

THE  
THIRD  
INDUSTRIAL  
REVOLUTION

HOW LATERAL POWER  
IS TRANSFORMING ENERGY,  
THE ECONOMY, AND THE WORLD



**NEW YORK  
TIMES  
BESTSELLER**

JEREMY RIFKIN

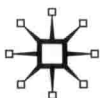
# THE THIRD INDUSTRIAL REVOLUTION

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## PRAISE FOR *THE THIRD INDUSTRIAL REVOLUTION*

“A provocative strategy for transforming the global energy system. This book may help frame the social and economic solutions for the 1.5 billion poorest people who lack access to clean, reliable, and efficient energy services.”

—Dr. Kandeh K. Yumkella, director-general of the  
United Nations Industrial Development Organization (UNIDO)  
and chairman of UN Energy

“Jeremy Rifkin’s intellectual rigor, combined with lively and engaging prose, has produced a timely and important work on how to diversify our energy sources in order to create a world in which people can live well and within the limits of the planet.”

—Björn Stigson, president of the World Business  
Council for Sustainable Development

“As the chairman of a global real estate services company, I’m convinced that Jeremy Rifkin’s vision of rethinking buildings as green ‘micro-power plants’ is the future. But to do this, we need the courage to act quickly and lay the foundation for the Third Industrial Revolution. So let’s get on with it.”

—Bruce Mosler, chairman of Cushman & Wakefield Global Brokerage

“Very compelling . . . while many experts focus on how to transform our energy systems, few offer such a comprehensive economic vision and social road map as Jeremy Rifkin. The ‘Energy Internet’ will lift our world to a new plateau of economic growth, while at the same time addressing climate change and increasing our energy security. . . . A must-read.”

—Guido Bartels, chairman of the Global Smart Grid Federation

“An exciting vision for a post-carbon society. Rifkin embeds green transport inside a new high-tech Third Industrial Revolution infrastructure, reframing the very concept of human mobility. This could well be the future of transportation.”

—Alan Lloyd, president of the  
International Council on Clean Transportation

“The old ways of creating wealth just don’t work anymore, and politicians the world over are struggling to cope with the convergence of financial meltdown, huge debt, rising commodity and energy prices, accelerating climate change, and food and water shortages. The Third Industrial Revolution presents us with a breathtakingly exciting alternative that will create the jobs, the profits, and the technological breakthroughs we now so urgently need.”

—Jonathon Porritt, founder and director of Forum for the Future

“Jeremy Rifkin’s Third Industrial Revolution sets forth a comprehensive, realistic, technically sound, market-driven model for transitioning the global economy into a more sustainable future. Rifkin’s vision of ‘Distributed Capitalism’ strikes a powerful chord among leading CEOs in the design and construction industries who will be tasked with turning the theory and promise of a Third Industrial Revolution into reality.”

—Mark Casso, president of the Construction Industry Round Table

“Erudite and highly entertaining . . . Jeremy Rifkin sees the reality of the Third Industrial Revolution overturning conventional economic theory, doing away with traditional political ideologies, and redefining capitalism itself. This is a book no serious thinker should miss.”

—Stéphane Rambaud-Measson, president of Passengers at  
Bombardier Transportation

*“The European Union’s priority task in the first half of the twenty-first century will be—to quote Jeremy Rifkin—‘to lead the way to the Third Industrial Revolution.’ Reducing CO<sub>2</sub> emissions is only part of the story: the time for a switch to a low-carbon economy has come.*

*This is no Utopia, no futuristic vision: in twenty-five years’ time, we will be able to construct each building as its own ‘mini power station’ producing clean and renewable energy for its own needs, with the surplus being made available for other purposes.*

*These are the pillars of the ‘Third Industrial Revolution,’ which Jeremy Rifkin has described so powerfully: greater use of renewable energies, the construction of buildings which produce their own energy, and the transition to the use of hydrogen for energy storage.*

