US EPA supports leading edge extramural research in exposure, effects, risk assessment, and risk management through competitions for STAR grants, fellowships, and research contracts under the Small Business Innovative Research Program. Several of these grants have focused on using TRI data and other information for pollution prevention purposes. Below are additional details about those research projects including abstracts, publications, and/or links to where publications associated with the research can be found.

More information about US EPA's extramural research can be found on their website: http://epa.gov/ncer.

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Title: **The Effects of Financial Distress, Organizational Structure, and Auditing Rules on Firm Emissions**
**Principal Investigator (PI):** Evans Mary, Gilpatric, Scott, McKee, Micheal et al
**Institution:** University of Tennessee, Knoxville

**Abstract:**
Publicly available information concerning the environmental behavior of firms enhances the use of the private market (through liability for harm and through consumer and shareholder reactions) as a mechanism to control firm environmental malfeasance. Programs such as the EPA Toxic Release Inventory (TRI) program require firms to report releases of listed toxics each year. Other programs such as the Fuel Economy Information Program and Energy Guide labeling programs require firms to inform consumers of various environment-related performance properties of the firm's products.

For such programs to be effective in introducing the market as a mechanism to limit malfeasance such information must be disclosed in a timely fashion and it must be correct and accurate. In the following description of our research agenda we describe the results for an emissions information program (such as the TRI) but the behavioral conclusions hold for environmental performance programs such as Energy Guide.

We develop models of a firm in which we explicitly incorporate the incentives for emissions decisions and information disclosure and examine the implications for two classes of firms: a firm managed by an entrepreneur-manager and a firm consisting of several divisions in which the division managers are compensated by rank order tournament (such as a promotion ladder) and there is an upper level manager.

These models yield predictions of firm behavior that show a relation between observable firm characteristics and emissions. Further, our models show a relation between observable firm characteristics and the reporting of such emissions. Finally, our models provide insights for the improvement of such programs for the overall enhancement of environmental quality. That is, such programs can be modified in ways that enhance the role of market forces in controlling firm environmental performance.

We will be testing our models via a series of laboratory market experiments and with field data. The laboratory experiments will test the predictions of our models of firm behavior including responses to changes in the information programs. We investigate the effects of ways to improve the TRI program through policy options such as enhanced auditing of TRI reports, more rapid publication of the data, and more publicity attached to the Information.

**Citation:** Evans MF, Gilpatric SM, McKee M, Vossler CA. Managerial incentives for compliance with environmental information disclosure programs. In: Cherry TL, Kroll S, Shrogen JF, eds. Environmental Economics, Experimental Methods. New York, NY: Routledge Press, 2007, Chapter 13, pp. 241-260.

**Link to book:** http://www.routledge.com/books/details/9780415770729/

**Grant details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/8003/report/0

**Presentation details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.publications/abstract/8003#52069

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Title: **Evaluating the Impact of Public Disclosure on Polluter Behavior: Evidence from TRI**
**Principal Investigator (PI):** Bui, Linda T. M
**Institution:** Brandeis University

Topic: **The Impact of Voluntary Initiatives and Quasi-Regulatory Mechanisms on Polluting Behavior: Evidence from Pollution Prevention Programs and Toxic Releases**

**Abstract:**
To date, there is little convincing evidence on the effectiveness of either voluntary environmental initiatives or "quasi-regulatory" mechanisms. Here we investigate how a class of these initiatives known as pollution prevention ("P2") programs affect toxic pollution. We construct a data base on federal and state-level P2 programs and exploit variation in adoption dates and program characteristics to study their effects on facility-level releases. We find strong evidence that these Mechanisms can alter polluter behavior. In particular, we find that (1) the adoption of state P2 programs led to reductions in toxic releases of 12%-18%; (2) every $100,000 in federal matching funds provided for state P2 activities led to reductions in average facility level toxic releases of 2% for facilities in that state; and that (3) industry-wide information spill-overs are important routes through which P2 programs can affect all facilities, not only those within a state with a P2 program.

