Environmental Policy Analysis and Practice

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There have been many more bumps and bruises over the past 40 years, and once in a while I have even earned a gold star. I have worked on locally unwanted land uses such as nuclear power plants, incinerators, and dams; on cleaning up chemical or nuclear weapons facilities and Superfund and brownfield sites; on sprawl; on environmental asthma and cancer; and on a variety of other environmental policy subjects. These projects have replaced my fantasies about how policy is formed with the reality of how and why decisions are made. Now I can laugh at my naiveté, but then I was horrified at the idea that good science was not the dominant consideration. I learned that good science was necessary for good policy but did not guarantee it; that as much as I would like to, I could not start every policy analysis with ecological and human health as the first consideration; and that I must consider six criteria for each policy option:

1 The likely reaction of elected government officials and their staffs
2. The likely reactions from the public and special interests, including not-for-profit organizations, business, and the media
3. Human and ecological health
4. Short- and long-term economic costs and benefits
5. The moral imperative
6 Flexibility and time pressure

I have used these six factors as a policy framework to assist governors, senators, and other elected officials; to talk with reporters; to lecture in various countries; and to teach at Columbia and Rutgers Universities. Whatever the policy issue, I write down and assess every argument, pro and con, for every option. For example, suppose the issue involves reducing the risk from left-over chemical weapons: Options include destroying by incineration, destroying by hydrolysis or another similar method, packing and shipping to another location, and a few others. Each of these options has advantages and disadvantages. Knowing them and evaluating them allows me to compare what we already know with what we need to know and to be assured that I have not missed a key policy driver. That exercise has almost always led to a more informed decision for me and sometimes for decision makers and their staff.

I am not going to assert that using the six criteria as a framework will provide a comprehensive understanding of every policy option, although it will certainly lead to a more complete view of the advantages and disadvantages of those options. Nor will I claim that policy makers will be impressed by all this information. In fact, the amount of information I have provided about multiple options and multiple criteria has led some recipients to assert that I am confusing the decision-making process by obfuscating the key variables with a barrage of data. I disagree because I have too often observed that decision makers have a tendency to jump on one or two drivers before due diligence has been given to all the potential key factors. I am convinced that too often what decision makers consider to be the critical criteria are not; their perceptions are too short-sighted, and they

ignore important effects that they should have considered. So I try to provide all the credible information possible, even if it is resisted.

When you have finished this book, I hope that you will have a better understanding of the factors that have driven some key environmental health decisions in the United States. However, it is important to remember that issues age. In a decade, some of these issues will no longer be considered important, although nuclear and chemical weapons, nuclear power, and environmental cancer will not age much. I would like you not to dwell too much on the policies themselves, but rather to recognize that adopting the framework and learning key theories and tools will place you in a good position to respond to the new policy issues that emerge. I would also like to share the excitement of this field by describing some of the most challenging environmental policy decisions we have faced. I have asked some very knowledgeable people to help me talk about these subjects.

I have been writing articles for my peers for decades, and I hope they will find some new insights in this book. But although it profiles the work of some great colleagues, I have not written this book for my peers. It is intended for upper-level college students and graduate students who are interested in the environmental policy process. I want this book to help attract ambitious and talented young people to environmental policy as a career. Bumps and bruises aside, working on environmental policy is challenging and rewarding.

Introduction

A Quick Walk through a Framework of Six Environmental Policy Criteria

I usually begin my senior-level course on protecting public health and the environment with the following statement: "Think of an environmental policy problem that you are really worried about, that distracts you (maybe keeps you up at night), that you talk about with your family and friends, and that probably brought you to this course." After a minute, they tell me what these problems are, and I write them on the board. Then I ask, "Why haven't we fixed these problems?" Some students seem surprised by the question, and they aim quizzical looks at me. I can feel them asking themselves, "If he's the expert, why is he asking us?"

I start the course this way because even the youngest students have already learned a lot about why we have not fixed the environmental health problems that they fear the most. Most of them have learned from tales, but some have grounding in theories and tools too. This introduction describes the way themes, tales, theories, tools, and tasks (the five T's) are used in this book to illuminate the six policy criteria, the organization of the volume, and the objectives of each chapter, as well as some of the methods I have used to teach environmental policy.

