CLIMATE CHANGE AND
THE LAW
LEXISNEXIS LAW SCHOOL ADVISORY BOARD

Lenni B. Benson  
Professor of Law &  
Associate Dean for Professional Development  
New York Law School

Raj Bhala  
Rice Distinguished Professor  
University of Kansas, School of Law

Charles P. Craver  
Freda H. Alverson Professor of Law  
The George Washington University Law School

Richard D. Freer  
Robert Howell Hall Professor of Law  
Emory University School of Law

Craig Joyce  
Andrews Kurth Professor of Law &  
Co-Director, Institute for Intellectual Property and Information Law  
University of Houston Law Center

Ellen S. Podgor  
Professor of Law &  
Associate Dean of Faculty Development and Electronic Education  
Stetson University College of Law

Paul F. Rothstein  
Professor of Law  
Georgetown University Law Center

Robin Wellford Slocum  
Professor of Law & Director,  
Legal Research and Writing Program  
Chapman University School of Law

David I. C. Thomson  
LP Professor & Director, Lawyering Process Program  
University of Denver, Sturm College of Law
CLIMATE CHANGE AND THE LAW

Chris Wold
Associate Professor of Law & Director International Environmental Law Project
Lewis & Clark Law School

David Hunter
Associate Professor of Law
American University Washington College of Law

Melissa Powers
Assistant Professor of Law
Lewis & Clark Law School
Dedication

To Sue, Zach, and Mats—C.W.

To Mark, with love—M.P.

To Margaret, Danielle, and Edward—D.H.
Climate change has become the defining environmental legal and policy challenge of the 21st century, as well as one of the most dynamic. If there is any doubt, consider just some of the events of the past eighteen months since we began writing this book. The Intergovernmental Panel on Climate Change (IPCC) issued its Fourth Assessment, concluding, with 90 percent certainty, that the observable increases in temperature are the result of human activities. The IPCC, along with Al Gore, shared the Nobel Peace Prize in 2007 “for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change.” The United States Supreme Court ruled in Massachusetts v. EPA that the U.S. Environmental Protection Agency has authority under the Clean Air Act to regulate carbon dioxide. The United States Fish & Wildlife Service listed the polar bear as a threatened species under the Endangered Species Act principally because its habitat, the Arctic sea ice upon which it is almost entirely dependent, is melting due to increased temperatures and other factors. The Inupiat Village of Kivalina has sued ExxonMobil and other leading energy companies for the costs of relocating their village, which is subsiding into the ocean due to climate change. Due to the high demand for development of solar power in six western states, the Bureau of Land Management and Department of Energy put a moratorium on such projects until it could prepare a programmatic Environmental Impact Statement to assess the environmental, social, and economic impacts associated with solar energy development — and then lifted moratorium. At the international level, governments agreed to an action plan laying out the negotiating framework for concluding a climate change treaty by 2009 to follow the Kyoto Protocol in 2012.

Climate change will continue to occupy center stage as individuals and governments wrestle with mitigating their emissions and adapting to the impacts of climate change at a time when the gravity of climate change becomes increasingly apparent. Seemingly every day, scientists announce new studies showing that the impacts of climate change are more severe or occurring more rapidly than previously predicted. For example, Arctic sea ice is melting faster than predicted and sea levels have risen more than originally thought. Moreover, citizens and governments continue to press for change, using every legal tool at their disposal. Municipalities are developing climate-friendly building codes. States continue to enact renewable portfolio standards that require electricity producers to obtain a certain percentage of energy from renewable sources. Citizens have brought legal actions against major emitters of greenhouse gases for causing a public nuisance. In addition to such common law claims, citizens have also sued the federal government under the Clean Air Act, the Endangered Species, and the National Environmental Policy Act, as well as made petitions under the Clean Water Act, to compel the United States government to mitigate greenhouse gas emissions. At the international level, citizens have used international processes, such as the Inter-American Human Rights Commission and the World Heritage Convention, to compel governments to act more aggressively to mitigate greenhouse gas emissions or adapt to climate change impacts. And many businesses are voluntarily reducing their carbon footprints and trading for increasing amounts of carbon credits in both international and domestic carbon markets.

Given the all-encompassing reach of climate change, it presents both unique challenges and opportunities for teaching. The subject allows students to study how many different areas of law — public international law, public administrative law, federal environmental law, state and municipal regulations, and the common law — can be implicated in
addressing such a major social issue. The subject thus allows for an integrated experience to study the law generally, as well as to understand in detail the many climate-related challenges facing the next generation of lawyers. To reflect the breadth of legal responses to climate change, this book takes a comprehensive approach to climate change and the law, covering everything from municipal building codes that incorporate climate-friendly requirements, to state efforts to reduce carbon dioxide emissions from automobiles and other sources of greenhouse gases, to federal litigation involving both the common law and statutory law, as well as to the international climate treaty regime. As such, this book could be used as a first-year introduction to the law, a capstone course, or simply as an issue-specific course.

The book is roughly organized in three parts. The first part of the book reviews the background scientific and policy issues surrounding climate change. Chapter 1 summarizes the scientific basis of climate change, relying principally on the IPCC’s Fourth Assessment, but supplementing the IPCC’s reports with the fast-growing scientific literature that is making the IPCC’s 2007 Fourth Assessment seemingly already out of date. Chapter 2 describes the policies and measures that are or could be used to mitigate greenhouse gas emissions, as well as the economic costs of some of those strategies. Recognizing that climate change impacts will occur regardless of how quickly we act to mitigate greenhouse gas emissions, Chapter 3 explores adaptation strategies.

Part two delves deeply into the international framework of the climate change regime. Chapters 4 and 5 introduce the 1992 United Nations Framework Convention on Climate Change (UNFCCC) and the subsequent 1997 Kyoto Protocol, which requires developed countries to reduce or limit their emissions of six greenhouse gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, sulphur hexafluoride, and perfluorocarbons. Subsequent chapters provide a detailed investigation of specific aspects of the international climate change regime. Chapter 6 explores the different types of emissions trading, collectively known as the flexibility mechanisms, under the Kyoto Protocol. Chapter 7 reviews the complicated and controversial regime for reducing greenhouse gas emissions through land use and forest management practices. Chapter 8 describes the Kyoto Protocol’s compliance regime. Chapter 9 then explores development of the post-Kyoto Protocol regime, an issue of particular importance as countries struggle to meet their existing obligations under the Kyoto Protocol while scientists make clear that the Kyoto Protocol’s commitments fall far short of the greenhouse gas emissions reductions necessary to avoid catastrophic climate change. Finally, Chapter 10 introduces other international laws affecting climate change. The Kyoto Protocol’s climate change regime is not the only international law relevant for mitigating emissions and adapting to climate change. Thus, Chapter 10 describes policies affecting climate change within other international conventions, including the Montreal Protocol on Substances that Deplete the Ozone Layer, the World Heritage Convention, and the World Trade Organization, among others.

Part three then explores U.S. domestic law. Chapter 11 begins this part by reviewing general U.S. policy concerning climate change. Much of the action, however, has taken place in the courts, so Chapter 12 starts with a discussion of threshold issues, such as Constitutional standing, that determine whether a climate change litigant can even use the judicial system. Chapter 13 then discusses the role existing federal environmental statutes — the Clean Air Act, in particular — may play in mitigating climate change. Chapters 14 and 15 then look at how U.S. energy and transportation policies affect and intersect with climate change policies. Chapter 16 turns back to the courts to discuss the role of the common law in addressing climate change. As Chapters 11 through 16 reveal, the United States does not have a uniform or cohesive climate change policy. Indeed, in many
situations, the U.S. government has refused to act and thus prompted state and local
governments to adopt their own climate change laws and regulations. Chapter 17 reviews
the most common and/or aggressive sub-federal actions and explores the roles that all
levels of government should and legally can play in mitigating climate change. Chapter
18 looks at the role that private actors have take on their own to reduce greenhouse gas
emissions. Finally, Chapter 19 attempts to peer into the future to discuss whether and
how governments may move toward a low-carbon future.