**Publication:** http://eecc.ubc.ca/2011/papers/EECC-2011-Bui.pdf

**Grant details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/7998/report/0

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Title: **Corporate Environmental Behavior: Examining the Effectiveness of Government Interventions and Voluntary Initiatives.**

**Principal Investigator (PI):** Morgenstern, Richard, Pizer, Billy & Shih, Jihn-Shyang
**Institution:** Resources for the Future

Topic: **Evaluating Voluntary Climate Programs in the United States**

**Abstract:**
Despite the growing importance of voluntary programs as tools for environmental management, they have been subject to quite limited evaluation. Program evaluation in the absence of randomized experiments is difficult because the decision to participate may not be random and, in particular, may be correlated with the outcomes. The present study is designed to overcome these problems by gauging he environmental effectiveness of two voluntary climate change programs—the U.S. Environmental Protection Agency's Climate Wise program and the U.S. Department of Energy's Voluntary Reporting of Greenhouse Gases Program, or 1605(b)—with particular attention to the participation decision and how various assumptions affect estimates of program outcomes. For both programs, the analysis focuses on manufacturing firms and uses confidential census data to create a comparison group and to measure outcomes (expenditures on fuel and electricity).

Overall, we find that that the effects from Climate Wise and 1605(b) on fuel and electricity expenditures are no more than 10 percent and probably less than 5 percent. Virtually no evidence suggests a statistically significant effect of either Climate Wise or 1605(b) on fuel costs. Some evidence suggests that participation in Climate Wise led to a slight (3–5 percent) increase in electricity costs that vanished after two years. Stronger evidence suggests that participation in 1605(b) led to a slight (4–8 percent) decrease in electricity costs that persisted for at least three years.

**Publication:** http://www.rff.org/RFF/Documents/RFF-DP-08-13.pdf

**Additional publication and presentation details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.publications/abstract/6283

**Grant details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/6283/report/0

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Title: **Pollution Prevention: The Role of Environmental Management and Information**
**Principal Investigator (PI):** Khanna, Madhu, Deltas, George & Joshi, Satish
**Institution:** University of Illinois at Urbana-Champaign and Michigan State University

**Several publications have been submitted on this project:**

1. Topic: **The effectiveness of voluntary environmental initiatives**

**Book Description:** We live in an era of human-dominated ecosystems in which the demand for environmental governance is rising rapidly. At the same time, confidence in the capacity of governments to meet this demand is waning. How can we address the resultant governance deficit and achieve sustainable development? This book brings together perspectives from economics, management, and political science in order to identify innovative approaches to governance and bring them to bear on

environmental issues. The authors' analysis of important cases demonstrates how governance systems need to fit their specific setting and how effective policies can be developed without relying exclusively on government. They argue that the future of environmental policies lies in coordinated systems that simultaneously engage actors located in the public sector, the private sector, and civil society. Governance for the Environment draws attention to cutting-edge questions for practitioners and analysts interested in environmental governance.

**Citation:** Khanna M, Brouhle K. The effectiveness of voluntary environmental initiatives. In: Delmas MA, Young OR, eds. Governance for the Environment: New Perspectives. New York, NY: Cambridge University Press, Chapter 6, pp. 144-182, 2009.

**Link to book:** http://www.cambridge.org/us/knowledge/isbn/item2427816/?site_locale=en_US

2. Topic: **Striving to be green: the adoption of total quality environmental management**

**Abstract:**

Many firms are undertaking environment-friendly organizational change by applying the philosophy of total quality management with its emphasis on reducing waste and increasing efficiency. Their objective is to improve their management of pollution and increase customer satisfaction. This article investigates the factors that lead to total quality environmental management (TQEM) by large firms. We find that internal considerations stemming from a firm's technical capability, size (absolute and relative to competing firms), extent of operations and volume of past emissions are strongly associated with the TQEM adoption decision. The first four factors are proxies for the firm's costs and capabilities of adopting TQEM while the fifth factor is related to the benefits from increasing efficiency and waste reduction, and thus proxies for internally generated demand for TQEM. The desire to improve a firm's image with customers, earning good-will with regulators and the anticipation of future regulations do not appear to be associated with the adoption of TQEM. Thus, this article's main conclusion is that the adoption of TQEM is associated mostly with internal factors and motives.

**Citation:** Harrington DR, Khanna M, Deltas G. Striving to be green: the adoption of total quality environmental management. *Applied Economics* 2008;40(23):2995-3007.