Themes, Tales, Theories, Tools, and Tasks

These are my equivalent of the three R's. Themes are the policy subjects, such as indoor air quality, the use of pesticides on crops, children's exposure to lead, the stockpile of chemical warfare agents, and nuclear power. My teaching of these subjects has led me to use several out-of-the-ordinary teaching devices. First, I do not provide an absolute answer to policy questions. That is, I do not say that government should do this or that. Instead, I provide clues, and, more specifically, I steer students into weighing the advantages and disadvantages of different decisions. There are tables in chapters 1 through 6 that pull together these advantages and disadvantages. Then I organize tasks that require students to debate

policy options. I also quote and paraphrase the views of people with whom many scientists, myself included, disagree. I do this because elected officials and their staffs do not readily dismiss the odd, unconventional opinion; they may cling to it because it fits their predilections. Like it or not, the policy process makes room for the unconventional.

Tales are stories told about policies orally and in articles, books, newspapers, magazines, government documents, and the so-called gray literature. Like almost everyone else, I derived my first lessons about the environment from listening to tales. It is not by chance that a lot of my work is directly related to vivid memories. Although this book is not a walking tour of my life and feelings, a personal example will make the point about the importance of tales. When I was a child living in New York City, my father impressed me as a fastidious person. It seemed to me that he was always clean shaven and well dressed, and he smelled of cologne. So I was shocked when my father and my grandfather told me about a drought so severe that New York City had shaveless and bathless days. I could not imagine my father smelly and unshaven. I went to the library and found the actual *New York Times* stories of the drought, including photos of men who had not shaved. The point is that the tale my father and grandfather told me made such an impression that I was primed to try to do something about our poor policy response to drought when the opportunity arose. In class, I go through the exercise of asking my students to share vivid environmental health tales with me. Everyone, I'm certain, has some to share.

My students' interest wanes when I get stingy and do not tell enough tales to prime theme discussions. For example, I remember trying to describe the laws and treaties agreed to by the U.S. government on the destruction of its chemical weapons stockpile. The students were somewhat interested — but only somewhat. Their curiosity increased exponentially when I described how I was required to demonstrate that I could use a gas mask and then had to take the gas mask and three syringes with me before I was allowed to walk into a shed that held chemical weapons.

Using tales requires being personal, sometimes using colloquial language, or as one colleague said, being "folksy." This book contains a lot of personal stories told by my colleagues and me. Because I am from the Northeast, the tales are disproportionately from the Northeast. But the themes, such as brownfields, nuclear power, automobile additives, pesticides, genetically modified organisms, and others are national in scope, and all of them have international equivalents.

Tales prime students' interest and are great teaching tools. Moreover, they give rise to nuanced insights. But tales typically lack generalizability. Theories are formed when a person takes disconnected tales, readings, meetings, and conversations and ultimately shapes what he or she has learned from them into generalizable expectations. I cannot describe all of the fascinating theories I have read or heard about environmental policy, but chapters 1 to 6 include discussions of key theories. Each chapter focuses on one theory whose standing is assessed by

me and also by one or more experts who have been involved with the theory in their work. There are many more than six important theories that have a bearing on environmental health policy, so the chapters briefly discuss some other key theories as well.

My own theory-building journey and view of environmental policy probably have more in common with historians or other social scientists who have looked at issues over time than with any other discipline. Some history books are directly relevant to today's — as well as yesterday's — environmental issues. Craig Colten's *An Unnatural Metropolis: Wresting New Orleans from Nature* (2005). Adam Rome's *The Bulldozer in the Countryside: Suburban Sprawl and the Rise of American Environmentalism* (2001), and Andrew Hurley's *Environmental Inequalities: Class, Race, and Industrial Pollution in Gary, Indiana, 1945–1980* (1995) speak directly to the impact of Hurricane Katrina, sprawl as a national concern, and environmental justice, respectively. Others, such as John Cumbler's *Northeast and Midwest United States: An Environmental History* (2005), Clay McShane's *Down the Asphalt Path: The Automobile and the American City* (1994), and David Stradling's *Smokestacks and Progressives: Environmentalists, Engineers, and Air Quality in America, 1881–1951* (1999), are more expansive in space or time.

