I INNOVATION, TECHNOLOGY, AND COMPETITIVENESS

Innovation, Technological Change, and Environmental Fiscal Reform

1. Innovation, Technology, and the Energy Revolution
   Michael Rodi

A. The Energy Revolution: Why we Need It, and How to Get There

B. Promoting Innovation—A Task for Governments

C. Challenges for Innovation Policy
   The concept of innovation and the complexity of the
   innovation process
   Coping with ignorance
   Responsibility for innovation and its consequences
   'Lock-in' effects and the path dependence of technology promotion
   The specific challenge of interdisciplinary innovation research

D. Instruments of Environmental Policy and their Potential
   as Motors of Innovation
   Command-and-control versus economic instruments
   Economic instruments versus informal instruments
   Comparing economic instruments

E. The Importance of an Instrument Mix

F. A Framework to Stimulate Innovation

G. Conclusion
2. Impacts of Environmental Policy Instruments on Technological Change
   Nils Axel Braathen
   A. Introduction 2.01
   B. Dynamic Incentives from Environmental Policy—Economic Theory 2.02
   C. Empirical Studies: General Impacts of Environmental Policy 2.06
   D. Empirical Studies: Impacts of Specific Environmental Policy Instruments 2.18
   E. Empirical Studies: Real-time Impacts of Different Environmental Policy Instruments 2.28
   F. Conclusion 2.42
   G. Some Ideas for Further Research 2.46
   References 43

   Katja Schumacher and Michael Kohlhaas
   A. Introduction 3.01
      1. Renewable energy in Germany 3.08
   B. Learning-by-Doing and Renewable Energy 3.14
      1. Learning-by-doing in renewable energy machinery and equipment 3.19
      2. Learning-by-doing in renewable electricity production 3.20
   C. LEAN_2000 3.23
      1. The model 3.23
      2. Implementation of learning-by-doing in LEAN_2000 3.30
      3. Renewable energy equipment in LEAN_2000 3.32
   D. Analysis and Results 3.34
      1. Output, investment, and price effects 3.38
      2. Macro-economic and international trade effects 3.46
   E. Summary and Conclusions 3.48
   References 67
Contents

Macroeconomic Impacts of Environmental Fiscal Reform

4. The Macroeconomic Effects of Unilateral Environmental Tax Reforms in Europe, 1995 to 2012 73
   Terry Barker, Sudhir Junankar, Hector Pollitt, and Philip Summerton

A. Introduction 4.01
B. Literature on the Macroeconomic Effects of Environmental Tax Reform 4.04
C. Modelling Environmental Tax Reform 4.05
   Description of the E3ME model 4.05
   The effects of carbon and energy taxation 4.07
   Tax rates and revenues 4.28
   Revenue recycling 4.39
   Scenarios used to model ETR 4.41
E. The Effects of Selected EU ETRs using E3ME (1995–2012) 4.42
   The baseline 4.42
   Model results: overall effects of ETR 4.44
   The effects of ETR in the non-ETR countries 4.52
   The effects of the exemptions 4.53
   Isolating the effects of the taxes 4.55
   Sensitivity of the results to key inputs 4.57
F. Conclusion 4.62

5. The Environmental Tax Reforms in Europe: Mitigation, Compensation, and CO₂ Stabilization 101
   Mikael Skou Andersen and Stefan Speck

A. Introduction 5.03
B. Assessment of Member State Approaches 5.07
   The requirements for reduced tax rates for energy-intensive industries 5.15
   The role of agreements for energy savings 5.23
D. Winners and Losers in ETR 5.29
E. Mitigation in a Regulatory Environment with Interaction Effects between Emissions Trading and Carbon-energy Taxes 5.54
F. Conclusion 5.61
## Contents

6. Unilateral versus Multilateral Climate Change Policy: A Quantitative Economic Analysis of Competitiveness Implications 123  
*Victoria Alexeeva-Talebi*

