Chapter 12
Collaborative Voluntary Programs: Lessons from Environmental Law

Kathleen Waugh and Gary E. Marchant

Scholars have likened the technology revolution that we are currently experiencing to the Industrial Revolution that occurred in the early nineteenth century (Hirsch 2006; Isenberg 1995; Litan 2001). Both "revolutions" introduced new technologies that transformed society, providing almost unimaginable benefits; but accompanying the benefits were unfortunate side effects and consequences (Hirsch 2006; Pearson 2002).

In the case of the Industrial Revolution, the new technologies generated considerable harm to the environment, and a new form of law – environmental law – developed in response to that challenge. In the case of today's converging technological revolutions, the legal system is grappling with how to deal with new challenges created by the rapid advances in science and technology. Because environmental law frequently addresses the output or effects of technology, particularly as it relates to the harm caused society, the variety of new regulatory approaches that have been tried in the area of environmental law in the past 20 years may prove instructive as the legal system grapples with today's technology challenges. In particular, the environmental field has utilized a variety of innovative cooperative and voluntary programs to enhance or supplement the environmental benefits obtained through traditional regulation (Gunningham 2009b). This experience with voluntary programs provides a rich history to consider and evaluate potential voluntary approaches to the oversight of emerging technologies.

This chapter begins with a general background on voluntary and collaborative programs in environmental law, including different types and common elements of such programs. The next section summarizes the strengths and limitations of these voluntary approaches. The third section then reviews the empirical experience of several specific voluntary programs and the lessons that can be drawn from those examples for the governance of emerging technologies.

K. Waugh (✉)
Arizona State University, Tempe, AZ, USA
e-mail: Kathleen.Waugh@asu.edu

G.E. Marchant et al. (eds.), *The Growing Gap Between Emerging Technologies and Legal-Ethical Oversight*, The International Library of Ethics, Law and Technology 7,
DOI 10.1007/978-94-007-1356-7_12,

12.1 Background on Voluntary Environmental Programs

The traditional form of environmental regulation known as "command and control," in which the government adopts rules of performance that are then enforced against regulated parties, has increasingly been criticized as an overly rigid and cumbersome system that discourages technical innovation because of the focus on narrowly-defined compliance to uniform minimum standards (Wyeth 2006). In the 1980s, environmental law began to utilize voluntary collaborative programs as a means to address the criticisms of traditional regulation, including the problem of outdated rules and disincentives for innovation (Gunningham 2009a). In the United States, many collaborative voluntary programs developed under the auspices of the U.S. Environmental Protection Agency (EPA) and the Occupational Safety and Health Agency (OSHA). As of July 2009, EPA was sponsoring approximately 60 collaborative partnership programs with 13,000 participants, including firms, industry groups and other organizations (U.S. EPA 2009). OSHA had 2,245 facilities participating in the agency's voluntary protection programs, and there were 616 partnerships between OSHA with associations, industry groups, and businesses (OSHA 2007).

The utilization of collaborative voluntary agreements is not unique to the United States. In the European Union, 300 voluntary agreements were in existence as of the mid-1990s, and the number continues to grow (Johnson 2001). For example, several international initiatives have developed in response to the health, safety and environmental issues created by the emergent field of nanotechnology. International initiatives to address this uncertainty include the European Union's voluntary *Code of Conduct for Responsible Nanosciences and Nanotechnologies Research* and the development of voluntary standards by ASTM International and the International Organization for Standardization (ISO), among others (Breggin and Carothers 2006). The European Union's *Code* sets forth guidelines for conducting research that embrace the precautionary principle, emphasizing that research should be conducted in a safe and ethical manner while fostering the creativity and flexibility necessary to promote innovation and growth (CEC 2008). ASTM International and the ISO have undertaken the development of voluntary standards for characterizing the physical properties of nanomaterials and assessing the risks and environmental impact of the toxicological properties of nanomaterials (ASTM undated).

These collaborative and voluntary approaches in both the U.S. and E.U. are of several different kinds (Alberini and Segerson 2002). One type of collaborative model is "industry self-regulation", in which businesses voluntarily police themselves through "business-led initiatives" without regulatory intervention by the government. Another form is a voluntary government program in which the regulator determines the terms of the agreement, designs the program and eligibility requirements, and then seeks participants. A third model is a negotiated agreement between the regulator and the regulated entity, in which some form of incentive or regulatory relief (e.g., relaxing of permitting or inspection rules) is offered by the regulator.