All of these books are full of tales and theories about why policies emerged where and when they did. My favorites are Joel Tarr's *Devastation and Renewal: An Environmental History of Pittsburgh and Its Region* (2003) and Martin Melosi's *Effluent America: Cities, Industry, Energy, and the Environment* (2001). These books say a good deal about the struggle between public health/environmental perspectives and capital's relentless need to grow, and the inconsistent role of elected officials and their staffs in protecting public health and the environment. The literature also provides an idea of the complicated role of the media as an information gatekeeper, a discussion of ethical imperatives and how they sometimes influence policy, and an idea of how time and the desire to be flexible have periodically been important policy drivers. There are many lessons to be learned from these histories. Historians may not come out and state the importance of the six policy criteria, but they are embedded in these books.

The protocols, processes, and quantitative and qualitative methods used to test the generalizability of proposed theories are the tools that allow the evaluation of policy options. This book will present a set of tools, such as risk assessment, environmental impact analysis, interviewing, content analysis, regional economic impact modeling, optimization modeling, checklists, and cost/benefit analyses.

Lastly, I am a firm believer in doing. A deep understanding of an environmental policy requires a knowledge of the five T's. The best way to achieve a deep understanding is to engage in a task that causes you to interact with them. I could never grasp a theory or tool or recommend a policy unless I worked with it. I have always created tasks for myself and for my students. Hence, each chapter ends with some suggested tasks.

The Organization of the Book

The book is divided into two parts. Part I has six chapters; each is devoted to one of the six policy criteria that together constitute the framework. Every chapter in part I has four sections. The first section begins with a theme that illustrates the particular criterion. For example, chapter 1 uses brownfield redevelopment policy to illustrate the critical role of local elected officials and their staffs in the development and implementation of environmental policy. Each theme section has two features. One highlights how that particular theme is interconnected with other policy themes. So, for example, chapter 1 highlights the relationship between the brownfields program, smart growth, and Superfund. The theme sections conclude with synopses of key pro and con attributes organized according to the six policy criteria.

For instance, a positive human and ecological health attribute of the brownfields program is that remediation and redevelopment reduce the potential exposure to residual contaminants. A possible disadvantage is that the policy could engender a backlash from public health practitioners and the public itself if remediation is not done properly, or is not maintained, and people are exposed. In other words, these synopses represent my back-and-forth wrestling with all six sets of criteria that could substantially influence the policy. I have written complete — but tedious — policy analyses. Rather than presenting them in full, I display them in tables as bulleted points. Typically, these points are what decision makers read, and sometimes they then ask questions and demand more details. In other words, before focusing on one policy criterion (the reaction of elected officials and their staffs in chapter 1), these synopses summarize all six key policy criteria operating on the theme.

The framework presented here and expressed most clearly by the tables of bulleted points in chapters 1 through 6 is summarized by table 1. A policy issue is identified along with options for addressing it. The six policy criteria are used to evaluate the options. In turn, each of the six criteria is assessed using themes, theories, tales, tools, and tasks. These evaluations are captured as the advantages and disadvantages of each policy option for each criterion. Then an overall assessment is made and used to inform the policy decision. Sometimes it is possible to integrate across the six criteria and arrive at a ranking or general ordering of policies into excellent, good, fair, or poor options. However, the policy makers I have dealt with rarely want me to assign weights to each of the six policy criteria. Chapter 8 describes how we could aggregate and weigh different criteria.

The second part of each of the first six chapters describes a key theoretical question that links the theme of the chapter and the policy criterion. For instance, chapter 1 focuses on regime, regulation, and sustainability theories as frameworks to understand mayors' implementation of brownfield policies. In the third section of chapters 1 through 6, I use a tale to illustrate the application of the policy criteria. In chapter 1, for example, three mayors who are considered national leaders in developing and implementing brownfield policies talk about conditions in their

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Step 3: Summarize

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TABLE 1

Framework for policy analysis and practice

Identifying the policy issue and plausible options

Step 1: Assess the options using the six criteria.

- The reaction of elected officials and their staff
- The reaction of nongovernment interests, such as not-for-profits, businesses, the media, and the public
- Health and ecological implications
- Economic considerations
- Moral imperatives
- Time and flexibility considerations

Step 2: Make sure that you bring the five T's to bear to examine each policy criterion for each option.

- Themes
- Theories
- Tales
- Tools
- Tasks

Step 3: Summarize the results of steps 1 and 2.

