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0521861799 - Sustainable Fossil Fuels: The Unusual Suspect in the Quest for Clean and Enduring Energy

Mark Jaccard

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Sustainable Fossil Fuels

More and more people believe we must quickly wean ourselves from fossil fuels – oil, natural gas and coal – to save the planet from environmental catastrophe, wars and economic collapse. Professor Jaccard argues that this view is misguided. We have the technological capability to use fossil fuels without emitting climate-threatening greenhouse gases or other pollutants. The transition from conventional oil and gas to unconventional oil, unconventional gas and coal for producing electricity, hydrogen and cleaner-burning fuels will decrease energy dependence on politically unstable regions. In addition, our vast fossil fuel resources will be the cheapest source of clean energy for the next century and perhaps longer, which is critical for the economic and social development of the world's poorer countries. By buying time for increasing energy efficiency, developing renewable energy technologies and making nuclear power more attractive, fossil fuels will play a key role in humanity's quest for a sustainable energy system.

MARK JACCARD is a Professor in the School of Resource and Environmental Management at Simon Fraser University in Vancouver.

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“Jaccard’s book offers an important perspective on the major challenges posed by conventional energy. CO₂ emissions from fossil fuel burning must be curbed and oil dependence must be reduced to address climate-change and oil-supply-insecurity concerns. Many understand that this implies making energy use more efficient and increasing renewable energy roles. But few realize that fossil energy technologies can be modified at relatively low incremental costs to help address these concerns with CO₂ capture and storage technologies. This book addresses this issue. It is a marvelous primer showing why this option must be taken seriously by policymakers and the general public.”

Dr. Robert Williams, Senior Research Scientist, Princeton Environmental Institute, Princeton University

“Mark Jaccard’s analysis of the potential contribution of fossil fuels provides a much-needed contrast to the more extreme views of imminent resource exhaustion.”

Dr. G. Campbell Watkins, co-editor of The Energy Journal

“This is an optimistic book. It significantly broadens energy perspectives. In the general discourse, energy is often associated with serious challenges: security of supply, peace, climate change, many other environmental issues, and the unfilled needs of energy services for economic growth and poverty alleviation for a majority of the world’s population. This book presents new technically and economically feasible options that promise to address these challenges. There is light in the tunnel, and it is now up to all stakeholders, and our political processes, to realize these options! I strongly recommend this book to all concerned about our common future!”

Dr. Thomas Johansson, Professor and Director, International Institute for Industrial Environmental Economics, Lund University – formerly Director of the Energy and Atmosphere Programme of the Bureau for Development Policy in the United Nations Development Programme

“Professor Jaccard’s book provides a very important addition to the policy debate over future sources of energy in a climate constrained world that is trying to become environmentally sustainable. At the heart of his book is the idea that ‘Renewables and zero-emission fossil fuels will compete for the dominant position in meeting the needs of a sustainable energy system over the coming century’. He finds that zero (carbon) emission fossil fuels are likely to have a cost advantage over renewables and in any event renewables, he argues, ‘would be hard pressed to overtake fossil fuels by the end of the century’. Whilst a number of published scenarios challenge this view, particularly for the

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period beyond the 2050s, he has marshalled a lot of arguments that are worthy of serious debate and further research. Although I am not convinced, I would urge all involved in this debate to read this important book!

Bill Hare, Visiting Scientist, Potsdam Institute for Climate Impact Research – formerly the Greenpeace International work on the Kyoto Protocol

“Professor Jaccard tackles the two key global energy problems, an apparent shortage of oil and a dangerous build up of CO₂ in the atmosphere, and presents an original perspective on how simultaneously to resolve them with such clarity that it appears obvious – after you have read the book! . . . The text provides a balanced mix of serious economics and science, presented in easy-to-understand language and with just the right addition of everyday examples and quiet humor.”

Dr. Jon Gibbins, Professor, Energy Technology for Sustainable Development Group, Mechanical Engineering Department, Imperial College

“Mark Jaccard skillfully makes the case that those who leave modifying the way we use fossil fuels out of any plan to achieve ‘sustainability’ in our energy systems surely confuse means with ends. If our objectives are to improve energy security and protect the environment at reasonable cost, he makes clear that, with a little bit of ingenuity and resolve, our extensive fossil fuel resources could well be our best friend rather than our worst enemy.”

Dr. John Weyant, Professor, Department of Management Science and Engineering, Stanford University

“Jaccard’s well-researched study injects a much-needed dose of reality into the discussion of a ‘sustainable’ energy system. It is the voice of the economist tempered by extensive practical experience in the field and an evident concern for the future of our environment.”