While there are many differences between the various collaborative approaches, there are also many common characteristics. These characteristics include the following:

- Leadership comes from multiple sources – the government, the individual business, the industry sector, community groups, and environmental groups, although the government agency may still play the largest role (Wyeth 2006; Karkkainen 2006). This is unlike the traditional command and control model, where leadership is highly centralized in the rulemaking agency (Fiorino 1996).
- The process of working together to negotiate a solution that considers the needs of both society and that of an individual company or sector is seen as fostering more creative solutions than is typical of the top-down, adversarial approach of traditional regulation (Caldart and Ashford 1999). There is an underlying premise that a uniform, "one-size fits all" approach to regulation is not optimal (Hirsch 2001a).
- The process of negotiating a collaborative agreement shifts the focus from compliance to looking at the potential for continuous improvement through innovation (Wyeth 2006).
- Significant flexibility is offered in how a regulated entity meets performance objectives, and the programs delineate performance goals, not the technology to be used (Davies and Mazurek 1996). This flexibility is critical for fostering innovation.

Voluntary collaborative agreements are potentially useful in expediting an oversight mechanism for new problems as well as minimizing outdated regulations. More informed decisions often result from the collaboration, because the companies or industry usually know their processes and operations better than the government can, and the voluntary programs are often structured to require or encourage companies to disclose relevant information to regulators and concerned stakeholders (Wyeth 2006; Sousa and Klyza 2007). Moreover, an approach that allows entities the flexibility to determine how best to meet performance targets stimulates innovation because it removes the incentive to remain stagnant by simply maintaining compliance with static and often outdated standards (Gunningham 2009a; Hirsch 2006). In essence, such a system "self-corrects" over time. This freedom to innovate can be crucial to industries undergoing rapid technological change.

Self-regulation through voluntary collaborative programs has also generated concerns, however. The propriety of a federal agency negotiating standards with the regulated entity has been questioned, due to the risk that the agency may fall captive to special interest groups and thus compromise its "watch dog" mission and role as trustee of societal resources (Zinn 2002). Additionally, some collaborative programs have been criticized as being just as, if not more, bureaucratic and administratively burdensome as the traditional regulatory process, in which rulemaking may take several years (Hirsch 2001b; Davies and Mazurek 1996). Some collaborative programs have also floundered due to legal problems relating to doubts about the agency's statutory authority to enter into collaborative or other innovative programs

(Caballero 1998). There are lessons to be learned from the experiments with voluntary and collaborative programs in environmental law, and below we explore some of those programs and the lessons that might be drawn from them for emerging technologies.

12.2 Examples of Voluntary Environmental Programs

In this section, the design and results of a number and variety of voluntary or cooperative environmental programs will be summarized, with the goal of drawing some lessons that could be useful for the governance of emerging technologies.

12.2.1 33/50 Program

The EPA first entered the arena of voluntary programs with its "33/50" program, which was launched in 1991 (Kerret and Tal 2005). This was a voluntary government program in which the government determined the terms of the agreement, designed the program and eligibility requirements, and then solicited participants (Coglianese and Nash 2008). EPA approached approximately 8,100 businesses that emitted any of 17 hazardous air pollutants identified as a priority by EPA based on reported emissions under the Toxic Release Inventory (TRI) (Coglianese and Nash 2008). Businesses were asked to voluntarily reduce emissions listed of the designated TRI pollutants in two phases, with a 33 percent reduction by 1992 and a 50 percent reduction by 1995, thus giving the 33/50 name for the program (Kerret and Tal 2005). The 33/50 program was completely voluntary, and there was no enforcement mechanism to ensure that the reduction targets were met (Innes and Sam 2008). The main incentives for companies to participate in this program included to gain public recognition for pollution control efforts and to enhance a company's reputation with EPA (Coglianese and Nash 2008; Davies and Mazurek 1996).

By the end of the program, approximately 1,300 facilities were participating, and most tended to be large corporations (US EPA 1999; Coglianese and Nash 2008). Overall releases from both participating and non-participating companies declined 56% between 1988 and 1995, and the two-stage national reduction goals of 33 and 50% were met (Coglianese and Nash 2008). Despite meeting its stated goals, the 33/50 program is not credited as being the sole driver of the reduction; other factors that influenced the reduction included the use of 1988 as the baseline year to begin measuring emissions so that companies could get credit for work they began prior to 1991, and the fact that companies could eliminate the requirement to report emissions under the TRI program if they reduced their use of certain toxic chemicals below designated levels (Coglianese and Nash 2008; Kerret and Tal 2005). Additionally, EPA did not distinguish between reductions made by program participants and non-participants but measured the reduction in the aggregate (Davies and Mazurek 1996). The EPA's goal of encouraging reductions at the source also was met, as participating facilities reported approximately 30% more source reduction activity for 33/50 chemicals than for other TRI chemicals (US EPA 1999). Instead

of mandating end-of-pipe controls, the 33/50 Program gave participants the freedom to pursue creative solutions, and it appears that companies did in fact pursue innovation.