**Link to publication:** http://www.tandfonline.com/doi/abs/10.1080/00036840600994005

3. Topic: **Adoption of pollution prevention techniques: the role of management systems and regulatory pressures**

**Abstract:**

This paper investigates the extent to which firm level technological change that reduces unregulated emissions is driven by regulatory pressures, and firms' technological and organizational capabilities. Using a treatment effects model with panel data for a sample of S&P 500 firms over the period 1994–1996, we find that organizational change in the form of Total Quality Environmental Management leads firms to adopt pollution prevention practices, after controlling for the effects of various regulatory pressures and firm-specific characteristics. We find that the threat of anticipated regulations and the presence of 'complementary assets' is important for creating the incentives and an internal capacity to undertake incremental adoption of pollution prevention techniques.

**Citation:** Khanna M, Deltas G, Harrington DR. Adoption of pollution prevention techniques: the role of management systems and regulatory pressures. *Environmental and Resource Economics* 2009;44(1):85-106.

**Publication:** http://v26265ncay506.aa.ad.epa.gov/ncerintranet/ncer_pubs/full_text/40740.pdf

4. Topic: **Markets with environmentally conscious consumers**

**Abstract:**
This paper considers a duopoly operating in a market with consumers who care about both an environmental attribute and other brand-specific attributes of products. Consumers are assumed to have the same willingness to pay for incremental improvements in product environmental quality but differ in their total willingness to pay for the product of each firm. Firms are allowed to be asymmetric, in that holding environmental quality of products the same, average willingness to pay for one firm's product is higher than for the other's. We focus on effects driven purely by the strategic interaction of firms, and thus do not allow for an aggregate demand response to changes in product quality and prices. The paper examines the choice of environmental quality of products by firms in the absence of any public intervention and the implications of various forms of public intervention. It finds that environmental quality would be under-provided even if consumers fully internalize the pollution externality. This implies that education campaigns that seek to inform consumers of the pollution consequences of their purchase decisions or taxes based on uninternalized environmental damages will fail to lead to the socially optimal level of environmental quality of products. A subsidy on the fixed costs of improving the environmental attribute would lead the higher quality firm to lower its environmental quality while it could lead the low quality firm to increase its quality if the degree of asymmetry among firms is high. A minimum quality standard leads the higher quality firm to lower its environmental quality and has an ambiguous effect on social welfare. The effects of these interventions on firms profits are shown to differ qualitatively for different types of intervention and also for each of the two firms. Thus, a firm that lobbies for one type of intervention may lobby against another seemingly similar one, and a firm may lobby for an intervention while its competitor may lobby against it.

**Citation:** Deltas G, Khanna M, Ramirez DT. Markets with environmentally conscious consumers. October 2004 (manuscript).

**Publication:** http://v26265ncay506.aa.ad.epa.gov/ncerintranet/ncer_pubs/full_text/40739.pdf

5. Topic: **Green management and the nature of technical innovation**

**Abstract:**
The types and nature of a firm's innovative activities are influenced by a firm's organizational structure. We develop an empirical framework to examine the effect of Total Quality Environmental Management (TQEM) on the adoption of 43 types of innovative pollution prevention activities over the period 1992-1996, and to determine whether it differs systematically across innovation types. We differentiate innovations according to (i) their functional characteristics: whether they involve procedural changes, equipment modifications, material modifications or other unclassified/customized changes; (ii) their visibility to consumers and, (iii) their ability to enhance efficiency. We find that the effect of TQEM on

pollution prevention is non-uniform and stronger for the adoption of practices that involve procedural changes or have unclassified/customized attributes. We also find that the visibility to consumers or efficiency enhancement does not incrementally contribute to the effect of TQEM on the adoption of pollution prevention practices. These findings are robust to controlling for the timing of TQEM adoption and any type-specific trends in pollution prevention activities. Because the pollution prevention activities most strongly affected by TQEM are generally more prevalent in the petroleum refining and chemical manufacturing, these sectors experience the largest impact from the adoption of TQEM on pollution prevention innovation.

**Citation:** Deltas G, Harrington DR, Khanna M. Green management and the nature of technical innovation. November 2007 (manuscript).

