both in and outside of the Kyoto Protocol that are designed to mitigate GHG emissions from sectors of the economy not covered by the EU-ETS.

The next three chapters describe other currently active or proposed market mechanisms to limit GHG emissions in other countries of the world. Chapter 5 deals the case of the US. This chapter contains a concise survey of the history of the many federal legislative efforts to establish a national GHG emissions trading mechanism since 2007, starting with the McCain-Lieberman Climate Stewardship and Innovation Act and ending with the Dingell-Boucher Draft in 2008. Multi-state regional carbon markets such as the currently operating Regional Greenhouse Gas Initiative (RGGI) and the proposed Western Climate Initiative and the Midwest Greenhouse Gas Accord are also summarized. Chapter 6 describes efforts to establish emissions trading in Australia. The chapter starts with a brief history of the political economy that rationalizes Australia's late entry into climate change mitigation efforts and ends with a description of the New South Wales emissions trading scheme and the proposed national emissions trading programme to be implemented in 2010. Chapter 7 describes efforts to implement mandatory GHG emissions trading mechanisms in New Zealand and Japan.

Although the focus of the book is on mandatory GHG emissions markets, Chapter 8 provides a survey of voluntary offset markets, where both the buyer and seller of emissions reductions participate voluntarily. This chapter outlines the basics of how these markets operate. However, it does not discuss the thorny issue of why buyers participate in these markets; nor does it assess the effectiveness of voluntary offset markets at reducing GHG emissions.

The broad coverage of existing and proposed carbon markets is the book's strength. The authors are to be congratulated for the considerable effort that went into compiling all of this information in one place and making it accessible to a non-specialist. However, this breadth appears to come at a cost, because the book contains a dearth of analysis of the challenges associated with convincing governments to implement a carbon market, join an existing carbon market, or even to set a price for carbon emissions. Moreover, the book also presents a number of controversial issues in climate policy and carbon market design as more one-sided than seems warranted by the academic literature. Many excellent papers in environmental economics related to climate policy and carbon market design are not discussed in the book. Including some of these key papers would have shown the reader why many of these issues are more unsettled than it appears from discussions presented in the book. It would also help to explain why the future is so uncertain for carbon markets. For example, a number of papers provide cogent arguments against the authors' position of a small or zero discount rate for the future costs and benefits associated with climate mitigation policies. There are also many credible papers that argue in favour of a gradual approach to addressing climate change, rather than the more aggressive approach supported by the authors.

Although it would have substantially increased the length of the book for the authors to point out more of the economic, political, and regulatory challenges associated with designing climate policies (including carbon markets), a less comprehensive book that focused only on the EU-ETS could have dealt with the major analytical challenges in the design of carbon policy. This would have resulted in a book that is more useful to those interested in designing and implementing carbon markets, which might have been a better strategy for authors interested in increasing the shelf life of their book.

As the final chapter of the book notes, there is considerable uncertainty about the long-term viability of carbon markets as a climate change mitigation measure. The COP-15 meeting in Copenhagen in December 2009 demonstrated that few of the remaining large GHG emitters (China, the United States and India) have much interest in joining a global GHG emissions trading regime. Finally, the recent decision by the Democratic leadership in the United States Congress not to attempt to pass climate legislation that would implement a national GHG emissions permit market has further reduced the likelihood that carbon emissions markets will survive beyond the end of 2012.

In spite of these quibbles with its content and focus, the book is very good at what it sets out to do: provide an accessible, comprehensive description of the history, market rules, and legal and regulatory institutions associated with currently operating and proposed carbon markets around the world. The subtitle of the book is a very appropriate description of its contents. The ideal audience for the book is a new carbon market participant, regulator, or policymaker interested in getting up to speed on the basics of these markets. For this reason, the book would also be an excellent supplement to an undergraduate economics, business, or law school course on climate policy.

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The Vanishing Face of Gaia
James Lovelock
Basic Books, New York, 2009, 288 pages.

The Vanishing Face of Gaia is a tale of planet Earth; Gaia was the goddess of the Earth in ancient Greece. As one would expect from Lovelock, this is a very well written and interesting book.

