LINKAGE AND MULTILEVEL GOVERNANCE

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INTRODUCTION

Most analysts assume that a unitary decisionmaker creates and enforces an emissions trading program.[1] This article, however, shows that environmental benefit trading under the Kyoto Protocol[2] depends heavily on a complex multi-jurisdictional architecture.[3] And it explores some of this architecture's implications for the ongoing effort to use an environmental benefit trading approach, conventionally seen as a property rights approach, to protect the atmospheric commons.[4]

This article begins by showing that the Kyoto Protocol does not create individual property rights at the global level, at least not directly. Instead, it provides a framework that distributes authority to create and enforce property rights to international, regional, national, sub-national, and even private entities.[5] Because of this architecture,

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1. *See* Jonathan Baert Wiener, *Global Environmental Regulation: Instrument Choice in Legal Context*, 108 YALE L.J. 677, 701-04 (1999) (discussing various models based on a unitary decision-maker).

2. Conference of the Parties to the Framework Convention on Climate Change: Kyoto Protocol, *adopted* Dec. 10, 1997, 37 I.L.M. 22 [hereinafter Kyoto Protocol].

3. *See* Erik B. Bluemel, *Unraveling the Global Warming Regime Complex: Competitive Entropy in the Regulation of the Global Public Good*, 155 U. PA. L. REV. 1981, 1984 (2007) [hereinafter Bluemel, *Unraveling*] (describing a "global warming regime complex" binding trading regimes together).

4. *Cf.* David M. Driesen, *What's Property Got to Do With It?*, 30 ECOLOGY L.Q. 1003, 1007-10 (2003) (reviewing DANIEL COLE, POLLUTION AND PROPERTY: COMPARING OWNERSHIP INSTITUTIONS FOR ENVIRONMENTAL PROTECTION (2002)) (discussing the limits of property as a metaphor for allowance trading).

5. *See* Bluemel, *Unraveling*, *supra* note 3, at 2015-25 (describing various subglobal trading regimes as "nested" within the Kyoto Protocol); *see also* Eva Benz, Andreas Löschel & Bodo Sturm, *Auctioning of CO2 Emission Allowances in Phase 3 of the EU Emissions Trading Scheme* 2-7 (ZEW Centre for Eur. Econ. Research, Discussion Paper No. 08-081, 2008),

efforts to create an international market in order to maximize cost savings and liquidity come not from a global assignment of property rights, but from efforts by numerous regulators to "link" disparate regional, national, and sub-national trading programs.

The article's second part analyzes some of the implications of this distribution of authority for the linking project. It discusses some enforcement concerns arising from this architecture that raise questions about whether Kyoto Protocol style trading is capable of delivering technology transfer, or instead, simply gives up emission reductions without obtaining any meaningful additional technology transfer. This problem has led to some restrictions on free trade of credits designed to combat what might be broadly described as emissions fraud.[6] The number of actors empowered to create such rules suggests that the rules addressing the problem will likely become numerous, varying, and complex.[7]

The third part of the article reviews some policy options for addressing the problems of excessive complexity in trading markets. It argues that recommendations to simply reduce transaction costs are overly simplistic, as transaction costs are necessary to pay for fraud detection. Instead, it suggests rethinking the automatic acceptance of linking and supplementing trading with measures to stimulate needed innovation.

The article concludes that a property rights regime can contribute to addressing global warming. But the global trading of credits does little to spur innovation and puts the realization of a cap at risk. For this reason, it may be wiser to restrict or even eliminate linkages between programs with caps and programs offering credits from uncapped sectors, such as the Clean Development Mechanism.

I. KYOTO'S MULTILEVEL GOVERNANCE STRUCTURE

In the past, many international agreements have limited the pollution coming from the countries involved without specifying the

available at http://ssrn.com/abstract=1298952 (describing the initial allocation rules implanted under the EU Emissions Trading Scheme).

6. I use this term to describe any case in which an emission reduction claim leads to a loss of a planned emission reduction without an additional, real, and correctly quantified extra emission reduction to make up for it, not just to describe intentionally false claims.

7. *Cf.* Judson Jaffe & Robert N. Stavins, *Linkage of Tradable Permit Systems in International Climate Policy Architecture*, 15-19 (Harvard Project on Int'l Climate Agreements, Discussion Paper 08-07, 2008), *available at* http://ssrn.com/abstract=1285606 (providing an overview of linkage).

mechanisms for limiting pollution.[8] It would be possible to craft a climate change agreement that established reduction targets for national governments, but said nothing about how they should achieve these targets.[9] Such an approach would leave countries quite free to choose between traditional regulation, emissions trading, pollution taxes, and even voluntary approaches, as long as the countries met their internationally agreed upon goals.[10]

The parties to the Kyoto Protocol, however, decided to address the instrument choice issue in the international agreement itself, rather than only on the national level.[11] As a result, the Kyoto Protocol authorizes no less than three emissions trading programs, allowing developed countries to purchase credits from developing countries through the Clean Development Mechanism (CDM), from Eastern Europe and the former Soviet Union through the Joint Implementation Program (JI), and from other developed countries with reduction obligations under the Kyoto Protocol.[12] The big advantage of this global approach, however fragmented, is that it allows for global trading of emission reduction credits.[13] The large market thus created will tend to produce greater cost savings than a smaller market would have.[14] At the same time, the use of international trading greatly increases the complexity of institutional challenges facing governments implementing the trading programs, which creates risks of lost emission reductions.

The Kyoto Protocol itself does not operationalize any trading program. It simply creates a framework for these programs which come to life if nation states (or other subglobal entities) implement

8. *See* David M. Driesen, *Choosing Environmental Instruments in a Transnational Context*, 27 ECOLOGY L.Q. 1, 18-19 (2000) [hereinafter Driesen, *Choosing Environmental Instruments*] (discussing treaties, including the Montreal Protocol on Ozone Depleting Substances, that do not specify implementation mechanisms).

9. *Id*. at 18 (discussing a "pluralism option" under which national governments choose instruments independently).

10. *See generally* Alan S. Miller, *Policy Responses to Global Warming*, 14 S. ILL. U. L.J. 187 (1990) (reviewing possible national responses to global warming).

11. *See* Kyoto Protocol, *supra* note 2, arts. 6, 12, 17.

12. *Id.*; Maria Netto & Kai-Uwe Barani Schmidt, *CDM Project and the Role of the UNFCCC Secretariat*, *in* LEGAL ASPECTS OF IMPLEMENTING THE KYOTO PROTOCOL MECHANISMS: MAKING KYOTO WORK 175, 175 (David Freestone & Charlotte Streck eds., 2005) [hereinafter KYOTO MECHANISMS].

13. *Cf.* Harro Van Asselt, Francesco Sindico & Michael A. Mehling, *Global Climate Change and the Fragmentation of International Law*, 30 LAW & POL'Y 423, 432 (2008) (discussing vertical fragmentation in international law as an influence on emissions trading).