**Publication:** http://v26265ncay506.aa.ad.epa.gov/ncerintranet/ncer_pubs/full_text/40738.pdf

6. Topic: **Investor responses to emission information: do toxicity, pollution prevention, and environmental management systems matter?**

**Abstract:**
While environmental management strategies both by firms and regulators are converging towards proactive stakeholder management, the key question remains: do investors, as major stakeholders, recognize and reward firms involved in such proactive environmental management and do these strategies create shareholder value? The answer is critical to the sustainability of proactive environmental management efforts. We analyze if relative risks of pollutant emissions, pollution prevention activities undertaken by the firm, and the characteristics of firm environmental management systems affect stock market reactions to toxic release information. Event study analysis of a panel dataset of S&P 500 firms suggests that stock market reactions incorporate information on relative risks, pollution prevention efforts and selected features of firm environmental management systems such as external reporting and employee incentives.

**Citation**: Joshi S, Khanna M, Sidique S. Investor responses to emission information: do toxicity, pollution prevention, and environmental management systems matter? 2005 (manuscript).

**Publication:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.pubFullText/publication_id/40742

**Additional publication and presentation details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.publications/abstract/6122

**Grant details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/6122/report/0

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Title: **Regulating Pollution Through Information Disclosure: Facility Response to the Toxics Release Inventory**
**Principal Investigator (PI):** Stavins Robert, Miller, Nohan

**Institution:** Harvard University

**Several publications have been submitted on this project:**

1. Topic: **Evaluating management-based regulation: a valuable tool in the regulatory toolbox?**

**Citation:** Bennear LS. Evaluating management-based regulation: a valuable tool in the regulatory toolbox? Coglianese C, Nash J, eds. In: Leveraging the Private Sector: Management-BasedStrategies for Improving Environmental Performance. Chapter 3. Washington, D.C: Resources for the Future Press, 2006, pp. 51-86.

**Publication:** http://www.duke.edu/~lds5/Papers/Bennear_RFF_Chapter.pdf

**Link to book:** http://www.amazon.com/Leveraging-Private-Sector-Management-Based-Environmental/dp/1891853961

2. Topic: **Are management-based regulations effective? Evidence from state pollution prevention programs**

**Abstract:**
This paper evaluates a recent innovation in regulating risk called management-based regulation. Traditionally, risk regulation has either specified a particular means of achieving a risk-reduction goal or specified the goal and left the means of achieving that goal up to the regulated entity. In contrast, management-based regulation neither explicitly imposes the means, nor the ends. Rather, what is required is that each regulated entity review its production processes and develop a set of goals and procedures that will reduce risk. I evaluate the effectiveness of management-based regulation by taking advantage of policy variation that occurred when 14 states adopted such regulations for toxic chemical control in the 1990s. Using panel data for just over 31,000 manufacturing plants in the United States, I investigate whether facilities subject to management-based regulations had larger changes in total quantities of toxic chemical releases, engaged in more pollution prevention activities, or reported fewer toxic chemicals to the Toxics Release Inventory (TRI). The results indicate that management-based regulation has had a measurable positive effect on the environmental performance of manufacturing plants. In particular, plants subject to management-based regulation experienced larger decreases in total pounds of toxic chemicals released and were more likely to engage in source reduction activities. © 2007 by the Association for Public Policy Analysis and Management.

**Citation:** Bennear LS. Are management-based regulations effective? Evidence from state pollution prevention programs. *Journal of Policy Analysis and Management* 2007;26(2):327-348.

**Link to publication:** http://onlinelibrary.wiley.com/doi/10.1002/pam.20250/abstract

3. Topic: **The effects of environmental regulation on technology diffusion: the case of chlorine manufacturing**

**Abstract:**
We use a hazard model to estimate the effect of environmental regulation on the diffusion of membrane cell production technology in the chlorine manufacturing industry. We estimate the effect of

regulation on both the adoption of the membrane technology at existing plants and on the exit of existing plants using older technologies. We find that environmental regulation did affect the diffusion of the cleaner technology in the chlorine industry. However, it did so not by encouraging the adoption of membrane cells by existing facilities, but by reducing the demand for chlorine and hence encouraging the shutdown of facilities using the environmentally inferior options.

