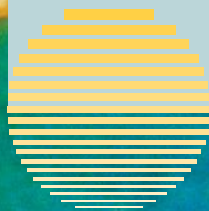


ENERGY,
CLIMATE AND
THE ENVIRONMENT



GLOBAL CLIMATE CHANGE POLICY AND CARBON MARKETS

Transition to a New Era

RICHARD H. ROSENZWEIG



Energy, Climate and the Environment

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Aim of the Series

The aim of this series is to provide texts which lay out the technical, environmental and political issues relating to proposed policies for responding to climate change. The focus is not primarily on the science of climate change, or on the technological detail, although there will be accounts of this, to aid assessment of the viability of various options. However, the main focus is the policy conflicts over which strategy to pursue. The series adopts a critical approach and attempts to identify flaws in emerging policies, propositions and assertions. In particular, it seeks to illuminate counter-intuitive assessments, conclusions and new perspectives. The intention is not simply to map the debates, but to explore their structure, their underlying assumptions and their limitations. The books in this series are incisive and authoritative sources of critical analysis and commentary, clearly indicating the divergent views that have emerged whilst also identifying the shortcomings of such views. The series does not simply provide an overview, but also offers policy prescriptions.

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Richard H. Rosenzweig

Global Climate Change Policy and Carbon Markets

Transition to a New Era

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Author's Preface

I decided to write this book approximately 25 years after getting involved in the climate change issue. In the early days, my interest in the issue was based on its multiple dimensions. The many characteristics that distinguished climate change from any other environmental and energy issue also increased the challenge of solving it. Impacts of such a change would affect all countries in the world, the rich and the poor alike, and the greenhouse gas (GHG) emissions that contributed to climate change were intrinsic to nearly every aspect of the economic activity. And sources of energy which powered the global economy were created predominantly by fossil fuels that emitted large quantities of carbon dioxide (CO₂), the dominant GHG.

I was also intrigued by the temporal dimensions of climate change and the characteristics of GHG emissions. The climate system was affected by cumulative GHG emissions over decades, measured in concentrations that remained in the atmosphere for long periods of time and not annual emissions. Achieving a specified concentration ceiling to reduce the risks and impacts of climate change required limiting GHG emissions to a fixed amount during the century. Strategies and policies needed to be put in to place to reduce GHG emissions throughout the twenty-first century, with a goal toward decarbonizing the energy system.

Because of these dynamics, domestic and international policy-makers would not be able to solve climate change by passing one piece of

legislation or agreeing to a treaty. Instead, the entire economic system and the vast fossil fuel energy infrastructure that drove it, valued in terms of trillions of dollars, would need to be remade into a clean modern network that emitted little or no GHGs, and particularly CO₂. This would be an enormous, complicated, and expensive undertaking.

The US was at the center of the issue. It was the largest economy and emitter of GHGs in the world. The power system, its largest emitting sector, was dominated by coal, the most carbon-intensive fuel, and one with hundreds of years of reserves in the ground. And the transportation sector was almost entirely dependent on oil, the second most carbon-intensive fuel. So, it seemed apparent to me that the US political system would organize itself to reduce GHG emissions at home and play a lead role in the international community's efforts to develop a global response. Policy-makers started to put building blocks in place to do so. One of the last, if not the last, amendment debated on the floor of the House of Representatives on the Clean Air Act Amendments of 1990 was the requirement for electric utilities to report their CO₂ emissions. It was adopted, but not before it created a firestorm of opposition. Following that, a provision was included in the Energy Policy Act of 1992 that established a system allowing companies to report actions taken to reduce their GHG emissions. At the global level, the world also adopted the United Nations Framework Convention on Climate Change (UNFCCC), and while modest, it appeared to be a framework the international community could build on.

After coming into office, the Clinton Administration, in which I served as the Chief of Staff of the Department of Energy (DOE), quickly proposed an energy tax and committed to reduce US GHG emissions. It also played a lead role in the negotiations that culminated in the Kyoto Protocol (KP), the first agreement committing industrial nations to limit their GHG emissions and which created a market designed to stimulate investment in activities to do so. None of this ended well in the US. The tax proposed by President Clinton was soundly defeated and the US Senate never voted on ratification of the KP, its seeds of defeat having been sown years earlier. And the debate in the US over climate change during this time was dominated by disagreement as to whether a problem even existed, not over solutions to address its causes.