14. *See* Wiener, *supra* note 1, at 717.

them. The Kyoto Protocol shares this dependence upon national implementation with substantially all international environmental agreements because there is no international bureaucracy capable of regulating private conduct directly.[15] Since most environmental harms stem from private production and consumption decisions, some sub-global governmental units must enact regulatory programs in order to implement international agreements aimed at reducing environmental hazards.[16]

The European Union (EU) assumed a leadership role in coordinating Europe's implementation of the Kyoto Protocol, while still leaving many substantial decisions to member states. Thus, the EU as a whole, not each member state, chose to implement an emissions trading program and determined which industries would be subject to emission limits.[17] This choice reflected the global decision embodied in the Kyoto Protocol to favor trading. While the Kyoto Protocol did not require countries to use trading, its support for trading no doubt influenced the EU decision to adopt it.[18]

While the EU as a whole made some important trading design decisions, it left the most important decision of all, the amount of reductions to require from facilities in its emissions trading scheme (ETS), largely to member states.[19] Yet, the ETS does provide for European Commission review of the National Allocation Programs (NAPs) that establish the caps and criteria under which the European Commission may disapprove of insufficiently ambitious NAPs, which the Commission has exercised.[20] The decision to leave critical

15. *See generally* ENGAGING COUNTRIES: STRENGTHENING COMPLIANCE WITH INTERNATIONAL ENVIRONMENTAL ACCORDS (Edith Brown Weiss & Harold K. Jacobson eds., 1998) (discussing national compliance efforts).

16. *See* Driesen, *Choosing Environmental Instruments*, *supra* note 8, at 6, 15-16 (developing a transnational legal process model explaining how international agreements become translated into domestic law generating compliance).

17. *See* Council Directive 2003/87/EC, 2003 O.J. (L 275). *See generally* Bent Ole Gram Mortensen, *The EU Emission Trading Directive*, 13 EUR. ENVTL. L. REV. 275 (2004) (discussing the directive and how it helps the European Union meet Kyoto Protocol objectives); Rie Watanabe & Guy Robinson, *The European Union Emissions Trading Scheme*, 5 CLIMATE POL'Y 10 (2005) (explaining the scheme's particulars).

18. *See* Chad Damro & Pilar Luaces Méndez, *Emissions Trading at Kyoto: From EU Resistance to Union Innovation*, 12 ENVTL. POL. 71, 74 (2003) (arguing that EU emissions trading "stems from" a "policy transfer" process emanating from the Kyoto Protocol negotiations).

19. *See* Marisa Martin, *Trade Law Implications of Restricting Participation in the European Union Emissions Trading Scheme*, 19 GEO. INT'L ENVTL. L. REV. 437, 443-44 (2007).

20. For a discussion of the European Commission review of NAPs and the litigation it spawned, see, e.g. Sharon Long & Giedre Kaminskaite-Salters, *The EU-ETS—Latest*

decisions about the stringency of caps primarily to member states left those states vulnerable to lobbying based on competitiveness concerns.[21] This vulnerability contributed to weakness in the NAPs, especially with respect to highly competitive energy intensive industries.[22] The European Commission has recognized this problem and is considering having the EU set the cap for a third phase of trading envisioned after 2012.[23]

Because the EU ETS links up with the "project-based mechanisms" (the CDM and JI programs that garner credits from individual projects), the integrity of the scheme depends upon effective oversight of claims of environmental benefits realized around the world.[24] The Kyoto Protocol has spawned a complex multi-level governance structure seeking to assure the integrity of credits said to reflect fresh efforts to address global warming.

At the international level, the Kyoto Protocol has created subsidiary bodies to exercise oversight and provide expert advice. The most prominent of these bodies, the CDM Executive Board, approves methodologies for estimating emission reductions from various types of projects.[25] Since this body cannot itself verify emission reductions on the ground in the developing countries where developers carry out CDM projects, Kyoto's architecture relies on national governments and private entity enforcement of the Kyoto Protocol as well. The Kyoto Protocol delegates decisions about whether projects contribute

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Developments and the Way Forward, 1 CARBON & CLIMATE L. REV. 64, 66-68 (2007); Leonard Massai, *Current Developments: European Union*, 2 CARBON & CLIMATE L. REV. 112, 117 (2008). *See also* Ved P. Nanda, *The European Union's Multinational Carbon Trading Program*, 85 DENV. U. L. REV. 995, 1001-02 (summarizing the Directive requiring the development of NAPs).

21. Axel Michaelowa & Sonja Butzengeiger, *EU Emissions Trading: Navigating Between Scylla and Charybdis*, 5 CLIMATE POL'Y 1, 5 (2005) (explaining how lobbying in the EU led to goals little different from "business-as-usual" levels in phase I of the EU trading scheme).

22. *See id. See generally* NATIONAL ALLOCATION PLANS IN THE EU EMISSIONS TRADING SCHEME: LESSONS AND IMPLICATIONS FOR PHASE II (Michael Grubb, Regina Betz & Karsten Neuhoff eds., 2006) (discussing weakness in the NAPs and reasons for them).

23. Benjamin Görlach, Hauke Hermann & Olaf Hölzer-Schopohl, *In the Market: The European Emissions Trading Scheme—Coming of Age? An Assessment of the EU Commission Proposal for a Review of the Scheme*, 2 CARBON & CLIMATE L. REV. 105, 106 (2008).

24. *See* ANJA KOLLMUSS ET AL., A REVIEW OF OFFSET PROGRAMS: TRADING SYSTEMS, FUNDS, PROTOCOLS, STANDARDS AND RETAILERS 6 (Stockholm Envtl. Inst.,Version 1.1, 2008) (describing the EU ETS as a major driver for the global offset market); Council Directive 2004/101/EC, pmbl. (2), 2004 O.J. (L 338) 18 [hereinafter *Linking Directive*].

25. *See* Ernestine Meijer & Jacob Werksman, *Keeping it Clean—Safeguarding the Environmental Integrity of the Clean Development Mechanism*, *in* KYOTO MECHANISMS, *supra* note 12, at 192, 197, 202 (discussing the CDM Executive Board's role of reviewing a project's environmental integrity).

to "sustainable development" to host country governments, which may disapprove of projects, but these governments, with the notable exception of China, have rarely exercised serious oversight.[26] Since developing countries often lack the capacity to monitor and verify emission reductions, the Kyoto Protocol privatizes that function, allowing "designated operational entities" to verify emission reductions.[27] The CDM Executive Board must approve these entities.[28] In practice though, these entities are usually consultant firms hired by the project developer.[29] This means that conflicts of interest threaten the system's integrity.[30]

Because the United States' federal government has not implemented the Kyoto Protocol, subnational governmental bodies took the lead in addressing climate change, including the initiation of emissions trading programs.[31] The first program, the Regional Greenhouse Gas Initiative (RGGI), consists of an agreement of governors of the northeastern states to require emission reductions from their electric utilities and allow trading to reduce the cost of these reductions.[32] This agreement not only offers an example of

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26. *See* Michael Wara, *Measuring the Clean Development Mechanism's Performance and Potential*, 55 UCLA L. REV. 1759, 1773 & n.77 (2008) (noting that countries have not disapproved CERs, but citing a Chinese Law using differential taxation to encourage its preferred types of CDM projects).

27. *See* Meijer & Werksman, *supra* note 25, at 198-202 (describing the role of Designated Operational Entities).

28. *Id.*

29. *See* Wara, *supra* note 26, at 1799 (discussing possible reforms, including to the CDM structure, to deal with conflict of interest for consultant firms hired by project developers).

