³ Significantly, regulators are thus free to use the original allocation to address other issues, including political or feasibility concerns, without undermining the value of the scheme.¹⁴ Emissions trading schemes, consistent with the polluter pays principle, help pass some of the cost of pollution control to the consumer of pollution-intensive products by imposing the costs of environmental harm on those who cause it and those who benefit from it.¹⁵

In addition to their ability to provoke ingenuity and invention, emissions trading schemes have also spurred the development of entirely new subsector of the economy. For example, the mandatory monitoring and reporting requirements under the ETS have forced companies to establish CO₂ budgets and carbon management systems for the first time, employing scores of specialists and consultants.¹⁶ The carbon market has spawned a new industry comprised of carbon traders, carbon finance specialists, carbon management specialists, carbon auditors, and others.¹⁷ New businesses such as Climate Change Capital in the U.K., and the Chicago Climate Exchange in the U.S., are poised to benefit from emissions trading schemes by providing consulting services that facilitate trading.¹⁸ But the benefits of any emissions trading scheme hinge on its rates of compliance.

3 COMPLIANCE: THE MAINSTAY OF EMISSIONS TRADING

High compliance is essential to emissions trading schemes, and under-

standing how to strengthen compliance with these kinds of market-based mechanisms must be a priority for many policy-makers in both developed and developing countries. As with any commodity traded in a market, compliance is a “prerequisite of investor confidence.”¹⁹ Low or even moderate levels of compliance can destroy markets and undermine the financial incentives that drive the benefits of emissions trading.

A recent article by John K. Stranlund, Carlos A. Chavez, and Barry C. Field discusses compliance and enforcement issues arising in emissions trading schemes.²⁰ The authors note that environmental agencies have often calibrated their enforcement mechanisms to traditional command-and-control regimes, which generally operate by setting environmental standards and then sanctioning those firms that fail to meet them.

Emissions trading schemes, by comparison, provide firms with a choice: to reduce emissions or purchase permits. It is this choice that complicates the regulators’ job. Under an emissions trading scheme, regulators must monitor both emissions levels and a firm’s participation in the trading scheme – in order to know the number of permits each firm possesses at a given time and to be able to sanction firms whose emissions exceed their permit holdings. As many schemes involve self-reported data from firms, the regulator must consider penalties for firms that falsify information.

From the firm’s perspective, they must decide how much to emit, how much to report, and how many permits to hold. Generally, firms will do so according to the lowest cost, which is why the cost of the permits must, obviously, be lower than the cost of the fines.²¹

Stranlund, et. al., argued that since the permit price is the firm’s marginal cost of acquiring enough permits to cover its emissions, there is a greater incentive to be non-compliant when permit prices are high. Conversely, when permit prices are low (and especially when fines are high) there is a greater incentive to comply. They drew particular attention to the extremely high costs of fines in the U.S. Sulfur Dioxide

Allowance Trading Program as evidence that high fines engenders high compliance.

Practice may bear them out: emissions trading schemes have achieved high compliance rates where monitoring, and thus the threat of sanction, was high. National level programs in the Europe and the U.S have benefited from sophisticated monitoring technology that allows regulators to track the emissions of participating firms. The U.S. EPA has experienced nearly 100 percent compliance with its SO₂ program in part due to its use of continuous emissions monitoring technology (CEM).²² Participating facilities are required to install continuous emissions monitoring systems, which allows the EPA to maintain an accurate tally of SO₂ emissions. The EPA has described the continuous emissions monitoring data as “the gold standard to back up the paper currency of emissions allowances” by “verifying the existence and value of the traded allowance.”²³

The near perfect compliance in the SO₂ program presumably is the result of the continuous monitoring, which makes it easy for EPA to detect any violations. Vandenberg, however, suggests that there may be another reason contributing to the high compliance rate, specifically the activation of the “autonomy norm.”²⁴ The SO₂ program allows firms more autonomy to choose strategies, including methods of compliance, compared with other programs under the U.S. Clean Air Act. “Firms are required to hold emissions allowances for all relevant emissions, but they can (with some limits) control many variables in the compliance calculus, including the number of emissions allowances purchased and the means of achieving emissions equal to those allowances. The means of achieving emissions totals may include end-of-pipe controls, switching to cleaner-burning fuels and reducing plant operations.”²⁵ Because market-based regulatory approaches allow more flexibility, they presumably elicit a stronger and more favorable perception of autonomy. This may contribute to increased compliance rates compared to more traditional command-and-control approaches with less autonomy.