Editor’s Note
Most footnotes and internal citations have been omitted without indication. Those
footnotes that have been retained are numbered as they are in the original text. Deletions
of text within an excerpt are indicated in two ways. Small deletions of a sentence or two
are indicated with ellipses. The deletion of larger blocks of text is denoted with asterisks.
Deletions of dissenting or concurring opinions are generally not noted.
Acknowledgements

This book would not have been possible without the assistance of many people. We thank Wil Burns, David M. Driesen, Sanford Gaines, Royal Gardner, Lesley McAllister, Marcos Orellana, Dan Rohlf, Kassie Siegel, Erica Thorson, Glenn Wiser, and Durwood Zaelke for their thoughtful comments which have improved this book tremendously. We also thank Moses Alajijian, Duncan Delano, Lisa Frenz, Tami Gierloff, Bonnie Green, Amy Lubrano, Nicolas Mansour, Andy Marion, James Mitchell, Courtney McAnn, Stacie Pacheco, Rowan Smith, and Lynn Williams for their excellent research and administrative support.
# Table of Contents

**Chapter 1**  
THE SCIENCE OF CLIMATE CHANGE  

<table>
<thead>
<tr>
<th>I. INTRODUCTION</th>
<th>Questions and Discussion</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>II. THE CAUSES OF CLIMATE CHANGE</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>A. Increasing Greenhouse Gas Emissions</td>
<td>Questions and Discussion</td>
<td>5</td>
</tr>
<tr>
<td>B. Declining Natural Carbon Sinks</td>
<td>Questions and Discussion</td>
<td>8</td>
</tr>
<tr>
<td>C. The Relationship between GHG Concentrations and Temperature</td>
<td>Questions and Discussion</td>
<td>10</td>
</tr>
<tr>
<td>III. THE ENVIRONMENTAL IMPACTS OF CLIMATE CHANGE</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>A. Melting Ice</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>B. Rising Sea Levels</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>C. Changing Ocean Ecology</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>D. Intensifying Weather Events</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>E. Declining Forests and Increasing Desertification</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>F. Impacts on Ecosystems and Wildlife</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>G. Regional Impacts</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Questions and Discussion</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>IV. SOCIO-ECONOMIC IMPACTS</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>A. Agriculture, Drought, and Famine</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>B. Public Health Impacts</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>C. Climate Refugees</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Teresita Perez, <em>Climate Refugees: The Human Toll of Global Warming</em></td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Questions and Discussion</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>V. RAPID CLIMATE CHANGE EVENTS AND LIVING WITH UNCERTAINTY</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>National Research Council, <em>Abrupt Climate Change: Inevitable Surprises</em></td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Questions and Discussion</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>VI. NATIONAL SECURITY AND CLIMATE CHANGE</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>The CNA Corporation, <em>National Security and the Threat of Climate Change</em></td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Questions and Discussion</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>VII. KEEPING OUR EYE ON THE BALL: LONG-TERM STABILIZATION TARGETS TO AVOID THE WORST CLIMATE IMPACTS</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Questions and Discussion</td>
<td>46</td>
<td></td>
</tr>
</tbody>
</table>
# Table of Contents

## Chapter 2  
RESPONDING TO CLIMATE CHANGE: MITIGATION  

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION</td>
<td>49</td>
</tr>
<tr>
<td>II. GENERAL MITIGATION APPROACHES</td>
<td>50</td>
</tr>
<tr>
<td>A. Climate Change as a Market Failure</td>
<td>51</td>
</tr>
<tr>
<td>Questions and Discussion</td>
<td>53</td>
</tr>
<tr>
<td>B. Internalizing External Costs: Cures for Market Failure</td>
<td>53</td>
</tr>
<tr>
<td>1. Traditional Regulation</td>
<td>55</td>
</tr>
<tr>
<td>2. Emissions Trading</td>
<td>55</td>
</tr>
<tr>
<td>Questions and Discussion</td>
<td>58</td>
</tr>
<tr>
<td>David M. Driesen, <em>Free Lunch or Cheap Fix?: The Emissions Trading Idea and the Climate Change Convention</em></td>
<td>61</td>
</tr>
<tr>
<td>Questions and Discussion</td>
<td>58</td>
</tr>
<tr>
<td>3. Carbon Taxes</td>
<td>63</td>
</tr>
<tr>
<td>Questions and Discussion</td>
<td>66</td>
</tr>
<tr>
<td>4. Information-Based Approaches</td>
<td>67</td>
</tr>
<tr>
<td>5. Investment and Technology Approaches</td>
<td>68</td>
</tr>
<tr>
<td>Questions and Discussion</td>
<td>68</td>
</tr>
<tr>
<td>III. MITIGATION POLICIES AT THE SECTOR LEVEL</td>
<td>69</td>
</tr>
<tr>
<td>A. Mitigation Measures</td>
<td>69</td>
</tr>
<tr>
<td>Questions and Discussion</td>
<td>74</td>
</tr>
<tr>
<td>B. Stabilization Wedges: Mitigation One Step at a Time</td>
<td>75</td>
</tr>
<tr>
<td>Stephen Pacala &amp; Robert Socolow, <em>Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies</em></td>
<td>76</td>
</tr>
<tr>
<td>Questions and Discussion</td>
<td>80</td>
</tr>
<tr>
<td>IV. THE BENEFITS AND COSTS OF CLIMATE MITIGATION</td>
<td>81</td>
</tr>
<tr>
<td>A. The Stern Review of Climate Economics</td>
<td>82</td>
</tr>
<tr>
<td>Nicholas Stern, <em>The Stern Review: The Economics of Climate Change</em></td>
<td>82</td>
</tr>
<tr>
<td>Questions and Discussion</td>
<td>85</td>
</tr>
<tr>
<td>B. The Critique of Cost-Benefit Analysis</td>
<td>87</td>
</tr>
<tr>
<td>Douglas A. Kysar, <em>Climate Change, Cultural Transformation, and Comprehensive Rationality</em></td>
<td>87</td>
</tr>
<tr>
<td>Questions and Discussion</td>
<td>92</td>
</tr>
</tbody>
</table>

## Chapter 3  
RESPONDING TO CLIMATE CHANGE: ADAPTATION  

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION</td>
<td>95</td>
</tr>
<tr>
<td>II. ADAPTATION STRATEGIES</td>
<td>96</td>
</tr>
</tbody>
</table>
Table of Contents

A. Adaptive Infrastructure ................................... 98
   IPCC 2007: Adaptation and Vulnerability ................... 99
B. Response to Sea-level Rise: Defend or Retreat .......... 100
   James G. Titus, Planning for Sea Level Rise Before and After a
   Coastal Disaster ........................................... 101
   Questions and Discussion .................................... 103
C. Expanding Disaster Relief ................................ 104
D. Adaptive Agriculture ..................................... 105
   Interdepartmental Working Group On Climate Change, Food &
   Agric. Org. of the U.N., Adaptation to Climate Change in
   Agriculture, Forestry and Fisheries: Perspective, Framework and
   Priorities ....................................................... 105
E. Adaptive Water Management ............................... 106
F. Relocation of Climate Refugees ........................... 107
G. Enhancing Natural Resilience and Ecosystem Services .... 108
H. Insurance as Adaptation .................................... 108
   Questions and Discussion .................................... 110
III. INTERNATIONAL CHALLENGES OF ADAPTATION ........... 114
   Ian Burton, Elliot Diringer, & Joel Smith, Adaptation to Climate
   Change ......................................................... 115
   Questions and Discussion .................................... 116
IV. GEOENGINEERING ........................................ 119
   A. What is Geoengineering? ................................. 119
   B. The Geoengineering Debate ............................... 121
   Questions and Discussion .................................... 122