30. *See* Michael W. Wara & David G. Victor, *A Realistic Policy on International Carbon Offsets* 19 (Program on Energy and Sustainable Dev., Working Paper No. 74, 2008), *available at* http://iis-db.stanford.edu/pubs/22157/WP74_final_final.pdf; *see also* Jelmer Hoogzaad, Adriann Korthuis & Charlotte Streck, *A Call to Reform*, CARBON FIN., Oct. 2008, at 16, 16 (describing designating operating authorities' incompetence).

31. *See* Erik B. Bluemel, *Regional Regulatory Initiatives Addressing GHG Leakage in the USA*, *in* CLIMATE CHANGE AND EUROPEAN EMISSIONS TRADING: LESSONS FOR THEORY AND PRACTICE 225, 225 (Michael Faure & Marjan Peeters eds., 2008); David M. Driesen, *The Changing Climate for United States Law*, 1 CARBON & CLIMATE L. REV. 33, 36-41 (2007); Kirsten H. Engel, *Mitigating Global Climate Change in the United States: A Regional Approach*, 14 N.Y.U. ENVTL. L.J. 54, 54 (2005); Douglas A. Kysar & Bernadette A. Meyler, *Like a Nation State*, 55 UCLA L. REV. 1621, 1628-32 (2008); *see generally* BARRY RABE, STATEHOUSE AND GREENHOUSE: THE EMERGING POLITICS OF AMERICAN CLIMATE CHANGE POLICY (2004) (discussing state programs addressing greenhouse gas emissions).

32. *See* REGIONAL GREENHOUSE GAS INITIATIVE MEMORANDUM OF UNDERSTANDING (2005) [hereinafter MOU], *available at* http://rggi.org/docs/mou_final_12_20_05.pdf; Note, *The Compact Clause and the Regional Greenhouse Gas Initiative*, 120 HARV. L. REV. 1958, 1959-60 (2007) (describing the political process establishing RGGI). Currently, these states are Maryland, Delaware, New Jersey, New York, Connecticut, Massachusetts, Rhode Island,

regional governance within a nation state; it also embodies multilevel governance within the sub-national region. The agreement creates a "Regional Organization" to perform central coordinating tasks, such as auctioning allowances.[33] Furthermore, the regional agreement resolves very important issues, such as the amount of reductions required, on the regional level.[34] But it leaves many important decisions, (e.g. how to use revenue realized from the auction) to states within the region. California and other states also are currently moving toward implementing emissions trading schemes.[35] Whether ultimately successful or not, international environmental benefit trading under the Kyoto Protocol has spawned a complex architecture, with responsibilities shared among global international bodies (*e.g.* CDM Executive Board), regional international bodies (*e.g.* EU Commission), national governments, subnational entities (*e.g*. state governments within the U.S.) and private entities.

Of course, all of this leads to coordination difficulties.[36] The European Commission has been in contact with California and RGGI staff to discuss coordination issues.[37] When the United States federal government enacts an emissions trading program, it will face an issue of how to coordinate its effort with the state programs already underway in the northeast and west. The EU has already faced a similar issue arising from an early emissions trading program in the United Kingdom, which predated the EU ETS.[38]

Vermont, New Hampshire, and Maine. Regional Greenhouse Gas Initiative, Inc., http://rggi.org/states (last visited Mar. 24, 2009).

33. MOU, *supra* note 32, § 4.

34. *Id.* § 2(c).

35. *See generally* MARKET ADVISORY COMM. TO THE CAL. AIR RES. BD., RECOMMENDATIONS FOR DESIGNING A GREENHOUSE GAS CAP-AND-TRADE SYSTEM FOR CALIFORNIA (2007); Western Climate Initiative, http://www.westernclimateinitiative.org (last visited Mar. 24, 2009); MIDWESTERN ENERGY SECURITY & CLIMATE STEWARDSHIP SUMMIT, MIDWESTERN GREENHOUSE GAS ACCORD (Nov. 15, 2007), *available at* http://www.wisgov.state.wi.us/docview.asp?docid=12497.

36. To have an international market, regulators must be willing to accept credits from other markets. Some will only be willing to do so if they are convinced that the rules governing credit generation outside their jurisdiction are sufficiently stringent to make the credits acceptable. Thus regulators will want to negotiate common rules, which will require complex compromises. Also, there is grave doubt about whether credits generated in the United States can be used to satisfy Kyoto obligations, because the U.S. is not a party to the Kyoto Protocol.

37. *See* Kysar & Meyler, *supra* note 31, at 1637 (discussing the coordination efforts of the European Union countries, U.S. states, and Canadian provinces under the International Carbon Action Partnership).

38. *See* Bluemel, *Unraveling*, *supra* note 3, at 2021-24 (discussing the British program and the EU effort to bring it into harmony with the ETS).

Because the Kyoto Protocol itself does not create or enforce individual property rights, efforts to establish an international market depend on a project of linking various national and regional markets. On the whole, regulators embrace this linking of markets, as they recognize that a broad market can deliver more cost savings than a smaller one.[39] But they have some concerns about environmental integrity that lead them to exercise some caution in ways which complicate linkage.[40]

II. MULTI-LEVEL GOVERNANCE'S IMPLICATIONS

A single government actor can establish and enforce a cap on the emissions of facilities within its jurisdiction.[41] Establishing and enforcing a cap creates environmental benefits. Allowing capped sources to forego local reductions if they purchase credits from outside the jurisdiction does not generally add environmental benefits beyond those achievable through local compliance with the cap, but it does allow for cost savings.[42] Unfortunately, the cost savings can either reflect evasion of pollution control obligations or simply control cost differentials between states.[43] Regulators must sort out the difference in a multi-level governance context.

A. Technology Transfer

The CDM aims to promote sustainable development.[44] While the sustainable development concept, like other broad concepts (democracy, free trade, liberalism) suffers from significant ambiguities, experts involved in trading under the Kyoto Protocol clearly associate it with a hope for clean technological development in

39. Kysar & Meyler, *supra* note 31, at 1634 (discussing efficiency increases with larger number of firms and sectors).

40. *See* KOLLMUSS ET AL., *supra* note 24, at 1 (describing offset environmental integrity risk as "widely apparent").

41. *See, e.g.*, Brennan Van Dyke, *Emissions Trading to Reduce Acid Deposition*, 100 YALE L.J. 2707 (1991) (discussing the EPA run acid rain program).

42. *See* David M. Driesen, *Is Emissions Trading an Economic Incentive Program?: Replacing the Command and Control/Economic Incentive Dichotomy*, 55 WASH. & LEE L. REV. 289, 324-27 (1998) [hereinafter Driesen, *Emissions Trading*] (explaining that trading provides no incentives for net reductions beyond those required by the cap).

43. *See* David M. Driesen, *Free Lunch or Cheap Fix?: The Emissions Trading Idea and the Climate Change Convention*, 26 B.C. ENVTL. AFF. L. REV. 1, 40, 86 (1998) [hereinafter Driesen, *Free Lunch*] (explaining that substantial cost savings can come from double counting credits, claiming credits for activities that do not reduce emissions, or claiming credits for projects that would have been undertaken without trading).