It is difficult to evaluate the success of the 33/50 Program in a vacuum, as other factors impacted and contributed to results, as noted above. However, it does appear that the 33/50 Program demonstrated that flexibility – both in allowing an individual company to set their targets and then in determining how to accomplish those targets – was effective and helped offset the problem of regulations that require the maintenance of status quo technology. The program also demonstrated that a valuable, collective societal goal – a reduction in pollution – was not compromised by a voluntary program granting individual companies significant flexibility.

12.2.2 Common Sense Initiative

EPA's Common Sense Initiative (CSI), launched in 1994, was an industry-government collaborative effort to produce "cleaner, cheaper, and smarter" regulatory frameworks that would integrate environmental performance for an entire industry sector (Kerr et al. 1999). The initiative represented a shift in the agency's traditional focus of managing specific media and pollutants to a more holistic, cross-media, industry-wide approach (Davies and Mazurek 1999). In general, improved environmental protection was to be accomplished primarily by identifying regulatory requirements that created barriers to innovation in environmental technology and protection (Davies and Mazurek 1999). The EPA hoped that the collaborative effort would yield consensus as to how best to change the existing statutes and regulatory requirements in order to stimulate longer term capital investment in new technologies (Davies and Mazurek 1999). The goal was to provide incentives and flexibility to industry so that businesses would develop cost-effective, innovative technologies that either met or exceeded environmental standards (Fiorino 1996).

Six industries were included in the effort: automobile manufacturing, computer and electronics equipment, metal finishing, petroleum refining, printing, and steel (President's Council 1997). For each industry, representatives from business, environmental and community groups, labor organizations, and federal, state and local governments met as stakeholders to determine recommendations for changes to national environmental policies. Each industry team sent their analysis of issues and recommendations to a CSI Council composed of representatives from all stakeholder groups across all six industries. The CSI Council reviewed the teams' inputs and then made recommendations to EPA, which had final decision-making authority. The goal was to change the existing array of complicated, inconsistent policies into a comprehensive sector strategy (President's Council 1997).

CSI offered industry the possibility of reforming laws and regulations that were either redundant or imposed conflicting requirements, and CSI appeared to offer the potential to create flexible alternatives to current regulations, such as simplified reporting and record-keeping requirements and a streamlined permitting process (Davies and Mazurek 1997). However, despite the initiative's original promise, CSI is viewed as having limited success (Sousa and Klyza 2007; Caldart and Ashford

1999). In EPA's final evaluation of the initiative, the agency noted that only four projects out of forty led to recommended rule revisions that EPA acted upon, and that most CSI participants gradually came to believe that the initiative would not achieve "far-reaching change to EPA's rules and regulations" (Kerr et al. 1999).

Most criticism centers on the program's lack of substantive results due to high transaction costs and a lack of statutory authority on the part of EPA to grant regulatory waivers to industry participants. In terms of process barriers, the requirement to reach consensus was a major impediment, and the amount of time required for decision-making produced high transaction costs (Davies and Mazurek 1997). Environmental groups complained that they were underrepresented and several representatives from these groups resigned (Davies and Mazurek 1997). Additionally, some industry participants were uneasy sharing their proprietary information with either the government or their competitors, and some industry representatives feared that environmental groups might use the information to mount citizen lawsuits (Caldart and Ashford 1999). By 1996, two participants were labeled as obstructionist and were dismissed from CSI by EPA; two industries also ended participation in the initiative of their own accord, complaining about the onerous process (Davies and Mazurek 1997).

Perhaps the most significant issue with the CSI was the lack of statutory authority for either the CSI board or EPA to exempt regulated entities from existing regulations. The high transaction costs stem largely from this lack of statutory authority; when the government has no legal authority, it is driven to act by achieving some degree of consensus (Davies and Mazurek 1997). Also, results were hampered further by the lack of a pending regulatory hammer or penalty. Because the CSI committees functioned more as an advisory board than a direct participant in negotiated rulemaking, the impetus to develop a rule was less pronounced; the committee did not need to produce a rule before EPA did, so that the stakes were less defined than in some other projects, where if the group did not produce a specific rule, the agency would (Caldart and Ashford 1999). Another commonly cited criticism of the program is that it lacked a clearly defined mission: committees did not have a shared vision beyond "cleaner, cheaper, smarter" – and that vision was never defined (President's Council 1997). The CSI was officially terminated in 1998, but elements of the initiative were transitioned into EPA's Sector Strategies Program, which continues today (Kerr et al. 1999).

