

Foreword by Governor
ARNOLD SCHWARZENEGGER

CRACKING THE CARBON CODE

**THE KEY TO
SUSTAINABLE PROFITS
IN THE
NEW ECONOMY**

TERRY TAMMINEN

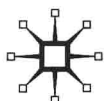
Cracking the Carbon Code

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Terry Tamminen



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*For Constantino Cruz, Diana Wrightson, Drew Bohan,
Michael Northrop, Craig Cogut, and the many others who
have shown us that climate change creates both challenges
and opportunities—but that the path ahead is up to us.*

FOREWORD

In my early days of bodybuilding, I remember working so hard to lift 50 pounds, then 100, then 300. After years of exercise and competition, I could lift 480 pounds, but wanted to beat the Austrian record of 500 pounds. Everyone at the gym said it was impossible. Even I had my doubts. But I knew that to win the ultimate bodybuilding championship, Mr. Universe, my muscles had to be strong enough to bench press that 500-pound barbell.

I tried week after week, five times, eight times, ten times, but could never lift that much weight. It was just 20 pounds more than I had already lifted, and no matter how many times I failed, I kept working to add muscle and become strong enough to beat the record. Any reasonable person would have settled for 480 pounds, but I was determined to prove the skeptics wrong and push myself to a new level. Finally, after what seemed like endless training, workouts, and setbacks, I thrust that barbell high over my chest—with 501 pounds of weight on it, a new record!

The lesson I learned from that experience was that no matter how hard it appears, every worthwhile goal can be accomplished. You have to set the goal and then organize every step along the way until it builds up to victory. You must evaluate the obstacles so you can overcome them—are they mental barriers or physical ones? Are they perception or reality? What will it take to do something no one has done before?

The same has been true for me as Governor of California, tackling the twin goals of building a strong economy and protecting the environment. I introduced the Million Solar Roofs Initiative to power the state with clean energy from the sun, for example, but each year the measure was defeated by the state legislature.

I kept working on it with Democrats and Republicans, with labor leaders and home builders, with environmental groups and chambers of commerce. On the third try we got it done. Today, we are more than halfway toward our goal of a million rooftops in California generating both clean energy and sustainable, high-paying jobs.

In recent years, the world's economy and its glaciers have experienced a simultaneous meltdown for many of the same reasons. The *solutions* to these problems are also intertwined and present us with a fantastic opportunity for a century of unparalleled growth and prosperity for everyone. But we must first set new goals for the way we think about energy and work toward them step by step.

Energy is a fundamental building block of any economy, not to mention any business or family budget. When gasoline prices double in a matter of weeks or when electricity grids can't keep up with demand, businesses close and workers are laid off. This breaks budgets around the world and such volatility makes it impossible to plan for other needs.

I remember the 1973 Arab oil embargo. It was just a few years after I arrived in America, and the lines went around the block to fill up our cars. What if we had a choice back then, to use a different fuel or to fill up with fuels that didn't depend on a single source? What if we had that choice now, when many families must choose between putting \$50 into their gas tanks instead of food on their tables? Reducing our dependence on carbon-based fuels can help us get out of the current financial mess; and greater energy diversity means long-term energy security.

But can clean, renewable fuels be enough to power our economy in the twenty-first century? Consider this: enough sunlight falls on the earth every hour to power all of humanity's energy needs for a year. And did you know that there's enough hydrogen in the water discharged by sewage treatment plants to power all of our cars, trucks, trains, and airplanes? Add to these the potential of biomass, geothermal, tidal power, wind, and other renewable sources and it's clear that there are enough clean energy resources, but we must deploy the technology to use them, especially

technologies that make more of what we already have. We've done it in California. For example, we have set energy efficiency standards for appliances and buildings that make us 40 percent more energy efficient than average Americans. I recently toured a company in San Francisco, Solazyme, that makes fuel for the Navy from algae. Our Hydrogen Highway Network is demonstrating that cars powered by the most abundant, clean resource in the universe can create even more new businesses, and freedom from unreliable, polluting fossil fuels.