- Prepare a list of the key advantages and disadvantages and uncertainties of each option.
- Prepare a longer report providing support for the list.
- If appropriate and possible, prepare a summary integrating the assessment.

Step 4: Reconsider the policy issue and options in light of the analysis.

towns. The goal is to show how the specific policy criterion (the reaction of elected officials and staffs) was critical in the decision-making process. The last part of each chapter briefly points to tools in chapters 7 and 8 and describes a task that I have used to help understand the policy criterion and theme.

Part 2 of the book describes a set of over 20 tools that are widely used in policy analysis. The two tools chapters blend together protocols and processes and qualitative and quantitative tools. Each chapter describes the tools and then illustrates them with examples drawn from the themes, tales, and theories presented in chapters 1 through 6 as well as selected others.

The tools chapters are separated from the themes, tales, and theory chapters because some tools are used in many stages of policy analysis. For example,

content analysis is widely used not only to study the actions of elected officials, but also to examine media reporting and the minutes of public meetings. Assigning content analysis to the elected official/staff chapter rather than the public/special interest or ethics chapter would have been arbitrary. Hence, it is described in a chapter that focuses on understanding individuals and groups. The intent is to introduce the tools so that readers will understand why they are used; it is not to provide advanced training. In other words, you will not become an expert after reading chapters 7 and 8, although I hope that they whet your appetite to learn more. References to papers and books with advanced examples are provided. Most of these tools are more quickly and effectively learned in the classroom context, however.

Many of the analyses presented in this book involved advanced multivariate statistics. Those analyses are summarized in words, not equations. I assume that readers are familiar with measures of central tendency dispersion and the ideas of association (correlation) among characteristics.

Chapter Contents

The first chapter is about the central role played by elected officials and their staffs. The illustration is the brownfield remediation program in the United States. Born out of the Superfund cleanup, the program has been a major priority for urban mayors and many other local elected officials. The theoretical focus of the chapter is on sharply different views of urban redevelopment. Historically, the economic needs of capital were emphasized, which meant that entire areas were bulldozed and rebuilt. More recently, theories of environmentally, economically, and socially sustainable development have challenged this perspective, adding the needs of public health, environmental protection, and community needs to pecuniary interests. J. Christian Bollwage, Douglas Palmer, and Joseph Vas, the mayors of three medium-sized cities, explain how political coalitions in support of brownfield redevelopment have come together during a period when the nation was hemorrhaging manufacturing jobs, when other federal programs to support urban areas were reduced, and when suburban mayors wanted to reduce the pressure to develop their green space.

Chapter 2 examines the role of nongovernment stakeholders, including businesses, not-for-profit organizations, the media, universities, the National Academies, labor, and the public. I use environmental cancer as a case study to illustrate how journalists use their sources to directly or indirectly influence environmental policy. I ask, What is cancer? Environmental cancer? A cancer cluster? How big is the environmental cancer problem? After answering these questions, I review the critical role of journalists as gatekeepers for information about cancer and every other health and ecological problem. The theory section examines what a newsworthy story is. Is it public health importance or is it something else?

I enlisted the help of two experts to help me tell tales and place environmental cancer in perspective. Dr. Daniel Wartenberg of New Jersey's Robert Wood Johnson Medical School is an authority on cancer clusters and is frequently interviewed by journalists. I interviewed him on November 6, 2006, and he describes the detection of cancer clusters from the perspective of a leading scientist. Dr. Arthur Upton, a physician who was director of the National Cancer Institute (NCI), was interviewed on February 9, 2006, and he talks about NCI's efforts to work with government agencies, not for-profits, the media, and other stakeholders during an exciting period in the institute's history. While the chapter focuses on the media as a stakeholder, cancer has other powerful stakeholder groups. These are reviewed as a force in policy development and as an influence on the media coverage of environmental cancer.