44. Kyoto Protocol, *supra* note 2, art. 12.

poorer countries.[45] Thus, CDM proponents see it as a means promoting technology transfer to developing countries. Such technology transfer could increase developing countries technical capabilities, which could contribute both to economic development and to their willingness and ability to limit their own greenhouse gas emissions in the future. Limiting developing country emissions is critical to global climate change policy, as the principle host countries for CDM (notably including China and India) have large and rapidly rising emissions that threaten to upset ongoing efforts to limit global warming.

Brokers involved in environmental benefit trading tend to see the large volume of money flowing into the CDM market as proof that the CDM is working, but unfortunately meaningful technology transfer depends on variables other than the mere volume of financial flows. Large financial flows can signify either technology transfer or massive emission credit frauds, where money is being paid for paper credits reflecting no real additional emission reduction.[46] The world has recently witnessed some of the problems that can occur where large volumes of assets are traded, but regulators fail to require generation of adequate information about the underlying value of the assets. In the environmental context, poorly regulated markets not only risk financial instability, but also loss of progress in solving the environmental problems that the governments created markets to address.

Even where real money is buying real emission reductions, the reductions can be realized either through meaningful transfer of technologies new to the country, or simply financing of projects that do not augment a country's technological capacity. The latter are perfectly good ways of realizing emission reductions, but do little to create the positive spillovers that can add value and contribute to

45. *See* David M. Driesen, *What is Free Trade?: The Real Issue Lurking Behind the Trade and Environment Debate*, 41 VA. J. INT'L L. 279, 287-312 (2001) (discussing competing conceptions of free trade based on laissez-faire, non-discrimination, and anti-coercion principles); David Takacs, *Carbon into Gold: Forest Carbon Offsets, Climate Change Adaptation, and International Law*, 15 HASTINGS W.-N.W. J. ENVTL. L. & POL'Y 39, 52-54 (discussing UNFCCC and Kyoto Protocol references to sustainable development in developing countries).

46. *See* Takacs, *supra* note 45, at 52-54 (noting that private actors generated $30 billion worth of CDM projects in 2006, but that in many cases these actors were able to evade real reductions in emissions).

sustainable development in the long-term, like increased technological capability within a country.[47]

B. Credit Quality and Design

Sophisticated designers of emissions trading programs appreciate a significant difference between credits in an environmental trading market and transactions of other types of goods and services. For many types of goods and services, markets can often function reasonably well with relatively little government oversight. The fundamental reason for this is that buyers care about getting what they pay for. Accordingly, makers of blue jeans who want to stay in business must make blue jeans that do not wear out too quickly, or they may find that no buyers purchase their jeans. Private purchasers of emission reduction credits, however, may not care about the quality of environmental benefit credits, unless public oversight makes them care.[48] They do not usually purchase these credits to realize some benefit for themselves, rather they purchase them in order to justify not implementing otherwise required emission reductions.[49] If the government will accept the credits purchased in lieu of the local emission reductions, the buyer gets what it paid for, even if no reduction occurred to justify the sale of credits.[50] The buyer will only care about the quality of the credits to the extent that poor quality may lead governments not to accept them in lieu of local compliance. Sophisticated regulators recognize this, which explains why a complex set of rules has emerged to check the quality of credits.

While most scholars refer to Kyoto style trading as a cap and trade program, linkage to CDM and JI programs creates the possibility of realizing credits from sources with uncapped emissions, which gives rise to serious problems. The U.S. acid rain program, probably the only environmentally successful trading program ever carried out in the U.S., used a pure cap and trade model, where all

47. *See* David M. Driesen, *Sustainable Development and Market Liberalism's Shotgun Wedding: Emissions Trading Under the Kyoto Protocol*, 83 IND. L.J. 21, 47-49 (2008) [hereinafter Driesen, *Sustainable Development*] (explaining the value of positive spillovers in the Kyoto context). *See generally* Brett M. Frischman & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 258-61 (2007) (explaining the spillover concept).

48. Driesen, *Free Lunch*, *supra* note 43, at 66 (pointing out that if a genuine desire for environmental quality motivated credit *purchases* then voluntary programs would suffice).

49. *Id*.

50. *Id*.

sources of credits were regulated under a strict well-monitored cap.[51] By contrast, bubble programs that preceded the acid rain program allowed sources that did not have emission caps to generate credits, and various kinds of emissions fraud riddled these programs.[52] While a full account of all the types of mischief trading with uncapped sources can lead to would require a separate article devoted to this topic, a review of some of the chief problems that have arisen under the Kyoto Protocol merits some treatment.

C. Additionality

Emission reduction losses arise when projects lack "additionality" – when credit is awarded for projects that would have reduced emissions even if no polluter had paid for the credit.[53] In that case the funds given the project developer do not create an additional

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51. *See* Driesen, *Emissions Trading*, *supra* note 42, at 311-22 (reviewing various programs, including the superior acid rain program); Justin Kirk, Note, *Creating an Emissions Trading System for Greenhouse Gases: Recommendations to the California Air Resources Board*, 26 VA. ENVTL. L.J. 547, 558 (2008) (noting that California's RECLAIM program, a cap and trade program dealing with urban smog, "is generally viewed as a failure"); Nancy Kete, *The U.S. Acid Rain Control Allowance Trading System*, *in* CLIMATE CHANGE: DESIGNING A TRADABLE PERMIT SYSTEM 78 (Org. for Econ. Co-operation & Dev. ed., 1992) (explaining the acid rain program with its cap); Van Dyke, *supra* note 41 (explaining the acid rain program with its cap). While the lead trading program ultimately achieved its goal, enforcement problems riddled the program. *See* RES., COMTY., & ECON. DEV. DIV., U.S. GAO, VEHICLE EMISSIONS: EPA PROGRAM TO ASSIST LEADED-GASOLINE PRODUCERS NEEDS PROMPT IMPROVEMENT 3-4, 18-19, 23-24 (1986) (discussing widespread non-compliance and under-enforcement). Robert W. Hahn & Gordon L. Hester, *Marketable Permits: Lessons from Theory and Practice*, 16 ECOLOGY L.Q. 361, 388 n.146 (1989). The ozone depletion program, usually cited as an example of a trading program, produced no trades, but was environmentally successful. *See* EDWARD A. PARSON, PROTECTING THE OZONE LAYER: SCIENCE AND STRATEGY 4 (2003) (describing the ozone regime as the "most conspicuous success yet achieved in protecting . . . the global environment"); David M. Driesen, *Economic Instruments for Sustainable Development*, *in* ENVIRONMENTAL LAW FOR SUSTAINABILITY: A CRITICAL READER 277, 282 (Stepan Wood, Benjamin J. Richardson eds., Hart Publications 2006) (explaining that "little or no trading" occurred under the Montreal Protocol).

52. *See* CALIFORNIA AIR RESOURCES BOARD AND UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, PHASE III RULE EFFECTIVENESS STUDY OF THE AEROSPACE COATING INDUSTRY 4 (1990) (finding that almost all large sources operating under a bubble are not achieving required reductions); RICHARD A. LIROFF, AIR POLLUTION OFFSETS: TRADING, SELLING, AND BANKING 22 (1980) (explaining that offsets can be a "meaningless paper game"); RICHARD A. LIROFF, REFORMING AIR POLLUTION REGULATION: THE TOIL AND TROUBLE OF EPA'S BUBBLE 62-67, 89-91 (1986) (providing examples of various bubble programs and noting their flaws); David Doniger, *The Dark Side of the Bubble*, ENVTL. F., July 1985, 33, 34-35 (discussing bubble's environmental integrity problems).