A. Introduction 6.01

- Scenarios 6.08  
- Results 6.10

C. Conclusion 6.16

### II IMPLEMENTATION ISSUES

#### Structural Questions

7. Green, White, and Brown Certificates Working Together: The Italian Experience 139  
*Giorgio Panella, Andrea Zatti, and Fiorenza Carraro*

A. Introduction 7.01

B. Systems of Certificates: Functioning 7.07  
- Tradeable green certificates (TGCs) 7.19
- Results, critical issues, and future challenges 7.23
- White certificates system 7.24
- Emission permits (brown certificates) 7.81
- The problem of integration 7.106

C. Conclusion 7.119

8. An Analysis of Spain’s Legal Framework for the Promotion of Electricity from RES and Energy Efficiency: Positive Effects Achieved So Far and Remaining Legal, Administrative, and Structural Barriers 171  
*FJ de Cendra de Larragán*

A. Introduction 8.01

B. The Legal Framework for the Promotion of Renewables in Spain 8.04

C. Targets and Degree of Compliance So Far 8.05  
- The plans for the promotion of renewable energy: overview of objectives and main existing barriers 8.05
- Plan for the promotion of energy efficiency: overview of objectives and main existing barriers 8.06
<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. Legal Barriers</td>
<td>8.07</td>
</tr>
<tr>
<td>Barriers in the generation side</td>
<td>8.07</td>
</tr>
<tr>
<td>Barriers in the consumption side</td>
<td>8.31</td>
</tr>
<tr>
<td>Buildings</td>
<td>8.45</td>
</tr>
<tr>
<td>Transport</td>
<td>8.48</td>
</tr>
<tr>
<td>E. Administrative Barriers</td>
<td>8.49</td>
</tr>
<tr>
<td>Licensing procedure</td>
<td>8.49</td>
</tr>
<tr>
<td>Planning law and conflicts of competences</td>
<td>8.51</td>
</tr>
<tr>
<td>The specific regime for marine wind parks</td>
<td>8.52</td>
</tr>
<tr>
<td>F. Structural Barriers and Consequences for RES</td>
<td>8.58</td>
</tr>
<tr>
<td>Barriers to the specific types of RES on the generation side</td>
<td>8.58</td>
</tr>
<tr>
<td>Barriers on the transport side</td>
<td>8.64</td>
</tr>
<tr>
<td>Barriers in the retail market</td>
<td>8.74</td>
</tr>
<tr>
<td>G. Political Barriers</td>
<td>8.75</td>
</tr>
<tr>
<td>H. The New Climate Change Strategy</td>
<td>8.77</td>
</tr>
<tr>
<td>I. Conclusion</td>
<td>8.78</td>
</tr>
<tr>
<td>9. Towards an Environmental Tax on Motor Vehicles</td>
<td>203</td>
</tr>
<tr>
<td>(a Proposal for a Community Directive and its Incidence on Spanish</td>
<td></td>
</tr>
<tr>
<td>Autonomous Communities)</td>
<td></td>
</tr>
<tr>
<td>Pedro M Herrera Molina, María Amparo Grau Ruiz, and Pablo Chico de la</td>
<td></td>
</tr>
<tr>
<td>Cámara</td>
<td></td>
</tr>
<tr>
<td>A. Introduction</td>
<td>9.01</td>
</tr>
<tr>
<td>B. The Basic Tax Framework</td>
<td>9.04</td>
</tr>
<tr>
<td>C. Provisional Amendment and Elimination of the Special Tax on Certain</td>
<td>9.11</td>
</tr>
<tr>
<td>Means of Transport (Registration Tax)</td>
<td></td>
</tr>
<tr>
<td>European legal framework</td>
<td>9.11</td>
</tr>
<tr>
<td>Prohibition of new taxes of this kind and definitive elimination</td>
<td>9.14</td>
</tr>
<tr>
<td>Transitional regime</td>
<td>9.18</td>
</tr>
<tr>
<td>Measures to eliminate double taxation</td>
<td>9.22</td>
</tr>
<tr>
<td>Implementation in Spain</td>
<td>9.28</td>
</tr>
<tr>
<td>D. Reform of the Tax on Mechanical Traction Vehicles:</td>
<td>9.45</td>
</tr>
<tr>
<td>Acceptance by the Autonomous Communities and Environmental Restructuring</td>
<td>9.45</td>
</tr>
<tr>
<td>Starting point</td>
<td>9.45</td>
</tr>
<tr>
<td>Environmental restructuring and elimination of double taxation</td>
<td>9.54</td>
</tr>
<tr>
<td>Acceptance by the autonomous communities and other alternatives</td>
<td>9.58</td>
</tr>
</tbody>
</table>
### Contents

