

# Contents

List of figures	XV
List of tables	XVI
List of abbreviations	XVII
Abstract	XXI
Zusammenfassung	XXIII
Introduction	1
I. Climate change as a defining challenge for humankind	3
II. The carbon budget problem	5
III. Integration or fragmentation	7
IV. Outline	9
Part One: Possibilities and Limits of Transnational Cooperation in Climate Policy	11
V. Overview on foci for solving the climate challenge	13
V.i) Ostrom: bottom-up strategies with co-benefits preparing the ground for eventual international cooperation	14
V.ii) Barrett: the paradox of international cooperation and the need for a technology-centric approach	16
V.iii) Edenhofer et al.: achieving a Global Contract – redefining the need and the possibility for international cooperation	18

VI.	Increasing the prospects for cooperation _____	20
VI.i)	Understanding what drives the behavior of nation states _____	21
VI.i.a)	Model assumptions in game-theoretic settings and their limitations _____	21
VI.i.b)	Regime theory and global climate change: toward an intermediate level of cooperation _____	27
VI.ii)	Can the payoff matrix be altered? _____	35
VI.ii.a)	Enlarging the solution space: beyond monolithic states toward a dynamic view of the national interest _____	36
VI.ii.b)	Empathy and morals in international cooperation _____	39
VI.ii.c)	Introducing a delta parameter in determining national positions _____	47
VI.ii.d)	Model results taking preferences for equity into account _____	51
VI.iii)	On the rationality of threats and commitment _____	56
Part Two: Deriving and Defining Normative Objectives for Global Climate Policy and Identifying Implementation Instruments _____		
VII.	The United Nations Framework Convention on Climate Change _____	63
VII.i)	An environmental objective as cornerstone of the Convention _____	63
VII.ii)	Translating the call to avoid dangerous anthropogenic interference with the climate system _____	65
VIII.	Evaluation criteria for climate policy _____	75
VIII.i)	Previous evaluation proposals _____	76
VIII.i.a)	Evaluation criteria as suggested by Philibert and Pershing _____	77
VIII.i.b)	Evaluation criteria as suggested by ECOFYS _____	78
VIII.i.c)	Evaluation criteria as suggested by Wicke _____	80
VIII.i.d)	Evaluation criteria as suggested by Stavins _____	83

VIII.ii)	Developing evaluation metrics for global climate policy _____	85
VIII.ii.a)	Environmental effectiveness _____	86
VIII.ii.b)	Cost effectiveness and investment implications _____	88
VIII.ii.c)	Equity _____	91
VIII.ii.d)	Institutional complexity and transaction costs _____	93
VIII.ii.e)	Enforcement of compliance _____	95
VIII.ii.f)	Political acceptability _____	96
IX.	Policy instruments for emissions management _____	100
IX.i)	Market-based instruments: price and quantity _____	100
IX.ii)	Command-and-control policy instruments _____	108
X.	Setting the focus on quantity management: cap-and-trade design options _____	110
X.i)	Geographic extension of the cap _____	111
X.ii)	Emissions coverage _____	114
X.iii)	Point of regulation _____	115
X.iv)	Allowance allocation among nations _____	117
X.iv.a)	Equal per capita allocation schemes _____	117
X.iv.b)	GDP-based allocation schemes _____	119
X.iv.c)	Multi-criteria approaches _____	121
X.v)	Allowance allocation on the emitter level _____	122
X.v.a)	Grandfathering _____	123
X.v.b)	Auctioning _____	124
X.v.c)	Mixed allocation _____	125
X.vi)	Revenue distribution from the sale of allowances _____	127
X.vii)	Flexibility mechanisms _____	130
X.vii.a)	Compliance period _____	130
X.vii.b)	Banking and borrowing _____	131
X.vii.c)	Safety valve _____	132
X.vii.d)	Offsets _____	133
X.viii)	Provisions for linking _____	134
X.viii.a)	Indirect linking _____	135