53. *See generally* Sandra Greiner & Axel Michaelowa, *Defining Investment Additionality for CDM Projects—Practical Approaches*, 31 ENERGY POL'Y 1007 (2003) (discussing the additionality concept and some of the difficulties in implementing it).

emission reduction, but the credits purchased (reflecting reductions from an already planned and financed project or an emission reducing happenstance, such as a plant closure) justify allowing the purchaser to forego an otherwise required reduction.[54] Accordingly, the Kyoto Protocol requires that projects generating credits be "additional to any that would occur in the absence of the certified project activity."[55]

Designing rules that separate additional from non-additional credits has proven difficult. The concept requires comparing an actual project carried out to some hypothetical baseline of what the world would have looked like without credit revenue flowing to the project.[56] There is some evidence that the CDM Executive Board has approved numerous projects that are not additional.[57] In one case, it approved a wind energy project for credit, even though the financing was in place long before the possibility of CDM credits existed.[58] Unfortunately, when a tiny portion of the money paid for credits reaches those developing the wind project, the project developers can claim that the money was essential to the project's completion.[59] These claims should be regarded as correct when the money earned for the credits account for a very high percentage of the project cost, but appear dubious when the credit revenue accounts for a very low percentage of the project cost, which has often been the case.

Renewable energy presents a political problem for the CDM Executive Board. If the CMD Executive Board applied a strict additionality test to relatively expensive projects like many renewable energy projects, it is possible that no renewables projects would

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54. *See* Jacob D. Werksman, *The "Legitimate Expectations" of Investors and the CDM: Balancing Public Goods and Private Rights Under the Climate Change Regime*, 2 CARBON & CLIMATE L. REV. 95, 97 (2008).

55. Kyoto Protocol, *supra* note 2, art. 12.5(c).

56. *See* Axel Michaelowa, *Determination of Baselines and Additionality for the CDM: A Crucial Element of Credibility of the Climate Regime*, *in* CLIMATE CHANGE AND CARBON MARKETS: A HANDBOOK OF EMISSION REDUCTION METHODS 289, 289 (F. Yamin ed. 2005).

57. *See* LAMBERT SCHNEIDER, OKO-INSTITUTE, IS THE CDM FULFILLING ITS ENVIRONMENTAL AND SUSTAINABLE DEVELOPMENT OBJECTIVES? AN EVALUATION OF THE CDM AND OPTIONS FOR IMPROVEMENT 42 (Nov. 5, 2007) (showing that CER revenue was a very small part of the projected internal rate of return for 546 of the first 803 projects); Wara, *supra* note 26, at 1790-97 (showing why it is likely that Chinese power plant projects provide non-additional credits); Larry Lohman, *Toward a Different Debate in Environmental Accounting: The Cases of Carbon and Cost-Benefit*, 34 ACCT. ORG. & SOC'Y (forthcoming 2009).

58. *See* CDM BD., PROJECT 0315, 125 WIND POWER PROJECT IN KARNATAKA, INDIA 34 (July 1, 2004), http://cdm.unfccc.int/Projects/DB/DNV-CUK1142448670.58/view (Project 0315).

59. *See, e.g.*, *id.* at 28 (claiming additionality when a project already generated a 7.36% return on investment without CDM, and only 7.87% with CDM).

generate credits.[60] If the board disapproves of credits when credit purchases account for a small portion of project revenue, there is a good chance that the project will be built without credit, and therefore without an increase in emissions in the country purchasing the credits. Thus, denial of credits will not cause a loss of renewable energy or other environmental benefit; instead it would produce two reductions, the one required by the cap in Europe and the reductions by the project not allowed to generate credits that was adequately financed without CDM. Under the CDM Executive Board's current approach, we often give up reductions in Europe because of reductions elsewhere that would have occurred even if there had been no credit purchased.

While additionality problems can arise when projects are too expensive to be funded solely with credit purchases, these problems can sometimes arise when reductions are so cheap that credit payments become a significant source of revenue for those running facilities. Most of the CDM credits generated so far arise not from renewable energy projects, which can have long-term value for addressing climate change, but rather from control of industrial gases.[61] The most widely controlled industrial gas, HFC-23, is a potent greenhouse gas emitted as a byproduct of producing ozone depleting an ozone depleting refrigerant (HCFC-22).[62] Payments for credits generated from HFC-23 control exceed the value of the refrigerant being produced. As a result, the carbon market, ironically, creates an incentive to increase production of an ozone depleting chemical in order to realize credits from control of the HFC-23 byproduct.[63] Since the market for the refrigerant alone probably would not justify a production increase, one can say that credits generated by increased production (*e.g.* at new facilities) is not additional.

60. *See* SCHNEIDER, *supra* note 57, at 42 (showing that CER revenue was generally a very small part of the projected internal rate of return for renewable energy projects).

61. *See* KARAN CAPOOR & PHILIPPE AMBROSI, STATE AND TRENDS OF THE CARBON MARKET 36 (2008), http://wbcarbonfinance.org/docs/State_Trends_FINAL.pdf (noting a decline in industrial gas projects from their peak in 2005); Wara, *supra* note 26, at 1778-81; *see also* Driesen, *Free Lunch*, *supra* note 43, at 46 (pointing out that geographically broad trading would facilitate avoidance of investment in renewable energy by offering cheaper opportunities for conventional approaches).

62. *See* Wara, *supra* note 26, at 1778-79. HCFC-22 also serves as the primary feedstock in producing Teflon.

63. *See id*. at 1783-85.

III. POLICY RESPONSES

Problems like these concern thoughtful regulators. They enact environmental benefit trading program in order to realize greenhouse gas emission reductions. But without effective policing, trades can end up giving away, rather than just reducing the cost of, emission reductions.

A. Rule Proliferation

Accordingly, problems like these have led, and will continue to lead, to a variety of rules and other trading restrictions coming from the various governments who are responsible for the efficacy of the trading programs. For example, the CDM Executive Board has enacted a rule forbidding the acceptance of credits from new HFC-23 emitting facilities to address the problem of carbon markets spawning new emission sources.[64] More broadly, different governments have defined "additionality" in different ways.

Policing the technical adequacy of individual trades in the absence of caps and effective monitoring proves extraordinarily difficult. Indeed, no government has done this reasonably well once trading outside a cap is allowed.[65] We have seen that the CDM executive board, with private contractors' assistance, examines individual trades.[66] But it is not the only entity involved in this. The board implementing the Joint Implementation Program performs a similar function for that program.[67] The Regional Greenhouse Gas Initiative requires RGGI states, with guidance from its regional operating authority, to perform a similar role for offset credits, credits generated by uncapped sources.[68]

Another approach to ensuring environmental integrity, or at least limiting the damage from a lack thereof, is to quantitatively restrict trade in credits. In fact, this approach is built into the Kyoto regime. For the Marrakech Accords require that trading credits be

64. *Id.* at 1785.

65. *See* Driesen, *Emissions Trading*, *supra* note 42, at 311-22 (reviewing the history of emissions trading programs).