The Clinton Administration was replaced by the Administration of George W. Bush. It quickly stated its opposition to the KP and put the world on notice that the US had little to no intent of reducing its GHG emissions. This rallied the world to take the actions necessary for the KP to take effect and to use the markets as the primary mechanism to reduce global GHG emissions. In 2000, recognizing that there would be no domestic climate change response for many years, I departed the policy world to gain experience with the markets. I ended up as the Chief Operating Officer (COO) of Natsource, a company which became the largest buyer of carbon credits in the world through 2007. By the election of 2008, with GHG emissions growing in the US as well as globally, it was known that the KP was unworkable, because it covered only a sliver of global emissions, and that a new approach was needed. The markets created by the KP and other policies were in tatters; their performance was adversely affected by market design, market administration, and the severe economic downturn.

It was at this point that Barack Obama became the president of the US. He had committed to reduce GHG emissions at home and to restore US leadership in the international climate change negotiations. Unfortunately, his support of legislation to create an economy-wide national cap-and-trade system to control GHG emissions and to remake the nation's energy system failed in 2010, requiring an entirely new approach at home. During the same period, the international community was engaged in efforts to develop a successor to the KP. As I write this, the US has established goals for reducing its GHG emissions and finally put policies in place in an attempt to achieve them. And nearly 200 countries around the world agreed to a successor treaty to the KP in December of 2015 to reduce GHG emissions which had grown by 40% from its 1990 base year to the end of its emissions reduction period in 2012. Both these efforts are in their nascent stages, and it is too early to determine whether they will succeed. The bottom line is that significant reductions in global GHG emissions, by 40 to 70% by 2050 and to virtually net zero by 2100, are necessary to achieve long-term climate policy objectives.

About 25 years ago, I would have bet that by now the US and the world would have fashioned the necessary policies to address climate

change, particularly as so much was learned about its causes and consequences. I wrote this book with one goal in mind: to use my government and business experience to contribute to the ongoing efforts to create an enduring, effective response to global climate change. I attempt to do this by describing the policies proposed and adopted during the last 25 years, and assessing their performance. I use the lessons drawn from this exercise to recommend criteria to guide future policy-making efforts and policies that can slow GHG emissions. I hope you enjoy the book and I do welcome any feedback you may have.

Washington, DC, US

Richard H. Rosenzweig

Series Editor's Preface

Concerns about the potential environmental, social, and economic impacts of climate change have led to a major international debate over what could and should be done to reduce emissions of greenhouse gases (GHGs). There is still a scientific debate over the likely scale of the severity of climate change, and the complex interactions between human activities and climate systems, but, global average temperatures have risen and the cause is almost certainly the observed build up of atmospheric GHGs.

Whatever we now do, there will have to be a lot of social and economic adaptation to climate change—preparing for increased flooding and other climate-related problems. However, the more fundamental response is to try to reduce or avoid the human activities that are causing climate change. That means, primarily, trying to reduce or eliminate emission of GHGs from the combustion of fossil fuels. Given that around 80% of the energy used in the world at present comes from these sources, this will be a major technological, economic, and political undertaking. It will involve reducing demand for energy (via lifestyle choice changes—and policies enabling such choices to be made), producing and using whatever energy we still need more efficiently (getting more from less), and supplying the reduced amount of energy from non-fossil sources (basically switching over to renewables and/or nuclear power).

Each of these options opens up a range of social, economic, and environmental issues. Industrial society and modern consumer cultures have been based on the ever-expanding use of fossil fuels, so the changes required will inevitably be challenging. Perhaps equally inevitable are disagreements and conflicts over the merits and demerits of the various options and in relation to strategies and policies for pursuing them. These conflicts and associated debates sometimes concern technical issues, but there are usually also underlying political and ideological commitments and agendas which shape, or at least color, the ostensibly technical debates. In particular, at times, technical assertions can be used to buttress specific policy frameworks in ways which subsequently prove to be flawed.

