Solar Energy, Technology Policy, and Institutional Values

Energy policies that promote new technologies and energy sources are policies for the future. They influence the shape of emergent technological systems and condition our social, political, and economic lives. *Solar Energy, Technology Policy, and Institutional Values* demonstrates the difficulties that individuals in and out of government encounter when they try to instigate a reconsideration of these broader properties of technological systems and the policies that support them. This historical case study analyzes U.S. renewable energy policy from the end of World War II through the energy crisis of the 1970s. The book illuminates the ways in which beliefs and values come to dominate official problem frames and get entrenched in institutions. In doing so it also explains why advocates of renewable energy have often faced ideological opposition, and why policy makers failed to take them seriously.

Frank N. Laird is Associate Professor of Technology and Public Policy at the Graduate School of International Studies, University of Denver. He has received grants from the National Science Foundation and the GTE Foundation, and he has published in such journals as *Policy Currents*, *The American Prospect*, and *Science, Technology and Human Values*. 
Solar Energy, Technology Policy, and Institutional Values

FRANK N. LAIRD

University of Denver
To my mother and late father, Mary F. and Frank E. Laird
# Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface</td>
<td>ix</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>xiii</td>
</tr>
<tr>
<td>Note on Sources and Archival Abbreviations</td>
<td>xvii</td>
</tr>
<tr>
<td>Introduction: Solar Energy, Ideas, and Public Policy</td>
<td>1</td>
</tr>
<tr>
<td><strong>PART I BEFORE THE ENERGY CRISIS</strong></td>
<td></td>
</tr>
<tr>
<td>1 Framing the Energy Problem Before the Energy Crisis</td>
<td>19</td>
</tr>
<tr>
<td>2 Creating Policy for the Future</td>
<td>34</td>
</tr>
<tr>
<td>3 Advocates Construct Solar Technology</td>
<td>54</td>
</tr>
<tr>
<td>4 Solar Energy's Incompatibility with Official Problem Frames</td>
<td>65</td>
</tr>
<tr>
<td><strong>PART II DURING THE ENERGY CRISIS</strong></td>
<td></td>
</tr>
<tr>
<td>5 Problem Frames During the Energy Crisis</td>
<td>85</td>
</tr>
<tr>
<td>6 Solar Advocacy in the Crisis</td>
<td>116</td>
</tr>
<tr>
<td>8 Solar Policy in Crisis</td>
<td>154</td>
</tr>
<tr>
<td>9 New Technologies, Old Ideas, and the Dynamics of Public Policy</td>
<td>180</td>
</tr>
<tr>
<td>Notes</td>
<td>193</td>
</tr>
<tr>
<td>Index</td>
<td>246</td>
</tr>
</tbody>
</table>
Preface

Why do governments take seriously some policies and not others? Indeed, what does it mean to say that a government takes a policy “seriously”? What distinguishes fringe policies from their mainstream counterparts, and how can policies move from one to the other? This study addresses these questions through an analysis of U.S. renewable energy policy. The result is a longitudinal case study of energy policy change that explains what has been taken seriously and what has not, and why.

As other authors have noted, although we discuss energy systems in the language of BTUs and barrels of oil, they are so pervasive and important that arguments about them are, in many instances, arguments about the kind of society that people desire. This concept helps us to understand how much was at stake in energy policy decisions between the end of World War II and the post-oil embargo period in the United States – the period that this study examines. This feature of energy policy makes it a prime example of what I call policies for the future. In the coming decades public policy, among other influences, will shape emerging technological systems. Those systems will, in turn, condition and constrain important political and social decisions. That fact makes it imperative that we better understand and deliberate over such policies.

Recent studies of politics and policy have emphasized the importance of ideas in shaping the political world, and this work builds on that literature. Ideas interact in complex ways with interests and institutions, all three shaping each other in the process. Ideas also form the basis for the problem frame through which policy makers view policy problems and solutions. Energy policies are powerfully affected by such ideas.