12.2.3 Project XL

Project XL (short for eXcellence and Leadership) was launched by EPA in 1995 as part of President Clinton's "Reinvention of Environmental Regulation" initiative (Lund 2000). A basic premise of Project XL was that the EPA's rigid, strict compliance system encouraged companies to simply follow the EPA's standards and discouraged investment in new technologies or approaches that could improve environmental performance beyond the current regulatory requirements (Caballero 1998). Unlike CSI, which focused more on reforming regulatory standards, XL

focused on waiving enforcement in exchange for improved environmental performance. The regulated entity was allowed to propose an innovative means of achieving superior performance, and if approved, EPA suspended the traditional regulatory requirements (Hirsch 2001b). Under Project XL, companies signed a legally-binding contract in which they agreed to reduce pollution for a specific facility above what was required by law (Kerret and Tal 2005). In return, EPA engaged in site-specific rulemaking that implemented the regulatory waivers sought by the company (Hirsch 2001b). A common proposal was the establishment of "cap and trade" permits, which allowed facilities to make production changes to their operations without undergoing an agency review, as long as the company remained within their overall emissions limits (Wyeth 2006). Other projects included using technology to prevent pollution at its source instead of installing control equipment to the existing process, and using environmental management systems as a basis for consolidating permits (Lund 2000).

For example, Intel requested a "pre-approved" permit under Project XL for their Chandler, Arizona, semiconductor manufacturing plant which allowed the company to make process changes without needing to seek and obtain a revised permit from regulators (Davies and Mazurek 1997). The agreement granted Intel a facility-wide cap on air pollutant emissions, which eliminated the need for individual permits for different sources of air pollutants (U.S. EPA 1998). It is estimated that Intel's savings were in the millions, as a result of eliminating 30–50 regulatory reviews and requiring fewer permits (U.S. EPA 1998). Such a program provides significant benefits to a firm such as Intel operating in a "quick-to-market" industry (Davies and Mazurek 1997); the company developed a new generation of microprocessor every two to three years and yearly made between thirty and forty-five significant changes to its manufacturing process (Hirsch 2001b). In exchange for regulatory relief, Intel committed to maintain emissions levels at the site to a level defined as "minor" by the Clean Air Act, regardless of changes to the production process or whether a new manufacturing facility was built at the site (U.S. EPA 1998). Intel also made other commitments, such as implementing an environmental management system and reducing water consumption and the generation of both hazardous and non-hazardous waste (U.S. EPA 1998).

Both the Project XL program and the idea of regulatory flexibility proved controversial (Wyeth 2006). Some environmental groups viewed the regulatory waivers as a concession to industry and big business (Wyeth 2006). Critics claimed that the project violated the law because EPA did not have the authority to waive statutory requirements (Coglianese and Nash 2008). In fact, a common quote from the time was "if it isn't illegal, it isn't XL" (Coglianese and Nash 2008). XL produced some successes, resulting in approximately 40 final agreements (Sousa and Klyza 2007). However, compared to other EPA programs, participation in Project XL was limited to relatively few companies, with many firms choosing not to pursue innovative changes under the program due to the risk associated with the lack of statutory authority (Davies and Mazurek 1997). XL stopped accepting projects in 2003. There are three major issues that led to the closure of Project XL: (1) questionable legal authority for EPA to grant regulatory relief and protect participants from citizen

lawsuits under existing environmental statutes; (2) lack of clarity around how the goal of "superior environmental performance" was defined and enforced; and (3) significant process barriers, such as the substantial time (average time 26 months) and cost (>$350,000) to negotiate an XL agreement (Caballero 1998; Coglianese and Nash 2008; Davies and Mazurek 1997).

12.2.4 Performance Track

Performance Track was launched in 2000 as part of EPA's effort to "reinvent" environmental regulation (OIG 2007). The program was intended to reward companies that achieved superior environmental performance (OIG 2007). In order to participate in the program, a facility had to complete a 22 page application that required extensive documentation of past achievements, a demonstrated record of sustained environmental compliance, and a commitment for specific future actions and achievements, including the commitment to improve environmental performance, to implement a formal environmental management system, and to engage in community outreach (Coglianese and Nash 2008). In exchange for making commitments for greater environmental protection, companies were offered relief from routine regulatory inspections, provided relief from some reporting and permitting requirements, given public recognition and favorable publicity, and provided networking and information exchange opportunities (Coglianese and Nash 2008).

