

# Public Entrepreneurship Networks

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# INTRODUCTION

## Overview

The tasks of environmental management are not what they used to be. Established roles and practices no longer fit with emerging problems and challenges. Sustainable development most clearly confounds traditional categories of practice, posing an apparent choice between environmental quality and economic development that must be reframed for both objectives to be achieved at the same time.

The institutional ground is also shifting. Project after project opens up new roles and responsibilities for private firms and civic organizations. Without their help, environmental goals will never be achieved. New partnerships and alliances are forming so fast that it is hard to keep track of them. Yet, unless we can harness these networks, responsibility for achieving sustainable development will fall entirely on government, which cannot shoulder the burden by itself.

In this report we draw out the implications these trends have for administrative agencies. In the dizzying array of organizational interactions that animate sustainable technology development, we trace what we call public entrepreneurship networks, which shape action, but remain largely invisible. This perspective highlights the new demands and opportunities opened by the overlapping participation of firms, financial institutions, NGOs, and citizens groups as government's partners in promoting sustainable development. It also offers new insights into what makes action strategies effective.

Unless government agencies learn to operate as part of these networks, the goal of achieving sustainability will never be met. Their active involvement is essential for public entrepreneurship networks to operate effectively. To respond to this challenge, government agencies at all levels must be ready to take on new roles and responsibilities. The net effect is a dramatic revision in the scope and nature of government's role in ensuring that "green" technologies are actually used.

## The Policy Challenge

The marriage between environment and development has been uneasy since the Brundtland Commission first wed the terms under the heading of sustainability. Many observers have suggested that this cannot be a marriage of equals. On one side, environmentalists argue that there must be strong limits on development. Advocates on the other side argue that development should not be sacrificed to achieve environmental protection. These parties agree upon one thing, however, ecological protection conflicts with economic development. Sustainability hangs from the horns of this dilemma.

Policy-making in the Netherlands has been distinctive because it has tried to address this dilemma head on. Sustainability only loses its meaning if the relationship between environment and development is posed as a tradeoff. The Policy Document on Environment and Economy refused to accept this tradeoff, however. It treated this tension as forming a challenge: “environmental and economic interests must become inseparably linked in future decision-making.”

The Policy Document grounded this challenge by identifying options in transport, construction, and agriculture where both sets of goals could be addressed. New processes like the recycling of waste moulding sand and practices like flexible construction (in which the layout of a building can be altered without damage) provide a grounded vision of how one goal can be achieved by achieving the other goal as well. New information technologies offer the possibility of enabling more environmentally aware industrial design and production, shifting transportation demand and optimizing the delivery of a variety of environmentally relevant goods and services.

Scrutiny of production processes ranging from semi-conductor fabrication to metal plating has yielded ways of reducing waste by using chemicals that also improve the bottom line of the firm. A “slow change” in business’s view of environment as a cost can now be discerned. Environmental improvements are now construed in commercial, market, and image terms. Firms must respond to social and political demands for corporate policies and practices that reflect environmental goals. Financial services and investors are grappling with different ways for using environmental criteria to rate risks and opportunities for investments. These developments root environmental concerns directly in economic activity.

The Policy Document also suggests that our optimism should be limited. It stresses that while steps can be taken that are both economically and environmentally beneficial, we should not expect these goals to converge spontaneously. The Policy Document stresses that “government must also act” and outlines some policies that “can be taken in close cooperation with industry to bring sustainable economic development closer.” The program outlined recognizes the need for an affirmative public role while accepting the fact that it would be self-defeating to try to legislate this convergence.

The policy document is rooted in the experience of using the technique of backcasting. Backcasting has provided a social technology that underscores importance of maintaining a long run perspective to guide sustainable development. The “prospective hindsight” that backcasting generates (in a democratic and institutionally feasible way) highlights the degree of change needed to push the convergence of environmental and economic goals forward.