**E. Compensation measures**  
- From the central state to the autonomous communities 9.61  
- From the autonomous communities to the municipalities 9.64  
- The municipalities' normative and management competences 9.65

**F. Conclusion** 9.66

### 10. Environmental Fiscal Reform in Italy: Something in the Way . . . 221

*Aldo Ravazzi Douvan and Claudia Cordié*

- **A. An Apparently 'Favourable Climate'** 10.01  
  - International level 10.02  
  - Europe at work (with its member countries) 10.05  
  - Italian level 10.06  
  - Best practices level 10.07

- **B. Towards an Environmental Tax Reform in Italy** 10.08  
  - Precedent attempts in brief 10.08  
  - Environmentally related taxes and market-based instruments 10.18  
  - Environmental taxes—statistics 10.20  
  - Financial Law 2007 10.24  
  - Local and regional measures—towards federalism? 10.28

- **C. Conclusion** 10.34

### 11. Administrative Costs of the Czech System of Environmental Charges 247

*Jan Pavel and Leos Vitek*

- **A. Introduction** 11.01

- **B. Methodology of the Assessment and Effectiveness of the Czech Tax System** 11.09

- **C. Charges for Environmental Protection in the Czech Republic** 11.17

- **D. Case Study: Charges on Air Pollution (APC) and Water Charges (WC)** 11.18  
  - System of the APC 11.18  
  - Efficiency of the APC 11.21  
  - System of the WC 11.26  
  - Efficiency of the WC 11.30

- **E. Comparison with Other Czech and International Taxes** 11.34

- **F. Conclusion** 11.39

xvi
12. The Sky is the Limit or Limits to the Sky? A Political Economy Perspective on Market-based Environmental Policy Instruments in EU Aviation

Sven Rudolph

A. Introduction 12.01
B. Climate Protection and Aviation 12.03
C. The Political Economy of Environmental Policy Instruments 12.08
   Voters 12.12
   Interest groups 12.15
   Environmental bureaucracy 12.22
   Politicians 12.25
D. Conclusion 12.27

13. Explaining Policy Change: The Role of Scientific Actors and Policy Entrepreneurs in Theory and Environmental Policy Practice in Germany

Michael Böcher

A. Introduction 13.01
B. Ecological Tax Reform in Germany and the Role of Environmental Economists 13.06
   Economists as evaluators of environmental policy 13.06
   Ecological tax reform in Germany 13.07
   Economists as critics of the ecological tax reform 13.09
   Economic explanations for the lack of influence of environmental economists 13.12
C. The Role of Scientists in Policy-making 13.14
   Technocratic solutions delivered by scientists? 13.15
   The importance of policy entrepreneurs for policy change 13.18
   Policy-learning 13.20
   Policy entrepreneurs as key actors and drivers of policy change 13.24
   Lessons to be learned from this approach 13.26
D. Some Examples of the Role of Policy Entrepreneurs within the Eco-tax Debate in Germany 13.27
   The birth of a new policy idea, the struggle of ideas, and policy entrepreneurs 13.28
   Scientific uncertainties and distributional conflicts 13.34
### Contents

