LINKS BETWEEN EUROPEAN EMISSIONS TRADING AND CDM CREDITS FOR RENEWABLE ENERGY AND ENERGY EFFICIENCY PROJECTS

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A CISDL WORKING PAPER

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1. Introduction

Will the European Emissions Trading Scheme (ETS) stimulate energy efficiency and use of renewable energy in developing countries through the Clean Development Mechanism (CDM)? This paper addresses this question as a means of critically examining the relationship between the Kyoto mechanisms and sustainable development. The paper's first part explains why the goals of attaining sustainable development and of effectively addressing climate change make this question important. The second part presents a theoretical analysis explaining why the short term cost effectiveness that trading fosters may not coincide with the long-term goals animating the climate change treaty and the sustainable development ideal. This analysis also provides a means of organizing empirical information about supply and demand to evaluate the likelihood that the Kyoto mechanisms will significantly increase developing countries' use of renewables and energy efficiency. The third part examines the demand side of the equation, discussing the extent to which the legal architecture of the European trading program provides room for financing CDM projects. The fourth part examines the question of supply, evaluating the extent to which CDM fosters projects that increase use of renewable energy or enhance energy efficiency. A concluding section summarizes the results and discusses their broader significance for the evolution of the Kyoto mechanisms.

2. Renewables, Energy Efficiency, Climate Change, and Sustainable Development

The Framework Convention on Climate Change (Framework Convention) articulates a goal of avoiding dangerous destabilization of the climate.[1] Achieving this goal may require a shift away from dependence upon fossil fuels.[2] Accordingly, the Kyoto Protocol to the Framework Convention explicitly encourages the "enhancement of energy efficiency" and the "increased use of new and renewable forms of energy."[3] In the long run, effective climate change policy must induce a significant shift away from fossil fuels.

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[1] *Report of the Intergovernmental Negotiating Committee for a Framework Convention on Climate Change on the Work of the Second Part of its Fifth Session*, U.N. Conference on Environmental and Development: Framework Convention on Climate Change, 5th Sess., pt. 2, Annex I, U.N. Doc. A/AC.237/18 (1992) (Part II)/Add.1, 1771 UNTS 108, available at <http://unfccc.int/2860.php> art. 2 [hereinafter Framework Convention].

[2] *See* WORKING GROUP III TO THE SECOND ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 1995 - ECONOMIC AND SOCIAL DIMENSIONS OF CLIMATE CHANGE 241 (James P. Bruce et al. eds., 1996) (noting that renewable energy sources emit little carbon and that switching to renewables will reduce emissions).

[3] *Report of the Conference of the Parties on its Third Session*, Kyoto Protocol to the U.N. Framework Convention on Climate Change, 3rd Sess., pt. 2, Annex I, U.N. Doc. FCCC/CP/1997/7 add.1, December 11, 1997, *reprinted without certain technical corrections in* 37 I.L.M. 22 (1998) Art. II, § 1(a)(i),(iv) [hereinafter Kyoto Protocol].

The delegates that adopted the Framework Convention approved a broad agenda for achieving the goal of sustainable development at the same time. This agenda, called Agenda 21, explicitly emphasized the importance of a shift to renewable energy and of energy efficiency.[4]

Improved energy efficiency decreases the need to burn fossil fuels and thereby decreases the emissions associated with that burning. Thus, enhanced energy efficiency comports with a view of sustainable development as linked to reducing the throughput of materials and pollution needed to adequately support a good life.[5]

Increased reliance upon renewable energy is even more crucial to sustainable development. Fossil fuels constitute non-renewable resources. If the present generation exhausts these resources it will leave nothing for future generation, thereby raising an inter-generational equity issue.[6] Sustainable development will require increased consumption and energy use in developing countries in order to meet the basic needs of very large populations of people. To the extent this growth comes from increased use of fossil fuels, it will create serious long-term and short term health and environmental hazards that will undermine the goal of adequately meeting people's basic need for a healthful life with adequate environmental quality. [7]

The drafters of the Kyoto Protocol created the CDM, in part to meet the need for sustainable development.[8] And the European Parliament cited the potential of European demands for credits to aid in achieving sustainable development as a reason to allow use of credits from CDM projects to satisfy the obligations of European polluters regulated under the ETS.[9] Therefore, an evaluation of the CDM's capacity to move developing countries away from fossil fuels provides one measure of CDM's success as an instrument of sustainable development.

Furthermore, developing country success in moving away from a fossil fuel basis for economic development would facilitate evolution of an adequate climate change regime. The Kyoto Protocol constitutes a first step toward meeting the Framework Convention's goal of avoiding

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[4] *See generally* U.N. Conference on Environment and Development, Agenda 21, U.N. Doc. A/CONF.151.26 (1992). For a discussion of the Agenda 21 provisions addressing renewable energy and air pollution generally, *see* David M. Driesen, *Air Pollution*, in STUMBLING TOWARD SUSTAINABILITY 257-261 (John C. Dernbach ed. 2002) [hereinafter STUMBLING].

[5] *See* DAVID M. DRIESEN, THE ECONOMIC DYNAMICS OF ENVIRONMENTAL LAW 89 (2003) (explaining the link between Daly's idea of reduced throughput and technological innovation), HERMAN E. DALY, BEYOND GROWTH (1996) (developing a concept of sustainable development linked to reduction in throughput).

[6] *See* Douglas A. Kysar, *Sustainable Development and Private Global Governance,* 83 TEX. L. REV. 2109 , 2118 (2005) (describing the idea of protecting the interests of future generations as "the most widely accepted meaning of sustainable development."); John C. Dernbach, *Synthesis*, *in* STUMBLING, *supra* note 4, at 5 (explaining that sustainability implies meeting the needs of the present "without compromising the ability of future generations to meet their own needs").