Focusing on human and ecological health criteria, chapter 3 examines a policy conundrum that the United States and other nations cannot seem to solve. What gasoline additives should be allowed in automobile engines? For three decades, there have been heated debates about lead, MTBE (methyl tertiary butyl ether), methanol, and others. Protecting public health should be a key driver of these policy changes. Yet every change or argument for change has come with new public health complications. Chapter 3 describes the long and complex history of this policy issue, from the human and ecological health concerns of each additive to the formidable economic, political, and ethical concerns. The theoretical focus is the principles we use to evaluate scientific evidence to protect people and the environment. I discuss the idea of safety and how evidence is obtained, weighed, and critiqued, as well as how scientists evaluate it. Then I compare the scientist's perspective with that of the general public and the courts. Helping me explain the complicated role of science is Dr. Bernard Goldstein, who has been involved in many risk-based policy issues in the United States and abroad. Dr. Goldstein was director of the Office of Research and Development at the U.S. Environmental Protection Agency when some of the automobile additive issues were debated and also spent many years at New York University, Robert Wood Johnson Medical School, and the University of Pittsburgh's School of Public Health, where he was dean. I interviewed him on December 26, 2006.

Chapter 4 uses the remediation of nuclear weapon wastes to illustrate cost and benefit criteria. Public health has surely been the key criterion for decision making, at least in the past. But an in-depth analysis of decisions shows the growing importance of costs and benefits. The cleanup and management program for nuclear weapon wastes is the single most expensive focused effort of its kind in the world. It will go on in perpetuity at some sites. The United States has already spent $70 billion. Will it spend another $150 to $400 billion in the future? The theoretical section focuses on stewardship. What does it mean to be responsible for the health, safety, costs, social justice, local economics, and other impacts of a legacy that will last many generations beyond the life of the steward

and cost billions of dollars? How does a steward balance engineered, legal, and human controls to build a sustainable plan? What are the practical options?

An expert perspective is provided by Dr. Henry Mayer, who was vice president and treasurer of Merrill Lynch and CFO of American Anglican, a multinational company that purchased municipal water and sewage treatment companies. During the past five years, he has been working on the Department of Energy's (DOE's) infrastructure and weapons residuals programs. I interviewed Dr. Mayer on January 30, 2007, and he explained how DOE's stewardship role, including its responsibility for sound fiscal management, is challenged by projects with an unprecedented degree of complexity.

Ethical concerns often fall by the wayside when policy is formulated. That is not to say that decision makers are not aware of or do not care about ethics. The problem is that the first four policy criteria seem more immediate. Using the ban on pesticides in the United States and its suspension as an illustration of the complex interactions among laws, environmental justice, cultural norms, and concerns about subsequent generations, chapter 5 highlights how moral imperatives change. The theoretical framework is drawn from environmental ethics and environmental justice. The fundamental issue is the sale of banned pesticides in developing nations by U.S. companies and the development of genetically modified organisms. Vanderbilt University and former Yale ethics professor Charles Powers, interviewed on July 11, 2006, helps put this complex issue in context.

Chapter 6 is about the importance of timing and flexibility as policy considerations. The United States clearly has an energy problem that appears to be worsening and a greenhouse gas issue that is being widely discussed. Should the government advocate for nuclear power? If it does, it will need to solve the chronic problem of nuclear waste management, find locations, and confront the relationship between the proliferation of nuclear weapons and nuclear power. How much support should the federal government provide? I interviewed Connie Hughes on December 11, 2006. An expert in energy policy and a member of the New Jersey Board of Public Utilities, she describes the role of state government in choosing fuels, siting facilities, and protecting the state economy and the public interest with regard to energy and other infrastructure.

Chapter 7 describes the tools used to assess the risk to human and ecological systems, including risk assessment and environmental impact analysis. Embedded within these processes are such diverse methods as toxicology, epidemiology, and geospatial mapping and siting, among others. Chapter 7 describes tools for understanding individual and group actions, including the use of content analysis to study laws, media coverage, and the policy statements of elected officials. The chapter also reviews interviewing, polling, and innovation diffusion tools. The third part of chapter 7 focuses on economic tools such as discounting, life-cycle cost analysis, assessment of the damage to natural resources, and regional economic impact assessment. The objective is to describe how these approaches have been applied to a range of critical policy decisions.

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Chapter 8 considers methods for aggregating the information from the six policy criteria, including written checklists, optimizing single-criterion models, cost-benefit, and multi-attribute interactive decision models. The chapter ends with a review of environmental laws, regulations, rules, executive decisions, changes in leadership, and budgets, which have been the ultimate policy tools in the United States, and the difficult challenge of communicating information on risk.