The implementation of the German ecological tax reform as a result of policy-learning, scientific uncertainties, and distributional conflicts 13.36

E. Conclusion 13.37

14. Public Choice over Efficiency: The Case of Road Traffic Management 307

*Jonathan Remy Nash*

A. Overview of the Economics of Roadway Usage 14.09


C. The Efficient Response to Traffic Congestion: Congestion Pricing 14.39

D. Economic and Public Choice Evaluation of New Roadway Capacity and Congestion Charges 14.54

E. Conclusion 14.66

15. Psychological Barriers to Gasoline Taxation 333

*Shi-Ling Hsu*

A. Introduction 15.01

B. The Gasoline Tax 15.05

C. Tax Psychology 15.10
   - Endowment effect 15.11
   - The do-no-harm effect 15.15
   - The identifiability bias 15.19
   - Metric effect 15.22
   - Isolation effect 15.24

D. Conclusion 15.28

### III ENERGY AND INNOVATION

Energy Policy in the European Union


*Claudia Dias Soares*

A. Climate Change Policy and the Lisbon Strategy 16.01
B. Criticism of the Current Regulatory Framework on EU Energy-intensive Sectors 16.11
   Economic arguments against overlapping regulation and national tax exemptions 16.11
   Legal arguments against national energy tax exemptions 16.23
C. Discussing Legal Scenarios for the Future 16.36
   The radical approach 16.49
   The conservative approach 16.60
   Changes at the energy tax level 16.83
   Long-term preferences 16.88
D. Conclusion 16.93

17. Direct Fiscal Aid for Renewable Energy Development: A Positive Cue from the Commission? 377
   Carol Ní Ghiolláináth
   A. Introduction 17.01
   B. Tax Policy for Renewable Energy—An EU Perspective 17.05
   C. Case Studies 17.12
      Investments in own energy-efficient assets 17.13
      Investments in projects of third parties 17.18
   D. State Aid Dimension of Direct Tax Incentives 17.23
      Investments in own energy-efficient assets 17.23
      Percentage deduction in year 1 17.26
      Investments in projects of third parties 17.29
   E. The Future for Tax Incentives in the EU State Aid Regime 17.31
   F. Conclusion 17.42

18. Energy Taxes in Europe—Lessons Learned with Relevance for Switzerland 393
   Rolf Iten, Helen Lückge, and Martin Peter
   A. Introduction and Objectives 18.01
   B. Energy Taxes in Europe 18.06
      EU policy 18.06
      Overview of current status by country 18.08
      Impacts of current energy taxes 18.10
      Findings for Swiss climate policy post-2012 18.14
   C. Conclusions that can be Drawn for Switzerland 18.23
Energy Efficiency and Environmental Fiscal Reform to Reduce Fossil Fuel Use

19. From Simple Concept to Complex Reality: US Tax Incentives to Reduce Household Use of Fossil Fuels

Janet E Milne

A. Introducing the Tax Incentives

Section 45L's new energy efficiency home credit—a tax credit for new or substantially reconstructed homes

Section 25C's non-business energy property credit—a tax credit for energy-efficiency improvements to existing homes

Section 45M's energy efficient appliance credit—a tax credit for appliance manufacturers

Section 136's energy conservation subsidies provided by public utilities—an income exclusion for conservation measures offered by utilities to homeowners

Section 25D's residential energy-efficiency property—a tax credit for residential alternative energy sources

Section 179D's energy-efficient commercial buildings deduction—a tax deduction for energy-efficiency investments

Section 48's energy credit—a tax credit for solar, geothermal, and fuel cell investments by businesses