[7] *See generally* Rio Declaration on Environment and Development, U.N. Conference on Environment and Development, U.N. Doc. A/CONF.151/5 Rev. 1, princ. 1, *reprinted at* 31 I.L.M. 874 (1992) (stating that human beings are entitled to a health and productive life in harmony with nature).

[8] *See* Kyoto Protocol, *supra* note 3, Art. 12, sec. 2 (describing "achieving sustainable development" as part of "the purpose of the clean development mechanism").

[9] Council Directive 2004/101/, preamble, Amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading with the Community, in respect to the Kyoto Protocol's project mechanisms. 2004 O.J. (L 338), 18, 18 (EC) [hereinafter, Linking Directive].

dangerous interference with the climate. While the continuation of business as usual in many countries has already rendered this goal impossible to meet, the Kyoto Protocol will prove a partial success if it begins an evolution significantly ameliorating climate change dangers. Developing countries are unlikely to commit to meaningful cuts in greenhouse gas emissions; unless they come to believe that a sustainable path of reducing dependence on fossil fuels is a viable approach. The cost of renewable energy has fallen as its use has increased. [10] Many renewable energy options, however, remain much more costly than fossil fuel options. More deployment of currently expensive renewable energy will increase learning by doing and drop the price, thus making a path away from fossil fuels attractive. If developing countries do not commit to significant cuts in emissions, prospects for meeting long-term goals for ameliorating climate change are bleak. Hence, the question of whether the European trading program will interact with CDM to increase deployment of renewables and realization of energy efficiency matters greatly to the future of climate change policy and sustainable development more generally.

3. An Analysis of Trading and Innovation

Proponents of sustainable development often like to imagine that it comports with free market liberalism.[11] There are some areas where both converge. For example, reduced agricultural subsidies serve both liberalism and sustainable development goals.[12] But in some areas, free markets tend to maximize present consumption without adequately protecting the environment or future generations.

Most of the law and economics literature argues that emissions trading encourages innovation more effectively than traditional regulation.[13] This argument might suggest that trading encourages renewable energy, implying congruence between free market liberalism and sustainable development.

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[10] *See, e.g.,* R. WISER ET AL., LETTING THE SUN SHINE: AN EMPIRICAL EVALUATION OF PHOTOVOLTAIC COST TRENDS IN CALIFORNIA (LBNL-59282, NREL/TP-620-39300) ii (2006) (discussing a 25% decline in solar energy costs in California since 1998); LESTER R. BROWN, PLAN B: RESCUING A PLANET UNDER STRESS AND A CIVILIZATION IN TROUBLE 158-59, 164 (2003) (discussing drastic decreases in wind and solar costs); Anthony D. Owen, *Renewable Energy: Externality Costs as Market Barriers*, 34 Energy Policy 632, 634 (2006) (documenting sharp declines in the price of renewables between 1980 and 1995). *Cf.* MARK BOLLINGER & RYAN WISER, BALANCING COST AND RISK: THE TREATMENT OF RENEWABLE ENERGY IN WESTERN NATURAL RESOURCES PLANS iv-v (LBNL 58450) (2005) (noting a sharp increase in the cost of wind power in 2005, but suggesting this increase might be anomalous).

[11] *See generally* Kysar, *supra* note 6, at 2114 (discussing the tendency to adapt sustainability to fit the market liberalism framework).

[12] *See* id. at 2146 (identifying the elimination of agricultural subsidies as an area where reform would advance both free market liberalism and sustainability).

[13] *See,* Robert N. Stavins, *Policy Instruments for Global Climate Change: How Can Governments Address a Global Problem*, 1997 U. CHI. LEGAL F. 293, 302-03; Robert W. Hahn & Robert N. Stavins, *Incentive-Based Environmental Regulation: A New Ear for an Old Idea*, 18 ECOLOGY L. Q. 1, 13 (1991); Bruce A. Ackerman & Richard B. Stewart, *Reforming Environmental Law: The Democratic Case for Market Incentives*, 13 COLUM. J. ENVTL. L. 171, 183 (1988); Daniel J. Dudek & John Palmisano, *Emissions Trading: Why is this Thoroughbred Hobbled?*, 13 COLUM. J. ENVTL. L. 217, 234-35 (1988).

Recent scholarship, however, has cast some doubt on the hypothesis that trading encourages innovation.[14] The acid rain program has delivered cost effective reductions primarily through the use of extremely conventional technology, namely scrubbers and low sulfur coal.[15] It certainly has not encouraged serious movement away from fossil fuels.[16] Indeed a recent study, the most comprehensive one to date, argues that the acid rain program encouraged less innovation than the prior "command and control" programs aimed at reducing U.S. sulphur dioxide emissions.[17] The Montreal Protocol produced a major technological change, the phase-out of ozone depleting substances.[18] While the Protocol authorized limited trading, no trades actually occurred. Clearly, the relationship between trading and innovation is more subtle than the conventional view suggests.

Those equating trading with innovation argue that trading produces innovation by encouraging polluters to go beyond compliance.[19] This is true with respect to sellers of credits. But buyers of credits achieve fewer reductions than they would under a comparably designed traditional performance standard.[20] Thus, they have less incentive to innovate than they would have under a comparably designed traditional regulation, which would require reductions from all regulated source.