The other side of this relationship is an acute awareness of the pool of technologies that are developed but not in use. This awareness cuts two ways. It suggests that the problem is not solely one of long-term development of new technological options. A supply of options that are intriguing from an environmental perspective already exists. At the same time the very existence of this pool highlights the problem of transition. It is neither easy nor clear how to initiate a program of experimentation and development that would move these technologies into broader use.

## **Public Entrepreneurship Networks**

Public entrepreneurship responds to this challenge. It acknowledges shifts in institutional resources among private sector and citizens groups that have moved the locus of initiative and change outside the state. Policy development increasingly occurs in an intermediate arena that is neither governmental nor private. Interaction and negotiation between the government and the private sector has become unavoidable as firms have developed internal capacities for analysis and action. Their increasing competence has highlighted the importance securing their active participation to make policy effective. Environmental and citizens groups have increased their capacity to pursue their aspirations outside of state policy.

The cases reviewed in this report acknowledge these trends, but suggest that successful policy-making still depends on the ability of the government to

work collaboratively with the private sector and citizens groups. At the same time, the robustness of this institutional transformation means that strategies for pursuing sustainable development will need to be synchronized with changes in organizational relationships.

Our approach explores an insight compatible with this emerging institutional environment. One way that radical change happens in complex systems is when “something starts somewhere and grows.”<sup>1</sup> We work from the assumption that radical change is necessary and a pool of available “greener” technologies creates a ready supply of positive first steps. The *public entrepreneurship network* (PEN) is our model to capture the dynamics of change and the implications for action by government agencies and other actors interested in sustainable development. Five key features distinguish public entrepreneurship networks:

- A pattern of *inter-organizational cooperation* that spans public, private, and civic spheres and develops through
- Interaction in *problem centered networks*.
- Public regarding *local initiative* supported by a set of
- Specific *organizational* roles related in an
- *Institutional ecology* that facilitates development.

Public entrepreneurship networks combine local initiative that has a distinctively entrepreneurial character with a strong orientation to sustainability and other public goals. This is accomplished in part because of the variety of organizations that participate in these networks. Public entrepreneurship networks are characterized by both the pattern of development and the key facilitative roles that have to be played for development to thrive.

These roles stress facilitative rather than managerial activities and tend to parallel the range of entrepreneurial roles that private sector actors have played in the dynamic economic sectors like information technology over the past few decades. They include:

- *Pioneers* who recognize opportunity, seize initiative, and catalyze action by making commitments.
- *Public venture capitalists* who understand and embrace risk and package financial, social, and human capital to meet project driven needs.
- *Superintendents* who provide an environment in which innovation can flourish by fostering the development of relationships that are sustained through formal and informal networks.
- *Mediators* who build consensus on goals and direction and bring directed problem-solving to bear on conflicts that threaten to stall or derail the development of ventures.
- *Stewards of the common good* who focus attention on the common good, maintain standards for responsible behavior, and facilitate the coalescence of democratic community around programs of action.

Given what is at stake, it is neither practical nor desirable to rely on private and non-governmental actors to consistently fill these roles. Government must participate to ensure that public entrepreneurship networks function effectively and stay oriented to publicly endorsed goals. Yet government action must not threaten the ecology of relationships that generates the attention and energy that make these networks effective.

This sets a challenge for government agencies. Their participation is essential. Yet efforts to “legislate” change may disrupt the very patterns of development they seek to promote. Identifying public entrepreneurship networks and understanding how they work is only the first step. Government must learn how to facilitate the creation of these networks and enhance their impact.

## Relation to Other Policy Approaches

PEN offers a distinctive analysis of the problem of development that has implications for the shape and character of the government role in sustainable development. To highlight PEN's distinctive character we compare it with a sample of other approaches to promoting sustainable development.

PEN is most clearly distinct from the "California Model" of technology forcing in which government's authority to set and enforce standards is used to promote change. This model draws on command-and-control regulatory traditions and extends them to sustainable technology development. In California, as in other cases, the technology forcing approach has had limited impact in producing practical commitments to change.