**Citation:** Snyder LD, Miller NH, Stavins RN. The effects of environmental regulation on technology diffusion: the case of chlorine manufacturing. *The American Economic Review* 2003;93(2):431-435.

**Publication:** http://v26265ncay506.aa.ad.epa.gov/ncerintranet/ncer_pubs/full_text/23529.pdf

**Additional publication and presentation details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.publications/abstract/5435

**Grant details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/5435/report/0

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Title: **Environmental Management Strategies and Corporate Performance: Identification and Analysis of the Motivators of Regulated Entities Environmental Behavior and Performance.**
**Principal Investigator (PI):** Delmas, Magnali & Aigner, Dennis
**Institution:** University of California, Santa Barbara

**Abstract:**
The objective of this research is to assess how and when environmental management practices impact environmental and corporate performance. Research into the link between environmental performance and corporate performance has produced conflicting results mostly because it has been phrased in the wrong terms. Instead of asking whether it pays to be green, we ought to be asking about the circumstances under which it may pay. Business behavior with respect to the environment, like any other aspect of strategy or management, should be considered in light of the basic economic situation of the firm: the structure of the industry in which it competes, its own position within that industry, and its internal organizational capabilities.

**Several publications have been submitted on this project:**

1. Topic: **Institutional pressure and environmental management practices**

**Citation:** Delmas M, Toffel M. Institutional pressure and environmental management practices. In: Sharma S, Starik M, eds. Northhampton, MA: Edward Elgar Publishing, 2004, pp. 230-245.

**Link to book:** http://www.e-elgar.co.uk/Bookentry_Main.lasso?id=3158

2. Topic: **Stakeholders and Environmental Management Practices: an Institutional Framework**

**Abstract:**

Despite burgeoning research on companies' environmental strategies and environmental management practices, it remains unclear why some firms adopt environmental management practices beyond regulatory compliance. This paper leverages institutional theory by proposing that stakeholders - including governments, regulators, customers, competitors, community and environmental interest groups, and industry associations - impose coercive and normative pressures on firms. However, the way in which managers perceive and act upon these pressures at the plant level depends upon plant- and parent-company-specific factors, including their track record of environmental performance, the competitive position of the parent company and the organizational structure of the plant. Beyond providing a framework of how institutional pressures influence plants' environmental management practices, various measures are proposed to quantify institutional pressures, key plant-level and parent-company-level characteristics and plant-level environmental management practices.

**Citation:** Delmas M, Toffel M. Stakeholders and environmental management practices: an institutional framework. *Business Strategy and the Environment* 2004;13(4):209-222

**Publication:** http://v26265ncay506.aa.ad.epa.gov/ncerintranet/ncer_pubs/full_text/27463.pdf

**3.** Topic: **Deregulation and environmental differentiation in the electric utility industry**

**Abstract:**

This paper analyzes how economic deregulation impacts firm strategies and environmental quality in the electric utility industry. We find evidence that the deregulation introduced to this historically staid industry has stimulated environmental differentiation. Differentiation is most likely to appear where its point of uniqueness is valued by customers, and we confirm this relationship in our sample. Specifically, utilities that served customers who exhibited higher levels of environmental sensitivity generated more 'green' power. The tendency for firms to differentiate in this way is lessened if they are relatively more dependent on coal-fired generation or relatively more efficient. Thus, there is evidence that firms sort themselves into either differentiation or low-cost strategies as the competitive realities of a deregulated world unfold. Deregulation and the ensuing environmental differentiation illustrate how utilities exploited formerly unmet customer demand for green power. The result has been greater levels of renewable generation and, hence, a cleaner environment.

**Citation:** Delmas M, Russo MV, Montes-Sancho MJ. Deregulation and environmental differentiation in the electric utility industry. Strategic Management Journal 2007;28(2):189-209.