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[14] *See, e.g.,* David M. Driesen, *Design, Trading, and Innovation, in* MOVING TO MARKETS IN ENVIRONMENTAL PROTECTION: LESSONS AFTER TWENTY YEARS OF EXPERIENCE (Jody Freeman & Charles Kolstad eds. 2006) (forthcoming) [hereinafter, Driesen, *Design*]; Joel F. Bruneau, *A Note On Permits, Standards, and Technological Innovation,* 48 J. ENVTL. ECON. & MAN. 1192 (2004); Juan-Pablo Montero, *Permits Standards, and Technology Innovation,* 44 J. ENVTL. ECON. & MAN. 23 (2002); Juan-Pablo Montero, *Market Structure and Environmental Innovation,* 5 J. APPLIED ECON. 293 (2000); David M. Driesen, *Is Emissions Trading an Economic Incentive Program?: Replacing the Command and Control/Economic Incentive Dichotomy,* 55 WASH. & LEE L. REV. 289, 313-22, 325-38 (1998) [hereinafter, Driesen, *Dichotomy*]. *See also* David A. Malueg, *Emissions Trading Credit and the Incentive to Adopt New Abatement Technology,* 16 J. ENVTL. ECON. & MAN. 52 (1987); W.A. Magat, *Pollution Control And Technological Advance: A Dynamic Model of the Firm,* 5 J. ENVTL. ECON. & MAN. 95 (1978).

[15] *See* David M. Driesen, *Does Emissions Trading Encourage Innovation?,* 33 ENVTL. L. REP. (Envtl. L. Inst.) 10094, 10105 (2003) (noting the dominance of these traditional technological options and discussing claims that the acid rain program encouraged innovation). *Cf.* Byron Swift, *Command Without Control: Why Cap-and-Trade Should Replace Rate-Based Standards for Regional Pollutants,* 31 ENVTL. L. REP. (Envtl. L. Inst.) 10330 , 10338 (2001) (claiming that trading encouraged some innovation).

[16] A. DENNY ELLERMAN ET AL., MARKETS FOR CLEAN AIR: THE U.S. ACID RAIN PROGRAM 130 (2000) (noting that the acid rain program did not produce greater reliance on renewable energy).

[17] *See* Margaret R. Taylor, Edward S. Rubin, and David A. Hounshell, *Regulation as the Mother of Innovation: The Case of SO_2 Control,* 27 LAW & POL'Y 348, 370 (2005). *Cf.* David Popp, *Pollution Control Innovations and the Clean Air Act of 1990,* 22 J. POL'Y ANALYSIS & MGMT 641 (2003) (agreeing that command and control caused more innovation than trading, but arguing that trading did better at encouraging environmentally superior innovations).

[18] *See generally* EDWARD A. PARSON, PROTECTING THE OZONE LAYER: SCIENCE AND STRATEGY (2003).

[19] *See* Adam B. Jaffe et al., *Environmental Policy and Technological Change,* 22 ENVTL. & RESOURCE ECON. 41, 51 (2002); Malueg, *supra* note 14, at 8-9 & n. 33.

[20] *See* Malueg, *supra* note 14; Driesen, *Dichotomy, supra* note 14, at 334; DAVID WALLACE, ENVIRONMENTAL POLICY AND INDUSTRIAL INNOVATION: STRATEGIES IN THE U.S.A., EUROPE, AND JAPAN 20 (1995) (explaining that the Malueg model casts doubt on the claim that emissions trading necessarily spurs innovation); Chuhlo Jung et al., *Incentives for Advanced Pollution Abatement Technology at the Industry Level: An Evaluation of Policy Alternatives,* 30 J. ENVTL. ECON. & MAN. 95, 95 (1996) ("marketable permits may not provide greater incentives than standards, because the incentive effects of marketable permits depend on whether firms are buyers or sellers").

The assumption that trading produces innovation conflicts with the "induced innovation" hypothesis that economists frequently employ to analyze innovation.[21] This hypothesis assumes that necessity is the mother invention – i.e. that firms will tend to innovate when the cost of employing conventional approaches is high.[22] But trading lowers the cost of employing conventional approaches by allowing polluters to shift reduction obligations to the facilities with the lowest compliance costs. The induced innovation hypothesis would therefore suggest that trading does not encourage more innovation than comparable performance standards without trading.[23]

The Kyoto mechanisms serve the Framework Convention's goal of encouraging cost effectiveness.[24] They create incentives for polluting facilities (or countries) to purchase credits reflecting the cheapest possible approaches to pollution control. This poses an issue, because the cheapest current emission reduction options may not coincide with those offering the greatest long-term environmental benefits or even the lowest long-term economic costs.[25] For example, even if massive investment in deploying solar technology or fuel cells would bring prices down to very low levels over time and provide enormous environmental benefits (less smog, climate change, coal mining, oil drilling, and oil spills), emissions trading will not make such investments economically rational unless the current costs of deploying solar power or fuel cells is less than that of other emission decreasing options.

The emissions trading literature tends to create an image of trading as magic, rather than as a type of regulatory program.[26] Trading encourages buyers to avoid making expensive local reductions by purchasing as many credits as they need to meet regulatory obligations, no more.[27] And it encourages them to buy the cheapest available credits to meet these targets. This means that the sellers can only sell as many cheap credits as the buyers need, and cannot sell credits costing more to generate than the cheapest emission reductions available in the program.