Dr. H. Jake Jacoby, Professor of Management and Co-Director of the MIT Joint Program on the Science and Policy of Global Change, Massachusetts Institute of Technology

“Discussions of energy options too often oversimplify the world into good guys and bad guys. In his latest book, Mark Jaccard has done us all a service. He has brought cool analysis and common sense to a complex area of public policy fraught with myth and image management. His objective is to consider what might constitute a more sustainable energy

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system and in this he considers not only the usual suspects (energy efficiency, nuclear and renewables) but the unusual – fossil fuels. In doing so, he moves beyond the simplistic rhetoric and offers us practical policy recommendations that deserve serious consideration.”

Milton Catelin, Chief Executive, World Coal Institute

“Does preventing global warming require an end to fossil fuels? Jaccard makes a strong case that significant fossil fuel use and climate protection can co-exist, without harming economic growth. Read the book and decide for yourself.”

David Hawkins, Director, Climate Center, Natural Resources Defense Council

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I dedicate this book to my parents, Doris and Lou.

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Preface

The dates on my initial computer files remind me that I first developed the detailed argument and structure of this book in April 2001. I remember being concerned at the time that the book might take two years to write and publish – but I wanted it out more quickly than that. Such optimism.

Various commitments intervened. One was a book on costing greenhouse gas abatement policy that I wrote and published with two co-authors in the period 2001–02. There was also international and national advisory work related to climate change policy as well as my ongoing research, article writing and teaching responsibilities. If a manuscript is incomplete by the end of summer, there is little chance for significant progress during the following eight months of teaching. I finally had a virtually completed draft of the manuscript by mid-2004, but then I consumed almost a year eliciting feedback from various researchers, especially in areas that are peripheral to my expertise. This led to more research and significant rewriting in some sections. I am grateful to the many people who provided this service. Of course, I alone am responsible for remaining errors.

It is difficult to anticipate how this book will be received. I have always seen myself as strongly motivated by a concern for the environment, so I am predisposed to arguments that our economic system is unsustainable and that our policies for environmental protection need to be much stronger. I hope that message is clear in this book. At the same time, I enjoy challenging my and others' assumptions in a spirit of earnest inquiry, and this leads me to question assumptions that some environmentalists may currently take to be incontrovertible. My hope, however, is that even those who cannot agree with the hypothesis I explore in this book will only do so after carefully considering the evidence and arguments I present.

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Preface

My goal is that the book be of interest to a fairly wide readership. I have tried to avoid technical jargon and excessive technological detail in order to invite non-expert readers. At the same time, I have aimed for a thorough presentation of the evidence that supports my hypothesis so that experts would also find the book to be a useful stimulus for debate and further research.

Because of this, the book is a bit longer than I would have liked. This presents a challenge to senior decision makers who need to review a lot of material in a given month. To accommodate these readers, I provide a synopsis of the book as an appendix. This synopsis includes chapter-specific reading suggestions so that someone can grasp the key evidence and arguments from a selective reading of about one fifth of the book's pages.

The book also has a website at <http://www.emrg.sfu.ca/sustainablefossilfuels>. This is updated regularly with reviews, comments, debates and updates on critical information.

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In the later stages of the book, I got help from Jon Gibbins, Dominique Finon, Campbell Watkins, Nic Rivers, Chris Bataille, Charlie Wilson, Chris Green, Karin Albert, Rose Murphy and some anonymous reviewers. Others in my research group, including Jacqueline Sharp, Noory Meghji, Paulus Mau and Chris Joseph, helped out with various tasks. In particular, I note the complete support I always get from my close collaborator, John Nyboer. Nothing happens if not for him working quietly away at keeping our research group functioning smoothly.

I thank my editor at Cambridge University Press, Chris Harrison, for his enthusiasm and support from the first time he read my book synopsis. I also thank Lynn Dunlop and Jackie Warren at the Press for carrying us through the final stages of editing and production, and Judith Anderson for the indexing.

I thank my immediate family for their patience and support – Ingram, Kjartan, Torsten, Brit and Ingrid.

If I have forgotten anyone, I will list them on the book's website (<http://www.emrg.sfu.ca/sustainablefossilfuels>).

Finally, I acknowledge with sadness the contribution to my thinking of two wonderful colleagues who have passed away in the last two years – much too young. Steve Bernow of the Tellus Institute had an infectious passion for the pursuit of a sustainable energy system. I am not sure he would have agreed completely with my hypothesis, but I would love to have had the chance to debate it with him. Campbell Watkins was from the other end of the spectrum, a cautious economist

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who taught many of us a lot about the good and the bad of energy markets. While he did provide some feedback on my exploration of fossil fuel supplies and substitution potential, I did not get a chance to discuss with him the broader sustainability themes of the book, some of which he may not have agreed with. Disagreeing with Campbell or Steve was one of the pleasures of life, and a great opportunity for learning.