Chapter 4 THE UNITED NATIONS FRAMEWORK CONVENTION
ON CLIMATE CHANGE ........................................ 127

I. AN INTRODUCTION TO INTERNATIONAL TREATIES ........ 127
   David Hunter, James Salzman & Durwood Zaelke, International
   Environmental Law and Policy ................................ 129
   Questions and Discussion .................................... 132
II. THE GLOBAL POLITICS OF CLIMATE CHANGE .......... 134
   A. National and Regional Contributions to Climate Change .... 134
   B. Global Divides in Climate Politics ....................... 135
      1. The North-South Split .................................. 136
      2. Divisions within the G-77 ................................ 136
      3. The Persistent EU-U.S. Division ......................... 137
      4. Special Situation of Countries in Economic Transition .... 138
         Questions and Discussion ................................ 138
III. THE NEGOTIATIONS OF THE UN FRAMEWORK CONVENTION .. 139
   A. The Early Years: Building Support for an International Convention on
      Climate Change ............................................ 140
# Table of Contents


Questions and Discussion ................................................................ 144

B. Negotiations of the UNFCCC ................................................. 145

Donald Goldberg, *As the World Burns: Negotiating the Framework Convention on Climate Change* ........................................ 145

Questions and Discussion .............................................................. 147

IV. THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE .................................................. 149

Problem Exercise: Reading the UNFCCC ........................................ 149

A. Selected Principles Underlying the UNFCCC ................................. 150


Questions and Discussion .............................................................. 151

1. State Sovereignty .................................................................. 151

Questions and Discussion .............................................................. 154

2. Common Concern of Humankind .............................................. 155

Questions and Discussion .............................................................. 156

3. The Right to Sustainable Development .................................... 158

Questions and Discussion .............................................................. 159

4. Common but Differentiated Responsibilities ............................. 161

UNFCCC, Preamble ................................................................ 161

UNFCCC, Article 3 .................................................................. 162

Questions and Discussion .............................................................. 163

5. Equity ................................................................................. 164

6. Intergenerational Equity .......................................................... 165

Questions and Discussion .............................................................. 166

7. The Precautionary Principle ..................................................... 166

UNFCCC, Article 3.3 ................................................................ 167

Questions and Discussion .............................................................. 167

B. The UNFCCC Objective ............................................................ 169

UNFCCC, Article 2 .................................................................. 169

Questions and Discussion .............................................................. 170

C. Commitments ....................................................................... 171

1. General Commitments of All Parties ........................................ 172

UNFCCC, Article 4 .................................................................. 172

UNFCCC, Article 12 .................................................................. 173


UNFCCC, Article 4 .................................................................. 174

UNFCCC, Article 12 .................................................................. 176

xv
Table of Contents

Daniel Bodansky, The United Nations Framework Convention on Climate Change: A Commentary .......................................................... 176
Questions and Discussion ................................................................ 178

3. Developed Country Commitments: Financial Assistance and Technology Transfer ................................................................. 178
UNFCCC, Article 4 ..................................................................... 179
Article 12 ................................................................................ 179
Daniel Bodansky, The United Nations Framework Convention on Climate Change: A Commentary ......................................................... 180
Questions and Discussion .............................................................. 182

E. Institutional Architecture ............................................................... 182
Questions and Discussion .............................................................. 183

V. EVALUATING THE UNFCCC: THE FRAMEWORK-PROTOCOL MODEL .................................................................................. 184
Questions and Discussion .............................................................. 185

Chapter 5 INTRODUCTION TO THE KYOTO PROTOCOL .... 189

I. INTRODUCTION ........................................................................... 189

II. NEGOTIATING THE KYOTO PROTOCOL .................................................. 190
A. The First CoP and the Berlin Mandate .................................................. 190
   Conclusion of Outstanding Issues and Adoption of Decisions ........ 190
   Questions and Discussion ................................................................ 191
B. Prelude to Kyoto: Building Political Will ............................................... 191
   S. Res. 98, Report No. 105–54, 105th Cong. .................................... 193
   Questions and Discussion .............................................................. 195
C. Negotiations at Kyoto .................................................................... 196
   Michael Grubb, et al., The Kyoto Protocol: A Guide and Assessment ............................................................... 197
   Questions and Discussion .............................................................. 204

III. THE KYOTO PROTOCOL ................................................................. 205
Questions and Discussion .............................................................. 206
A. Emission Reduction Targets and Timetables ......................................... 207
   Claire Breidenrich, et al., The Kyoto Protocol to the United Nations Framework Convention on Climate Change .................................................. 207
   Kyoto Protocol, Article 3 .............................................................. 209
   Questions and Discussion .............................................................. 210
B. Policies and Measures .................................................................... 210
   Kyoto Protocol, Article 2 .............................................................. 211
   Kyoto Protocol, Article 10 ............................................................ 212
   Questions and Discussion .............................................................. 212
C. Forests and Other Sinks .................................................................. 213
   Questions and Discussion .............................................................. 214
D. Emissions Trading and Other Flexibility Mechanisms .......................... 215
Table of Contents

Kyoto Protocol, Article 17 ........................................... 215
Kyoto Protocol, Article 6 ........................................... 216
Kyoto Protocol, Article 4 ........................................... 216
Kyoto Protocol, Article 12 .......................................... 217
Questions and Discussion ........................................... 218

E. Implementation and Compliance ................................ 219
Kyoto Protocol, Article 8 ........................................... 220
Questions and Discussion ........................................... 221

IV. TOWARDS RATIFICATION: NEGOTIATING THE MARRAKESH
ACCORDS ...................................................................... 221
Questions and Discussion ........................................... 223

Chapter 6 IMPLEMENTING THE KYOTO PROTOCOL ........ 225

I. INTRODUCTION .................................................. 225

II. THE KYOTO PROTOCOL’S FLEXIBILITY MECHANISMS ....... 226
A. Bubbles .......................................................... 227
Questions and Discussion ........................................... 228
B. Joint Implementation ........................................... 228
Questions and Discussion ........................................... 229
C. The Clean Development Mechanism .......................... 232
Questions and Discussion ........................................... 235
Craig A. Hart, The Clean Development Mechanism ............ 236
D. Emissions Trading .............................................. 238

III. IMPLEMENTATION ISSUES ..................................... 239
A. Supplementarity ................................................... 239
Decision 2/CMP.1 Principles, Nature and Scope of the Mechanisms
Pursuant to Articles 6, 12 and 17 of the Kyoto Protocol ............ 241
Questions and Discussion ........................................... 242
B. Additionality ...................................................... 242
1. Establishing Baseline Emissions ................................ 243
Ram M. Shrestha et al., Baseline Methodologies for Clean
Development Mechanism Projects: A Guidebook ............... 243
2. Additionality Assessment ......................................... 244
3. Leakage .......................................................... 246
The CDM Guidebook: A Resource for Clean Development
Mechanism Developers in Southern Africa ....................... 247
Questions and Discussion ........................................... 248
CDM Executive Board, Twenty-seventh Meeting, Proposed
Agenda-Annotations .................................................. 249
C. Eligibility of Parties .............................................. 251
Questions and Discussion ........................................... 252
D. Problems of Project Breadth and Equity in the CDM ........... 253
1. Breadth of CDM Projects ...................................... 253
Table of Contents

Keith Bradsher, *Outsize Profits, and Questions, in Effort to Cut Warming Gases* ........................................ 253


Questions and Discussion ..................................... 256

2. *Inequitable Distribution of CDM Benefits* .............. 258

Matthieu Glachant et al., *The Clean Development Mechanism and The International Diffusion of Technologies: An Empirical Study* ........................................ 259