This market preference for a limited amount of cheap available credits means that analyzing the ETS's capacity to support CDM projects reflecting efforts at deploying renewables and enhancing energy efficiency requires analysis of both the demand side (ETS) and the supply side (CDM). Therefore, this paper will assess the likely demand for CDM credits emanating from the ETS and the likely supply of credits from renewable energy and energy efficiency projects. Since sellers of credits from these types of projects must compete with sellers of credits from other types of projects and might have to compete with sellers of "hot air" credits, the relative prices of credits will also influence the capacity of trading between the European Union and developing countries to encourage renewables and energy efficiency. Credits from renewable

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[21] Driesen, *Design*, *supra* note 14.
[22] *See* Richard G. Newell et al., The Induced Innovation Hypothesis and Energy-Saving Technological Change, 114 Q. J. ECON. 941 (1999).
[23] Driesen, *Design*, *supra* note 14, at ___.
[24] *See* Framework Convention, *supra* note 1, Art. 3, sec. 3 (stating that measures to combat climate change "should be cost-effective").
[25] *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, 44 (1998) (explaining this point with a renewable energy example).
[26] *Cf.* David M. Driesen, *Markets are Not Magic*, 20 ENVT'L FORUM 19 (Nov.-Dec. 2003).
[27] *See* Driesen, *Dichotomy*, *supra* note 14, at 324-25 (explaining why trading only provides limited incentives for reductions).

energy and energy efficiency projects compete on the basis of price for the limited demand for credits from buyers seeking only to meet their limited regulatory obligations.

4. European Trading as a Source of Demand

The European Union has developed a regional trading program as part of its effort to meet its Kyoto target.[28] The amount of emission reduction demanded by the program and the percentage of credits allowed from CDM will ultimately establish the maximum potential ETS demand for CDM credits.

The European Commissions' initial ETS proposal favored enforceability and simplicity over cost effectiveness and flexibility. This proposal contemplated trading of carbon dioxide emissions only between well monitored sources within the European Union that assumed caps on their emissions under the program.[29] This approach resembles that of the U.S. acid rain program, which has succeeded largely because it confines itself to a single pollutant emitted from a small group of well-monitored sources, namely large emitting units at electric utilities.[30]

The European Parliament, however, ultimately passed a more liberal proposal that left some potential to imitate the vices of earlier unsuccessful U.S. programs, which allowed trading with uncapped and poorly monitored sources. The EU's 2003 Directive, like the initial proposal, only limits the carbon dioxide emissions of large industrial sources.[31] It does so by requiring two phases of reductions. Polluters subject to the scheme must meet a phase one target in the 2005-2007 time period.[32] They must meet a phase two target by 2012.[33] The Directive, however, left the choice of targets to national governments within the European Union, subject to some supervision by the European Commission.[34] A recent study commissioned by the World Wildlife Fund has found that the caps of many countries for phase one demand insufficient reductions to change business as usual or adequately contribute to meeting Kyoto targets.[35] This implies weak demand for CDM credits.

While the 2003 Directive followed the European Commission Proposal in targeting a narrow sector and leaving reduction decisions largely to national governments, it departed from the proposal by enlarging the possible sources of credits. First, it allows credits for projects that reduce any one of six greenhouse gases, including some, such as methane, that usually are very difficult to monitor.[36] Second, it opens up the possibility of negotiating mutual recognition of

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[28] *See* Council Directive 2003/87, 2003 O.J. (L 275) (EC) [hereinafter ETS Directive].
[29] *See* Commission Proposal for a Directive of the European Parliament and Council Establishing A Scheme for Greenhouse Gas Emission Allowance Trading Within the Community and Amending Council Directive 96/61/EC, 2002 O.J. (C 075 E) 9.
[30] *See generally* Brennan Van Dyke, *Emissions Trading to Reduce Acid Deposition*, 100 YALE L. J. 2707 (1991).
[31] *See* ETS Directive, *supra* note 29, Annex 1.
[32] Id., Art. 11, sec. 1.
[33] Id., Art. 11, sec. 2.
[34] Id., Art. 11.
[35] *See* ILEX ENERGY CONSULTING, THE ENVIRONMENTAL EFFECTIVENESS OF THE EU ETS: ANALYSIS OF CAPS: A FINAL REPORT TO WWF V-VI (2005).
[36] *See* ETS Directive, *supra* note 28, Art. 3 (a), Art. 24.

credits with non-EU trading programs.[37] Finally, it envisages some use of CDM and joint implementation credits, but leaves the details to subsequent elaboration.[38]

The European Parliament amended the 2003 Directive in 2004, largely in order to address the linkages between the ETS and the Kyoto mechanisms.[39] This "Linking Directive" sought to "increase the diversity of low-cost compliance options" while safeguarding the "environmental integrity" of the community's trading scheme.[40] It opined that this linkage would increase "demand for CDM credits" and thereby provide aid to "developing countries . . . in achieving their sustainable development goals."[41] Accordingly, it authorized use of credits from CDM projects, called Certified Emission Reductions (CERs) beginning in 2005.[42]

But the Directive punts on the vital issue of the extent to which operators may rely upon CERs to fulfill their obligations under the Directive. It allows each Member State to authorize regulated sources to satisfy a specified "percentage" of their emission reduction obligations through the purchase of CERs.[43] The Linking Directive also suggested that the percentage should be small by requiring compliance with the Kyoto Protocol's "supplementarity obligation", the obligation to use credits only to supplement domestic compliance efforts.[44] But in the same paragraph, it stated that "domestic action will thus constitute a significant element of the effort made," which suggests wider use of CERs, since domestic action can remain a "significant element" even if a small majority of credits comes from CERs.[45] Thus, a crucial paragraph about the extent of reliance on CERs looks like an effort to paper over policy differences on the role of CERs and accordingly yields vague guidance. It tracks fairly similar language found in the Marrakech Accords to the Kyoto Protocol. [46] The European Parliament clearly decided, however, to prohibit credits for projects involving land use or nuclear power.[47] The Linking Directive also discourages the use of large hydropower credits by requiring member states to ensure that relevant international criteria "will be respected" when approving use of these CERs.[48] Hence, the total demand for CERs will be limited by the percentages allocated for CERs in national trading plans under the ETS Directive and by several discrete limitations on problematic projects.