*What is at stake is the future of the European Union—and we should not be so complacent as to understand the word ‘future’ as meaning only something which comes after us!*

*We must not miss the opportunity to usher in the Third Industrial Revolution: it offers us a chance to put the European economy on a forward-looking and sustainable footing and, in that way, to secure its competitiveness in the long term.”*

—Hans-Gert Pöttering, president of the European Parliament,  
speaking at the European Union’s second Citizens’ Agora,  
June 12, 2008

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A special thanks to Angelo Consoli, who has directed our European operations for the past nine years. Mr. Consoli's political acumen and tireless dedication has been instrumental in making the Third Industrial Revolution vision a reality across Europe.

Finally, I would like to thank my wife, Carol Grunewald, for her trusted advice and counsel over the past twenty-two years. Our shared dream of creating a more sustainable world for every human being, as well as for all of our fellow creatures, has been the inspiration that has guided our journey.

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# INTRODUCTION

WASHINGTON, DC

Our industrial civilization is at a crossroads. Oil and the other fossil fuel energies that make up the industrial way of life are sunseting, and the technologies made from and propelled by these energies are antiquated. The entire industrial infrastructure built on the back of fossil fuels is aging and in disrepair. The result is that unemployment is rising to dangerous levels all over the world. Governments, businesses and consumers are awash in debt, and living standards are plummeting. A record one billion human beings—nearly one-seventh of the human race—face hunger and starvation.

Worse, climate change from fossil fuel-based industrial activity looms on the horizon. Our scientists warn that we face a potentially cataclysmic change in the temperature and chemistry of the planet, which threatens to destabilize ecosystems around the world. Scientists worry that we may be on the brink of a mass extinction of plant and animal life by the end of the century, imperiling our own species' ability to survive. It is becoming increasingly clear that we need a new economic narrative that can take us into a more equitable and sustainable future.

By the 1980s the evidence was mounting that the fossil fuel-driven Industrial Revolution was peaking and that human-induced climate change was forcing a planetary crisis of untold proportions. For the past 30 years I have been searching for a new paradigm that could usher in a post-carbon era. In my explorations, I came to realize that the great economic revolutions in history occur when new communication technologies converge with new energy systems. New energy regimes make possible the creation of more interdependent economic activity and expanded

commercial exchange as well as facilitate more dense and inclusive social relationships. The accompanying communication revolutions become the means to organize and manage the new temporal and spatial dynamics that arise from new energy systems.

In the mid-1990s, it dawned on me that a new convergence of communication and energy was in the offing. Internet technology and renewable energies were about to merge to create a powerful new infrastructure for a Third Industrial Revolution (TIR) that would change the world. In the coming era, hundreds of millions of people will produce their own green energy in their homes, offices, and factories and share it with each other in an “energy Internet,” just like we now create and share information online. The democratization of energy will bring with it a fundamental reordering of human relationships, impacting the very way we conduct business, govern society, educate our children, and engage in civic life.

I introduced the Third Industrial Revolution vision at the Wharton School’s Advanced Management Program (AMP) at the University of Pennsylvania, where I have been a senior lecturer for the past sixteen years on new trends in science, technology, the economy, and society. The five-week program exposes CEOs and business executives from around the world to the emerging issues and challenges they will face in the twenty-first century. The idea soon found its way into corporate suites and became part of the political lexicon among heads of state in the European Union.

By the year 2000, the European Union was aggressively pursuing policies to significantly reduce its carbon footprint and transition into a sustainable economic era. Europeans were readying targets and benchmarks, resetting research and development priorities, and putting into place codes, regulations, and standards for a new economic journey. By contrast, America was preoccupied with the newest gizmos and “killer apps” coming out of Silicon Valley, and homeowners were flush with excitement over a bullish real estate market pumped up by subprime mortgages.