Questions and Discussion ..................................... 260

IV. IMPLEMENTATION OF KYOTO’S FLEXIBILITY MECHANISMS: THE EUROPEAN UNION’S EMISSIONS TRADING SCHEME .... 261

A. Key Features of the ETS ..................................... 262

1. *Scope of the ETS* ........................................ 262

2. *Emission Allowances* ..................................... 262

3. *National Allocation Plans* .................................. 263

4. *Monitoring and Reporting* ................................. 264


5. *Linkages to Other Emissions Trading Regimes* ........ 264

Questions and Discussion ..................................... 265

B. Implementation of the ETS ................................... 266

Questions and Discussion ..................................... 268

Chapter 7 LAND USE AND FORESTRY ............................. 271

I. INTRODUCTION ............................................. 271

II. THE ROLE OF LAND USE ACTIVITIES IN CLIMATE CHANGE .... 272

A. Nature’s Carbon Warehouse .................................. 272

B. Land Use Factors Affecting Carbon Stocks ................ 274

IPCC, *IPCC Special Report: Land Use, Land-Use Change, and Forestry* ........................................ 274

C. Greenhouse Gas Emissions from Land Use ................ 276

Questions and Discussion ..................................... 277

III. INCORPORATING LAND USE INTO THE CLIMATE REGIME .... 278

A. Accounting Challenges of Land Use Activities .......... 278

Bernhard Schlamadinger & Gregg Marland, *Land Use & Global Climate Change: Forests, Land Management, and the Kyoto Protocol* ........................................ 279

Questions and Discussion ..................................... 281

B. The Kyoto Protocol Negotiations ........................... 281

Schlamadinger & Marland, *Land Use & Global Climate Change:*

xvii
Copyright © 2013 Carolina Academic Press, LLC. All rights reserved.

Table of Contents

Forests, Land Management, and the Kyoto Protocol .......................... 282
C. The Rules of the Kyoto Protocol .................................................... 284
   1. Defining Land Use Activities: LULUCF ............................................. 284
   Questions and Discussion ............................................................... 285
   2. Accounting for LULUCF Activities ................................................. 285
      Kyoto Protocol, Article 3 ............................................................. 286
      a. Afforestation, Reforestation, and Deforestation .............................. 287
      b. Revegetation and Cropland and Grazing Land Management ............ 288
      c. Forest Management ................................................................. 288
      Questions and Discussion ............................................................ 289
D. LULUCF and the CDM ............................................................... 291
   Questions and Discussion ............................................................ 293

IV. DEFORESTATION AND CLIMATE CHANGE ....................................... 295
   IPCC Working Group III, Forestry .................................................. 295
   A. Compensated Reductions in Deforestation ..................................... 296
      Márcio Santilli et al., Tropical Deforestation and the Kyoto
      Protocol: An Editorial Essay ......................................................... 296
   B. Brazil’s Reduced Rate of Emissions Proposal ................................ 298
      Brazil, Brazilian Perspective on Reducing Emissions from
      Deforestation .................................................................................. 298
   C. Bolivia’s Proposed REDD Mechanism .......................................... 300
      Questions and Discussion ............................................................... 300

Chapter 8 COMPLIANCE AND DISPUTE SETTLEMENT .......................... 305

I. INTRODUCTION ................................................................. 305
II. COMPLIANCE UNDER MULTILATERAL ENVIRONMENTAL
    AGREEMENTS ............................................................ 306
    Xeuman Wang & Glenn Wiser, The Implementation and Compliance
    Regimes Under the Climate Change Convention and its Kyoto
    Protocol ............................................................................................ 306
    Questions and Discussion ............................................................... 309

III. COMPLIANCE WITHIN THE CLIMATE CHANGE REGIME ............... 311
   A. The Climate Change Convention ..................................................... 311
      Questions and Discussion ............................................................... 312
   B. The Kyoto Protocol ........................................................................ 312
      1. The Kyoto Protocol’s Compliance Mechanism ................................ 312
         UNFCCC Secretariat, An Introduction to the Kyoto Protocol
         Compliance Mechanism ................................................................. 313
      2. The Consequences of Noncompliance ......................................... 315
         Decision 27/CMP.1, Annex, Procedures and Mechanisms Relating
         to Compliance Under the Kyoto Protocol .................................... 315
         Xeuman Wang & Glenn Wiser, The Implementation and
         Compliance Regimes Under the Climate Change Convention and

xviii
Table of Contents

its Kyoto Protocol .................................... 317
Questions and Discussion ............................ 319

IV. DISPUTE SETTLEMENT AND RESOLUTION ........... 322
A. Settlement of Disputes under the Climate Change Regime .... 322
   UNFCCC, Article 14 .................................. 322
   Questions and Discussion ............................ 323
B. Climate Disputes under Customary International Law .... ... 324
   UNFCCC, Climate Change: Impacts, Vulnerabilities and Adaptation
   in Developing Countries .............................. 325
   1. The Duty Not to Cause Environmental Harm ...... 326
   2. State Responsibility .................................. 328
   Questions and Discussion ............................ 329
   David M. Driesen, Free Lunch or Cheap Fix?: The Emissions
   Trading Idea and the Climate Change Convention .... 331

Chapter 9 BEYOND 2012: THE POST-KYOTO CLIMATE
REGIME ............................................. 335

I. INTRODUCTION ..................................... 335
II. THE ROAD TO BALI .................................. 336
   A. Europe and Other Annex I Parties .......... 337
      Questions and Discussion .......................... 337
   B. The United States and the Major Emitters’ Process ........ 338
      President Bush Discusses United States International Development
      Agenda .................................................. 338
      Questions and Discussion ............................ 340
   C. The G8 ............................................. 341
      G8, Growth and Responsibility in the World Economy ... 342
      Questions and Discussion ............................ 345
   D. Developing Countries ................................. 345
      Statement by H. E. Mukhdoom Syed Faisal Saley Hayat on Behalf
      of the Group of 77 and China ......................... 346
      Questions and Discussion ............................ 347
      Thomas C. Heller & P.R. Shukla, Development and Climate:
      Engaging Developing Countries ....................... 348

III. THE BALI ACTION PLAN ............................ 349
   UNFCCC, Decision 1/CP.13 ............................. 350
   Questions and Discussion ............................ 353

IV. OPTIONS FOR A POST-KYOTO PROTOCOL AGREEMENT .... 353
   A. Who Will be Subject to Commitments? ............... 354
      Questions and Discussion ............................ 356
      Wolfgang Sachs, Human Rights and Climate Change .... 356
   B. The Nature of the Commitments .................... 358
      1. The Commitment Goal ............................. 358
Table of Contents

Jonathan Pershing & Fernando Tudela, A Long-Term Target:
Framing the Climate Effort ........................................ 359
Questions and Discussion ........................................... 364

2. Options for Mitigation Commitments ............................... 364
   a. Intensity Targets ................................................ 365
      Kevin A. Baumert, et al., What Might a Developing Country
      Commitment Look Like? ........................................ 365
      Questions and Discussion ....................................... 370
   b. Action Targets .................................................... 371
      Kevin A. Baumert & Donald M. Goldberg, Action Targets: A
      New Approach to International Greenhouse Gas Controls ... 371
      Questions and Discussion ....................................... 373
   c. Policies and Measures ............................................ 374
      Daniel Bodansky, Climate Commitments: Assessing the
      Options ............................................................ 375
      Scott Barrett, U.S. Leadership for a Global Climate Change
      Regime ............................................................ 377
      Questions and Discussion ....................................... 378
      Daniel Bodansky, A Survey of Approaches ....................... 380

Chapter 10 CLIMATE CHANGE AND OTHER INTERNATIONAL LAW
REGIMES .................................................................. 383