4 THE FEASIBILITY OF EMISSIONS TRADING SCHEMES IN DEVELOPING AND TRANSITION COUNTRIES

Skeptics point out that the benefits of emissions trading schemes will only be realized by the countries with the resources and technological expertise necessary to administer them. Emissions trading schemes in developing countries have been derided as a waste of valuable resources that could be more effectively applied to command-and-control programs, which remain the backbone of any serious environmental regime. But Joe Kruger, Katherine Grover, and Jeremy Schreifels have commented that there is little empirical evidence to suggest that the resources or expertise necessary to implement emissions trading schemes are greater than for other types of regulation.²⁶ And this has not stopped programs from going forward in China, Chile, and the Philippines, which have all pioneered their own emissions trading programs. One of the biggest drawbacks is the cost of implementing continuous emissions monitoring technology. But some emissions may be tracked using engineering calculations – such as by monitoring fuel composition and consumption data to calculate total emissions.²⁷ Regulators can also review supplemental information such as fuel purchases and product output to estimate emissions levels.²⁸

5 CONCLUSION

High rates of compliance are essential for emission trading schemes to succeed. Investors will not participate and the market will fail unless there is sufficient assurance that the contracts that support the trades will be fulfilled, and that violators will be punished. Because trading schemes promote efficiency and technology innovation, they are essential for any regulatory effort to address climate change. Sufficient resources to ensure full compliance must be provided, along with sufficient training for the new cadre of compliance officials who will require a new skill set.

6 REFERENCES

- ¹ A 1999 OECD survey identified more than 100 permit- or credit-based systems worldwide, which not only included nine emissions trading programs but also 75 permit trading schemes to protect fisheries, three schemes to manage water resources, five schemes to control water pollution, and five applications in land use management. OECD, *Economic Instruments for Pollution Control and Natural Resources Management in OECD Countries: A Survey*. 1999. See also Henrik Hasselknippe, *Systems for carbon trading: an overview*, *Climate Policy Special Supplement on Defining and Trading Emission Targets*, 3 suppl. 2, 43-57 (2003) (describing the increasing number of regional, national, and international systems for trading and transfer of GHG emission allowances, focusing on the International Emissions Trading Association (IETA) Trading Schemes Database, developed by Point Carbon.).
- ² Porter, Michael E. & van der Linde, Claas, *Toward a New Conception of the Environment-Competitiveness Relationship*, *Journal of Economic Perspectives*, vol. 9, no. 4, 97-118. (1995); M.N. Murty, S. Kumar, *Win-win opportunities and environmental regulation: testing of porter hypothesis for Indian manufacturing industries*, *Journal of Environmental Management* 67 pp. 139-144. (2003); Glen Dowell, Stuart Hart, Bernard Yeung, *Do Corporate Global Environmental Standards Create or Destroy Market Value?* *Management Science*, vol. 46, no. 8, pp. 1059-1074 (2000) in *Making Law Work: Environmental Compliance & Sustainable Development* (Durwood Zaelke, Donald Kaniaru & Eva Kružíková eds.) 2005. See also Stephen O. Andersen & Durwood Zaelke, *Industry Genius: Inventions and People Protecting the Climate and Fragile Ozone Layer* (Greenleaf 2003).
- ³ For a discussion of reasons inflexible standards severely limit innovation, see Environmental Law Institute, *Innovation*,

Cost and Environmental Regulation: Perspectives on Business, Policy and Legal Factors Affecting the Cost of Compliance (1999).

⁴ Id.

⁵ The scheme is based on Directive 2003/87/EC. The first phase, from 2005 to 2007, covers only selected industries and emissions, but will likely expand in its coverage in later phases (such as to transportation), as well as possibly link with other emissions trading schemes that may arise under Kyoto or other agreements. In its first phase, the ETS will involve more than 12,000 installations in the 25 Member States and account for approximately 45 percent of the EU's total CO₂ emissions. The ETS aims to reduce GHG emissions to 8 percent of 1990 levels by 2012.

⁶ The Kyoto Protocol's programs include: the national systems to estimate GHG emissions and removals (Article 5(1)); the reporting of GHG emissions (Article 7(1)); and the rules for the Protocol's three market-based mechanisms — joint implementation (JI), the clean development mechanism (CDM), and international emissions trading (Articles 6, 12, and 17). See also Terje Berntsen, Jan Fuglestad & Frode Stordal, Reporting and Verification of Emissions and Removals of Greenhouse Gases, in *Implementing the Climate Regime: International Compliance* (Olav Schram Stokke, Jon Hovi & Geir Ulfstein eds., 2005).

⁷ European Commission, *EU Emissions Trading: An Open Scheme Promoting Global Innovation To Combat Climate Change* (2004), available at http://europa.eu.int/comm/environment/climat/pdf/emission_trading2_en.pdf (The EU scheme allows companies to use credits from Kyoto mechanisms, which provides cost-effective means for EU firms to cut emissions and creates additional incentives for firms to invest in emission-reduction projects abroad, such as in developing countries). Similar-

ly, a report by the Natural Resources Defense Council on the impacts on employment in the U.S. as a result of the proposed McCain-Lieberman Climate Stewardship Act indicated that the "jobs created outweigh jobs lost by a factor of five by 2015, rising nearly to seven to one by 2025." James Barrett et al., *Jobs and the Climate Stewardship Act: How Curbing Global Warming Can Increase Employment* (2005), available at <http://www.nrdc.org/globalWarming/csa/CSAjobs.pdf>.