The aim of this series is to provide texts which lay out the technical, environmental, and political issues relating to the various proposed policies for responding to climate change. The focus is not primarily on the science of climate change, or on the technological detail, although there will be accounts of the state of the art, to aid assessment of the viability of the various options. However, the main focus is the policy conflicts over which strategy to pursue. The series adopts a critical approach and attempts to identify flaws in emerging policies, propositions, and assertions.

The present text certainly looks at an area where there is no shortage of disagreements about policies—the attempt to develop carbon trading systems and carbon markets as a response to climate change. The author was involved with US policy formation and practice in this area and brings an insider's view to the debate on how to proceed in future. Carbon trading is seen by some as a market mechanism which ought to appeal to those on the political right, but it is also inevitably seen as a device for reducing fossil fuel use, and thus as suspect for those who do not believe that climate change is man-made. The polarization of views seem very strong in the US, the main focus of this book, less so in the EU, but, overall, real or contrived uncertainties about climate issues are making it hard to adopt the radical positions that some feel are needed to limit climate impacts. The approaches that have been adopted so far have clearly not been very successful: despite the KP and the attempt to use carbon markets to stimulate change, emissions have

in general continued to rise. Given this situation, this book argues that it may be wise, or at least necessary, to adopt less ambitious approaches and more modest, targeted policies. That, it claims, may be more successful, and in terms of fighting climate change, policy successes are urgently needed.

David Elliott

Acknowledgments

This book has been both a labor of love and a significant challenge for me. I had wanted to write the book two to three years earlier, but the sudden death of a family member caused a delay in the project.

Like all challenges, I could not have succeeded without the encouragement and support of family members, friends, and colleagues. I want to acknowledge those that follow.

First, my family. I want to thank my mom who gave me my work ethic and was always there for me. I could not have completed the project without the support of my wife and partner, Sarah Wade. She encouraged, pushed, and cajoled me to take on this project and provided me with the confidence and support necessary to complete the book. Sarah also served as the primary editor—which is not an easy job. I also want to thank my son, Joel, for becoming the person he has. And last but not the least, thanks to my family of friends who put up with my complaints and encouraged me throughout.

I want to acknowledge my colleagues who contributed to the formulation and writing of the book. First, thanks to Dr. James A. Thurber of American University, whom I've known since 1983 when I walked into my first graduate school class. Jim is a well-respected scholar of the American political system and served as the Director of the Center for Congressional and Presidential Studies at AU for many years. Jim was the

first person I talked to about this project and would not have undertaken it without his enthusiastic support and guidance.

Several former colleagues from Natsource made specific contributions that I want to acknowledge. First, Jack Cogen, the founder and the CEO of Natsource. He also encouraged me to write this book and provided invaluable advice and comments throughout, particularly on all things regarding the carbon markets. Andy O'Connor, the General Counsel of Natsource, who kept me out of trouble while I was with the company and continued to do so during the project. He provided invaluable advice, particularly on the sections of the book about the company and the transactions. Michael Intrator helped me in thinking about the carbon markets. Rina Cerrato reviewed my assessment of the Clean Development Mechanism and offered valuable comments and research assistance. Another former colleague, Ben Feldman provided his inputs and was particularly helpful with the details of the Atlantic Methanol Production Company (AMPCO) Clean Development Mechanism (CDM) project that is described. Rob Youngman and Dirk Forrister also supported my efforts.

Jae Edmonds is one of the world's great climate modelers and the best energy analyst I have worked with during my 25 years on the climate change issue. As usual, he was selfless in giving his time to discuss data-related issues with me, explaining differences in various data sets and reviewing some of my interpretation of them. Finally, Dan Isaac provided me with invaluable research assistance. I am grateful to all these people for their help and support.

I want to acknowledge the support of other professional colleagues over the past 25 years. There are many, particularly those I worked with on the issue of climate change. Thanks to everyone at Natsource. It was a great ride for nearly 15 years and a lot of fun to be one of the companies that pioneered the carbon markets. The early days were crazy and exhausting but I would not have changed anything. Many talented and dedicated people worked at the company and were responsible for its success.