The program produced mixed results. As with other initiatives, such as the 33/50 program, it is difficult to document whether the program alone is responsible for a reduction in environmental pollutants (Coglianese and Nash 2008). In 2006, a Harvard University study funded by EPA found that the prospect of membership in Performance Track did not necessarily motivate firms to improve their environmental performance, and that members' performance did not necessarily exceed the environmental performance of non-members (Coglianese and Nash 2008). A 2007 report from the Office of the Inspector General (OIG) reported both positive and negative criticism. While many participating firms had superior toxic release performance than their industry as a whole, a "substantial minority" performed worse than their industry counterparts (OIG 2007). Additionally, the report found that only 2 of 30 sampled program members "met all of their environmental improvement commitments." (OIG 2007). Performance Track was terminated in May 2009, after almost nine years of operation, at which time it had 547 members (US EPA 2009).

12.2.5 The Dutch Covenants Model

In general, the use of voluntary agreements in the United States tends toward site-specific "achievement" initiatives that allow flexibility to a regulated firm by gearing programs to fit the specific circumstances of the firm (Kerrret and Tal 2005). Additionally, the agreements usually are not legally binding and may lack an enforcement mechanism. In contrast, European countries often have utilized legally-binding, industry-wide "macro-contracts" that set specific performance standards,

versus a general goal of "superior environmental achievement" as in the United States (Kerrret and Tal 2005). For example, the Netherlands has used a "covenant" model since the mid-1980s (OECD 2002). A covenant is a legally-binding, negotiated agreement between industry and government that specifies performance goals for the industry as a whole. In the "Dutch covenant" model, companies within an industry may choose whether to participate in an agreement, but once they voluntarily agree to the collectively-negotiated goals, they are then legally bound by the terms of the agreement (Harjula 1998).

In the Netherlands, the government developed the "Dutch covenant" model by working with selected industry sectors to set pollution reduction goals (Fiorino 1996). Industries were subdivided on the basis as to whether the sectors were "homogenous" or "heterogeneous". "Homogenous" sectors were characterized by companies that utilize similar operations and processes, and for those sectors, standards were negotiated for the sector as a whole. In "heterogeneous" sectors, processes are variable and complex, making it difficult to set sector-wide standards; for those sectors, agreements were negotiated with individual companies, and the individual company's goals fell within the overall sector goals (Fiorino 1996). Each company committed to achieving a negotiated share of the sector-wide pollution reductions. Thus the covenant became a plan for managing the environmental performance of an individual company as it fit within a sector or the sector as a whole, depending on whether the industry was homogenous or heterogeneous.

There are several benefits to a covenant approach. For example, because industry usually has more input in the development of a covenant than in traditional regulation, the covenants are usually "more practical and workable" for the industry (Hirsch 2006). Also, covenants often delineate performance goals instead of technology-based requirements, thus providing industry with flexibility in how to meet the goals. Technology is not prescribed. Additionally, covenants allow an industry to allocate a goal among sector participants so that those who can achieve the reduction most efficiently are allowed to do so; this mitigates some of the inefficiency inherent in traditional regulation (Hirsch 2006). In terms of innovation, covenants can act to either stimulate or restrict innovation. On one hand, covenants usually run for many years, and during this negotiated time period, the government may agree to maintain the established standards (Hirsch 2006; Fionori 1996). This allows companies to do long term planning that may incorporate capital investment and technological innovation. On the other hand, a covenant could remove the incentive to innovate, depending on the targets that are established.

12.3 Advantages and Disadvantages of Voluntary Collaborations

A review of the history of voluntary collaborative programs shows mixed results (Borck et al. 2008; Kerret and Tal 2005; Strasser 2008). Some of the projected benefits from voluntary programs were realized, but to a lesser degree than expected, and unanticipated negatives also resulted. A survey of the advantages and disadvantages of voluntary collaborative programs indicates there are important impacts on both the positive and negative sides of the ledger.