The overall matrix

B. The Challenge of Confronting the Devils in the Details: The Need for Niche Rules

Multiple owners

Government owner

Location and type of home

Swimming pools

Other subsidies

C. The Challenge of Defining the Standard for Qualification: The Need to Deal with Technology

The basic approaches to choosing the standard

The implications

D. The Challenge of Implementation: Certification Requirements

Certification for alternative energy sources

Certification of comparative energy savings

Certification for satisfying static standards

The implications

E. Conclusion

Appendix
20. Demanding More: The Role of Demand Management and Improved End-use Efficiency in Australian Electricity Markets

Rowena Cantley-Smith

A. Introduction 20.01
B. The Stationary Energy Sector's Impact on the Environment 20.03
C. Energy Market Reforms to Date
   Overview of policy developments and establishment of the NEM 20.11
   A new legislative framework for the NEM 20.16
D. Demanding Different Environmental Outcomes in the NEM
   Governmental responses to environmental problems 20.19
   Demand management of the NEM 20.23
E. Impediments to Better Environmental Outcomes 20.32
F. Conclusion 20.42

21. CO₂ Emissions in Italy: A Micro-simulation Analysis of Environmental Taxes on Firms' Energy Demand

Rossella Bardazzi, Filippo Oropallo, and Maria Grazia Pazienza

A. Introduction 21.01
B. Growth and Environment: Is Decoupling an Option?
   Emission trends in Europe and Italy 21.07
C. Are Environmental Taxes a Useful Tool?
   Current use of energy and CO₂ taxes in Europe and Italy 21.24
D. The Micro-simulation Model and the Data 21.29
E. Estimation Results
   Regression of CO₂ emissions 21.37
   The demand of some energy products: a fixed-effect model 21.43
F. Final Remarks 21.53

Environmental Fiscal Reform and Renewable Energy

22. Energy Efficiency and Renewable Energy Supply for the G-7 Countries, with Emphasis on Germany

Jon Strand

A. Introduction 22.01
B. Renewables in Advanced Economies: General Issues 22.12
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>22.12</td>
</tr>
<tr>
<td>Support for and supply of renewables in major developed countries</td>
<td>22.21</td>
</tr>
<tr>
<td>Public renewables support and carbon emissions reductions</td>
<td>22.32</td>
</tr>
<tr>
<td>Biofuels and their support in advanced economies</td>
<td>22.37</td>
</tr>
<tr>
<td><strong>C. Further Aspects of Renewables Policies in Germany</strong></td>
<td>22.49</td>
</tr>
<tr>
<td>Introduction</td>
<td>22.49</td>
</tr>
<tr>
<td>Renewables for electricity generation in Germany</td>
<td>22.52</td>
</tr>
<tr>
<td>Policies affecting value-adding inputs</td>
<td>22.58</td>
</tr>
<tr>
<td><strong>D. Overall Assessment of Renewables Policies in Advanced Countries</strong></td>
<td>22.66</td>
</tr>
</tbody>
</table>

23. Stimulating the Use of Renewable Energy in the Canadian Residential Sector with Economic Instruments 523

Nathalie Chalifour and Amy Taylor

A. Introduction 23.01

B. Background 23.08
   - Renewable energy potential and cost in Canada 23.11
   - Solar photovoltaic 23.16
   - Small wind 23.19

C. Residential Renewable Energy Barriers 23.22
   - Barriers 23.22
   - Economic instruments 23.24

D. Economic Instrument Choice 23.30
   - Instrument evaluation 23.31
   - Economic instruments at the federal level 23.34
   - Economic instruments at the provincial level 23.37
   - Economic instruments at the municipal level 23.40

E. Jurisdiction 23.42
   - A pro-rated upfront grant for small systems and a production incentive for medium systems offered by the federal government 23.46
   - Feed-in tariff laws applied provincially 23.50
   - A reduction in development fees or a local improvement charge (municipal) 23.56
   - Conclusion 23.65

F. Distributional Impacts and Fairness 23.66
   - Introduction 23.66
   - Distributional impacts and fairness of the proposed measures 23.71
   - Conclusion 23.77