What one would not expect from an environmentalist (unless one has followed the media carefully) is to read that renewable energy is bad; that we must increase army spending and suspend democracy; and that scientists should be conscripted to deliver the innovation needed on climate change. And that, even with these drastic measures, we will still not be able to mitigate climate change fast enough. The planet will cull us to a sustainable number, about 100 million people, under the inevitable warmer temperatures. We need to start adapting for life on the remaining oases (England, the Nordic countries, the poles, Canada and the United States).

In nine chapters, Lovelock covers a lot of ground in a fascinating and surprising way. The first chapter summarizes his argument — reiterated throughout the book — that the large world population has upset the Earth's equilibrium, especially in terms of climate change. Human beings and their pets are responsible for 23% of CO_2 emissions, 50% when including the food system. No voluntary human act will reduce the population fast enough to mitigate climate change. Because we fail to see Gaia as a living organism, our policies and actions are misguided. Gaia will do what she needs to do to survive, even if it leads to starvation, competition for space and resources, war, and ultimately the disappearance of the human race. Despite this conclusion, Chapter 9, which is more philosophical, claims to be positive because, although only a fraction of us may survive, the survivors will have evolved to have less selfish genes and thus be able to put Gaia first and co-habit with her.

The chapters in between are full of anecdotes on the science of climate forecasting, with a focus on the flawed models used to make these predictions and thus their underestimation of climate change. According to Lovelock, underestimation of the speed of climate change can be attributed to: (1) over reliance on models (as opposed to field work) even when their results are contradicted by observed changes; (2) linear projections based on past events (despite evidence of non-linearity); (3) not taking into account the physiological response of land or ocean ecosystems to climate change; and (4) scientific results being tampered with to align with the agendas of national leaders. Many uncertainties remain that must be studied and included in models, such as the impact of haze, smog, and smoke from burning forests on the absorbed sunlight or the reduced ability of oceans to store carbon dioxide due to their rapid acidification, as well as the ability of the geoengineering solutions to curb climate change.

Chapter 3 looks at the consequences of these flawed predictions, which is that we are not acting fast enough and focus on mitigation instead of adaptation. Where we are acting, we are investing in the wrong technologies, including renewable energy. Chapter 4 reviews the sources of energy, dedicating two pages to solar energy; 14 to elaborate on the superiority of nuclear power; seven to wind energy, mostly to demonstrate how Europe's massive investment in wind will be remembered as one of the great follies of the twenty-first century. Chapter 5 reviews the various geoengineering techniques that could buy us time, though by no means solve our problems. Chapter 6 is a chronicle of the author's fight to have the concept of planet Earth as a self-regulating and living entity accepted by mainstream scientists. Chapter 7 continues with a review of what we mean by a living organism (including the Earth) and explains how accepting that Gaia is alive adds complexity to all natural and Earth sciences. That acceptance requires a multidisciplinary approach to Earth sciences, including the study of atmospheric conditions, the ocean, humans, living organisms, and surface rocks to see the interaction among all of them. In addition to this, it adds mathematical complexity, requiring the use of differential equations and non-linear systems, which partly explains the resistance to his theory, according to Lovelock. Chapter 8 is a biography of Lovelock as well as of the environmentalist movement, which concludes that the evolution of the movement from one of protecting biodiversity and the environment to one of protecting humans has made environmentalism a new religion, including all the flaws inherent to monotheistic religions. True environmentalism, according to Lovelock, is realizing that the health of the planet is more important than that of humankind or human rights; we are not separate from Gaia and our obligations to her must come first. Analogies to religion do not stop there. To Lovelock, planting trees to sequester carbon and buying carbon offsets are akin to wealthy Catholics buying indulgences sold by the Catholic Church to offset their time in purgatory!

Lovelock thus concludes that we have to stop wasting time and money and start investing in nuclear power instead of in renewable energy. The 14 pages spent on nuclear energy sanctifies it as the greenest, cheapest, safest, most secure and thus the most desirable source of energy, and it is the only one that can meet the huge demand of energy needed for growing mega-cities. Lovelock reviews criticisms of nuclear power using a straw man approach. For instance, did you know that the annual waste output of a 1,000 megawatt plant can fit in a medium-sized car? I would want to see a citation for this as well as the research supporting the claim that a wind farm of twenty one megawatt turbines requires more than ten thousand tons of concrete or that one full-sized nuclear powered or coal-fired power station is needed to back up these wind farms for the 75% of the time when the wind is too low or too high. Table 4.2 (p. 129) compares energy sources based on their footprint, pollution, and the Government subsidy needed to make it profitable, but no references are given for these estimates. Lovelock does believe that solar thermal energy, combined with existing cable delivery technologies to carry this electricity

over thousands of miles, could be the next practical large scale energy scheme, though with a larger footprint than nuclear power. However, he does not believe providing subsidies for renewable energy is a good idea, since rushing invention is rarely successful . . .