12.3.1 Strengths of the Collaborative Models

A key advantage of voluntary collaborative programs is the provision of flexibility. A collaborative agreement may allow businesses the flexibility to produce results better than the required legal minimum standard, so that the focus shifts from mere compliance to looking at how to generate continuous improvement over time (Wyeth 2006). Compliance may become merely the "starting point". More creative solutions are made possible by this approach, and this flexibility facilitates longer term capital planning, which includes investment in new technology (Kerret and Tal 2005). Flexibility was an underlying tenet of all programs used as case studies in this analysis, although it is difficult to quantify the benefits that resulted from this additional flexibility.

In addition, voluntary collaborative programs can promote cooperative relationships between business, the government, NGO's, communities, and interested citizen groups. A more cooperative relationship was expected to lead to faster, less expensive and more informed decision making with reduced transaction costs, and ultimately to improved environmental performance with fewer violations. While these results have been found largely lacking in the examples discussed above (Wyeth 2006; Gunningham 2009a), other benefits emerged. A collaboration can produce movement and consensus on an issue when political support for confronting an issue is lacking or when opposing political parties are at impasse, for example (Kerret and Tal 2005). Additionally, a collaboration with community or other special interest groups can generate good will leading to an enhanced corporate reputation for a company, which may be important to the long-term fiscal health of a business.

Another major expected advantage of voluntary collaborative programs was that better policies and strategies would result from greater information sharing. Such information sharing was an underlying tenet of all programs used as case studies, although the type of information sharing may have differed. In 33/50 and CSI, the government provided forums for industry participants to meet and exchange information. In addition, CSI convened multi-stakeholder meetings that supplied recommendations to EPA. In Performance Track, the government publicized the efforts of companies viewed as top performers in order to stimulate others to make similar environmental gains. While the limited analysis of voluntary programs has shown that such programs did not consistently produce the expected gains in environmental performance (Strasser 2008), few would doubt that in general, better decisions are made with better information, and most would agree that it is possible to improve policies if they are based on better and more complete information.

12.3.2 Weaknesses of the Collaborative Models

A number of reviews of the voluntary initiatives discussed above have found few or limited demonstrated benefits (Gunningham 2009a; Wyeth 2006; Kerret and Tal 2005). The central role that industry played in setting targets, poor monitoring of results, free riding by some companies, the uncertainty of regulatory threats and

citizen suits created by a lack of statutory authority for EPA to grant regulatory waivers, and the fact that agreements were largely unenforceable due to a lack of sanctions or penalties, were often cited as reasons why results were less than expected (Gunningham 2009a). Additionally, there were concerns about the amount of time and resources required to produce a multi-stakeholder agreement, which led to high transaction costs (Hirsch 2001b; Caballero 1998). Finally, environmental advocates often looked cynically upon voluntary agreements, viewing them as "cosmetic attempts" by industry to appear as responsible corporate citizens, and categorized the agreements as "greenwash" due to the lack of sanctions associated with voluntary programs (Kerret and Tal 2005). Environmental groups often viewed collaborations as government-authorized "back-sliding" on environmental protection (Wyeth 2006).

12.4 Lessons Learned

From the case studies studied above, along with the scholarly commentary on these and other voluntary programs, several lessons can be distilled for the design and implementation of possible voluntary programs for emerging technologies. Perhaps the most basic lesson learned is that flexibility is necessary in the crafting of effective regulatory solutions involving voluntary programs. Traditional regulations are unable to anticipate all future scenarios and contexts in which they may be applied, especially for fast moving fields like emerging technologies (Hirsch 2001b). Voluntary collaborative agreements can be structured to adjust or "self-correct" over time, thus allowing firms to adapt more quickly to rapid changes in the industry without necessarily sacrificing the integrity of regulations.

A second basic lesson is that reward must at least approximate the assumed risk. If incentives are weak and transaction costs are too high, a program is less likely to succeed (Davies and Mazurek 1996). Quite simply, if a program is overly burdensome and has high transaction costs, participants are less likely to join. Participation is further threatened when an agency's lack of statutory authority to grant regulatory exceptions makes a program too risky. Third, voluntary programs tend to be more effective if backed-up by the threat of sanctions or enforcement, including the imposition of traditional regulatory requirements in the event of non-compliance with a voluntary program (Gunningham 2009a; Wyeth 2006). As one empirical analysis summarized its findings, "[t]he history of voluntarism would suggest that where the private interests of polluters in maintaining profitability and the public interest in protecting the environment do not substantially coincide, then (unless there are countervailing economic or social pressures) pure voluntarism will be largely ineffective in changing behavior" (Gunningham 2009b, p. 161).