This book is primarily for those who are concerned with energy and environmental policy in particular and broader questions of public policy
Preface

more generally – anyone working in the areas of policy studies; political science; history of technology; and science, technology, and society, as well as professional policy analysts, policy advocates, and policy makers. Anyone who seeks to influence policy making, especially as it concerns energy policy and other technology policies, will, I hope, find lessons in this study. I show that effective policy arguments must address issues as they are understood by the officially accepted problem frame. If particular policy arguments cannot do that, their advocates must work on changing the problem frame to change policy.

During the period that I examine here, solar energy advocates, both prominent individuals and organized groups, tried to influence energy policy. Solar energy was then an umbrella term, often referring to what we now call renewable sources of energy, including such things as wind and biomass. Solar advocates enjoyed only modest success. Solar energy failed to become a strong option for meeting U.S. energy needs during this period, not for simple reasons of untested technology or economic cost, but for complex reasons that include a failure to institutionalize new ideas about the energy problem at the top executive levels of government. To support this position, I take a longer historical view of solar energy policy than is typical to analyze the special dynamics of creating public policy around emerging technologies.

The introduction lays out the terms and theoretical frameworks that help us to distinguish the strands of complex ideas that shape national energy policy. It provides the tools for analyzing the ways in which particular ideas come to dominate the official definition of a problem; the conceptualization of its possible solutions; and the rules, norms, and operating procedures of particular institutions.

The chapters in Part I concentrate on U.S. energy policy between World War II and the 1970s’ energy crisis. They examine the ways that the federal government and private groups sought to develop solar energy and how various interested parties framed its potential.

Part II applies the same interpretive tools to the energy crisis and its aftermath. The crisis gave energy policy much greater saliency, raising its profile among the public and policy makers alike. The crisis caused many people to express doubts about both American international hegemony and, coming along with the rise of the environmental movement, the viability of the modern industrial way of life. People involved in energy policy increasingly perceived that energy technology choices entailed political and social consequences of the first order, and that perception engendered extensive and bitter conflict.

Examining the interactions of ideas, interests, and institutions surrounding solar energy policy from the postwar to the postembargo
period can help us to discover why we have the overall energy policies that we do. It also helps us to understand why changing such deeply embedded policies as those about energy is so difficult. Ultimately, a better understanding of this interaction may help to show how policy can be made better, especially when policy makers are confronted with difficult long-term emergent technological issues.
Acknowledgments

It never ceases to amaze me how indebted I am to so many people for what I keep referring to as “my book.” Unlike most debts, these are a joy to have and a pleasure to acknowledge here.

Many friends helped to form my professional community. They are a source of ideas and advice, to be sure, but just as importantly they provide the support and sense of belonging that is such an important part of intellectual life. In particular I want to thank Evelyn Brodkin, Penelope Canan, David Guston, Patrick Hamlett, Bruce Hutton, Sheila Jasanoff, W. D. Kay, David Levine, Dianne Rahm, Richard Sclove, and Ned Woodhouse.

People have contributed to my research for this book in wonderfully diverse ways. The staffs at seven presidential archives helped to guide me through their voluminous holdings. I want to express my gratitude to the archivists at the Harry S. Truman Library, Independence, MO; the Dwight D. Eisenhower Library, Abilene, KS; the John F. Kennedy Library, Boston, MA; the Lyndon B. Johnson Library, Austin, TX; the National Libraries Nixon Project, part of the National Archives now in College Park, MD; the Gerald R. Ford Library, Ann Arbor, MI; and the Jimmy Carter Library, Atlanta, GA. These materials, a gold mine for scholars and a crucial resource for our history, are so extensive that I felt lost when first confronting them. The archivists patiently helped me to make sense of the bewildering collections and find what I needed. The people and the materials are both national treasures.

I also benefited greatly from the use of the library at the National Renewable Energy Laboratory, Golden, CO. The librarians there guided me to their historical collection, which contains materials found nowhere else.