Technology forcing focuses attention on the definition of regulatory requirements and issues like timing that influence the enforcement of these standards. The development process receives less attention. Whereas PEN draws on the interest and commitment of firms and non-governmental actors and encourages them to move beyond traditional regulatory roles and become more actively engaged in problem solving, technology forcing deepens the commitment to traditional roles and zero-sum patterns of interaction.

The California Zero Emissions Vehicle (ZEV) mandate provides an important example of the limitations of technology forcing approaches.<sup>1</sup> The policy, which mandates that the equivalent of 10 percent of the vehicles sold in the state meet a standard of zero emissions by 2003, has thus far proven more successful in generating debate about the definition of the enforcement standards than bringing about change in technology use.<sup>2</sup> After some initial positive effects on interest and investment in the design of electric cars, development has stalled.<sup>3</sup> Few electric cars have been sold in the state, and manufacturers continue to debate with regulators about which technologies should receive ZEV credit.

The strict guidelines have also limited flexibility and impaired communication, hindering efforts to promote innovation. Because the mandate offers little opportunity to discuss which technologies would best meet the interests of all parties and serve environmental goals most effectively, it may have disrupted vehicle and infrastructure development for other more potentially beneficial technologies such as fuel cell and

compressed natural gas.<sup>4</sup> Although California revised the mandate in 1998 and 2001 to allow automakers to meet a portion of the requirement with such “zero emission credit” vehicles, the controversy has created considerable confusion among automakers about what technologies to adopt.

The California experience is consistent with more general reviews of technology forcing approaches. While they may be attractive because of their historical prominence, directness, and continued importance in guaranteeing baseline commitments to public and environmental health, regulatory standards have been unsuccessful in prompting innovation and change.<sup>5</sup> A notable exception is the outright bans in cases like PCBs and CFCs.<sup>6</sup> The standard reason for this weakness is the emphasis standards place on existing technologies. From the perspective of PEN, we would also highlight the thin networks that are generated and the character of the problems that occupy attention in those networks.

Covenants have been used historically to change just these dynamics and are much closer to PEN as an approach to environmental policy. Covenant programs in the Netherlands have been credited with improving environmental performance in many sectors of the Dutch economy.<sup>7</sup> Despite their success in introducing greater flexibility in the development of enforcement procedures, covenants have primarily focused on regulation rather than innovation.

Programs in the United States such as *Project XL* and the *Common Sense Initiative* have highlighted the problem with assuming that innovation will result from introducing flexibility into environmental enforcement. Rather than producing new technological development, the programs have been characterized by traditional public-private antagonism over regulation. Discussion between firms and environmental agencies often centers on the potential shape of enforcement procedures and their legality rather than focusing directly on the innovation process. PEN suggests a response to this dilemma by stepping away from regulatory approaches and focusing directly on producing technological change.

PEN also differs from covenants by moving the locus of action outside the state. Despite the greater flexibility offered the firms in developing enforcement programs, covenants still rely on government affirmation and direction to approve the regulatory program and trigger change. Rather than relying on government agencies to promote innovation through regulation, PEN focuses on policy development that occurs in an intermediate arena

that is neither public nor private. This approach extends the model of collaboration that characterized successful covenants to new kinds of partnerships focused on innovation and characterized by closer and more ongoing patterns of interaction.

PEN overlaps with programs like constructive technology assessment (CTA) and strategic niche management (SNM) that are concerned with the management of technology in society.<sup>8</sup> Like CTA, PEN highlights the constructive potential of social interaction around technology. It can reshape the terms in which technologies are understood and actions evaluated. The identification of “de facto CTA” led to comparable insights about the active role that groups outside of government play in shaping the development of technology.<sup>9</sup>

Unlike CTA, however, PEN does not focus exclusively on anticipating the effects and social acceptance of new technologies, but is concerned directly with the development process. How does change start and grow? This extends the focus on societal learning to embrace strategic concerns about how development occurs in a world where interests and concrete organizational goals are at least as influential as curiosity and a commitment to learning.