In *Cracking the Carbon Code*, my friend Terry Tamminen provides us with a compelling playbook of how to restore our economic vitality and preserve our environment for generations to come. Businesses can save money and grow markets by reducing their carbon footprints. Governments can create public-private partnerships to invest in low carbon technologies, making schools, public facilities, and fleets into leaders of green building and transportation designs. People around the world can compete with each other to see which company, state, or nation can slash its carbon the most, with a goal of reducing greenhouse gases at least 80 percent by 2050. And we shouldn't wait to see who goes first, but race to the head of the pack.

Of course there are many complex solutions to our economic and climate change challenges, but in the end, igniting this fundamental shift will depend on bold action by government, business, and each one of us. This won't be a spectator sport. There are no innocent bystanders now that we know what's at stake.

So let's get on with it! Together we can lift the heavy weight of the economic and climate change challenges facing us today, and make everyone a champion for generations to come.

A large, stylized handwritten signature in black ink, which appears to read "Arnold Schwarzenegger". The signature is fluid and cursive, with a long horizontal stroke at the end.

—GOVERNOR ARNOLD SCHWARZENEGGER

ACKNOWLEDGMENTS

The benefits of cracking the Carbon Code would not have materialized in the United States without the bold leadership of Governor Arnold Schwarzenegger. Because of his political risk-taking in California, the rest of the country is unlocking the secrets of the Carbon Code and the federal government has now begun to follow. This, in turn, gives us all hope for a global agreement that will result in a sustainable environment and economy in the twenty-first century. We owe him a great debt of gratitude.

Of course, as the old saying goes, success has many parents. My team at Seventh Generation Advisors has contributed to this book and helped California push forward on the low-carbon path and shown other governments and businesses around the world to learn from its example. Thanks to Kristina Haddad, Sasha Abelson, Andria Mack, and Jenna Cittadino. Thanks also to my partner and friend Bonnie Reiss, who served with me in the Schwarzenegger administration and made the climate policy work possible. She and her colleague Nick Kislinger remain instrumental in implementing that vision in the business world today.

Just as Al Gore first spoke to Congress about climate change in the early 1980s, there was one shrewd strategist who not only saw that states would be the living laboratories for a low-carbon economy before the rest of us did, but also put the strength of a major foundation behind numerous NGOs to develop and implement the policy details. Thanks to Michael Northrop of the Rockefeller Brothers Fund (ironically, a foundation with an endowment built on oil wealth) for being that visionary a decade ago and introducing me to the idea that we need not wait for national governments to get things done.

I also owe a great deal to Eric Heitz, Marcus Schneider, Jane Bloch, and the team at the Energy Foundation. In 2003, tasked by Governor Schwarzenegger to recommend carbon reductions for the state and the means to achieve them, I realized that my staff at the California EPA had no time and limited expertise for such a monumental project. I turned to the Energy Foundation for help and they pulled together the scientists, policy experts, and economists that helped us draft the Climate Action Plan, which ultimately became the state's Global Warming Solutions Act of 2006 (AB32). Their support since then has resulted in numerous countries and companies discovering the benefits of energy efficiency, renewable energy, and a host of other measures that make cutting carbon both possible and cost effective.

With the creation of AB32, it took a dedicated team that works both inside and outside of government to make a low-carbon future possible. Thanks to the entire CalEPA and CARB teams, but especially to Linda Adams, Alan Lloyd, Mary Nichols, Drew Bohan, Patty Zwarts, Anne Baker, Margret Kim, Eileen Tutt, Maureen Gorsen, Clay Russell, and the unflappable Will Fox.

Of course if policies are enacted but no companies respond with products and services that replace our fossil-fueled habits (and if consumers don't embrace those transformational companies), it's like clapping with one hand. Thanks also goes to the smart investors, such as Craig Cogut and the team at Pegasus Capital Advisors, for proving time and again that a sustainable environment is the fundamental building block of the most profitable, sustainable economies and for their contributions to this book.

Telling a story and providing advice verbally is one thing, but putting it on paper is quite another. Thanks to Cynthia Cannell and Bruce Tracy for helping me wrangle complicated material into a usable format in this book, and to my editor at Palgrave, Laurie Harting, for getting it onto bookshelves.