Fourth, an effective agreement has ambitious, clearly defined goals and a mechanism for amending goals over time, along with an effective monitoring and sanctions system. This helps facilitate and sustain agreement between varied constituencies over time. Also, measurable outcomes are necessary for determining success. Fifth, involvement of varied constituencies tends to create an incentive for companies to

comply with the agreements, as such involvement adds transparency and improves the prospect for public support (Kerret and Tal 2005). Finally, a successful collaborative process requires a significant investment in resources, particularly in staff time allocated to the effort. The procurement cycle for each participating entity should be considered, as delays can sabotage the long-term success of a negotiation, and participants can walk away after incurring significant transaction costs. Parties to such a collaborative process should be made aware of and plan for the necessary investment of time and resources, otherwise, the effort may dissipate over time.

12.5 Conclusion

The success of recent voluntary collaborative programs in the environmental field is mixed. Some scholars consider the focus on voluntary and negotiated agreements to be largely unsuccessful, as voluntary performance standards have not been consistently associated with improved environmental performance (Gunningham 2009a; Strasser 2008). However, direct and indirect benefits have been obtained under at least some voluntary programs. The OECD concluded that properly designed voluntary programs can "play a useful role in 'lubricating' [the] policy mix; increasing flexibility, paving the way for new regulations without a stringent and brutal implementation, inducing industry to develop innovative approaches, [and] filling enforcement deficits. . . ." (OECD 2000). Thus, voluntary programs remain a viable tool to consider for oversight of emerging technologies, especially as an interim measure when no traditional regulation exists or is feasible (Marchant et al. 2008).

There is ample information to be gleaned from recent regulatory experiments so that we are now better positioned to determine which mechanism will work best in a particular industry at a particular time. If the required statutory authority is granted to a rulemaking agency, then regulation can be used effectively as either an incentive or a penalty to supplement a voluntary collaborative program that is tailored to fit a given situation. For some collaborations, an industry sector approach may be most effective; at other times, a site-specific approach may be optimal. Regardless, flexibility is critical. Otherwise, regulations are likely to continue to fall behind the pace of science and technology and will continue to exact a high societal cost.

References

Alberini, Anna and Kathleen Segerson. 2002. Assessing voluntary programs to improve environmental quality. *Environmental and Resource Economics* 22: 157–184.

ASTM International Nanotechnology Standards available at http://www.astm.org/Standards/nanotechnology-standards.html; ISO Standards developed by the ISO's Technical Committee 229 on Nanotechnologies is available at http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_tc_browse.htm?commid=381983&includesc=true&published=on&development=on.

Borck, Jonathan C., Cary Coglianese, and Jennifer Nash. 2008. Environmental leadership programs: Toward an empirical assessment of their performance. *Ecology Law Quartely* 35: 711–833.

Breggin, L.K., and L. Carothers. 2006. Governing uncertainty: The nanotechnology environmental, health, and safety challenge. *Columbia Journal of Environmental Law* 31: 285–329.

Caballero, Thomas E. 1998. Project XL: Making it legal, making it work. *Stanford Environmental Law Journal* 17: 399–471.

Caldart Charles C., and Nicholas A. Ashford. 1999. Negotiation as a means of developing and implementing environmental and occupational health and safety policy. *Harvard Environmental Law Review* 23: 141–202.

Coglianese, Cary, and Jennifer Nash. 2008. Government clubs: Theory and evidence from voluntary environmental programs. *University of Pennsylvania Law School*, 6–7. Public law and legal theory research paper series, research paper no. #08–49, available at http://ssrn.com/abstract=1311340.

Commission of the European Communities (CEC). 2008. *Commission recommendation on a code of conduct for responsible nanosciences and nanotechnologies research*, dated 7/2/2008, available at: http://ec.europa.eu/nanotechnology/pdf/nanocode-rec_pe0894c_en.pdf.

Davies, Terry, and Jan Mazurek. 1996. *Industry incentives for environmental improvement: Evaluation of U. S. federal initiatives.* Washington, DC: Global Environmental Management Initiative.

Fiorino, Daniel J. 1996. Toward a new system of environmental regulation: The case for an industry sector approach. *Environmental Law* 26: 457–488.

Gunningham, Neil. 2009a. Environmental law, regulation and governance: Shifting architectures. *Journal of Environmental Law* 21: 179–212.

Gunningham, Neil. 2009b. The new collaborative environmental governance: The localization of regulation. *Journal of Law and Society* 36: 145–166.

Harjula, Henrik. 1998. *Extended producer responsibility, phase 2, case study on the Dutch packaging covenant.* Organisation for Economic Co-operation and Development, 15 May 1998.