Generally, one cannot disagree with the analysis that we must act now and that huge changes in lifestyle, agriculture, and eating habits are needed, but the evidence presented here does not convince me that the drastic solutions he proposes are the best and only ones. For instance, with regard to the food problem, Lovelock argues for the funding of "a huge program of food synthesis by the chemical and biochemical industry". I would need much more evidence than what is presented in order to be convinced to put even more of our food system in the hands of a few multinational corporations. Lovelock tries to address my concern by including an interesting section on cognitive disconnect that explains why we tend to believe anecdotes (supported by bad media) more than scientific evidence. However, he himself uses various anecdotes to advance his point and fails to acknowledge (except in passing on p. 132) the power of multinational lobbyists to "influence science and our perception of it". I am also not as convinced as he is that Governments won't make the right decisions and that the private sector will fare better. I do agree with him, however (and so does the recent WBCSD Vision 2050) that empowered and well-educated women with a high standard of living could curb population growth and thus go a long way towards reducing mankind's problems.

The book proves to be an interesting read that may unfortunately be too drastic to generate the intense debate that is needed around issues such as: whether a concerted technological push to provide clean energy to all is warranted; on the climate justice issues that arise from the analysis — who decides who lives on the oases? and on the role that nation states, the international community, the private sector and civil society organizations must play in order to find and implement solutions.

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An Introduction to Sustainable Transportation: Policy, Planning and Implementation
Preston L. Schiller, Eric C. Bruun and Jeffrey R. Kenworthy
Earthscan, London and Washington, DC, 2010, 342 pages.

Sustainable transportation is essentially a societal, rather than a strictly technical, process that depends upon planning, policy, economics and citizen involvement. With this observation in their *Introduction to Sustainable Transportation*, Preston Schiller, Eric Bruun and Jeffrey Kenworthy highlight the urgent need to more effectively address the multiple sustainability challenges in transport, including waste of scarce economic and natural resources, growing social inequity, urban air pollution and climate change.

Almost all of the motorized modes by which individuals, goods and materials move around cities, and indeed Planet Earth, consume a considerable amount of energy and resources, most of which are not renewable. Most of these modes are highly dependent on fossil fuels and are deeply implicated in the processes of greenhouse gas emissions and their atmospheric accumulation. This book explores the ways in which transportation benefits can be retained, while social and environmental burdens are reduced.

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An Introduction to Sustainable Transportation addresses students, planners and concerned citizens. It is an informative compendium on transport policy issues of considerable interest to laypersons and experts alike. The interdisciplinary analysis is presented in ten clearly structured chapters, each one with its own comprehensive bibliography for further reading, overview tables, graphs and photos, as well as case studies or examples described in separate text boxes. Suggested questions for further discussion presented at the end of each chapter make this book a useful source of materials for teachers as well.

The book offers plenty of "food for thought" and subjective viewpoints for discussion. Chapter 1 starts with an analysis of the emergence of our present day automobile dependence and "hypermobility". Chapter 2 presents an illustrated critique of the car culture, including a reflection on the role of the media in creating wants and in romanticizing automobility. Chapter 3 offers a comprehensive historic retrospective of sustainable and unsustainable transportation. Chapter 4 discusses the multiple inter-relationship between the various transport modes and related infrastructure, in particular in urban areas. Chapter 5 discusses global freight and concludes with the observation that "globalization, with its heavy dependence upon fossil fuels and long-range supply chains, works against sustainable development". The authors' follow-on suggestion, however, to raise tariffs or taxes or to otherwise restrict growing global trade if external effects and external costs of transport are not internalized, will certainly raise counter-arguments. Chapter 6 includes a critical review of conventional economic feasibility analysis and