The supplementary concept, then, limits the maximum potential demand for CDM and JI credits. The amount of the limitation depends upon the volume of demand for credits. The demand for credits, in turn, depends on the amount reductions required in the trading scheme and the percentage of reductions allowed for CER. Individual countries, not the EU, make the decisions

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37 Id. Art. 25.
38 Id. Art. 30.
39 Linking Directive, *supra* note 9.
40 Id., L 338/18.
41 Id.
42 Id. Art. 11a.
43 Id., Art. sec. 8(c), 338/23.
44 Id. 338/19 (par. 6); Kyoto Protocol, *supra* note 3, Art. 6, sec. 1(d).
45 *See* Linking Directive, 338/19 (par. 6).
46 *See* Decision 15/CP.7, Principles, nature and scope of the Mechanisms Pursuant to Articles 6, 12, and 17, of the Kyoto Protocol, FCCC/CP/2001/13/Add.2, at 2 (2001).
47 *See* Linking Directive, *supra* note 9, § 2 (adding Art. 11a to the 2003 Directive).
48 Id., § 2(b)(6).

about precisely how much reduction to demand in the trading program and what percentage of that reduction may come from CERs.

The World Bank has estimated that the annual average demand for all Kyoto credits (including AAUS, CDM, and JI) at 600 to 1150 $MtCO_{2e}$.[49] The ETS regulates sectors representing 46% of European CO_2 emissions.[50] Accordingly, NATSOURCE has estimated that the European Emission Trading Scheme will generate demand for credits of 110 $MtCO_{2ee.}$[51] This amount might prove less than the demand generated by governments and private parties outside of the trading scheme.[52] The NATSOURCE estimate, however, represents total demand for JI and CDM credits, not CDM alone (the topic of this paper). Nevertheless, this number represents a reasonable estimate of total potential ETS demand for CDM credits.

These numbers, however, are subject to some caveats. As of this writing the National Allocation Plans do not include firm targets for 2012 or firm numbers limiting the use of credits from the project-based mechanisms for phase II of the ETS. Weak targets will lower demand. Conversely stronger targets will increase demand. Final decisions about what percentages of project based credits to allow into the system will also influence demand emanating from the ETS.

Promoters of renewable energy and energy efficiency projects hoping to sell credits to facility owners regulated under the European ETS will find that their offerings will face competition from other types of both JI and CDM projects. If economic rationality governs the purchase decisions of the regulated industries, they will choose the cheapest available credits from among these offerings, perhaps discounting for risk (if there is any). This competition could reduce actual demand for CDM renewables and energy efficiency credits substantially.

Unfortunately, available data on the prices of CDM credits is quite limited. Many of those involved in projects have attempted to keep pricing data confidential.[53] This raises a transparency concern. One of the chief advantages of trading is that it reveals the actual cost of reductions. Since actual cost usually are lower than projected costs, this information can help spur subsequent actions to clean the environment. On the other hand, operators who have funding for projects not dependent on purchases by CER purchasers would want to hide the low cost of credits they can offer, since the low cost would suggest a lack of additionality in some cases. Transparency is vital both to informing the policy process and to providing a *post-hoc* check on the accuracy of *a priori* additionality determinations. The limited data available does not justify strong conclusions about how various types of approved projects are competing on the basis of price.

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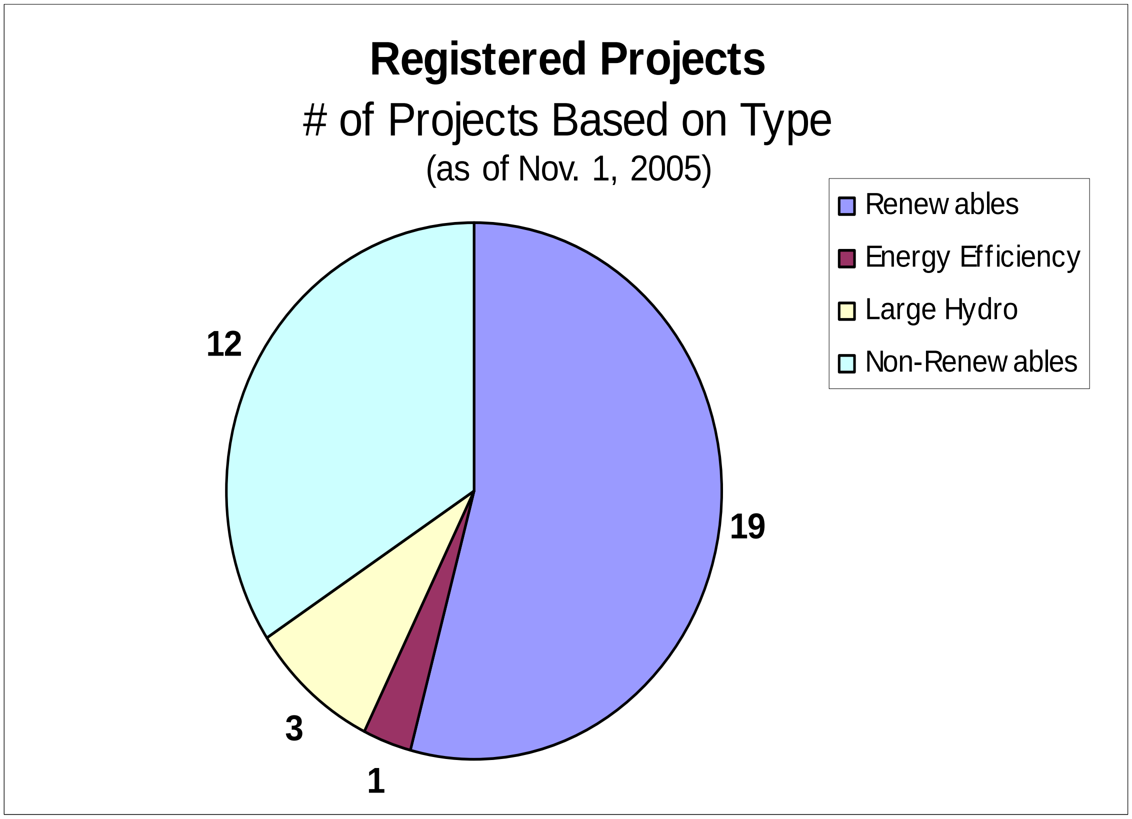
[49] *See* E. Haites & S. Seres, *Estimating Market Potential for the Clean Development Mechanism: Review of Models and Lessons Learned*, PCFPLUS REPORT 19 (2004).
[50] American Bar Ass'n, *Sustainable Development, Ecosystems, and Climate Change,* ABA ENV'T, ENERGY, & RESOURCES L.: YEAR IN REV. 120, 123 (2004).
[51] Gernot Klepper & Sonja Peterson, *Emissions Trading, CDM, JI, and More- The Climate Change Strategy of the EU* 11 (FEEM Working Paper No. 55.05, April 2005). This estimate might be off by 65 $MtCO_{2e}$ in either direction. Id.
[52] *See* id.
[53] FRANCK LECOCQ & KARAN CAPOOR, STATE AND TRENDS OF THE CARBON MARKET 2005, at 26 (2005), *available at* http://www.ieta.org/ieta/www/pages/getfile.php?docID=899.