Finally, I often joke that I could end global warming single-handedly if I stopped flying around the world. While an exaggeration, it highlights the weeks spent away from home and the fact that I could not have undertaken the work described in this

book without the love, support, and advice of my wonderful wife Leslie Tamminen and our son Jake Rubin.

On behalf of generations yet to come, who will live with our success or failure in making the profound transition to a truly sustainable world, my gratitude to everyone who is helping world governments and businesses to crack the Carbon Code—and secure the path to sustainable prosperity in the new economy of the twenty-first century.

INTRODUCTION

What Is the Carbon Code?

Carbon emissions. Carbon tax. Cap-and-trade. “New” economy.

California Governor Arnold Schwarzenegger and Chinese Minister Xie Zhenhua.

AB32. AAUs/CERs. CDM & JI. CFCs. CO₂. COP15.

EU ETS. GHGs. ICAP. IPCC. ISO14064. RPS.

UNFCCC. WCI/RGGI/MWGGGA.

The Japanese town of Kyoto.

This dizzyingly varied jumble of people, places, concepts, and acronyms are all oddly shaped pieces of a mosaic that, taken together, equal a new owner's manual for the economy of the twenty-first century. Along with hundreds of new laws, incentives, politics, inventions, Nobel Prize winners, science debates, and disappearing natural resources, it all adds up to something called the *Carbon Code*.

Simply stated, the six “greenhouse” gases emitted from decaying materials and the combustion of fossil fuels—called “carbon” for short—are a surprisingly effective means to measure efficiency and waste. The more carbon emitted from a power plant, for example, the less efficient is that combination of fuel and generator. Those inefficiencies can be measured and mitigated, saving money and limited natural resources in the process. The Carbon Code sets out the practical steps for making almost any business more efficient and shows how to use this unique yardstick to understand the costs and benefits of each marginal improvement.

Of course not all companies are direct emitters of carbon, but most rely on those that are, such as power plants, transportation, waste disposal, and buildings (yes, even an office tower is a major source of carbon emissions). Businesses, investors, shareholders, governments, and consumers are being inundated with complex and conflicting data points about climate change and the efforts to address it. The book in your hands puts all of this dynamic information into a comprehensible order and context. It provides a road map through the maze to help you understand what parts of this new economic paradigm will fundamentally change the way we do business, the way we choose our investments, and even the way we make choices about allocating the planet's remaining natural resources.

Anyone working at an oil refinery, for example, already knows they must measure and report carbon emissions to USEPA. So do managers of the other 10,000 installations across the United States and 15,000 across Europe in industries with similarly large and obvious carbon footprints. But what about manufacturers, or their suppliers, of the hundred thousand products on Walmart shelves? What about businesses that don't realize their operations may hide liabilities so vast that companies "too big to fail" will soon be dropping in value, or even from the marketplace altogether? Everyone with money to make—or lose—needs to understand how to crack the Carbon Code and how to make profitable use of this information.

This book will not only reveal the secrets of the Carbon Code, but it will give you the amazing background of how it was developed and introduce you to the fascinating people and places to watch for future changes and opportunities. Those who crack the Carbon Code will be able to spot the companies and technologies that are to the new low-carbon economy what Microsoft and Apple were to the information technology revolution of the 1980s.

Liabilities avoided. Fortunes made. The wiring instructions of the future made simple. This is what *Cracking the Carbon Code: The Key to Sustainable Profits in the New Economy* is all about.

C O N T E N T S

<i>List of Illustrations</i>	ix
<i>Foreword</i>	xi
<i>Acknowledgments</i>	xv
<i>Introduction What Is the Carbon Code?</i>	xix
1 The Bodybuilder, the Brit, and the Oilman: A Brief History of the Carbon Code	1
2 Cracking the Carbon Code Step One: Time Your Carbon Tipping Point	25
3 Cracking the Carbon Code Step Two: Build a Fence	41
4 Cracking the Carbon Code Step Three: Cut the Carbon	61
5 Cracking the Carbon Code Step Four: Manage What Can't Be Cut	77
6 Cracking the Carbon Code Step Five: Estimate Carbon Resilience	99
7 Conclusion and Quick-Start Guide	117
<i>Resource Guide</i>	123
<i>Glossary</i>	135
<i>Appendix A Carbon 101: The Four Key Facts</i>	143