Few Americans were interested in sobering peak oil forecasts, dire climate change warnings, and the growing signs that beneath the surface, our economy was not well. There was an air of contentment, even complacency, across the country, confirming once again the belief that our good fortune demonstrated our superiority over other nations.

Feeling a little like an outsider in my own country, I chose to ignore Horace Greeley’s sage advice to every malcontent in 1850 to “Go West, young man, go West,” and decided to travel in the opposite direction,

across the ocean to old Europe, where new ideas about the future prospects of the human race were being seriously entertained.

I know at this point, many of my American readers are rolling their eyes and saying, “Give me a break! Europe is falling apart and living in the past. The whole place is one big museum. It may be a nice destination for a holiday but is no longer a serious contender on the world scene.”

I’m not naïve to Europe’s many problems, failings, and contradictions. But pejorative slurs could just as easily be leveled at the United States and other governments for their many limitations. And before we Americans become too puffed up about our own importance, we should take note that the European Union, not the United States or China, is the biggest economy in the world. The gross domestic product (GDP) of its twenty-seven member states exceeds the GDP of our fifty states. While the European Union doesn’t field much of a global military presence, it is a formidable force on the international stage. More to the point, the European Union is virtually alone among the governments of the world in asking the big questions about our future viability as a species on Earth.

So I went east. For the past ten years, I have spent more than 40 percent of my time in the European Union, sometimes commuting weekly back and forth across the Atlantic, working with governments, the business community, and civil society organizations to advance the Third Industrial Revolution.

In 2006, I began working with the leadership of the European Parliament in drafting a Third Industrial Revolution economic development plan. Then, in May 2007, the European Parliament issued a formal written declaration endorsing the Third Industrial Revolution as the long-term economic vision and road map for the European Union. The Third Industrial Revolution is now being implemented by the various agencies within the European Commission as well as in the member states.

A year later, in October 2008, just weeks after the global economic collapse, my office hurriedly assembled a meeting in Washington, DC, of eighty CEOs and senior executives from the world’s leading companies in renewable energy, construction, architecture, real estate, IT, power and utilities, and transport and logistics to discuss how we might turn the crisis into an opportunity. Business leaders and trade associations attending the gathering agreed that they could no longer go it alone and committed to creating a Third Industrial Revolution network that could work with governments, local businesses, and civil society organizations toward the goal

of transitioning the global economy into a distributed post-carbon era. The economic development group—which includes Philips, Schneider Electric, IBM, Cisco Systems, Acciona, CH2M Hill, Arup, Adrian Smith + Gordon Gill Architecture, and Q-Cells, among others—is the largest of its kind in the world and is currently working with cities, regions, and national governments to develop master plans to transform their economies into Third Industrial Revolution infrastructures.

The Third Industrial Revolution vision is quickly spreading to countries in Asia, Africa, and the Americas. On May 24, 2011, I presented the five-pillar TIR economic plan in a keynote address at the fiftieth anniversary conference of the Organization for Economic Cooperation and Development (OECD) in Paris, attended by heads of state and ministers from the thirty-four participating member nations. The presentation accompanied the rollout of an OECD green growth economic plan that will serve as a template to begin preparing the nations of the world for a post-carbon industrial future.

This book is an insider's account of the unfolding Third Industrial Revolution vision and economic development model, including a look into the personalities and players—heads of state, global CEOs, social entrepreneurs, and NGOs—who are pioneering its implementation.

In designing the EU blueprint for the Third Industrial Revolution, I have been privileged to work with many of Europe's leading heads of state, including Chancellor Angela Merkel of Germany; Prime Minister Romano Prodi of Italy; Prime Minister José Luis Rodríguez Zapatero of Spain; Manuel Barroso, the president of the European Commission; and five of the presidents of the European Council.