Here PEN’s focus is more similar to strategic niche management (SNM). SNM takes the development of viable technologies as its focus. It focuses on technology developers as the active agents. With respect to government it asks, what level and type of protection is necessary to foster experimentation and produce technologies that are viable in the market? PEN looks at government as a more direct participant whose status is differentiated by the breadth of its concerns and the special resources it brings.

The model of change is also different. SNM takes variation and selection as the model for social change collapsing many distinctions under the rubric of selection. PEN, in contrast, looks at change as development in a network of relationships and develops a form of analysis that brings out the characteristics of these networks. Where SNM takes the market as an evolutionary environment, PEN focuses on the ecology of roles that support development in venture oriented programs. Public entrepreneurship networks could serve many of the functions of a strategic niche. Overall, PEN is distinguished by the model of development, a focus on the venture (which sets a scale for analysis), and the effort to describe a robust set of roles for government agencies and other organizations interested in

sustainable development.

## Organization of the Report

This report is organized into four sections. The first presents the case of SunLine Transit Agency in California. SunLine's exemplary experience in changing from outdated to advanced technology provides a detailed illustration of the pattern of development that characterizes the PEN model. The exposition of the case is followed by an analysis of the pivotal moments in the history and the roles that SunLine and other actors played in the process. The third section of the report takes these roles as the focus of analysis and relates findings from other cases to them. Following the conclusions is an appendix that provides accounts of these cases at varying levels of detail.

The first goal of this report is to clearly render a distinctive pattern of development that builds on what we take to be some durable and significant change in the institutional landscape of industrialized democracies. The second goal is to analyze this pattern in a way that identifies the implications for practice in public administration, private enterprise, and civic organizing. Each level of organization is oriented to these two goals. Together we hope they contribute to opening a conversation about new forms of practice and to promoting change.

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### <sup>1</sup> The California experience with technology forcing

The California zero-emission vehicle (ZEV) mandate remains one of the most visible cases of technology forcing. The California Air Resources Board initially adopted the mandate in September 1990, claiming that advances in electric vehicle (EV) technology had advanced far enough for near-term wide scale implementation. Adopted as part of the Low Emission Vehicle and Clean Fuels program, the program stated that at least 2 percent of new car sales represent ZEVs in 1998, and would increase to 5 percent and 10 percent in 2001 and 2003, respectively (California Environmental Protection Agency, August 2000). Major auto companies lobbied aggressively against the mandate from the outset of the program, claiming that the standards would result in dramatically increased automobile prices (Brown, 59). As typical of technology forcing programs, CARB maintained that the high initial price of EVs would decrease with economies of scale, and would eventually reach levels competitive with conventional vehicles.

CARB also established a biennial review process for the program, which served as a focal point for debate about the mandate. Although the reviews in 1992 and 1994 were characterized by “intense lobbying” from the auto industry, the agency upheld the standards and maintained that technological development was on course to meet the 1998 deadline (Brown, 59). Auto manufacturers, however, stridently disagreed with this conclusion, and continued to assert that battery technologies had not advanced enough to provide sufficient driving range and would be prohibitively expensive to produce. These concerns appeared to be validated in 1996 when CARB eliminated the requirements for 1998 and 2001, leaving only the 10 percent mandate for 2003. Echoing the concerns of automakers, CARB explained the abandonment as an acknowledgement of technological necessity, arguing that “this is not a political decision, it is a technical decision” (Brown, 59).

The introduction of the first EVs began to raise questions about the ability of the technology to meet the goals of the parties involved and serve environmental goals. Despite the postponement of the ZEV mandate, GM introduced the first EV (titled the EV1) in December 1996, which generated lukewarm market demand. With a driving range of approximately 140 miles, few consumers were willing to lease the vehicles despite heavy subsidies from the GM to cover high battery costs. Moreover, even after several years of production, the EV1 (and other electric vehicles introduced by Toyota and Ford) also failed to produce the economies of scale and reduced costs predicted by CARB. Manufacturers and CARB staff agreed that only a major technological breakthrough would substantially reduce costs, and production would require manufacturers to continue to incur significant losses. In March 2000, GM announced it would end production of the EV1 after only selling 950 vehicles since its introduction. An executive engineer at Toyota summarized the situation by describing the mandate as “a technology development program that didn’t deliver as expected . . . this is a technology that should not be commercialized because it’s not cost-effective” (Polkavic, 9 September 2000).