X.viii.b)	Formal linking	136
X.viii.c)	The timing of linking	136
X.ix)	Interaction with targeted policies	138
X.ix.a)	Rationale of targeted policies on static efficiency grounds	139
X.ix.b)	Rationale of targeted policies in a wider perspective	140
Part Three: Developing an Implementation Strategy		145
XI.	Evaluation of the Kyoto Protocol and of a set of academic proposals for a global carbon market	147
XI.i)	The Kyoto Protocol	148
XI.i.a)	Environmental effectiveness	148
XI.i.b)	Cost effectiveness and investment implications	150
XI.i.c)	Equity	153
XI.i.d)	Institutional complexity and transaction costs	156
XI.i.e)	Enforcement of compliance	159
XI.i.f)	Political acceptability	161
XI.i.g)	Summary evaluation of the Kyoto Protocol	163
XI.ii)	The Global Climate Certificate System	164
XI.ii.a)	Environmental effectiveness	164
XI.ii.b)	Cost effectiveness and investment implications	166
XI.ii.c)	Equity	169
XI.ii.d)	Institutional complexity and transaction costs	170
XI.ii.e)	Enforcement of compliance	172
XI.ii.f)	Political acceptability	174
XI.ii.g)	Summary evaluation of the Global Climate Certificate System	176
XI.iii)	The WBGU Budget Approach	177
XI.iii.a)	Environmental effectiveness	178
XI.iii.b)	Cost effectiveness and investment implications	179
XI.iii.c)	Equity	181
XI.iii.d)	Institutional complexity and transaction costs	183
XI.iii.e)	Enforcement of compliance	185
XI.iii.f)	Political acceptability	187

XI.iii.g)	Summary evaluation of the Budget Approach	189
XI.iv)	Kyoto2 – A global carbon market and climate protection investment scheme	190
XII.	Lessons from the Montreal Protocol applied to climate policy	193
XII.i)	The Montreal Protocol as a cooperation success	194
XII.ii)	Applying the insights in the area of climate change	196
XII.ii.a)	Setting incentives for developing countries and addressing technology	198
XII.ii.b)	Building in reciprocity in defining mitigation targets	200
XII.ii.c)	Using strategic trade measures to affect free rider incentives	202
XII.ii.d)	Enforcing the agreement and maintaining the incentive to cooperate	203
XIII.	A Modular Carbon Market as cornerstone of a future global climate policy architecture	205
XIII.i)	Summary description of the main design elements	205
XIII.ii)	The architectural elements of the Modular Carbon Market in detail	210
XIII.ii.a)	A broad carbon market with increasing global participation	210
XIII.ii.b)	Apportioning the global carbon budget over time	211
XIII.ii.c)	Regular auctions and the pivotal role of a World Climate Bank	213
XIII.ii.d)	Introducing flexibility mechanisms to enhance dynamic efficiency	216
XIII.ii.e)	Away from national self-commitments and toward a global revenue-sharing from climate policy	217
XIII.ii.f)	Implementing a global carbon market through a modular, expandable system	222
XIII.ii.g)	An audit scheme to ensure the integrity of the global carbon market	224

XIII.ii.h)	Addressing leakage on the way to the global carbon market	226
XIII.ii.i)	Addressing energy price increases in developing countries	228
XIII.iii)	Evaluation of the Modular Carbon Market	230
XIII.iii.a)	Environmental effectiveness	230
XIII.iii.b)	Cost effectiveness and investment implications	231
XIII.iii.c)	Equity	233
XIII.iii.d)	Institutional complexity and transaction cost	235
XIII.iii.e)	Enforcement of compliance	236
XIII.iii.f)	Political acceptability	237
XIII.iii.g)	Summary evaluation of the Modular Carbon Market	240
XIII.iv)	Managing the climate rent in the context of development	241
XIII.iv.a)	How should the revenue stream be structured?	243
XIII.iv.b)	When to invest and where?	253
Outlook		267
XIV.	Synthesis – choices and tradeoffs in global climate policy	269
XV.	The carbon market as a framework for multilevel action	272
References		275