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List of Abbreviations

AB 32	California Global Warming Solutions Act
ACES	American Clean Energy and Security Act
AEO	Annual Energy Outlook
AIJ	Activities Implemented Jointly
AR	Assessment Report (IPCC)
ARB	Air Resources Board
ARRA	American Recovery and Reinvestment Act
BAU	Business as Usual
BSA	Burden Sharing Agreement
CAAA	Clean Air Act Amendments of 1990
CAFÉ	Corporate Average Fuel Economy
CAP	Climate Action Plan
CARB	California Air Resources Board
CCAP	US Climate Change Action Plan
CCS	Carbon Capture and Storage
CCTI	Climate Change Technology Initiative
CDM	Clean Development Mechanism
CEQ	Council on Environmental Quality
CERs	Certified Emission Reductions
CERUPT	Certified Emissions Reduction Unit Procurement Tender
CO ₂	Carbon Dioxide
COO	Chief Operating Officer
COP	Conference of the Parties

CPP	Clean Power Plan
CPs	Complementary Policies
CQ	Congressional Quarterly
DNA	Designated National Authority
DOA	Department of Agriculture (US)
DOE	Department of Energy (US)
DOEs	Designated Operational Entities
DRM	Delivery Risk Model
EB	Executive Board
EC	European Commission
EEA	European Environment Agency
EED	Energy Efficiency Directive (EU)
EIA	Energy Information Administration
EIT	Economies in Transition
EPA	Environmental Protection Agency (US)
EPACT	Energy Policy Act
ERU	Emission Reduction Units
ERUPT	Emission Reduction Unit Procurement Tender
EU	European Union
EU ETS	European Union Emissions Trading Scheme
EUAs	European Union Allowances
GG-CAP	Greenhouse Gas Credit Aggregation Pool
GHG	Greenhouse Gas
GWP	Global Warming Potential
HFC	Hydrofluorocarbon
HG	Mercury
IEA	International Energy Agency
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
KP	Kyoto Protocol
LC	Letter of Credit
LCV	League of Conservation Voters
LOA	Letter of Approval
LYPC	PetroChina Limited Liaoyang Petrochemical Company
MSR	Market Stability Reserve
MtCO ₂ e	Million Tons CO ₂ Equivalent
N ₂ O	Nitrous Oxide

NAP	National Allocation Plan
NATCAP	Natsource Carbon Asset Pool
NDC	Nationally Determined Contributions
NJ	Natsource Japan
NO _x	Oxides of Nitrogen
OECD	Organization for Economic Cooperation and Development
OEP	Office of Environmental Policy
PCF	World Bank's Prototype Carbon Fund
PDD	Project Design Document
PERT	Canada's Pilot Emission Reduction Trading Program
PPMV	Parts Per Million Volume
PPs	Project Participants
PUC	Public Utility Commission
RD&D	Research Development and Demonstration
RECs	Renewable Energy Credits
RED	Renewable Energy Directive (EU)
RGGI	Regional Greenhouse Gas Initiative (US)
RPS	Renewable Portfolio Standards
SD	Sustainable Development
SLCPs	Short Lived Climate Pollutants
SNAP	Significant New Alternatives Policy Program
SO ₂	Sulfur Dioxide
UCF	Umbrella Carbon Facility
UNFCCC	United Nations Framework Convention on Climate Change
USIJI	United States Initiative on Joint Implementation
WB	World Bank

1

Introduction

The Rationale for this Book

This book is an outgrowth of my attempt, over 25 years in senior positions in government and business, to create and use environmental markets to reduce emissions of conventional air pollutants and GHGs that cause climate change. My goal is to draw on this experience to contribute to the continuing efforts to develop effective, enduring responses to the critical issue of global climate change. I attempt to do this by describing the key policies, analyzing their results, and using these lessons to propose a path forward. A brief word on what the book is not. It is not meant to be an exhaustive review of every climate decision and policy from the last 25 years or to focus on issues such as adaptation. Others are better equipped to do that.