A wild card variable comes from hot air.[54] To the extent that polluters are allowed to purchase credits reflecting hot air, which should be cheap because they cost nothing to produce, demand for renewable or energy efficiency CERs should diminish or disappear altogether. In phase one, some hot air may come into the ETS through countries like Poland, which have caps higher than current emissions under both Kyoto and the ETS.While political rejection of hot air may restrain use of extensive use of these credits, economic rationality will likely push facility owners toward favoring hot air over CERs, unless countries choose to provide tighter restraints on hot air than they apply to CDM, something not required by the Linking Directive,

5. CDM Projects as a Source of Supply

Examination of CDM projects suggests that project developers have favored end-of-the-pipe controls to ameliorate business as usual to projects providing renewable energy and energy efficiency. At first glance, it might appear that the CDM has done a magnificent job of encouraging renewable energy. After all, 19 of the 35 registered projects as of November 1, 2005, were renewable projects.[55]

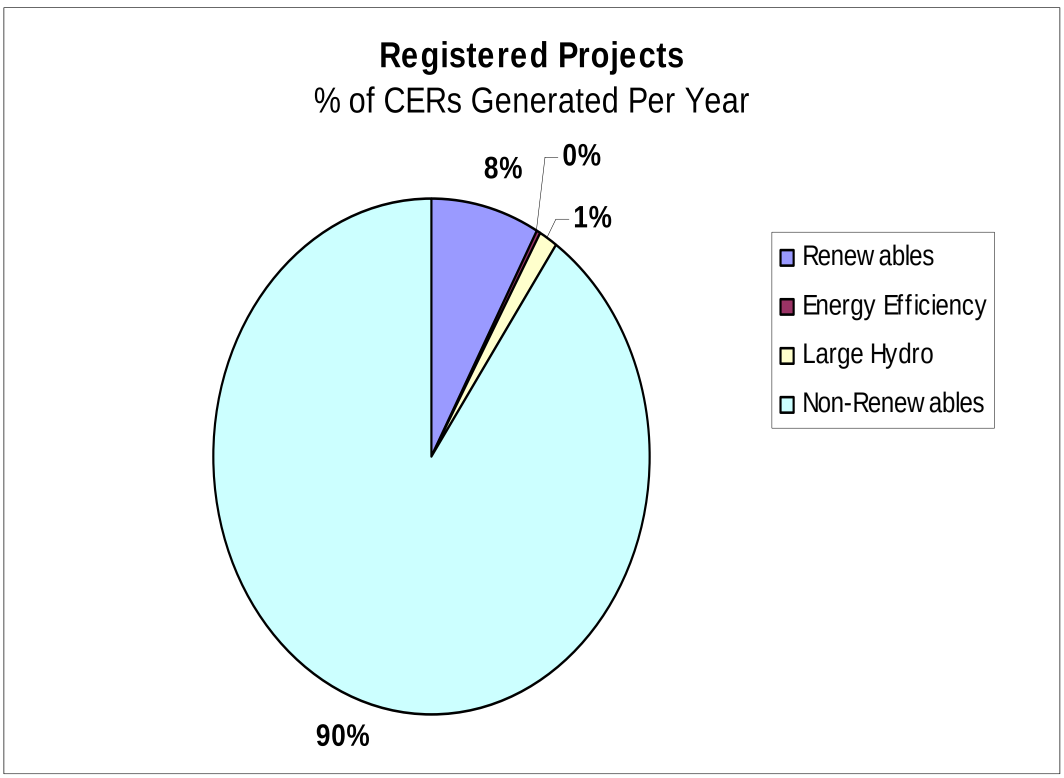


[54] Frank Lecocq, *State and Trends of the Carbon Market 2005 (Executive Summary)*, CARBON MARKET UPDATE 10, 11 (September, 2005) (explaining that the amount of AAU from Russia and the Ukraine are a key uncertainty).
[55] *See* http://www.cd.unfcc.int.html (last visited Nov. 4, 2005).

But examining the projects from the more meaningful perspective of how many CERs different types of projects generate yields a very different picture. Approved renewable energy projects CDM are expected to generate only .7 $MtCO_{2e}$ over the lifetime of the approved projects.