**Publication:** http://v26265ncay506.aa.ad.epa.gov/ncerintranet/ncer_pubs/full_text/37969.pdf

**4.** Topic: **Survey Questionnaire on environmental management practices: summary of results by industry and practices**

**Publication:** http://v26265ncay506.aa.ad.epa.gov/ncerintranet/ncer_pubs/full_text/37970.pdf

5. Topic: **Deregulation and resource reconfiguration in the electric utility industry**

**Abstract:**
This paper analyzes how economic deregulation impacts resource reconfiguration in the electric utility industry. We argue that to understand strategic change in this industry, we need to understand how development and deployment of a firm's resources reflects path dependencies that nonmarket actors impose on firms. We find evidence that the deregulation introduced to this historically staid industry has stimulated environmental differentiation strategies for incumbent firms. Consistent with theories that suggest differentiation is most likely to appear where its point of uniqueness is valued by customers, utilities engaged in differentiation if they served states whose populace exhibited a higher level of environmental sensitivity. The tendency for firms to differentiate is lessened if they are relatively more dependent on coal-fired generation or relatively more efficient. In both of these cases, the variables are associated with lower operating costs, in turn demonstrating that firms sort themselves into either differentiation or low cost strategies as their environments reflect more market-like segmentation in a deregulated world. This paper contributes to the resource based view of the firm by highlighting the importance of the nonmarket context in which resources are developed and leveraged.

**Publication:** http://v26265ncay506.aa.ad.epa.gov/ncerintranet/ncer_pubs/full_text/27460.pdf

6. Topic: **Institutional pressure and environmental management**

**Abstract:**
When integrated with key organizational characteristics, institutional theory can yield new insights to understand differences between firms' strategies. We propose that a company's functional organization and internal power structure influence its facility managers' sensitivity to and interpretation of institutional pressures. Combining over 500 responses from an original survey with existing data sources, we show how two corporate departments affect how facility managers perceive and respond to various institutional pressures to adopt environmental management practices.

**Publication:** http://v26265ncay506.aa.ad.epa.gov/ncerintranet/ncer_pubs/full_text/27461.pdf

**Additional publication and presentation details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.publications/abstract/5553

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Title: **Organizational Structures, Citizen Participation, and Corporate Environmental Performance**
Principal Investigator (PI): Grant, Don
Institution: University of Arizona

**Multiple publications have been submitted on this project:**

1. Topic**: Are Subsidiaries More Prone to Pollute? New Evidence from the EPA's Toxics Release Inventory**

**Abstract:**
Some scholars fear that because firms are no longer liable for the hazardous activities of their subsidiaries, the latter are under less corporate pressure to limit their pollution. However, researchers have yet to examine the environmental performance of subsidiaries. This reflects a more general failure on their part to test the effects different organizations have on pollution. *Methods.* To begin to remedy this situation, we use data from the EPA's Toxics Release Inventory to determine whether subsidiaries emit pollutants at a higher rate than other facilities in the chemical industry. *Results.* We find that subsidiaries have significantly higher emission rates than other facilities after controlling for several relevant factors. *Conclusions.* Results suggest how recent research on the structural determinants of environmental degradation might be advanced by focusing on the effects of specific organizational forms.

**Citation:** Grant D, Jones AW. Are subsidiaries more prone to pollute? New evidence from the EPA's Toxics Release Inventory. *Social Science Quarterly* 2003;84(1):162-173.

**Link to journal article:** http://onlinelibrary.wiley.com/doi/10.1111/1540-6237.t01-1-8401010/abstract

2. Topic**: Do facilities with distant headquarters pollute more? How civic engagement conditions the environmental performance of absentee managed plants.**

**Abstract:**
Scholars agree that due to advances in transportation and communication technologies, firms can extend their reach and more easily externalize their pollution by setting up plants in far-flung, less regulated areas. They also concur that absentee managed plants or facilities with remote headquarters are rapidly becoming the modal type of industrial organization. However, they have yet to examine the environmental performance of these plants and how their propensity to pollute is conditioned by the types of communities that harbor them. This reflects a more general failure on the part of social scientists to study the impact that different organizational forms have on the physical environment. Using the EPA's newly published 2000 Toxics Release Inventory, we test the direct and interactive effects of absentee management on the environmental performance of chemical plants in the U.S. Findings reveal that absentee managed plants emit more toxins, on average, than other plants. However, when we take into account the amount of chemicals that plants have on-site and other factors that influence facilities' emissions, we discover that the environmental performance of absentee managed plants is no worse than that of other plants. Whether plants with distant headquarters emit more toxins largely depends on the presence of local institutions that facilitate civic engagement. When embedded in communities with more associations, churches, and "third places," absentee managed plants emit significantly fewer toxins.