Those who have dedicated their careers to creating policy responses to climate change and participating in the markets understand how challenging the effort has been. There have been many successes and failures. However, given the increases in both emissions and concentrations of GHGs in the atmosphere and the resultant impacts and climate-related

risks,¹ it is fair to say that in the first generation of climate change policy-making, which I generally refer to as ‘climate change 1.0’, failures outweigh successes. Climate change 1.0 ended with the defeat of GHG cap-and-trade legislation in the US and generally with the initiation of negotiations for a successor treaty to the KP² at the international level.

The new era of policy-making, ‘climate change 2.0’, overlapped with 1.0 in 2009 with the advent of President Obama’s policies including the first proposed regulation in the US designed to reduce GHG emissions from the transportation sector³ and the attempt to negotiate a new international treaty⁴ at the international level. It was expedited in 2013 in the US with the release of President Obama’s Climate Action Plan⁵ and internationally with an agreement reached at the Conference of the Parties (COP) 17⁶ meeting to conclude a successor agreement to the KP in 2015. My references to international-level policy throughout the book are to the United Nations Framework Convention on Climate Change (UNFCCC),⁷ the KP⁸ and its market-based mechanisms, the recently concluded Paris Agreement⁹ and many of the key decisions taken in the negotiations conducted under the authority of the United Nations.

My thesis is simple. The primary policy responses in climate change 1.0 failed because they were overly ambitious, complex, inflexible, and, in

¹ Synthesis Report Summary for Policymakers, IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II, and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Core Writing Team, R.K. Pachauri and L.A. Meyer [eds.]). IPCC, Geneva, Switzerland, 151 P.

² *Kyoto Protocol to the United Nations Framework Convention on Climate Change*. United Nations. 1998.

³ This is a reference to a proposed regulation which imposed the first GHG standards on light duty vehicles in the US.

⁴ *Report of the Conference of the Parties on its fifteenth session, held in Copenhagen from 7 to 19 December 2009*. United Nations. 2009.

⁵ Executive Office of the President. *The President’s Climate Action Plan*. The White House. 2013.

⁶ *Report of the Conference of the Parties on its seventeenth session, held in Durban from 28 November to 11 December 2011, Establishment of an Ad Hoc Working Group on the Durban Platform for Enhanced Action*. Decision 1/CP.17. United Nations. 2012.

⁷ United Nations. *United Nations Framework Convention on Climate Change*. 1992.

⁸ *Kyoto Protocol*. 1998.

⁹ *The Paris Agreement to the United Nations Framework Convention on Climate Change*. United Nations. 2015.

part, top-down in nature. This is particularly the case given that these were the first attempts to address climate change, which is a century scale issue. In addition, the KP and its mechanisms were administered by the UN bureaucracy as overseen by nearly 200 countries. Decision-making in this process is cumbersome at best, making it extremely difficult to learn and adapt to new information. This is critical to successfully addressing any public policy issue and climate change in particular, because of its multiple dimensions and continually increased understanding of its causes.

Much has been learned from these missteps. The failures in 1.0 have significantly influenced emerging policy-making in 2.0. For the most part, the new efforts underway in the US to achieve GHG emission reduction targets are more bottom-up and targeted in nature and consist of less ambitious measures¹⁰ than a broad-based tax or an economy-wide cap-and-trade program as proposed in 1.0.¹¹ Similarly, the international agreement recently concluded in Paris¹² at the twenty-first COP is in total contrast to the KP. The approach to reducing GHG emissions to achieve climate policy objectives is bottom-up in nature, flexible and supported by top-down elements. Hopefully, it will work better in slowing global GHG emissions.

Although US and international climate change policies in 2.0 will not be as ambitious as the ones that were considered and adopted in 1.0, they will likely be more successful. The book reviews the policies proposed in the US and adopted at the international level in 1.0, assesses why they failed, and describes how they influenced ongoing policy development. It reviews emerging trends in the new era of policy-making and propose a series of 'modest', targeted policies that I believe can be effective in reducing GHG emissions and controlling costs. Success is essential to building public confidence and creating the political conditions necessary to develop more ambitious actions that will be required in the future, something that is imperative in today's fractured and often dysfunctional political environment. To borrow an analogy from baseball, it is time to play a

¹⁰The US strategy, and the policies which comprise it will be described in later chapters of the book.