Is there anything we Americans can learn from what's happening in Europe? I believe so. We need to begin by taking a careful look at what our European friends are saying and attempting to do. However falteringly, Europeans are at least coming to grips with the reality that the fossil fuel era is dying, and they are beginning to chart a course into a green future. Unfortunately, Americans, for the most part, continue to be in a state of denial, not wishing to acknowledge that the economic system that served us so well in the past is now on life support. Like Europe, we need to own up and pony up.

But what can we bring to the party? While Europe has come up with a compelling narrative, no one can tell a story better than America. Madison Avenue, Hollywood, and Silicon Valley excel at this. What has distin-

guished America is not so much our manufacturing acumen or military prowess, but our uncanny ability to envision the future with such vividness and clarity that people feel as if they've arrived even before they've left the station. If and when Americans truly "get" the new Third Industrial Revolution narrative, we have the unequalled ability to move quickly to make that dream a reality.

The Third Industrial Revolution is the last of the great Industrial Revolutions and will lay the foundational infrastructure for an emerging collaborative age. The forty-year build-out of the TIR infrastructure will create hundreds of thousands of new businesses and hundreds of millions of new jobs. Its completion will signal the end of a two-hundred-year commercial saga characterized by industrious thinking, entrepreneurial markets, and mass labor workforces and the beginning of a new era marked by collaborative behavior, social networks, and boutique professional and technical workforces. In the coming half century, the conventional, centralized business operations of the First and Second Industrial Revolutions will increasingly be subsumed by the distributed business practices of the Third Industrial Revolution; and the traditional, hierarchical organization of economic and political power will give way to lateral power organized nodally across society.

At first blush, the very notion of lateral power seems so contradictory to how we have experienced power relations through much of history. Power, after all, has traditionally been organized pyramidically from top to bottom. Today, however, the collaborative power unleashed by the merging of Internet technology and renewable energies is fundamentally restructuring human relationships, from top to bottom to side to side, with profound implications for the future of society.

As we approach the middle of the century, more and more commerce will be overseen by intelligent technological surrogates, freeing up much of the human race to create social capital in the not-for-profit civil society, making it the dominant sector in the second half of the century. While commerce will remain essential to human survival, it will no longer be sufficient to define human aspirations. If we succeed in meeting the physical needs of our species in the next half century—a big if—transcendent concerns are likely to become an ever more important driver of the next period of human history.

In the pages that follow, we will explore the underlying features and operating principles of the Third Industrial Revolution infrastructure and economy, track its likely trajectory over the next four decades, and explore

the obstacles and opportunities that exist along the way to its implementation in communities and countries around the world.

The Third Industrial Revolution offers the hope that we can arrive at a sustainable post-carbon era by mid-century and avert catastrophic climate change. We have the science, the technology, and the game plan to make it happen. Now it is a question of whether we will recognize the economic possibilities that lie ahead and muster the will to get there in time.

PART I

# THE THIRD INDUSTRIAL REVOLUTION





# CHAPTER ONE

## THE REAL ECONOMIC CRISIS EVERYONE MISSED

It was 5 a.m. and I was running on my treadmill, only half listening to the early news on cable TV when I heard a reporter talking excitedly about a new political movement calling itself the “Tea Party.” I stepped off the machine, not sure if I had heard correctly. The screen was full of angry middle-aged Americans hoisting yellow “Don’t Tread on Me” flags, complete with the coiled snake insignia. Others were thrusting signs at the camera declaring “No taxation without representation,” “Close the borders,” and “Climate change is a hoax.” The reporter, barely audible above the chants, was saying something about a spontaneous grassroots movement that was spreading like wildfire across the heartland, protesting big government in Washington, DC, and liberal career politicians who cared only about enriching themselves at the expense of their constituents. I couldn’t believe what I was seeing and hearing. It was like witnessing a perverse inversion of something I had organized nearly forty years ago. Was this some kind of cruel cosmic joke?

### THE BOSTON OIL PARTY OF 1973

December 16, 1973. Snow began falling just after sunrise. I felt a chilling wind against my face as I approached Faneuil Hall in downtown Boston,