66. *See supra* notes 24, 26-28 and accompanying text.

67. Andrew Schatz, Note, *Discounting the Clean Development Mechanism*, 20 GEO. INT'L ENVTL. L. REV. 703, 713 (2008) (explaining that the Joint Implementation Oversight Committee oversees "track two" JI projects).

68. *See* MOU, *supra* note 32, §§ 2(F), 4(A)(3)-(5).

"supplemental" to domestic actions.[69] Recent European Commission guidance has given this principle some minimal meaning, by generally limiting project-based credits to 50% of member states' emission reduction obligations.[70]

The RGGI program, however, does include rules limiting the percentage of reductions that utilities subject to the RGGI can realize by purchasing offset credits, reductions from sources not covered by RGGI's cap, in order to protect environmental integrity.[71] Furthermore, in recognition of the difficulties of reliably evaluating project integrity outside the regulator's jurisdiction, the RGGI program imposes more stringent quantitative limits on credits generated outside the northeast than on credits generated within it.[72] Some proposed legislation in the U.S. Congress likewise includes authority to quantitatively limit the use of offset credits.[73]

Thus, concerns about environmental integrity lead numerous levels of government to enact rules and conduct review processes to make sure that trading contributes to, rather than undermines, efforts to achieve planned emission reductions. This rule proliferation holds out the promise of protecting against emission losses, but can limit trading's ability to lower the costs of protecting the global commons.

B. Coordination

The effort to link markets will raise questions about reconciling the emerging body of rules. Should all countries accept all credits allowed by international law, regardless of their quality? Allowing this could cause an enormous loss of emission reductions, as the rules appear to allow acceptance of "hot air" credits reflecting declines in emissions in the former Soviet Union and Eastern Europe, which

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69. *See* U.N. Framework Convention on Climate Change, Report of the Conference of the Parties on Its Seventh Session, Marrakesh, Morocco, Oct. 29, 2001-Nov. 10, 2001, *Addendum*, *Guidelines for the Preparation of the Information Required Under Article 7 of the Kyoto Protocol*, ¶21, U.N. Doc. FCCC/CP/2001/13/Add.3 (Jan. 21, 2002), *available at* http:// unfccc.int/resource/ docs/cop7/13a03.pdf.

70. *See* J. de Sépibus, *Linking the EU Emissions Trading Scheme to JI, CDM and post-2012 International Offsets* 7-8 (Swiss Nat'l Centre of Competence in Research, Working Paper No. 2008/18, 2008); *see also Parliament Baffles with EU ETS Offset Rules*, CARBON FIN., Oct. 2008, at 9, 9 (discussing proposals for quantitative restrictions in CDM credits before the European Parliament).

71. *See* MOU, *supra* note 32, § 2(F)(2)(b).

72. *See id.* § 2(F)(2)(a)(1)-(2).

73. *See* KOLLMUSS ET AL., *supra* note 24, at 5 (pointing out that the Climate Security Act proposes allowing domestic offsets to equal 15% of the overall emissions cap and international offsets to equal an additional 15%).

could, in principle, justify doing nothing to change energy consumption and production habits.[74] While this possibility may appear academic in light of the lack of such trades so far and economic modeling showing why the former Soviet Union may benefit from withholding credits from the market, the current economic collapse may spread the availability of such credits and looming compliance deadlines may make such credits attractive to countries that are not on track to achieve Kyoto targets (unless, of course, economic collapse brings European domestic emissions down to the point where serious compliance difficulties disappear).[75]

Efforts to harmonize rules will create familiar concerns about races to the bottom. Analysts differ as to whether they view the potential for a race to the bottom as a significant problem.[76] To the extent that different governments attempt harmonization, the difficulties of accomplishing it may create uncertainties about the future content of rules that can discourage trading. As governments will want to change their rules often, because of changes in governmental philosophy, new evidence of fraud, and pressure from interests wanting more liberal trade in credits (such as brokers). So, harmonization will not be a one-time event, but an ongoing uncertain and confusing process. These uncertainties can discourage investments that might otherwise be helpful in addressing global warming, as they will make it hard to know what the rules are and to predict their future content. It is hard enough to predict what an individual government will do in the future, but predicting the actions of multiple governments acting partly on their own and partly in

74. *See* Driesen, *Free Lunch*, *supra* note 43, at 60-61 (explaining how "hot air" credits can eliminate progress in developed countries with reduction commitments).

75. *See, e.g.*, Gernot Klepper & Sonja Peterson, *Trading Hot-Air: The Influence of Permit Allocation Rules, Market Power, and the US Withdrawal from the Kyoto Protocol*, 32 ENVTL. & RESOURCE ECON. 205, 224-26 (2005) (predicting that countries will sell more hot air after adopting welfare maximizing strategies instead of revenue maximizing strategies). *Cf.* Christoph Boringer, Ulf Moslener & Bodo Sturm, *Hot Air for Sale: A Quantitative Assessment of Russia's Near-Term Climate Policy Options*, 38 ENVTL. & RESOURCE ECON. 545, 558 (2007) (explaining that Russia may have incentives to join the international trading market).

76. *See, e.g.*, Kirsten H. Engel, *State Environmental Standard-Setting: Is There a "Race" and Is It "To the Bottom"?*, 48 HASTINGS L.J. 271, 278 (1997) (claiming that state regulators compete for business by lowering standards); Richard L. Revesz, *Federalism and Environmental Regulation: A Public Choice Analysis*, 115 HARV. L. REV. 553, 555-59 (2001) (disputing various claims about the superiority of centralized regulation); Richard L. Revesz, *Rehabilitating Interstate Competition: Rethinking the "Race-to-the-Bottom" Rationale for Federal Environmental Regulation*, 67 N.Y.U. L. REV. 1210, 1233-44 (1992).

response to political pressures for harmony will prove even harder to predict.[77]

Absent harmonization, trading may focus on the polities with the least demanding environmental standards.[78] Unless the international rules providing the minimum standards are sufficiently strict (and so far the evidence suggests they are not), this shift of trading activity to poorly regulated jurisdictions can undermine the environmental achievement otherwise realizable through achieving a cap.

C. Transaction Costs

Many U.S. law and economics scholars would probably respond to this by simply insisting that the goal must be to minimize transaction costs.[79] And this response does have some appeal to it; after all, rule proliferation may discourage trades and the cost savings they produce.

Yet, this response proves too glib. As I've argued elsewhere, if minimizing transaction costs means reducing the costs private parties incur in making trades as much as possible, this is a poor policy recommendation.[80] Governments impose transaction costs on parties engaged in trading, such as monitoring and reporting obligations, in order to make it possible to see to it that the benefits associated with an emission reduction claim actually exist.[81] Government must impose such costs in any environmental law system in order to make it enforceable. Insisting on the virtual elimination of transaction costs is tantamount to a demand not to take programs' environmental goals seriously, substituting the goal of maximizing trading volume for the goal of minimizing the costs of delivering the benefit planned for in

77. *See, e.g.*, *CDM Approval Now 'Impossible to Predict'*, CARBON FIN., Oct. 2008, at 5, 5 (discussing a carbon fund manager's complaint that CDM executive board is not predictable, since the rules change almost daily).