¹¹The policies most identified with climate change 1.0 in the US are the BTU tax proposed by President Bill Clinton in 1993 and the American Clean Energy and Security Act which passed the House of Representative in 2009 and died in the US Senate. These initiatives will be described in subsequent chapters.

¹²*The Paris Agreement*. 2015.

small ball. Policy-makers should attempt to hit a lot of singles and doubles in trying to achieve large-scale reductions in GHG emissions. Singles and doubles, in this context, modest initiatives, put a lot of runs on the board. We need to avoid the temptation to swing for the fences and hit home runs in 2.0. The overreach in 1.0 was a primary cause of its failure.

A review of the first generation of climate change policy and recommendations for 2.0 would be incomplete without a sober assessment of the performance of the carbon markets that were the cornerstone in 1.0. With great fanfare, the KP attempted to create a single, integrated global market to assist developed countries achieve GHG emissions reduction obligations at the lowest cost. Similarly, the EU Emissions Trading Scheme¹³ (EU ETS) was the primary element of its strategy to comply with its KP targets and was linked to the Kyoto market. It remains a cornerstone of EU climate policy to achieve long-term GHG emission reduction targets. The US failed in its attempt to create a carbon market by developing an economy-wide GHG cap-and-trade system in the first few years of the Obama Administration.

The carbon markets were and continue to be a significant source of controversy. In my view, advocates oversell markets' potential benefits while detractors minimize them. I have not found many dispassionate reviews of their actual performance. Therefore, one of the book's primary emphases is to undertake and provide such a review of the performance of the KP markets, with an emphasis of the CDM¹⁴ and the EU ETS. A clear look at their shortcomings and successes, and the reasons for such, is essential to understand what carbon markets can realistically deliver in the future. This is critical, given that approximately 60 trading systems or taxes have already been implemented or are under development at the national and subnational levels and a new mechanism was incorporated in the Paris Agreement.^{15,16} As such, markets will continue to be a prominent component of the climate policy portfolio in 2.0.

¹³European Commission. *The EU Emissions Trading Scheme*. European Commission. doi: [10.2834/55480](https://doi.org/10.2834/55480). 2013.

¹⁴*Kyoto Protocol. Article 12*. 1998.

¹⁵Kossov, A., G. Peszko, K. Oppermann, N. Prytz, N. Klein, K. Blok, *State and Trends of Carbon Pricing 2015* (September), by World Bank, Washington, DC.

¹⁶*The Paris Agreement. Article 6*. 2015.

I was a strong believer that carbon markets provided the best hope of achieving climate policy objectives at the lowest cost. My support was based primarily on my experience with the US acid rain trading program (the world's first large-scale market created to solve an environmental problem) included in the Clean Air Act Amendments (CAAA) of 1990. However, it was strengthened by the characteristics of GHG emissions and economics. First, the nature of climate change is such that reductions achieved anywhere in the world would benefit the global climate equally. And second, the large disparities in reduction costs around the globe provided powerful cost-saving opportunities for trade. Designed correctly, carbon markets could help drive down the cost of achieving GHG emission reductions, provide incentives for additional reductions, and stimulate innovation. In the US, markets also provide the possibility of moving past the contentious and inevitable debate over the use of taxes to address climate change as they had with acid rain.

After stubbornly denying it for many years, I reluctantly concluded that the initial vision of carbon markets playing the central role in GHG emissions mitigation and mobilizing large volumes of capital necessary to combat climate change would not become a reality. This was a difficult conclusion for me to reach. Markets will continue to play an important role in the effort to address climate change; however, other approaches will also play significant roles. Policy-makers and affected parties need to move past the contentious debates of trade versus taxes versus regulation. They all have a role to play and we need all of them. Each nation should implement policies based on their circumstances and policy-making traditions.