G. Conclusion 23.78
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. Abundance of Low-cost Fossil Fuel</td>
<td>25.34</td>
</tr>
<tr>
<td>E. The Photovoltaic Industry Relies on the Rebate Program</td>
<td>25.44</td>
</tr>
<tr>
<td>Change of government policy</td>
<td>25.49</td>
</tr>
<tr>
<td>F. Australia's Mandatory Renewable Energy Target</td>
<td>25.51</td>
</tr>
<tr>
<td>Administration of the MRET</td>
<td>25.54</td>
</tr>
<tr>
<td>Price of renewable energy certificates</td>
<td>25.58</td>
</tr>
<tr>
<td>MRET encourages growth in the renewable energy sector</td>
<td>25.59</td>
</tr>
<tr>
<td>Independent review of the MRET</td>
<td>25.60</td>
</tr>
<tr>
<td>Increase in MRET beyond 2010</td>
<td>25.63</td>
</tr>
<tr>
<td>G. Inadequate Funding for Deployment and Commercialization of Solar Energy</td>
<td>25.65</td>
</tr>
<tr>
<td>Funding for solar cities</td>
<td>25.70</td>
</tr>
<tr>
<td>Proposed additional investment in low-emission technology</td>
<td>25.73</td>
</tr>
<tr>
<td>All low-emission technology to compete on equal terms to avoid 'picking winners'</td>
<td>25.76</td>
</tr>
<tr>
<td>Phasing out 'less efficient' abatement policies</td>
<td>25.81</td>
</tr>
<tr>
<td>Remove renewable energy subsidies that 'mute price signals'</td>
<td>25.83</td>
</tr>
<tr>
<td>I. Subsidies to Fossil Fuels should not 'Mute Price Signals'</td>
<td>25.86</td>
</tr>
<tr>
<td>J. Additional Fiscal Measures Required for the Deployment and Commercialization of Solar Energy</td>
<td>25.91</td>
</tr>
<tr>
<td>K. Conclusion</td>
<td>25.97</td>
</tr>
<tr>
<td>Appendix</td>
<td>598</td>
</tr>
</tbody>
</table>


*Rahmat Tavallali, Paul Lee, and Bruce McClain*

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Introduction</td>
<td>26.01</td>
</tr>
<tr>
<td>B. Ethanol Economy</td>
<td>26.07</td>
</tr>
<tr>
<td>C. Oil Economy</td>
<td>26.10</td>
</tr>
<tr>
<td>D. Ethanol versus Gasoline</td>
<td>26.13</td>
</tr>
<tr>
<td>E. Ethanol as Renewable Energy</td>
<td>26.18</td>
</tr>
<tr>
<td>F. Corn for Food or Fuel</td>
<td>26.21</td>
</tr>
<tr>
<td>G. Ethanol Production Process</td>
<td>26.23</td>
</tr>
</tbody>
</table>
Contents

H. Tax Policy 26.25
   Federal subsidies 26.27

I. Conclusion 26.33

27. Successes and Failures of Bio-fuels Promotion
    in the Czech Republic 615
    Hana Brůhová-Foltýnová and Vojtěch Máca

   A. Introduction 27.01
   B. EU Bio-fuel Support Policy 27.06
   C. Bio-fuel Policy in the Czech Republic 27.15
   D. Analysis of Bio-fuel Support Regimes: Methodology 27.22
      Formulation of alternative policies 27.26
      Evaluation and comparison of effects of alternative policies 27.29
      Policy selection 27.39
   E. Conclusion 27.43