<i>Appendix B</i>	<i>The United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol</i>	149
<i>Appendix C</i>	<i>Global Cap-and-Trade Carbon Markets 101</i>	155
<i>Appendix D</i>	<i>States Taking Action on Carbon</i>	163
<i>Index</i>		167

LIST OF ILLUSTRATIONS

Figures

2.1	Worldwide sources of greenhouse gas emissions in 2007	28
2.2	Carbon footprint label on milk	33
4.1	The McKinsey curve	66
5.1	Regional vulnerability assessments	96
6.1	Finding the Carbon Resilience Ranking of a company	102
A.2	Trends in GHG emissions over time	146
C.1	How cap-and-trade works	156
C.2	Cap-and-trade markets in the United States	161
D.1	U.S. states with greenhouse gas emissions targets	164
D.2	U.S. states with climate action plans (or equivalent policies)	165
D.3	U.S. states with renewable portfolio standards	165

Tables

3.1	Annual carbon emissions report: Bentley Prince Street, from California operations	55
7.1	A carbon code quick start checklist	122
A.1	The six greenhouse gases and their characteristics	145
A.3	Sources of carbon added to the atmosphere annually	147

CHAPTER 1

The Bodybuilder, the Brit, and the Oilman: A Brief History of the Carbon Code

Never was so much owed by so many to so few.

Winston Churchill, August 20, 1940

It was a warm and muggy Southern California day in July 2006, but no hint of perspiration dared to appear on the bronzed face of Governor Arnold Schwarzenegger. He was speaking with Lord John Browne, then chairman of oil giant BP (known then as British Petroleum), and me at a port facility in Long Beach. We were waiting for the arrival of British Prime Minister Tony Blair.

The topic of this summit was putting a price on greenhouse gas pollution—"carbon"—and its genesis was straightforward. A year earlier, The Governor had addressed a crowd in the San Francisco City Hall on the United Nations' World Environment Day, declaring "the science is in; the debate is over; the time for action is now," and set California's goals for reducing carbon—down to 1990 levels by 2020 and 80 percent below that by 2050. He signed an

Executive Order that day establishing a path to achieve those goals, but any truly meaningful regulation of carbon would depend on putting all of this into law, because industries such as oil, cement, agriculture, and the catch-all California Chamber of Commerce quickly lined up to criticize the governor's action as a job-killer and business-buster.

Despite the misgivings of some, by early 2006 state agencies and a multitude of stakeholders had developed a credible plan that would achieve the carbon reductions and pay for much of it with energy efficiency measures, renewable energy generation like solar and wind power, and the production of alternative fuels like hydrogen, bio-diesel, and batteries—all things that would make California more competitive and create new industries in the Golden State. To convert the plan into law, the governor worked with legislators to introduce Assembly Bill 32 (or simply “AB32”), The Global Warming Solutions Act of 2006.

Locked in a tough re-election campaign and with his own Republican Party firmly opposing AB32, Schwarzenegger began campaigning to get the bill passed. In June, Schwarzenegger and I had flown to Sedona, Arizona to attend the Western Governors' Association annual meeting. We had successfully convinced the other governors at the meeting—conservative Republicans and liberal Democrats alike—to sign an agreement to tackle climate change on a regional basis. We needed this kind of broad support to make the case back home for AB32, but the meeting highlighted another challenge: addressing global issues on a less than global scale.

As we prepared for the formal session where the regional deal would be adopted by the nineteen governors, we compared notes on carbon policy with two other progressive governors—Janet Napolitano of Arizona and Christine Gregoire of Washington. Janet was smart and articulate, qualities that would later bring her to the attention of President Obama and put her at the head of the federal Homeland Security Agency. Christine was a bold risk-taker. She had just won her first term in office, after a recount, by a mere 200 votes (taking Seattle with a 150,000 vote majority, but losing the rest of the state by an equally large margin), highlighting