I. INTRODUCTION .......................................................... 384
II. THE OZONE REGIME AND CLIMATE CHANGE ..................... 384
   A. Introduction to Ozone Depletion .................................. 384
      David Hunter, James Salzman & Durwood Zaelke, International
      Environmental Law & Policy ...................................... 385
   B. The UNFCCC’s Treatment of Ozone Depleting Substances .... 387
   C. The Montreal Protocol Regime’s Treatment of Greenhouse Gases ... 389
      Questions and Discussion ....................................... 391
III. BIODIVERSITY-RELATED TREATIES .................................. 392
   A. The World Heritage Convention .................................. 394
      1. Background ....................................................... 394
      2. World Heritage Sites in Danger Due to Climate Change .... 394
         Convention for the Protection of the World Cultural and Natural
         Heritage ........................................................... 396
         Erica J. Thorson, On Thin Ice: The Failure of the United States
         and the World Heritage Committee to Take Climate Change
         Mitigation Pursuant to the World Heritage Convention Seriously . 397
         Questions and Discussion ....................................... 400
   B. Convention on Biological Diversity ................................ 402
      Questions and Discussion ....................................... 403
   C. Convention on International Trade in Endangered Species of Wild Fauna

xx
**Table of Contents**

and Flora ............................................ 405

Species Survival Network, *Cities and Climate Change: Interactions, Impacts and Potential Responses* .......................... 406

Questions and Discussion ............................................ 406

D. The Ramsar Convention on Wetlands of International Importance .... 407

Questions and Discussion ............................................ 409

E. The Convention on the Conservation of Migratory Species of Wild Animals ............................................. 410

Questions and Discussion ............................................ 411

Robert A. Robinson, et al., *Climate Change and Migratory Species* .... 411

IV. CLIMATE CHANGE AND THE LAW OF THE SEA ............. 412

A. Introduction .......................................... 412

B. The Law of the Sea Regime ............................... 413


Questions and Discussion ............................................ 417

C. Shifting Baselines Due to Climate Change .................... 417

Charles Di Leva & Sachiko Morita, *Maritime Rights of Coastal States and Climate Change: Should States Adapt to Submerged Boundaries* ........................................ 418

Questions and Discussion ............................................ 419

D. Ocean Fertilization and Climate Change ...................... 422

*Statement of Concern Regarding Iron Fertilization of the Oceans to Sequester CO₂* ........................................ 423

Questions and Discussion ............................................ 425

V. HUMAN RIGHTS CONVENTIONS .......................... 426

A. Introduction .......................................... 426

Wolfgang Sachs, *Human Rights and Climate Change* ............ 427

Questions and Discussion ............................................ 429

B. The Inuit Petition to the Inter-American Commission .......... 430

*Petition to the Inter-American Commission on Human Rights Seeking Relief From Violations Resulting From Global Warming Caused by Acts and Omissions of the United States* ............ 431

Questions and Discussion ............................................ 434

C. The Small Island States .................................. 435

*Malé Declaration on the Human Dimension of Global Climate Change* ........................................ 435

Questions and Discussion ............................................ 436

D. Human Rights Implications of Climate Change Policies ........... 437

*Milan Declaration of the Sixth International Indigenous Peoples Forum on Climate Change* .......................... 438

Questions and Discussion ............................................ 439

Women’s Environment and Development Organization (WEDO), et al., *Declaration on Climate Change and Gender Equality* .... 441

xxi
## Table of Contents

### VI. CLIMATE CHANGE AND THE INTERNATIONAL TRADE REGIME .............................................. 442

A. Introduction .......................................... 442

B. Climate Impacts of International Trade ....................... 443
   Questions and Discussion ................................ 444

C. Competitiveness Concerns ................................ 445
   Questions and Discussion ................................ 446

D. International Trade Rules and Climate Change Policy ............ 446
   1. An Introduction to International Trade Rules ............... 446
      Questions and Discussion ................................ 448
   2. Carbon and Other Taxes ................................... 450
      a. Automobile Taxes ...................................... 450
      b. Carbon Taxes ........................................ 451
      c. Border Tax Adjustments .................................. 452
      d. Taxes on Products Made with Fossil Fuels ............... 452
         Questions and Discussion ................................ 453
   3. Renewable Energy Requirements ............................ 455
      Questions and Discussion ................................ 456
   4. Fuel Efficiency Standards and Ecolabels ..................... 457
      Questions and Discussion ................................ 459
   5. Subsidies ........................................... 460
      Questions and Discussion ................................ 461

### Chapter 11 THE U.S. NATIONAL CLIMATE CHANGE POLICIES ........................................ 465

I. AN OVERVIEW OF GREENHOUSE GAS EMISSIONS IN THE UNITED STATES .............................. 466
   Adapted From the U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks .................. 466
   Questions and Discussion ................................ 477

II. THE BUSH ADMINISTRATION’S POLICY ON CLIMATE CHANGE ...................................... 478
   Press Release, White House, Text of a Letter From the President to Senators Hagel, Helms, Craig, and Roberts ...................... 478
   White House, The U.S. Global Climate Change Policy: A New Approach, Executive Summary .......................... 479
   Questions and Discussion ................................ 482
   Pew Center on Global Climate Change, Analysis of President Bush’s Climate Change Plan ................................. 483

III. LEGISLATIVE PROPOSALS TO ADDRESS CLIMATE CHANGE ........................................ 486
      Questions and Discussion ................................ 488
   B. Carbon Tax Legislation .................................. 492
Table of Contents

Questions and Discussion ........................................... 492

Chapter 12  CLIMATE CHANGE IN THE COURTS ................. 497

I. THRESHOLD ISSUES ............................................. 497
II. ARTICLE III STANDING ......................................... 498
   A. Standing in Early Climate Change Cases .................... 499
      Foundation On Economic Trends v. Watkins ................ 500
      Northwest Environmental Defense Center v. Owens Corning
      Corporation .................................................. 503
   B. Massachusetts v. EPA ....................................... 506
      Massachusetts v. Environmental Protection Agency ........ 506
      Questions and Discussion .................................. 519
      A Note on Parens Patriae .................................... 522
      Alfred L. Snapp & Son, Inc. v. Puerto Rico Ex Rel. Barez.... 522
III. IS CLIMATE CHANGE A NONJUSTICIABLE POLITICAL
     QUESTION? ..................................................... 526
      California v. General Motors Corp. .......................... 527
      Questions and Discussion .................................. 533

Chapter 13  CLIMATE CHANGE UNDER EXISTING FEDERAL
            ENVIRONMENTAL STATUTES .............................. 537

I. REGULATING CLIMATE CHANGE UNDER THE CLEAN AIR
   ACT .............................................................. 538
   A. Overview of the CAA ....................................... 539
      1. National Ambient Air Quality Standards .................. 540
      2. Hazardous Air Pollutants .................................. 541
      3. Stationary Source Emissions Standards or Limitations .... 541
      4. Mobile Source Emissions Standards ....................... 542
         Questions and Discussion .................................. 543
   B. Massachusetts v. EPA: The Authority to Regulate .......... 543
      Massachusetts v. Environmental Protection Agency .......... 544
      Questions and Discussion .................................. 552
   C. Regulation of Vehicle Emissions Standards by the States ... 553
      1. California’s Waiver under the Clean Air Act for Vehicle
         Emissions Standards ....................................... 553
         Notice of Decision Denying a Waiver of Clean Air Act Preemption
         for California’s 2009 and Subsequent Model Year ........ 554
         Questions and Discussion .................................. 561
      2. Are California’s State Vehicle Emissions Standards Preempted?.. 563
         Central Valley Chrysler Jeep v. Goldstene .................. 564
   D. Challenges to Coal-Fired Power Plants ....................... 574
Table of Contents