Appendix 1 630
Appendix 2 631

IV LAND USE, PLANNING, AND CONSERVATION

28. Land Use, Congestion, and Urban Management 635
    Alberto Majocchi and Andrea Zatti

   A. Land Use as an Environmental Problem 28.01
      Traffic and congestion management in Italian urban areas 28.04
      Parking pricing 28.11
      Electronic road pricing 28.28
      The Milan Ecopass 28.32
   C. Urban Planning and the Role of Services 28.47
   D. An Environmental Tax to Internalize the External
      Costs of Tourism 28.54
   E. The Problem of Bio-fuels 28.59
   F. Environment and Agricultural Policy 28.65
   G. Conclusion 28.67
29. The Unsustainable Dependence of Spanish Local Treasuries on Taxes and Charges Related to Construction Activities

*Ignasi Puig-Ventosa*

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Introduction</td>
<td>29.01</td>
</tr>
<tr>
<td>B. Main Taxes, Charges, and Other Sources of Revenue Related to</td>
<td>29.06</td>
</tr>
<tr>
<td>Construction Activities in Spain</td>
<td></td>
</tr>
<tr>
<td>One-off income sources related to new construction activities</td>
<td>29.08</td>
</tr>
<tr>
<td>and capable of financing other policies</td>
<td></td>
</tr>
<tr>
<td>Other revenue sources related to urbanism</td>
<td>29.20</td>
</tr>
<tr>
<td>C. The Dependence of Spanish Local Treasuries on Revenue Sources</td>
<td>29.26</td>
</tr>
<tr>
<td>related to New Urban Development</td>
<td></td>
</tr>
<tr>
<td>The incidence of low-density urbanism</td>
<td>29.40</td>
</tr>
<tr>
<td>D. Proposals</td>
<td>29.43</td>
</tr>
<tr>
<td>E. Conclusion</td>
<td>29.49</td>
</tr>
</tbody>
</table>

30. Transferable Conservation Easement Tax Credits . . . The Virginia Experience

*Eleanor Weston Brown*

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Introduction</td>
<td>30.01</td>
</tr>
<tr>
<td>B. The Case for Conservation</td>
<td>30.05</td>
</tr>
<tr>
<td>C. Conservation Easement Defined</td>
<td>30.10</td>
</tr>
<tr>
<td>D. Conservation Easement as Federal Charitable Deduction</td>
<td>30.13</td>
</tr>
<tr>
<td>E. Land Preservation and Conservation Tax Credits:</td>
<td></td>
</tr>
<tr>
<td>State Tax Incentives Generally</td>
<td>30.20</td>
</tr>
<tr>
<td>F. Virginia Land Conservation Incentives Act 1999</td>
<td>30.23</td>
</tr>
<tr>
<td>G. Conservation Easement: The Future</td>
<td>30.30</td>
</tr>
<tr>
<td>H. Conclusion</td>
<td>30.31</td>
</tr>
<tr>
<td>Appendix</td>
<td>696</td>
</tr>
</tbody>
</table>

31. EcoTerra Model—Application of Environmental Fiscal Reform in Local Government Financing in Portugal

*Joana Prates and João Joanaz de Melo*

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Introduction</td>
<td>31.01</td>
</tr>
<tr>
<td>B. Land-use Management in Portugal</td>
<td>31.06</td>
</tr>
</tbody>
</table>
32. An International Comparison of Factors Influencing Modal Split: Implications for Environmental Taxation

Hana Brůhová-Foltýnová and Jan Brůha

A. Introduction 32.01
B. Data 32.12
C. Econometric Model 32.23
D. Findings 32.31
E. Conclusion 32.37

Appendix 1 728
Appendix 2 729
Appendix 3 731

V GLOBAL ISSUES

International Policy Approaches

33. Border Tax Adjustments, WTO Law, and Climate Protection

Felix Ekardt and Andrea Schmeichel

A. Environmental Costs, Competitiveness, and WTO Law 33.01
B. The National Treatment Principle as WTO Measure for Border Tax Adjustments (Articles II, III, VI GATT) 33.09
C. Justification of Border Tax Adjustments According to Article XX GATT as an Exception to Article III GATT in relation to the Protection of the Environment 33.23
D. Justification of Border Adjustments relating to the Environment by the Notion of Avoiding Subsidies by Externalization of Costs? 33.28
E. Details of Border Adjustments 33.33
Contents