Hirsch, Dennis D. 2006. Protecting the inner environment: What privacy regulation can learn from environmental law. *Georgia Law Review* 41: 1–64.

Hirsch, Dennis D. 2001a. Second generation policy and the new economy. *Capital University Law Review* 29: 1–20.

Hirsch, Dennis D. 2001b. Project XL and the special case: The EPA's untold success story. *Columbia Journal of Environmental Law* 26: 219–257.

Innes, Robert, and Abdoul G. Sam. 2008. Voluntary pollution reductions and the enforcement of environmental law: An empirical study of the 33/50 program. *Journal of Law and Economics* 51: 271–296.

Isenberg, Howard. 1995. The second industrial revolution: The impact of the information explosion. *Industrial Engineering* 27: 15.

Johnson, Stephen M. 2001. Economics v. equity II: The European experience. *Washington and Lee Law Review* 58: 417–486.

Karkkainen, Bradley C. 2006. Information-forcing environmental regulation. *Florida State University Law Review* 33: 861–902.

Kerr, Greiner, Anderson, and April, Inc. 1999. Analysis and evaluation of the EPA's common sense initiative, http://www.epa.gov/evaluate/pdf/pubs_finalcsi.pdf.

Kerret, Dorit, and Alon, Tal. 2005. Greenwash or green gain? Predicting the success and evaluating the effectiveness of environmental voluntary agreements. *Penn State Environmental Law Review* 14: 31–84.

Litan, Robert E. 2001. Law and policy in the age of the internet. *Duke Law Journal* 50: 1045–1085.

Lund, Lisa C. 2000. Project XL: Good for the environment, good for business, good for communities. *Environmental Law Review* 30: 10140–10152.

Marchant, Gary E., Douglas S. Sylvester, and Kenneth W. Abbott. 2008. Risk management principles for nanotechnology. *NanoEthics* 2: 43–60.

Occupational Safety & Health Administration. 2007. All about VPP, available at http://www.osha.gov/dcsp/vpp/sitebysic.html

Office of Inspector General, EPA. 2007. Evaluation report: Performance Track could improve program design and management to ensure value, available at http://www.epa/gov/oig/reports/2007/2007/20070329-2007-P-00013.pdf.

Organisation for Economic Cooperation and Development (OECD). 2002. *Regulating policies in OECD countries: From interventionism to regulating governance – Annex II*, OECD Reviews of Regulatory Reform: Regulatory Policies in OECD Countries.

Organisation for Economic Cooperation and Development (OECD). 2000. *Voluntary approaches for environmental policy: An assessment*. Paris: OECD Publishing.

Pearson, Eric. 2002. Environmental and Natural Resources Law. Albany, NY: LexisNexis Matthew Bender, 2d ed.

President's Council on Sustainable Development, New National Opportunities Task Force. 1997. Lessons learned from collaborative approaches, available at http://clinton2.nara.gov/PCSD/Publications/Lessons_Learned.html.

Sousa, David J. and Christopher McGrory Klyza. 2007. New directions in environmental policy making: An emerging collaborative regime or reinventing interest group liberalism? *Natural Resources Journal* 47: 377–444.

Strasser, Kurt A. 2008. Do voluntary corporate efforts improve environmental performance?: The empirical literature. *Boston College Environmetal Affairs Law Review* 35: 533–555.

U.S. Environmental Protection Agency. 2009. National Environmental Performance Track, memorandum from EPA administrator Lisa P. Jackson dated 16 March 2009. *Next steps for the national environmental Performance Track program and the future of environmental leadership programs*, available at http://epa.gov/performancetrack/downloads/PerformanceTrackNextStepsMemoExternal-text.pdf.

U.S. Environmental Protection Agency (EPA). 1999. 33/50 program: The final record. EPA-745-R-99-004, available at http://www.epa.gov/oppt/3350/3350-fnl.pdf.

U.S. Environmental Protection Agency (EPA). 1998. Intel XL project fact sheet, available at http://www.epa.gov/ProjectXL/intel/09998.html.

U.S. Environmental Protection Agency. 2009. EPA partnership programs: List of programs, available at http://www.epa.gov/partners/programs/index.htm.

Wyeth, George B. 2006. "Standard" and "Alternative" environmental protection: The changing role of environmental agencies. *William & Mary Environmental Law and Policy Review* 31: 5–73.

Zinn, Matthew D. 2002. Policing environmental regulatory enforcement: Cooperation, capture, and citizen suits. *Stanford Environmental Law Journal* 21: 81–174.