Friends of the Chattahoochee, Inc. v. Couch .......................... 574
Gregory B. Foote, Considering Alternatives: The Case for Limiting
CO₂ Emissions From New Power Plants Through New Source
Review .......................................................... 576
Questions and Discussion ........................................ 582
E. Future Regulation of Climate Change ............................. 586
II. THE NATIONAL ENVIRONMENTAL POLICY ACT ................. 588
A. Is an EIS Needed? ............................................. 589
   Center For Biological Diversity v. National Highway Traffic Safety
   Administration .............................................. 589
   Questions and Discussion .................................... 594
B. The Scope of the “Effects” Analysis ............................. 595
   1. Direct and Indirect Effects ............................... 595
      Mid States Coalition for Progress v. Surface Transportation
      Board ...................................................... 595
      Questions and Discussion ................................ 597
      Border Power Plant Working Group v. Dept. of Energy .... 598
      Questions and Discussion ................................ 602
   2. Cumulative Impacts ....................................... 603
      Center For Biological Diversity v. National Highway Traffic
      Safety Administration .................................... 603
      Questions and Discussion ................................ 605
C. Alternatives .................................................. 605
   Center For Biological Diversity v. National Highway Traffic Safety
   Administration .............................................. 605
   Questions and Discussion .................................... 606
III. THE ENDANGERED SPECIES ACT ............................... 609
A. Introduction to the ESA ...................................... 609
   1. Prohibition against “Taking” .............................. 610
   2. Designation of Critical Habitat ........................... 610
   3. Consultation and the Duty to Avoid Jeopardy ............. 611
   4. Recovery Plans .......................................... 612
   B. Polar Bears, Climate Change, and the ESA .................. 613
      1. A Dependency on Diminishing Sea Ice .................. 613
      2. Polar Bears Are Threatened with Extinction ........... 614
         FWS, Polar Bear Determination ........................ 615
      3. Can the ESA Save the Polar Bear from Climate Change? 617
         a. Jeopardy and Adverse Modification of Critical Habitat 617
            Brendan R. Cummings and Kassie R. Siegel, Ursus Maritimus:
            Polar Bears on Thin Ice ................................ 617
            FWS, Polar Bear Determination ........................ 618
            Questions and Discussion ............................. 620
         b. Prohibitions against “Taking” Polar Bears ............... 625
            Questions and Discussion ............................. 626
Table of Contents

J.B. Ruhl, *Climate Change and the Endangered Species Act: Building Bridges to the No-Analog Future* .................. 626

- c. *Recovery Plans* .......................... 628
  Questions and Discussion ................... 628

IV. THE CLEAN WATER ACT .......................... 630
  A. Overview ..................................... 630
  B. Climate Change and the Water Quality Standards Program ....... 631
    1. *The 303(d) Listing Process* ............ 633
       Center for Biological Diversity, *Request to Add California Ocean Waters to List of Impaired Waters Due to Carbon Dioxide Pollution Resulting in Ocean Acidification* .......... 634
       Questions and Discussion .................. 638
    2. *The Consequences of a 303(d) Listing Decision* ............. 639
       a. *Implications for Point Sources: The Prohibition against New Discharges into Water Quality Limited Streams* .......... 640
          *Friends of Pinto Creek v. United States Environmental Protection Agency* ................ 640
          Questions and Discussion .................. 644
       b. *Implications for All Sources: Compliance with TMDLs* ...... 645
          *Pronsolino v. Nastri* ..................... 645
          Questions and Discussion .................. 649

Chapter 14 UNITED STATES LAW AND POLICY: ENERGY ...... 651

I. INTRODUCTION .................................. 652

II. TRADITIONAL ELECTRICITY REGULATION AND FOSSIL FUELS ............................................. 653
  A. An Introduction to the U.S. Electricity System ............... 654
    1. *The Electricity System* .................. 654
    2. *Regulation of Electricity in the United States* ........... 655
       a. *The Traditional Electricity Regulatory Model* .......... 655
       b. *Electricity Restructuring and Alternatives to the Traditional Model* .................. 656
       c. *The Role of States and the Federal Government* .......... 656
          Questions and Discussion .................. 657
  B. Utility Regulation and Fossil Fuel Use ..................... 659
    Joseph P. Tomain, *The Past and Future of Electricity Regulation* ........ 659
    Questions and Discussion ..................... 663
  C. Addressing Carbon Dioxide Emissions through Utility Regulation .... 664
    1. *An Overview of PUC Authority* ............. 664
       Sandra L. Hirotsu, *Remembering the Bottom Line: Why the Oregon Public Utility Commission’s Obligation to Protect Utility Ratepayers Requires Saying No to Coal* .......... 664
       Questions and Discussion ................... 667
Table of Contents

2. PUC Decisions Regarding Coal-Fired Power Plants .................. 668
   In Re Petition for Determination of Need for Glades Power Park
   Units 1 and 2 Electrical Power Plants in Glades County,
   by Fla. Power & Light Co. .................................. 668
   Questions and Discussion .................................. 670

III. REVISING THE ENERGY PORTFOLIO IN THE UNITED STATES ... 673
   A. Traditional Fuels as Sustainable Energy Sources? ............. 673
      1. “Clean Coal” .......................................... 673
         a. Carbon Sequestration ................................ 673
            National Energy Technology Laboratory, Carbon Sequestration,
            CO₂ Storage .......................................... 674
         b. Should Governments Invest in CCS Technology? .......... 675
            Ben Block, U.S. Environmental Groups Divided on “Clean
            Coal” ................................................. 675
            Questions and Discussion .......................... 677
      2. Nuclear Power ......................................... 678
         Fred Bosselman, The Ecological Advantages of Nuclear Power .. 678
         Questions and Discussion .............................. 682
   B. Renewable Energy Sources .................................. 682
      1. Wind Power ........................................... 683
         Questions and Discussion ................................ 684
         Department of Energy, 20% Wind Energy by 2030: Increasing
         Wind Energy’s Contribution to U.S. Electricity Supply ...... 685
      2. Solar Power ............................................ 687
         National Renewable Energy Laboratory, Solar Energy Basics .. 687
         Questions and Discussion ................................ 689
      3. Hydropower ............................................. 691
         U.S. Department of Energy, Hydropower Basics ............... 692
         Questions and Discussion ................................ 692

IV. RENEWABLE ENERGY GENERATION: REGULATION AND
    INCENTIVES ............................................... 694
   A. Reforming the Electricity System ............................ 694
      Sidney A. Shapiro & Joseph P. Tomain, Rethinking Reform of
      Electricity Markets ........................................ 694
      Questions and Discussion ................................ 697
   B. Renewable Portfolio Standards ................................ 698
      Joshua P. Fershee, Changing Resources, Changing Market:
      The Impact of a National Renewable Portfolio Standard on the
      U.S. Energy Industry ....................................... 699
      Questions and Discussion ................................ 702
   C. Tax Credits, Deductions, and Other Incentives ................. 703
      Union of Concerned Scientists, Renewable Energy Tax Credit
      Extended Again, but Risk of Boom-bust Cycle in Wind
      Industry Continues ....................................... 703

xxvi
Table of Contents

Questions and Discussion ................................ 705

V. ENERGY EFFICIENCY AND CONSERVATION ................ 706
   Sidney A. Shapiro & Joseph P. Tomain, Rethinking Reform of
   Electricity Markets ..................................... 706
   Questions and Discussion ............................. 711