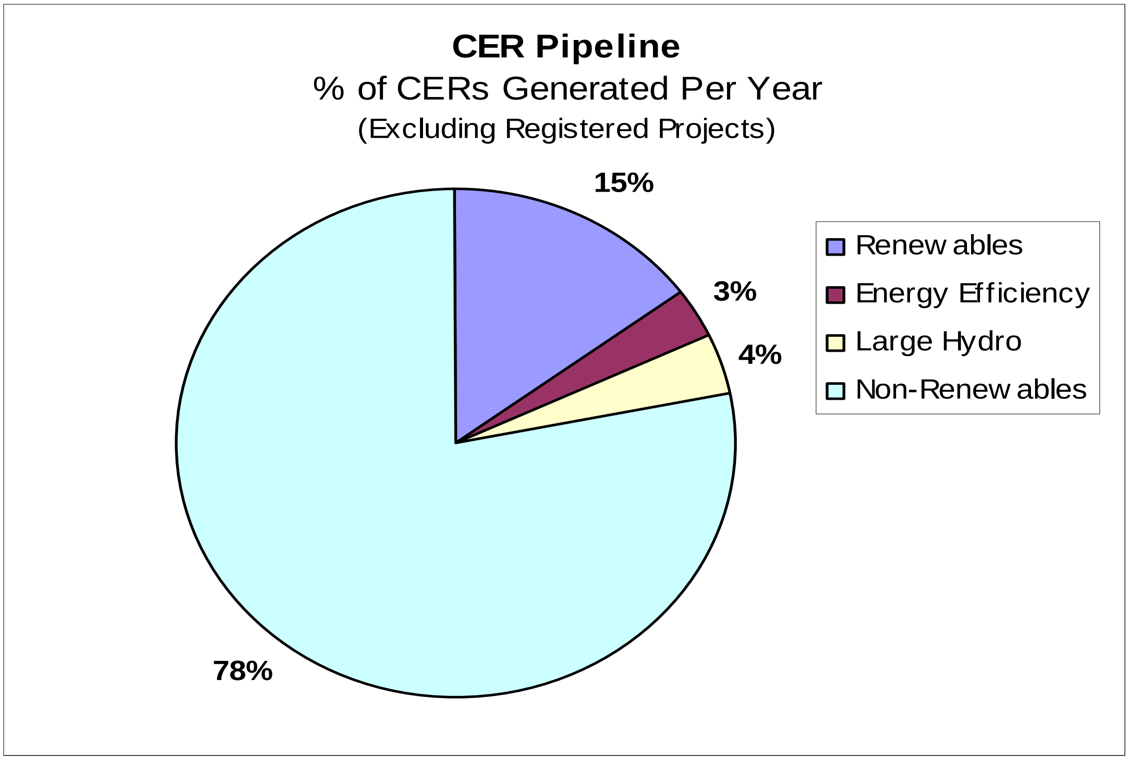
Registered Projects: Type	# of Projects (as of 11/22/05)	Metric Tonnes CO2 Reductions Per Year	% of CERs / yr
Renewables	19	638,965	8%
Energy Efficiency	1	6,580	0%
Large Hydro	3	104,155	1%
Non-Renewables	12	7,072,276	90%
Total	35	7,821,976	100%

This constitutes less than 10% of the available CDM credits.



It also constitutes less than 1% of the European potential demand for project mechanisms credit. As companies must plan to meet the phase one limits of the ETS in the 2005-2007 time period, the current supply could seriously limit the maximum potential European finance of sustainable development supporting CDMs in phase one.

Renewables projects in the pipeline could expand this supply. If all of these projects are approved, renewable project would generate 15% of the total credits.



So far, only one small energy efficiency project has received certification. The pipeline contains very few energy efficiency projects as well.

Ben Pearson has suggested several reasons why the CDM program has not generated a large supply of renewable energy credits.[56] The main reason is that renewable energy often costs more than other approaches to generating credits. Consequently, CDM developers have favored projects that contribute little or nothing to meeting sustainable development goals, but efficiently provide large volumes of cheap credits.

Typically, these projects capture or destroy gases with high global warming potential, such as methane and HFC-23.[57] Project developers understand that buyers maximizing cost effectiveness will want the cheapest credits available, not necessarily those that deliver the broadest and most important long-term environmental, economic, and social benefits.

Energy efficiency projects often pay for themselves, but that means that honest oversight will tend to make life difficult for energy efficiency projects. Energy efficiency has terrific potential for cheap reductions in greenhouse gases. But energy efficiency measures typically involve

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[56] *See* Ben Pearson, *CMD is Failing*, 56 TIEMPO 12 (2005).
[57] Id. at 12. For a critique of a major HFC-23 project *see Newest Biggest Deal*, DOWN TO EARTH (November 15, 2005), available at http://www.downtoearth.org.in/cover.asp?foldername=20051115&filename=anal&sid=1&sec_id=7 (last visited November 11, 2005). This article estimates that HFC-23 projects account for 24% of all CERs sold.

many low volume steps, each generating a small amount of reductions in greenhouse gases indirectly, by lessening demand for electricity generated by fossil fuels. This makes such projects unattractive for prospective purchasers of credits. In addition, because these projects often pay for themselves by generating reduced energy costs over time, serious questions about whether a project is additional, and therefore eligible to generate credits, should make it hard to get these projects approved. Policy interventions, such as information programs to make people aware of the opportunities for energy efficiency, taxes making carbon expensive, and efficiency standards for cars, buildings, and appliances can help. But the CDM, in the past, has generated project credits, not policy interventions. So, it is not surprising that CDM developers have not done much with energy efficiency.