As automakers began to shift their research to other more cost effective technologies including electro-chemical fuel cells, hybrid vehicles, and mini-cars, the mandate created considerable debate about what technologies should be recognized in the regulations. Automakers argued that these and other technologies such as natural gas would be cheaper to produce, more marketable due to their longer driving ranges, and generate greater environmental impact through actual sales. CARB first responded to these concerns at the 1998 biennial review after sales of electric vehicles failed to reach projections, modifying the mandate to allow automakers to satisfy up to 6% of the ZEV requirement with low emission “partial-ZEV” (PZEV) vehicles (California Air Resources Board, October 2000). In order to represent a PZEV, vehicles must qualify under CARB regulations as a Super Ultra-Low Emissions Vehicle (SULEV), as well as produce zero evaporative emissions and contain a 150,000-mile warranty for air pollution control equipment (California Air Resources Board, October 2000).

Considerable debate surrounded the decision about which automobiles would qualify for PZEV status, with some SULEV vehicles such as the Honda Accord SE and Civic GX being excluded due to their failure to meet emission system warranty requirements. Even hybrid vehicles such as the Toyota Prius and Honda Insight failed to qualify as PZEV vehicles, leaving manufacturers’ most technologically advanced vehicles with zero credit in the mandate. After witnessing several shifts in regulatory signals throughout the 1990s, the situation left automakers confused about what technologies to adopt. Indeed, with some

environmental groups claiming that such hybrid vehicles represented more environmentally sustainable technologies than EVs, the standards may have reduced the incentive to provide more beneficial products (O'Dell, 14 February 2000). Gearing up for the 2000 biennial review, a spokesman for the GM technology division noted "we are looking at various product alternatives and would like to move forward. But we will not do so until we understand what the final rules will be" (O'Dell, 18 October 2000).

Confrontation over what technologies should qualify under the mandate continued as automakers and CARB continue their highly divergent strategies to developing environmentally sustainable automobiles. Hoping that CARB would further reduce the ZEV mandate in its 2000 biennial review, manufacturers continued to focus research on more cost-effective technologies such as hybrid vehicles while simultaneously discontinuing their electric vehicle production. Although automakers launched their most visible campaign against the ZEV mandate in 2000, garnering considerable national press coverage and favorable editorials, CARB ultimately upheld the 1998 regulations. Despite the fact that manufacturers had ceased production of their electric vehicles, officials directed the automakers to resume manufacturing or face penalties. Some companies such as Ford vowed to meet the requirements, while others questioned whether the ZEV mandate still represented a credible threat to the automakers. Many felt that the requirements represented an infeasible goal (only 3,300 electric vehicles had been sold or leased throughout the entire country since 1996) and would again result in a game of regulatory chicken with little impact on technological innovation.

The CARB mandate has proven more successful in generating confrontation between automakers and the state than producing technological change. As the 2000 biennial staff report asserts, "the challenge is to determine how to achieve sustainable success in the field." The mandate has failed to generate such success by developing and sustaining an antagonistic environment that limits the potential for creating innovative strategies that might have served the interests of the parties involved more effectively. Faced with a zero-sum situation, automakers have strategized to escape the ZEV requirements due to their purported initial high cost constraints. Whatever the merits of this argument, ZEVs may have faced a more nurturing environment had the automakers not been faced with regulations that made manufacturing the vehicles a negative proposition. While automakers have taken the position that producing hybrid and other non-EV products represents the best solution, and therefore have thus far failed to resume production of electric vehicles, their course of action will either result in a regulatory train wreck or repeated modifications in the mandate. Either way, technological innovation will not occur as rapidly as would result from a strategy focused on development rather than regulation.