Chapter 15   UNITES STATES LAW AND POLICY:
   TRANSPORTATION ...................................... 715

   I. AUTOMOBILE FUEL EFFICIENCY STANDARDS .......... 716
   A. Early Case Law and Deference to NHTSA .......... 718
      Center For Auto Safety v. National Highway Traffic Safety Admin. . 718
      Questions and Discussion .......................... 722
   B. Recent Developments in the CAFE Program: A New Era? ........ 725
      1. Reformed CAFE and Light Trucks ............... 726
         Center For Biological Diversity v. National Highway Traffic Safety Admin. ........ 726
         Questions and Discussion ........................ 733
         Questions and Discussion ........................ 734
   II. REFORMING THE TRANSPORTATION INFRASTRUCTURE .... 737
   A. A Survey of Policies to Reduce Vehicle Miles Traveled (VMT) .... 738
      Michael Grant et al., Transportation and Global Climate Change: A
      Review and Analysis of the Literature ............. 738
      Questions and Discussion .......................... 747
   B. The Role of the Federal Government in Transportation Policies .... 751
      Questions and Discussion .......................... 752
   III. ALTERNATIVE FUELS .................................. 753
   A. An Overview of Alternative Fuel Production and Use .......... 754
      1. Agricultural Sources of Fuels .................... 754
         a. Ethanol ........................................ 754
            L. Leon Geyer, Philip Chong & Bill Hxue, Ethanol, Biomass,
            Biofuels and Energy: A Profile and Overview ........ 755
         b. Biodiesel ...................................... 756
            Union of Concerned Scientists, Alternative Fuels: Biodiesel
            Basics .......................................... 756
            Questions and Discussion ........................ 757
            Michael Briggs, Widescale Biodiesel Production from Algae .... 760
      2. Natural Gas ........................................ 761
      3. Hydrogen Fuel Cells ................................ 762
         Joseph Romm, California’s Hydrogen Highway Reconsidered .... 764
         Questions and Discussion .......................... 766
   B. The Legal Framework Regulating Alternative Fuels ............ 766
Table of Contents

1. Tax Incentives and Subsidies ........................................ 766
      John A. Sautter et al., *Construction of a Fool’s Paradise: Ethanol Subsidies in America* ............ 767
   b. The Energy Independence and Security Act of 2007 and the 2008 Farm Bill .................................... 769
      Questions and Discussion ...................................... 770
2. Renewable Fuel Standards ............................................. 771
   a. The 2005 EPAct RFS ............................................. 771
   b. The 2007 EISA RFS ............................................... 772
      Questions and Discussion ...................................... 773
C. Are Hybrids and Plug-In Vehicles the Solution? ................ 775
   1. An Overview of PHEV Technology .............................. 775
      David Sandalow, *Ending Oil Dependence: Protecting National Security, the Environment and the Economy* .... 775
      Questions and Discussion ...................................... 777
   2. Policies Affecting PHEV Use .................................... 777
      a. Federal and State Purchasing Programs ....................... 777
      Questions and Discussion ...................................... 778
      b. Tax Credits for Purchasers of PHEVs ......................... 779
         IRS, *Hybrid Cars and Alternative Fuel Vehicles* .......... 779
         Questions and Discussion ...................................... 780

Chapter 16 CLIMATE CHANGE AND TORTS .............................. 783

I. INTRODUCTION ..................................................... 783
   David A. Grossman, *Warming Up to a Not-So-Radical Idea: Tort-based Climate Change Litigation* .......... 784
   Questions and Discussion ...................................... 786
II. A REVIEW OF CURRENT CLIMATE-RELATED TORT CASES .... 787
   A. The State Attorneys General Cases ......................... 787
   B. Private Causes of Action ...................................... 788
      *Kivalina v. Exxonmobil, Complaint For Damages* .......... 789
      Questions and Discussion ...................................... 794
III. EVALUATING THE ELEMENTS OF A TORT ACTION IN THE CLIMATE CONTEXT .......................... 795
   A. Breach of Duty: The Reasonableness of Defendants’ Actions 796
      David Hunter & James Salzman, *Negligence in the Air: The Duty of Care in Climate Change Litigation* .... 796
      Questions and Discussion ...................................... 800
   B. Causation ....................................................... 801
      David A. Grossman, *Warming Up to a Not-So-Radical Idea* 801
      Questions and Discussion ...................................... 802
   C. Damages ....................................................... 804
Table of Contents

IV. DEFENSES TO TORT ACTIONS ..................................... 805
   A. Political Question Doctrine and other Threshold Issues .......... 806
   B. Are Common Law Claims Pre-Empted by the Clean Air Act? ........ 806
      1. Is Federal Common Law Preempted? ........................... 807
         Illinois v. Milwaukee ........................................ 807
         Milwaukee v. Illinois ........................................ 809
         Questions and Discussion ..................................... 814
      2. Is State Common Law Preempted? ................................. 814
         International Paper Co. v. Ouellette .......................... 815
         Questions and Discussion ..................................... 817
      Andrew Jackson Heimert, Keeping Pigs Out of Parlors: Using
      Nuisance Law to Affect the Location of Pollution ................ 818

V. FUTURE IMPLICATIONS OF TORT LITIGATION ...................... 820
   David Hunter, The Implications of Climate Change Litigation for
   International Environmental Law-Making ................................ 821
   Questions and Discussion ......................................... 824

Chapter 17  STATE AND LOCAL RESPONSES TO CLIMATE
CHANGE ................................................................. 827

I. INTRODUCTION .................................................... 827

II. STATE AND LOCAL ACTIONS TO MITIGATE CLIMATE
    CHANGE ............................................................. 830
   A. Regional Measures ................................................. 830
      Regional Greenhouse Gas Initiative .............................. 830
      Questions and Discussion ....................................... 835
      Robert K. Huffman & Jonathan M. Weisgall, Climate Change and the
      States: Constitutional Issues Arising From State Climate Protection
      Leadership ............................................................ 837
      Robert K. Huffman & Jonathan M. Weisgall, Climate Change and the
      States: Constitutional Issues Arising From State Climate Protection
      Leadership ............................................................ 839
   B. State and Local Measures .......................................... 841
      1. Renewable Portfolio Standards .................................. 841
         Questions and Discussion ...................................... 843
      2. Greenhouse Gas Emission Reduction Goals ........................ 845
         a. Statewide Emissions Reductions: California .................. 845
            Global Warming Solutions Act ................................ 845
            Questions and Discussion ...................................... 847
         b. Local Emissions Reductions: Portland, Oregon ............... 849
            Hari M. Osofsky & Janet Koven Levit, The Scale of
            Networks?: Local Climate Change Coalitions ................ 849
            Questions and Discussion ...................................... 851
Table of Contents

3. Measures to Limit Emissions from Coal Plants .................. 851
   a. Carbon Cap or Offset Requirements for New Coal Plants ...... 852
   b. Carbon Capture and Sequestration Technology-based
      Mandates .................................................. 852
      In the Matter of Application No. 2006-01, Energy Northwest
      Pacific Mountain Energy Center Power Project ............... 852
      Questions and Discussion ............................. 855

4. Other Common State and Local Measures ......................... 857
   a. Climate Action Plans ...................................... 857
   b. Environmental Reviews ................................... 857

III. DOES THE COMMERCE CLAUSE PROHIBIT SUB-FEDERAL
    REGULATION OF GREENHOUSE GAS EMISSIONS? ............... 858
    City of Philadelphia v. New Jersey .......................... 858
    A. Commerce Clause Challenges to Emissions Standards ....... 861
       Re: Integration of Greenhouse Gas Emissions Standards into
       Procurement Policies, Rulemaking Proceeding 06-04-009 ........ 862
       Questions and Discussion ................................ 866
    B. Commerce Clause Challenges to Renewable Portfolio Standards .... 868
       Benjamin K. Sovacool, The Best of Both Worlds: Environmental
       Federalism and the Need for Federal Action on Renewable Energy
       and Climate Change ........................................ 868
       Kirsten H. Engel, The Dormant Commerce Clause Threat to
       Market-Based Environmental Regulation: The Case of Electricity
       Deregulation ................................................ 869
       Questions and Discussion ................................ 870

IV. THE FUTURE ROLE OF STATE AND LOCAL GOVERNMENTS ....... 871
    Franz T. Litz, Toward a Constructive Dialogue on Federal and State
    Roles in U.S. Climate Change Policy ......................... 871
    Questions and Discussion ................................ 876

Chapter 18 THE PRIVATE SECTOR ..................... 877

I. INTRODUCTION ............................................ 877

II. WHY DO CORPORATIONS VOLUNTARILY CURB EMISSIONS? ........ 879
   Questions and Discussion .................................. 880