My conclusions regarding the role that markets have played in 1.0 and their best use in 2.0 result from my experiences in government as the Chief of Staff at the US DOE from 1993 to 1996 and in the private sector as the Managing Director and COO from 2000 to 2013 of Natsource, a leading company in the formative years of the carbon markets.

At DOE, I participated in the development of the first project-based market mechanism designed to reduce GHG emissions. The mechanism, the United States Initiative on Joint Implementation (USIJI), was a pilot program included in the first US climate change action plan (CCAP)

developed in 1993.¹⁷ It was an outgrowth of the Joint Implementation (JI) concept that was included in the UNFCCC.¹⁸ USIJI, along with other pilot programs including activities implemented jointly (AIJ),¹⁹ which was created by the international community, were the forerunners of the CDM, included as Article 12 in the KP, which became an important and controversial component of the global carbon market. The USIJI was included in the CCAP in recognition of the global opportunities to reduce GHG emissions where they were the cheapest and for firms to gain experience investing in emission reduction projects outside of the US. It would be the first step in attempting to determine if such programs could work and in motivating the private sector to operationalize such mechanisms. Following my departure from government, and prior to joining Natsource, I worked with several large utilities and energy companies during the Kyoto negotiations and to formulate response strategies once it had been agreed.

In recognition of the Bush Administration's decision to avoid the issue of climate change, I departed the familiar policy world to gain commercial experience and with environmental markets. I joined Natsource in 2000 to create a research business to work with the private sector on climate change. I became the COO in 2005—the year the KP took effect and when the company launched the world's largest private sector carbon fund. According to an independent research, Natsource was the largest buyer of contracted carbon credits created by the KP mechanisms on behalf of its investors through 2007 on a risk-adjusted basis.²⁰ The company closed in 2014.

My hope for the carbon markets in climate change 1.0 was not realized for many reasons. Among the most important are the artificial nature of environmental markets and that the people who design them

¹⁷ Clinton, President W.J., Vice President A. Gore Jr. *The Climate Change Action Plan*. Executive Office of the President. 1993. PP. 26–27.

¹⁸ UNFCCC. Article 4.2. (a). 1992.

¹⁹ *Report Of The Conference Of The Parties On Its First Session, Held At Berlin From 28 March To 7 April 1995, Activities implemented jointly under the pilot phase*. Decision 5/CP.1. United Nations. 1995.

²⁰ Rosenzweig, R. Natsource Recognized as World's Largest Purchaser of Carbon Credits by Leading Investor Research Firm. (Press Release) 6 March 2008.

frequently lack commercial and financial expertise. Unlike natural markets, no firm would require a GHG emissions offset or permit/allowance unless Government required them to comply with an emissions limitation. Governments establish the supplies of compliance instruments in these markets and attempt to set demand, although other dynamics intervene in these efforts, particularly on the demand-side. This leads to design elements that adversely affect the markets' performance. These issues will be described in Chaps. 3 and 4 assessing the CDM and the EU ETS.

In addition, the EU ETS and the Kyoto mechanisms share a characteristic, which is common to top-down systems, that greatly affected their performance in 1.0. This is the inability of governments to respond to and learn from external events and adapt to new information in a timely fashion. For example, the economic recession, which took hold in 2008, and the energy policies in place at the EU level, which operated alongside the EU ETS, contributed to a massive supply and demand imbalance beginning in 2009 that continues today. And although the market enjoyed some successes, the EU's inability to respond contributed to the market's uneven performance and volatility since their inception.

The issues regarding the artificial nature of the market, program design, and external dynamics will continue to impact market performance at the international level. And although the US never adopted a national carbon market, and will not for the foreseeable future, the attempt to pass legislation that would have created a market for GHG emissions following the election of President Obama was a failure by any measure. Its demise was caused by several substantive and political reasons that will be the subject of discussion in Chap. 5. I am confident that the market would not have worked as intended. These conclusions regarding carbon markets are what I reluctantly took away from Climate Change 1.0. Supporters of the KP model believed it would provide Parties with an incentive to develop domestic cap-and-trade systems that would link to the global market. Many believed that this approach provided the best hope to achieve climate policy objectives at the lowest cost. It did not work out as they had hoped.