78. *See* Bluemel, *Unraveling*, *supra* note 3, at 2036-42 (explaining why the regime complex is only as strong as its weakest regime); Driesen, *Free Lunch*, *supra* note 43, at 65-68 (explaining that polluter preferences to generate credits in the countries with the laxest rules will undermine compliance in a multijurisdictional setting).

79. *See* David M. Driesen & Shubha Ghosh, *The Functions of Transaction Costs: Rethinking Transaction Cost Minimization in a World of Friction*, 47 ARIZ. L. REV. 61, 79-82 (2005) (discussing specific recommendations made commonly in the literature to reduce transaction costs associated with emissions trading).

80. *See id.* at 107 (arguing that governments must impose sufficient transaction costs to allow them to safeguard the environment from harm of bogus trades).

81. *See id.* at 92-98 (discussing how transaction costs generate enforceability and other benefits).

setting a cap. In other words, transaction costs deliver benefits.[82] And they only deserve elimination if the transaction costs seem unlikely to deliver significant benefits.[83]

Several experts have pointed out that a system where nation states subsidize emission reductions abroad in addition to, rather than in lieu of, a carbon reduction in a developed country might prove more efficacious.[84] The recent trend toward auctioning allowances could create a pool of money that might make such a proposal more feasible than it has been in the past, unless, of course, the current economic crises either unwinds this trend or makes it impossible to devote the funds to environmental protection.[85]

Two concerns support such a proposal. First, the already discussed concerns about poor CDM performance counsel against continuation of this approach.[86] Second, transaction costs have already become so high that little of the money being doled out for credits pays for emission reduction.[87] Hence, the CDM has proven a very inefficient means of subsidizing environmental benefits and technology transfer.[88]

Evaluation of this proposal requires consideration of both private and governmental transaction costs. Most scholars tend to recommend reforms of the CDM designed to improve its environmental performance, like the restriction of HFC credits mentioned earlier. It requires a lot of legal experience to make good judgments about whether such reforms can in fact produce largely

82. *See id.* at 110 (concluding that "transaction costs purchase corollary benefits").

83. *Id.* at 103-04 (arguing that proposals to reduce or eliminate transaction costs need to take the associated benefits into account).

84. *See, e.g.*, Wara, *supra* note 26, at 1800-02; David G. Victor & Danny Cullenward, *Making Carbon Markets Work*, SCI. AM., Dec. 2007, at 70, 76-77. *Cf.* Bluemel, *Unraveling*, *supra* note 3, at 1986, 2045-48 (proposing the creation of a "Clean Development Fund" to allow countries that "would otherwise be in noncompliance" to "fund emission-reducing projects").

85. *See* Benito Müller, *To Earmark or Not to Earmark?: A Far Reaching Debate on the Use of Auction Revenue From (EU) Emissions Trading* 4 (Oxford Inst. for Energy Studies, EV 43, 2008), *available at* http://www.oxfordclimatepolicy.org/publications/mueller.html; *see, e.g.*, *Mixed Welcome for Latest US Cap-and-Trade Bill*, CARBON FIN., Oct. 2008, at 10, 10 (stating that Dingell-Boucher proposal requires auctioning of 100% of all allowances by 2026); *Parliament Plays It Tough*, CARBON FIN., Oct. 2008, at 14, 14 (discussing European Parliaments support for auctioning beginning in 2013 and rising to 100% of allowances by 2020).

86. *See* Wara, *supra* note 26, at 1797-98.

87. *See* Wara & Victor, *supra* note 30, at 11-12 (explaining that buyers of emission reduction credits have paid €4.7 billion for industrial gas credits costing less than €100 million to produce).

88. *See* Michael Wara, *Is the Global Carbon Market Working?*, 445 NATURE 595, 596 (2007) (describing the CDM as woefully inefficient).

game proof rules without caps. But if this is possible at all, it would be accomplished by more rule proliferation, which would raise private transaction costs further, thereby making the CDM an even more inefficient mechanism for technology transfer. This proposal does suggest a need for comparative analysis of the efficiencies of CDM and direct subsidies.

A related question about governmental transaction costs arises: Should governments invest a large percentage of the limited public resources available to establish and enforce climate policies to the linkage project? Such resources will not be available to expand the scope of existing programs to protect the atmospheric commons. Instead, they simply limit the losses of planned reductions that might otherwise occur through broad environmental benefit trading. These reductions could, of course, be realized through national or regional trading programs or simply through caps without trades. The decision to expand the scope of trading carries with it governmental transactional costs that can limit the capacity of government to make further progress on global warming.

The government transaction costs concern may help explain the attractiveness of numerical limits on offset credits. While such limits certainly reduce the opportunities for trading and associated private sector cost savings, they do not involve terribly large transaction costs for either private or public parties. By contrast, project-specific review, if carried out properly, involves high transactions costs for both governments and private parties. Indeed, poorly funded regulatory bodies like those in the United States[89] may be wholly incapable of adequately monitoring a large credit flow, so that quantitative restrictions may be essential to making qualitative checks feasible.

D. Opportunity Cost Concerns: Can Trading Protect the Global Commons Alone?

The opportunity costs involved in employing a trading design that allows for high volume credit generation from uncapped sources may be quite serious. Of course, if a trading regime by itself adequately protected the global commons, it might make sense to devote all of our resources to perfecting the trading regime. But it is

89. *See* Barton H. Thompson, Jr., *The Continuing Innovation of Citizen Enforcement*, 2000 U. ILL. L. REV. 185, 191 (2000) (describing state and federal environmental enforcement as "woefully understaffed and underfunded").

highly unlikely that trading will succeed by itself in protecting the global commons, although the caps set, if sufficiently stringent, can make a meaningful contribution.

Global trading's primary value lies in its ability to seek out the lowest cost reductions anywhere in the world. For that reason, it does little to spur valuable investments that may be needed to address global warming.[90] The primary example of this problem may be nuclear power. France has very low utility sector emissions because its government has supported nuclear power and carefully supervised nuclear projects to try to address public concerns about safety and waste disposal. It is extraordinarily unlikely that a trading program would stimulate any nuclear power, even if the trading rules allowed it (current EU rules disallow it).[91]

There is a tradeoff between maximizing cost reduction and maximizing technological development likely to significantly increase global capacity to address global warming.[92] Some technologies, such as experimental installation of advanced solar technologies, may generate positive spillover effects, such as increasing the efficiency of solar cells to make them more useful in the future and generating local air pollution benefits.[93] Advanced technologies with positive spillover effects may prove valuable in increasing our long term capacity to address climate change.[94] But valuable technologies will often prove expensive, and trading favors the least cost reduction

90. *See* David M. Driesen, *Does Emissions Trading Encourage Innovation?*, 33 ENVTL. L. REP. 10094, 10094-105 (2003) (discussing environmental innovation's value generally and empirical and theoretical evidence of innovation in trading programs); Driesen, *Free Lunch*, *supra* note 43, at 41-55 (explaining trading's weaknesses in encouraging innovation and why this matters to the future of the climate regime); Driesen, *Sustainable Development*, *supra* note 47, at 41-55 (explaining emissions trading does not well support the most valuable innovations, which tend to be relatively expensive).

91. *See Linking Directive*, *supra* note 24, art. 11a(3)(a).