III. VOLUNTARY COMMITMENTS AND ACTIONS ...................... 882
    A. Reporting and Reducing GHG Emissions .................... 882
       Andrew J. Hoffman, Getting Ahead of the Curve: Corporate
       Strategies that Address Climate Change .................... 884
       Questions and Discussion ................................ 887
       Petition to the SEC, Appendix G: Key Elements of Proposed SEC
       Guidance on Climate Disclosure ............................ 889
    B. Creating a Carbon Market: the Chicago Climate Exchange .... 894
       1. How CCX Works ...................................... 894

xxx
Table of Contents

2. Enforcement and Compliance .................................. 895
   Questions and Discussion ...................................... 897

IV. GREENING INVESTMENT AND GREEN COLLAR JOBS ........ 898
    The Apollo Alliance, *New Energy for America: The Apollo Jobs Report* ............................................. 899
    Questions and Discussion ...................................... 901
    *Remarks by John J. Sweeney, President, AFL-CIO* ........... 902

V. THE PRIVATE SECTOR AND PUBLIC CLIMATE POLICY ....... 903
    U.S. Climate Action Partnership, *A Call for Action: Consensus Principles and Recommendations* ................................ 905
    Questions and Discussion ...................................... 908

Chapter 19 TOWARD A CARBON-FREE FUTURE ............... 909

I. ENVISIONING A CARBON-FREE ECONOMY ............... 909
   Questions and Discussion ...................................... 913

II. HOW TO ACHIEVE A CARBON-FREE FUTURE .............. 913
    Christopher Flavin, *Building a Low-Carbon Economy* .......... 913
    Arjun Makhijani, *Carbon-free and Nuclear-free, a Roadmap for U.S. Energy Policy* .................................... 916
    Questions and Discussion ...................................... 917

III. BUILDING SUPPORT FOR A CARBON-FREE FUTURE .......... 918
    A. Building Political Will for Preventing Climate Change .... 919
       James Gustave Speth, *The Bridge At the Edge of the World: Capitalism, the Environment and Crossing From Crisis to Sustainability* ........................................ 919
       Questions and Discussion ...................................... 921
    B. Reframing How We Talk About Climate Change ............. 922
       Joe Brewer and Evan Frisch, *Cognitive Policy, The Environmental Forum* ........................................... 922
       Questions and Discussion ...................................... 924
       Lisa Heinzerling, *Climate Change, Human Health, and the Post-Cautionary Principle* .............................. 925

ANNEX 1 UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE ................. 927

ANNEX 2 KYOTO PROTOCOL TO THE UNITED NATIONS
Table of Contents

FRAMEWORK CONVENTION ON CLIMATE CHANGE .................................... 947

Table of Cases ............................................... TC-1
Index ........................................................ I-1
## Abbreviations & Conversion Units

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>Assigned Amount</td>
</tr>
<tr>
<td>AAU</td>
<td>Assigned Amount Unit</td>
</tr>
<tr>
<td>CAA</td>
<td>Clean Air Act</td>
</tr>
<tr>
<td>CAFE</td>
<td>Corporate Average Fuel Economy</td>
</tr>
<tr>
<td>CCX</td>
<td>Chicago Climate Exchange</td>
</tr>
<tr>
<td>CDM</td>
<td>Clean Development Mechanism</td>
</tr>
<tr>
<td>CER</td>
<td>Certified Emissions Reduction</td>
</tr>
<tr>
<td>CH₄</td>
<td>Methane</td>
</tr>
<tr>
<td>CO₂</td>
<td>Carbon Dioxide</td>
</tr>
<tr>
<td>CO₂eq</td>
<td>Carbon Dioxide Equivalent</td>
</tr>
<tr>
<td>CWA</td>
<td>Clean Water Act</td>
</tr>
<tr>
<td>EISA</td>
<td>Energy Independence and Security Act</td>
</tr>
<tr>
<td>ERU</td>
<td>Emission Reduction Unit</td>
</tr>
<tr>
<td>EPA</td>
<td>United States Environmental Protection Agency</td>
</tr>
<tr>
<td>EPAct</td>
<td>Energy Policy Act</td>
</tr>
<tr>
<td>ESA</td>
<td>Endangered Species Act</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>GEF</td>
<td>Global Environment Facility</td>
</tr>
<tr>
<td>GHG</td>
<td>Greenhouse Gas</td>
</tr>
<tr>
<td>GWP</td>
<td>Global Warming Potential</td>
</tr>
<tr>
<td>HCFCs</td>
<td>Hydrochlorofluorocarbons</td>
</tr>
<tr>
<td>HFCs</td>
<td>Hydrofluorocarbons</td>
</tr>
<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
</tr>
<tr>
<td>JI</td>
<td>Joint Implementation</td>
</tr>
<tr>
<td>lCERs</td>
<td>Long-term Certified Emission Reductions</td>
</tr>
<tr>
<td>MtCO₂eq</td>
<td>Million Tons Equivalent of Carbon Dioxide</td>
</tr>
<tr>
<td>MW</td>
<td>Megawatt</td>
</tr>
<tr>
<td>NEPA</td>
<td>National Environmental Policy Act</td>
</tr>
<tr>
<td>NHTSA</td>
<td>National Highway Traffic Safety Administration</td>
</tr>
<tr>
<td>N₂O</td>
<td>Nitrous Oxide</td>
</tr>
<tr>
<td>PHEV</td>
<td>Plug-in Hybrid Electric Vehicles</td>
</tr>
<tr>
<td>RMU</td>
<td>Removal Unit</td>
</tr>
<tr>
<td>RFS</td>
<td>Renewable Fuel Standard</td>
</tr>
<tr>
<td>RPS</td>
<td>Renewable Portfolio Standard</td>
</tr>
<tr>
<td>SF₆</td>
<td>Sulfur Hexafluoride</td>
</tr>
<tr>
<td>tCERs</td>
<td>Temporary Certified Emission Reductions</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
</tr>
<tr>
<td>VMT</td>
<td>Vehicle Miles Traveled</td>
</tr>
</tbody>
</table>
Conversion Units

| 1 tonne (t) | 1,000 kilogram (kg) | 10^6 gram (g) | 1 Megagram (Mg) |
| 1 Megatonne (Mt) | 1,000,000 t | 10^{15} g | 1 Teragram (Tg) |
| 1 Gigatonne (Gt) | 1,000,000,000 t | 10^{15} g | 1 Petagram (Pg) |
| 1 hectare (ha) | 10,000 square metre (m^2) | | |
| 1 square kilometer (km^2) | 100 hectare (ha) | | |
| 1 tonne per hectare | 100 gram per square metre (g m^2) | | |
| 1 tonne carbon | 3.67 tonne carbon dioxide (tCO_2) | | |
| 1 tonne carbon dioxide | 0.273 tonne carbon (t C) | | |
| 1 tonne | 0.984 imperial ton = 1.10 US ton = 2,204 pounds | | |
| 1 hectare (ha) | 2.471 acre | | |
| 1 square kilometer (km^2) | 0.386 square mile | | |

Putting Emissions in Context

1 Metric Ton CO_2. Producing one ton of cement releases 1 metric ton CO_2 into the atmosphere (each new average home built uses 19 tons of cement). In Honolulu, the city with the lowest carbon footprint per capita in the U.S., each resident accounts for 1.5 metric tons CO_2 emissions per year.

100 Tons CO_2. Driving an automobile with an average fuel economy of 15 miles per gallon 12,000 miles a year over the course of 10 years would emit close to 100 metric tons CO_2 (or, more precisely, 94.2 metric tons CO_2).

1,000 Metric Tons CO_2. The U.S. produces roughly 1,000 metric tons CO_2 every 5.4 seconds.

* Some authors quoted in this book use the abbreviation MMtCO_2 to refer to million metric tons of carbon dioxide. 1MMtCO_2 and 1MtCO_2 are equivalent.