The Conference of the Parties meeting in Montreal in 2005, however, attempted to increase the use of energy efficiency credits by authorizing credits for efficiency projects forming part of a government program to increase efficiency.[58] Assuring that such credits are truly additional will necessarily involve a difficult inquiry into the motives of the policy-makers adopting energy efficiency programs.

One would expect that renewable energy projects, while offering enormous long term benefits, would present difficulties for developers seeking to quantify reductions. Renewable energy projects do not directly reduce emissions, they add energy with little or no added emissions. They reduce emissions indirectly, by displacing more carbon intensive energy supply sources. Hence, estimating the value of credits requires calculation of the amount of energy produced, the associated emissions (if any), and the carbon emissions associated with the energy sources displaced. While this is possible, especially with less innovative projects that make a *priori* calculations of energy production reliable, it is more complicated than calculating the value of credits from a project that simply reduces the impacts of business as usual directly without starting down the path of fundamental change. Again, trading, with its emphasis on *a priori* calculation and low costs, does little to encourage renewable energy.

6. Lessons from CDM's Lack of Impact on Sustainable Development

Currently, only a few European countries seem on track to meet Kyoto limits. Others have significant shortfalls. The European Union and the international community generally will face pressures to make up the shortfall. They will face the question of how and whether to shore up commitments to sustainable development in that context.

Available options include:

- Paper Compliance – Relax oversight of CDM credits to make project approval easier and liberalize their use in the ETS.

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[58] Decision -/CMP.1: Further Guidance Relating to the Clean Development Mechanism, COP/MOP 1, Montreal U.N. Climate Change Conference, 5 (2005), *at* http://unfccc.int/files/meetings/cop_11/application/pdf/cmp1_24_4_further_guidance_to_the_cdm_eb_cmp_4.pdf.

- Ratchet down the caps in the ETS.
- Increase the stringency and breadth of non-ETS programs in the EU.
- Limit CDM to track Sustainable Development Goals
- Non-compliance

Trading's relationship to sustainable development offers some lessons about how to think through these options.

Trading creates an economic dynamic that can make paper compliance attractive. In the United States, at least, use of emissions trading often leads regulators into the trap of losing sight of long-term goals like sustainable development or even the realization of real verifiable surplus emission reductions. Instead of treating emissions trading as a means to achieve sustainable development, regulators involved in trading tend, over time, to view stimulation of a trading market as an end in itself. They often view impediments to trading, such as regulatory oversight and limits on the use of questionable credits, as "barriers" to trading or "transaction costs."[59] This view tends to lead almost inexorably to efforts to lower the barriers and transaction costs. This perspective will support an approach to encouraging renewables and energy efficiency by making approval and use of those credits easier.

While the lowering of transaction costs might increase the supply of credits, it often does so at a cost in environmental quality.[60] Transaction costs are not usually deadweight losses. They usually purchase something of value. In emissions trading markets, the transaction costs related to governmental oversight of the validity of credits purchase quality.[61] Absent such oversight, buyers, sellers, and brokers may have no interest in the quality of credits, since any credit acceptable to a regulator serves the function motivating the purchase, i.e. satisfying regulatory demand for credits.[62] Any reduction of transaction costs should avoid undercutting important elements of the oversight function.

The European Union can increase demand for CDM credits by adopting stringent regulations in Phase Two for the trading sector. Such an approach may create pressures to expand the use of cheap CDM credits and hot air. If that pressure is not resisted, then risks exist of having the cheapest credits, hot air, crowd out everything else. This will create the appearance, but not the reality, of compliance.

Developing countries and other observes are already skeptical of nations' claims that they are taking meaningful steps to address climate change. If climate policy-makers in developing countries do not believe that the developed countries have taken meaningful local action to address climate change, then they may resist assuming meaningful obligations in the post-Kyoto

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[59] *See* David M. Driesen & Shubha Ghosh, *The Functions of Transaction Costs: Rethinking Transaction Cost Minimization in a World of Friction,* 47 ARIZONA L. REV. 61, 92-98 (2005) (discussing the tension between the impetus to reduce transaction costs to encourage trading and the need to preserve effective government oversight to protect environmental quality from poor quality trades).
[60] *See id*. at 93-94 (explaining why both buyers and sellers of pollution credits share incentives to exaggerate the value of traded reductions).
[61] *Id.* at 93 (explaining that government oversight makes it possible to distinguish good from bad emissions trading transactions).
[62] *Id.* at 92-94

period. Conversely, if the European Union and other nations currently undertaking compliance with Kyoto targets take meaningful steps toward sustainable development, then the developed country will acquire increased credibility that may enhance developing countries' willingness to make commitments. Similarly, the claims of some U.S. politicians that complying with Kyoto is too costly to be achieved will lose credibility over time, if the EU does comply without reliance on hot air and non-additional project credits. This would aid ongoing efforts by many people in the United States to change the federal government's irresponsible climate change policy.

One way of increasing the use of renewables would be to restrict competing types of CDM credits. This would force buyers to choose options favoring sustainable development, instead of giving primacy to short term cost effectiveness.

Another option involves increasing the reductions from sectors not covered by the ETS Directive or enhancing other policy measures aimed at the Kyoto targets. The EU has under consideration a tax reform aimed at transport; countries have implemented renewable energy portfolio standards; many nations have imposed energy efficiency standards; and some countries have used carbon taxes in a limited fashion. Because trading measures have limited capacity to finance renewables and energy efficiency, increasing the scope and stringency of these more targeted policy measures may better stimulate moves toward sustainable development than tweaking the trading mechanism.

7. Conclusion

The goal of sustainable development is in some tension with the goal of short term cost effectiveness. The sooner we face up to the tension between free market liberalism and sustainable development, the better the chances for effective climate change policy.

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