Carbon markets have an important role to play in the policy portfolio in climate change 2.0 at the national and subnational levels—but they are not ‘the’ answer as many had thought. Taxes and regulation will also play prominent roles in future climate change policy-making. The argument as to which is the best approach needs to stop. The reality of the 60 diverse, bottom-up programs in existence and under development is quite different from the KP’s top-down approach to creating a global market. With the exception of the EU ETS and China’s effort to create a carbon market, they are less ambitious. However, their performance will continue to be affected by the dynamics cited above. For example, the EU ETS operates alongside many other energy policies and measures, many of them regulatory in nature, designed to achieve ambitious goals for renewable energy²¹ and energy efficiency.²² Similarly, California’s cap-and-trade program operates alongside many other measures called complementary policies (CPs).²³ Other jurisdictions are using similar policy models in their response to climate change. These programs often compete with the market’s primary objective of achieving GHG reductions at the lowest cost. The interaction between the market-based systems and regulatory approaches in the emerging era of policy-making will have a significant impact on the magnitude of GHG reductions that are achieved and their costs. To inform future policy-making efforts, more research is required to gain a greater understanding of the interactions between these policy approaches.

Because of continuing interest in using market-based approaches to achieve climate policy objectives, the book will briefly describe the evolution of these approaches and provide recommendations regarding their future role in the policy portfolio. My experience in government

²¹ Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC. Brussels, European Parliament, and Council.

²² Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC. Brussels, European Parliament, and Council.

²³ California Air Resources Board. *Climate Change Scoping Plan, A Framework for Change Pursuant to AB 32, The Global Warming Solutions Act*. 2008.

and participation in the market provides practical insight into these important issues.

Overview

This book is organized around two generations of climate change policy that are primarily distinguished by differences in their approaches and ambition.

Chapters 2, 3, 4 and 5 focus on what I refer to as climate change 1.0. Collectively, this is a reference to domestic and international policies and carbon markets from 1993 through 2012. To learn from these experiences, the main emphasis is on the reasons for the US's failure to adopt important climate change policies including the tax on the British Thermal Unit (BTU) content of energy and GHG cap-and-trade legislation. At the international level, the emphasis is on the major policies and markets including the EU ETS, the CDM, and the KP.

Managing a company at the dawn of the carbon markets was a great personal and professional challenge; it was both exhilarating and exhausting. In an attempt to make the markets less abstract for the reader and show firsthand how they operate, Chaps. 3 and 4 describe Natsource's business strategy to participate in the markets, some of the cutting-edge transactions the company participated in, and the forces that contributed to the closing of the company. I am hopeful that these real-world examples will be entertaining, but most importantly illustrate the interaction between policies and markets and how companies participate in them.

Chapter 6 describes the emergence of policies that are defining climate change 2.0 in the US and at the international level. Collectively, this is a group of more targeted bottom-up policies that emerged while the first generation was drawing to a close. They include President Obama's Climate Change Action Plan and the Paris agreement. Chapter 7 provides recommendations for future policy in the US and internationally.

2

Climate Change Policies of the Clinton Administration

Domestic Policy

The environmental community was excited for the Clinton Administration to take office following 12 years of Republican administrations it viewed as hostile to the environment. President George H.W. Bush had advocated for and signed the CAAA of 1990 into law and his administration had negotiated the UNFCCC, the international community's first attempt to develop an international framework to address the issue of climate change. It included the non-binding aim of returning GHG emissions to 1990 levels.¹ However, the environmental community did not believe that the voluntary emissions reduction goals included in the convention were up to the task. After 12 years in the wilderness, it was looking forward to working with the new Administration and Democratic majorities in both houses of Congress to advance its agenda, and one of its primary emphases was on climate change. During the campaign, candidate Clinton had pledged to 'limit US carbon dioxide emissions

¹United Nations. *United Nations Framework Convention on Climate Change*. Article 4 2. (b). 1992.