**Citation:** Grant D, Jones AW, Trautner MN. Do facilities with distant headquarters pollute more? How civic engagement conditions the environmental performance of absentee managed plants. *Social Forces* 2004;83(1):189-214.

**Link to journal article:** http://sf.oxfordjournals.org/content/83/1/189.abstract

**Grant details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/810/report/0

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**Presentation details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.publications/abstract/810

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Title: **Evaluating the Dissemination and Impact of Toxic Release Inventory Data**
**Principal Investigator (PI):** Vasu, Micheal, Atlas, Mark & Dimick, Michael.
**Institution:** North Carolina State University

**Abstract:**
The objectives of this research project were to: (1) determine how Toxics Release Inventory (TRI) information, which is disseminated to the public, is received by the public; and (2) what, if any, means there are for improving the delivery and understanding of TRI data.

**Final report:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/431/report/F

**Presentation details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.publications/abstract/431

**Grant details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/431/report/0

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Title: **Business-led Environmental Management: Economic Incentives and Environmental Implications**
**Principal Investigator (PI):** Khanna, Madhu & Thurston, Deborah.
**Institution:** University of Illinois at Urbana Champaign

**Multiple publications have been submitted on this project:**

1. Topic: **What is driving corporate environmentalism: opportunity or threat?**

**Abstract:**
Environmental management systems (EMSs) can differ considerably in the mix of practices and the number of practices adopted by firms. This paper explores the various incentives motivating adoption of different types of practices by a sample of Standard & Poor's 500 firms and provides an explanation for why firms adopt practices selectively. Observable firm characteristics, proxies for the incentives faced by firms, are used to determine the types of firms more likely to adopt certain types of practices. We find that practices, such as having an internal environmental policy, corporate environmental standards and environmental auditing are motivated more strongly by regulatory pressures, while practices such as total quality environmental management and environmental reporting are motivated more strongly by the potential for gaining competitive advantage and improving relations with stakeholders.

Citation: Khanna M, Anton WRQ. What is driving corporate environmentalism: opportunity or threat? Corporate Environmental Strategy 2002;9(4):409-417.

**Link to publication:** http://www.sciencedirect.com/science/article/pii/S1066793802001185

**2.** Topic: **Non-Mandatory Approaches to Environmental Protection**

**Abstract:**
The approach to environmental protection has been evolving from a regulation-driven, adversarial "government-push" approach to a more proactive approach involving voluntary and often "business-led" initiatives to self-regulate their environmental performance. This has been accompanied by increasing provision of environmental information about firms and products to enlist market forces and communities in creating a demand for corporate environmental self-regulation by signaling their preferences for environmentally friendly firms. This paper provides an overview of the non-mandatory approaches being used for environmental protection and surveys the existing theoretical literature analyzing the economic efficiency of such approaches relative to mandatory approaches. It also discusses empirical findings on the factors motivating self-regulation by firms and its implications for their economic and environmental performance. It examines the existing evidence on the extent to which information disclosure is effective in generating pressures from investors and communities on firms to improve their environmental performance.

**Citation:** Khanna M. Non-mandatory approaches to environmental protection. Journal of Economic Surveys 2002;15(3):291-324.

**Link to publication:** http://onlinelibrary.wiley.com/doi/10.1111/1467-6419.00141/abstract

**3.** Topic: **Corporate environmental management: regulatory and market-based incentives.**

**Abstract:**
The corporate approach to environmental protection has been evolving from a regulation-driven reactive mode to a more proactive approach involving voluntarily adopted management systems that integrate environmental concerns with traditional managerial functions. Several hypotheses about the factors explaining the diversity in the environmental management systems adopted by firms are tested using survey data for a sample of S&P 500 firms. The analysis shows that the threat of environmental liabilities, high costs of compliance, market pressures, and public pressures on firms with high on-site toxic emissions per unit output create incentives for adopting a more comprehensive environmental management system.

**Citation:** Khanna M, Anton WRQ. Corporate environmental management: regulatory and market-based incentives. Land Economics 2002;78(4):539-558.

**Link to publication:** http://le.uwpress.org/content/78/4/539.abstract

**Additional publication details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.publications/abstract/210

**Grant details:**
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/210/report/0