⁸ Id.

⁹ U.S. Environmental Protection Agency, *Tools of the Trade: Designing and Operating a Cap and Trade Program*, EPA430-B-03-002. But see Barringer, Felicity, *Bush to Permit Trading of Credits to Limit Mercury*, N.Y. Times, Mar. 14, 2005.

¹⁰ Boemare, Catherine and Quirion, Philippe, *Implementing Greenhouse Gas Trading in Europe: Lessons from Economic Literature and International Experiences*, Centre International de Recherche sur l'Environnement et le Développement, 2002.

¹¹ Tietenberg, Tom, *The Tradable Permits Approach to Protecting the Commons: What Have We Learned?* Fondazione Eni Enrico Mattei, 2002.

¹² Id.

¹³ Id.

¹⁴ Id.

¹⁵ Costanza, Robert, et al., *An Introduction to Ecological Economics* 205 (St. Lucie Press, 1997).

¹⁶ Id.

¹⁷ Id.

¹⁸ Climate Change Capital is an independent merchant bank in the UK offering financial consulting to clients affected by climate change and energy policies, developing risk management and other financial markets that help develop new markets, and conduct a variety of research and transactional services related to carbon markets. See

<http://www.climatechangecapital.com>. Chicago Climate Exchange is a multi-national and multi-sector market for reducing and trading GHG emissions. See <http://www.chicagoclimatex.com/>.

- ¹⁹ Edwards, Rupert, *Effective Enforcement and Compliance in the EU ETS: A View from the Financial Sector*, available at <http://inece.org/emissions/edwards.pdf> (“[T]he rules must be credible or the investor community will not play or will heavily discount the price, thus undermining the policy goals.”). See generally, the workshop website, available at <http://inece.org/emissions>.
- ²⁰ Stranlund, John K., Chavez, Carlos A. & Field, Barry C., *Enforcing Emissions trading programs: Theory, practice, and performance*, *Policy Studies Journal* 30(3), 343-361 (2002).
- ²¹ See Becker, Gary S., *Crime and Punishment: An Economic Approach*, 76(2) *J. Political Econ.*, 169 (1968) (discussing how potential offenders respond to both the probability of detection and the severity of punishment if detected and convicted. Compliance may be enhanced either by raising the penalty, by increasing monitoring activities to raise the likelihood that the offender will be caught, or by changing legal rules to increase the probability of conviction.).
- ²² Part of the Acid Rain Program in Title IV of the 1990 Clean Air Act Amendments, the trading scheme has succeeded in reducing emissions in 2003 by 38 percent of 1980 levels. See U.S. EPA’s Acid Rain Program 2003 Progress Report, available at <http://www.epa.gov/airmarkets/cmprpt/arp03/summary.html>. This is in contrast to the 61% compliance rate identified by EPA’s annual inspections of fossil fuel electric utilities under relevant EPA statutes. (EPA Office of Enforcement & Compliance Assurance, EPA/310-R-97-007, *Profile of the Fossil Fuel Electric Power Generation Industry 125* (1997) available at <http://www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/fossil.html>).
- ²³ U.S. EPA, “Continuous Emissions Monitoring Fact Sheet,” <http://www.epa.gov/airmarkets/monitoring/factsheet.html>.
- ²⁴ Vandenberg, Michael P., *Beyond Elegance: A Testable Typology of Social Norms in Corporate Environmental Compliance*, 22 *Stan. Envtl. L.J.* 55 (2003), at 99, n. 142, citing Marco Verweij, *Why is the River Rhine Cleaner than the Great Lakes (Despite Looser Regulation)?*, 34 *Law & Soc’y Rev.* 1007, 1029-30 (2000). The autonomy norm is described as: “An individual should be left alone unless events suggest that the individual has done or will do something morally blameworthy. Examples of the norm in the environmental compliance area include the common expectation in the business world that in the absence of blameworthy activity an individual or firm should be free from government intervention. Violation of the norm of autonomy may diminish one’s attachment to the norm of law compliance.” *Id.*
- ²⁵ *Id.* at n. 152.
- ²⁶ Kruger, Joe, Grover, Katherine & Schreifels, Jeremy, *Building Institutions to Address Air Pollution in Developing Countries: The Cap and Trade Approach*, OECD Global Forum on Sustainable Development: Emissions Trading, 2003.
- ²⁷ *Id.*, citing Jahnke, James, *Continuous Emission Monitoring*, 2nd Ed. (John Wiley and Sons 2000).
- ²⁸ *Id.*