92. *See* David M. Driesen, *Design, Trading, and Innovation*, *in* MOVING TO MARKETS IN ENVIRONMENTAL REGULATION: LESSONS FROM TWENTY YEARS OF EXPERIENCE 436 (Jody Freeman & Charles D. Kolstad eds., 2007) (discussing trading's limits as a promoter of innovation along with design issues relevant to innovation); Driesen, *Sustainable Development*, *supra* note 47, at 51-59 (explaining the reasons for the tradeoff); David A. Malueg, *Emission Credit Trading and the Incentive to Adopt New Pollution Abatement Technology*, 16 J. ENVTL. ECON. & MGMT. 52, 52-53 (1989) (explaining that trading reduces incentives for credit buyers to innovate, while increasing sellers' incentives to adopt cheap innovation).

93. *See* Driesen, *Sustainable Development*, *supra* note 47, at 48-49 (describing solar power's positive spillovers as an example of spillovers critical to long-term efforts to address global warming).

94. *Id.* at 48 (explaining how innovation in renewable energy can increase our ability to phase out fossil fuels).

regardless of positive spillover effects.[95] Initially expensive technologies, such as substantially all renewables, have experienced declining costs when makers have opportunities to experience "learning by doing" and will continue to do so in the future if sufficiently encouraged.[96] Accordingly, governments that have made serious technological advances that increase our capacity to address global warming have generally not accomplished this through broad environmental benefit trading, but from a variety of programs that have technological advancement as a primary aim.[97] Examples include feed-in tariffs supporting renewable energy, renewable portfolio standards, and Brazil's program to promote biofuels.[98]

In other words, picking low hanging fruit is a good thing. But if we expect to need to pluck substantially all of the fruit from the tree, we may need to invest some funds early on in ladder construction. While well-designed trading programs can certainly contribute to protection of the global commons, some programs aimed more squarely at technological advancement through encouragement of deployment of advanced technology may be needed.[99]

While the high volume of capital flowing into the CDM program to purchase reductions substituting for already planned for reductions in Europe excites analysts, other capital flows may be more important to global warming policy. For example, the World Bank continues to fund fossil fuel projects in developing countries and many developed countries continue to subsidize their own fossil fuel industries. These capital flows dwarf the flows into the CDM and drive emissions

95. *Id.* at 52 (explaining that trading favors least cost abatement over maximization of positive spillovers).

96. *See* David M. Driesen, *Renewable Energy Under the Kyoto Protocol: The Case for Mixing Instruments*, *in* A GLOBALLY INTEGRATED CLIMATE POLICY FOR CANADA 203, 205 (Steven Bernstein et al. eds., 2008).

97. *See* Driesen, *Sustainable Development*, *supra* note 47, at 37-39, 42-44 (discussing specific programs and their general results).

98. *See id*. at 37-38 (discussing feed-in tariffs and renewable portfolio standards); Juscelino F. Colares, *A Brief History of Brazilian Biofuels Legislation*, 35 SYRACUSE J. INT'L L. & COM. 293 (2008); Haroldo Machado-Filho, *Climate Change and the International Trade of Biofuels*, 2 CARBON & CLIMATE L. REV. 67, 70-71 (2008); Marc Ringel, *Fostering the Use of Renewable Energies in the European Union: The Race Between Feed-in Tariffs and Green Certificates*, 31 RENEWABLE ENERGY 1, 3-5 (2006) (discussing the policy aims of EU renewable energy programs).

99. *See* Driesen, *Sustainable Development*, *supra* note 47, at 59 (suggesting the need for targeting polices at the innovation goal, rather than just assuming that innovation emerges as a byproduct of any efficient market mechanism).

upwards.[100] Eliminating such perverse subsidies will require the time and attention of policymakers.

Even within trading programs themselves, it is not clear that using tons of resources to broaden the programs as much as possible constitutes the wisest investment of scarce government resources. For example, regulators in the RGGI region have been concerned that caps on electric utility emissions could lead to increases in electricity prices that could hurt consumers and make future progress politically difficult. Accordingly, RGGI states plan to invest some of the proceeds from allowance sales in funding end-use energy efficiency.[101] Energy efficiency improvements can enable consumers to avoid cost increases in their total bill, even if per kilowatt hour charges increase.[102] Of course, implementing these programs properly will require substantial investment of government resources to design and operate the programs. These local uses of resources probably have much more capacity to make programs successful than efforts to broaden the programs through linkage.[103]

Because government regulators have significant alternative investments available to them for addressing climate change, devoting large amounts of scarce government regulatory resources to accommodating the kinds of trades that government has never successfully monitored in the past does impose an opportunity cost on the public. These costs probably merit analysts' attention. Furthermore, a world of multiple regimes with trading between them provides opportunities for private actors to game the system by

100. Axel Michaelowa, *At the Crossroads*, CARBON FIN., Mar. 2008, at 14, 14 (2008) (citing $1 billion in traded CDM credits in 2007); Christopher Swann, *World Bank Increases Fossil Fuel Funding Despite Pledge*, PITTSBURGH TRIB. REV., Aug. 24, 2008, *available at* 2008 WLNR 16004007 (reporting World Bank funding of $2.3 billion annually for fossil fuel related undertakings).

101. *See* Regional Greenhouse Gas Initiative, http://www.rggi.org/about (last visited Mar. 25, 2009) (noting that RGGI "us[es] the proceeds of allowance auctions to support . . . energy efficiency and clean renewable energy"); MOU, *supra* note 32, § 2(G)(1).

102. *See* Maxine Burkett, *Just Solutions to Climate Change: A Climate Justice Proposal for a Domestic Clean Development Mechanism*, 56 BUFF. L. REV. 169, 217 n.189 (2008) (explaining that "[t]he proceeds from the sales" under RGGI will help spare consumers from the costs of "potential rate hikes").

103. Political economy considerations may appear to justify broad offset programs, because cheap credits may enable regulators to set more stringent caps. *Cf.* Driesen, *Sustainable Development*, *supra* note 47, at 62 (explaining that in principle cheaper regulation allows for stricter caps). But there is some doubt about the role of anticipated cost savings in setting caps, *see id*. at 62-64 (discussing reasons for this), and an ostensibly stricter cap based on offsets may prove ephemeral.

generating credits in the countries with the laxest oversight.[104] Simplification through concrete limits on linkage, especially with respect to offsets, may prove better for the environment and for market stability than wide open linked systems.

CONCLUSION

A global property rights regime requires enforcement and involves multiple levels of government. While capping carbon can contribute to the effort to address global warming, globalizing trading poses challenges that can undermine the effort. Governments would be wise to focus less on linking up disparate markets in carbon reduction and more on establishing a variety of approaches that maximize emission reductions and innovation.

104. *See* Bluemel, *Unraveling*, *supra* note 3, at 2036-42 (explaining why the "regime complex is . . . only as strong as its weakest regime"); Driesen, *Free Lunch*, *supra* note 43, at 65-68 (explaining that polluter preferences to generate credits in the countries with the laxest rules will undermine compliance in a multijurisdictional setting); Sam Headon, *Offsets in the International Emissions Market: Do Buyers Get What They Pay For?*, 4 CARBON & CLIMATE L. REV. 406, 415 (2008) (finding that the top 50 buyers in the CDM market are prioritizing cost effectiveness over environmental integrity and transparency).