Colleen Dunlavy found the privately printed biography of Farrington Daniels at a yard sale and sent it to me. I never would have found it on my own, and it helped me in more ways than even its appearance in the
endnotes would indicate. Al Teich, who knows a great deal about 1970s energy policy, gave me all of his files on solar energy, including some little-known studies that greatly aided my research. It pays to let your friends know what you’re working on.

Many people helped to shape my approach to technology policy. Attending Langdon Winner’s courses more than twenty years ago, reading his work, and talking to him ever since has opened my eyes to a whole range of approaches to the subject. When I sometimes got lost in the theoretical and empirical minutiae of the work, Langdon’s ideas helped me to stay focused on the important political issues. Ted Greenwood and Gene Skolnikoff, in addition to guiding me through graduate school and tolerating my incessant challenges to almost everything that they tried to teach me, also provided examples of academics deeply committed to being part of the policy process. Sheila Jasanoff and Ned Woodhouse both spent more time talking to me about this project than they probably care to remember, particularly at a time when I was struggling with it. The book is much better for their labors. My intellectual debts to Deborah Stone are only partly revealed by her frequent appearance in my endnotes. As both a teacher and a scholar, Deborah has been a model for me with her joyful and serious commitment to a life of ideas and political change.

The Gerald R. Ford Library provided me with a travel grant that enabled me to work in their archive. I am also deeply grateful for crucial financial support from the National Science Foundation, grant SBER 9023010. I got wonderful help from Vivian Weil and Rachelle Hollander in guiding me through the process of applying to the NSF. The views expressed in this book are strictly my own, and do not reflect in any way on the NSF or its employees.

The NSF grant made it possible for me to hire wonderful research assistants – Jack Boynton, Enrique Zaldua, and, especially, Meade Love Thomas Penn. They greatly amplified my ability to do research.

Gail Reitenbach provided developmental editing for the entire manuscript at a crucial point in its evolution, improving its organization and coherence. Two anonymous reviewers for Cambridge University Press also provided insightful comments on the manuscript. They helped me greatly in improving it. Alex Holzman, Alissa Morris, Lewis Bateman, and Elise Oranges of the Press guided my manuscript through every stage of the publication process, and did so ably.

My parents have always supported me, with no strings attached, in whatever direction I have chosen to take in life, including stressing that I should get the best education of which I am capable. As I have gotten older I have come to realize what a rare gift they gave me, which is why I dedicate this book to my mother and late father.
I am at a loss to think about how I can adequately express my gratitude to my wife, Pamela. A remarkable scholar in her own right, she has been involved in this book from day one – talking over concepts, helping to structure my research, reading numerous drafts of numerous chapters, and helping me do research in some of the archives. As an accomplished historian, she was invaluable in teaching this nonhistorian some of her craft. But all of these things still understate her contribution to my work. She kept me going when I was discouraged, and made it possible for me to recover from setbacks. She has given me a home, a place of grace, from which I can face the tasks ahead and enjoy the accomplishments of the past. I marvel at my good fortune to have a love such as that.

Needless to say, all of these good people are absolved from whatever inadequacies lie within. For those I must, alas, claim sole responsibility.
The primary sources for much of this work come from the archives of Presidential Libraries and from the vertical files of the library of the National Renewable Energy Laboratory. This last collection is not in a strict sense an archive, but they have a very wide range of newsletters and obscure journals, many now defunct, that are unavailable almost anywhere else. I use the following abbreviations in the endnotes for brevity.

DDEL Dwight D. Eisenhower Presidential Library, Abilene, KS
GRFL Gerald R. Ford Presidential Library, Ann Arbor, MI
HSTL Harry S. Truman Presidential Library, Independence, MO
JCL Jimmy Carter Presidential Library, Atlanta, GA
JFKL John F. Kennedy Presidential Library, Boston, MA
LBJL Lyndon Baines Johnson Presidential Library, Austin, TX
NLNP National Libraries Nixon Project, an annex of the National Archives, Alexandria, VA
NREL Vertical Files, Library, National Renewable Energy Laboratory, Golden, CO
WHCF White House Central Files, a major collection in most presidential libraries