F. Environmental Protection by WTO Law? North–South Conflicts, Frictions of a Free World Trade, Limits of the International Treaties, and Multilateralism 33.35

34. Carbon Emission Rights: The Key to an Optimal Regional Approach to Climate Change? 761
Ken Piddington and Frank Scrimgeour

A. Introduction and Overview 34.01
B. The New Zealand Objective 34.05
C. Shifting Currents in Officialdom 34.11
D. Allocation of Emission Rights—The Key Decision 34.18
E. Think Globally, Act Regionally! 34.23
F. Concluding Observations 34.30

35. Fiscal and Regulatory Challenges of Managing Sinks, with a Focus on Australia 773
Patricia Blazey

A. Introduction 35.01
B. The Benefit of Sinks 35.09
C. Australia’s Approach to Carbon Sinks 35.24
D. Taxation Benefits for Forest Sink Projects in Australia 35.33
E. Conclusion 35.37

Environmental Fiscal Reform in Developing, Emerging, and Transition Economies

36. Environmental Fiscal Reform in Developing, Emerging, and Transition Economies 793
Jacqueline Cottrell, Axel Olearius, and Stephanie Lorek

A. Introduction 36.01
B. Good Governance and Capacity Development 36.03
   Good governance and good financial governance 36.05
   Capacity development 36.08
C. Policy Analysis for Improved Implementation 36.10
D. Political Barriers to Implementation 36.16
37. Environmental Fiscal Reform—Differences and Similarities between Developed and Developing Countries, Based on a Case Study of the Current Situation in Sri Lanka

Stefan Speck and Anjan Datta

A. Introduction 37.01

B. The Concept of Environmental Fiscal Reform—A Broader Concept than Environmental Tax Reform 37.05
   EFR in developed countries—the European context 37.08
   EFR in developing countries 37.10
   The potential of EFR in developing countries—the situation in Sri Lanka 37.13
   The economic situation in Sri Lanka 37.15

C. Current Status of the Use of Economic Instruments for Environmental Protection 37.19
   Energy products 37.20
   Electricity pricing 37.25
   Water 37.30
   Agriculture—the fertiliser subsidy program 37.40

D. The Revenue Aspect of MBIs Implemented in Sri Lanka 37.44

E. Discussion and Summary 37.56

38. On the Road to a Sustainable Transport Sector in South Africa: The Role of Market-based Instruments

Alexander Ross Paterson

A. Introduction 38.01

B. Environmental and Regulatory Realities 38.05
   Environmental realities 38.06
   Regulatory realities 38.15

C. Towards a Market-based Approach 38.25
   Environmental policies 38.27
   Fiscal policies 38.37
D. Market-based Options for the Road Transport Sector

- Fuel levies
- Windfall taxes
- Vehicle levies
- Licensing tariffs
- Congestion charges
- Product taxes
- Deposit-refund systems
- Disposal taxes
- Income tax allowances
- Donations tax

E. Key Challenges and Prerequisites for Extending the Use of Market-based Instruments

- Environmental effectiveness
- Technical and administrative issues
- Revenue issues
- Distributional impacts
- Competitiveness impacts
- Policy alignment
- Legislative aspects
- Public support

F. Conclusion

39. Energy Tax: How Far is it from Idea to Practice? Lessons Learned from the Experience in China

Tianbao Qin

A. Introduction

B. The Lengthy Process of Introducing an Energy Tax in China

- The genesis of energy taxation
- Introduction of an energy tax in China

C. Game between Central and Local Governments

- Roles and interrelations between central and local governments as regards fuel taxation
- The reallocation of interests between central and local governments by the proposed fuel tax
- Attitudes of central and local governments towards fuel tax
- Suggestions for coordinating interests between central and local governments