FOREWORD BY GIL CARMICHAEL

TRANSPORT BEYOND *Oil*

POLICY CHOICES FOR A MULTIMODAL FUTURE

EDITED BY JOHN L. RENNE AND BILLY FIELDS

Transport Beyond Oil

Policy Choices for a Multimodal Future

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Transport Beyond Oil

Policy Choices for a Multimodal Future

The editors wish to dedicate this book to all of the people and communities along the Gulf Coast who were and still are impacted by the *Deepwater Horizon* disaster.

Foreword

Where Have We Come From? Where Are We Going? Interstate 2.0

Like President Obama, a growing number of American people envision an upgraded, higher-speed rail (HSR) transportation system for intercity passengers in the United States. It is a logical and necessary next step forward from President Eisenhower's Interstate Highway System of the 1950s—but proponents have long had a hard time being heard until recently. While HSR has become ultra-politicized, with some governors canceling good programs (Phase 1–funded at $10.1 billion in recent years) and sending money back to the federal government, high-speed rail is an important step in this century's most important transportation infrastructure program.

Many of us remember when the Arab oil embargo took place in October 1973, creating our first energy crisis. Long waiting lines formed at service stations and many stations turned off their lights on the Interstate. They were out of gas! Americans woke up and realized that we had built a mobility system on a finite fossil fuel. I remember that by 1974 people were abandoning their 4,000-pound, eight-cylinder, six-MPG Buicks and lining up to buy the Volkswagen Rabbit diesel. We started to "think small," and solar and wind energies were being discussed. But by the late 1970s, we were seemingly discovering oil under every polar bear in the Arctic. The price of a barrel of oil went from $35 back down to $9–12 a barrel, and by the mid–1980s we were once again well on our way to preferring gas-guzzling muscle cars, SUVs, 400 HP V8s, and $70,000 trucks! Fat City was the way to go—until 2008. Furthermore, research shows the United States had an unwritten transportation policy that declared Americans want "cheap fossil fuel." Any political figure who even talked about raising the gas tax was doomed!

So where are we today with our twenty-first-century global economy? The truly big energy crisis has occurred. Oil rose to $140-plus per barrel. Gasoline/diesel went to $5 per gallon. Since 2010, oil prices per barrel have remained $80–100 per barrel, which has clobbered the transportation industry, especially aviation. In recent years our Big Three car manufacturers were shattered, and our economy is still on life support. Congress cannot keep prices low by legislation. Global economic chaos will result if just one major oil-producing nation has some sort of calamity.

We can no longer afford the lavishness of the past. As soon as possible, this nation has got to radically change the way People and Freight move in order to avoid long-term economic decline. One need only look at our demographics and our growing population density. When I was thirty, there were 130 million people in the United States. By 2040, there will be 400 million people in the United States and North America will have a population of well over half a billion people! As we finish the first decades of this new century, the old order of "business as usual" is not working. What is the biggest public-works project that can ensure prosperity in this century? Last century it was building Interstate 1.0—the Interstate Highway System—with its 43,000 miles of grade-separated, four-lane highways. It served millions of cars and trucks, and it fed into thousands of small, busy airports with commuter airplanes as well as huge hub airports with large passenger planes going long distances to big cities. In the 1970s and 1980s the airlines expanded, in part because jet fuel prices were about 40–60¢ per gallon, with no tax! Western man built a huge, gaudy, wasteful, polluting transportation system on this cheap oil; it employed millions of people and we all prospered. But that is all over now, and the good old days of cheap fuel will not return.

Where Are We Going?

So what do we do now? What major public-works project can we implement in this century that will help keep our 400 million people working, will promote a prosperous economy, and will build a long-lasting, sustainable transportation system? My answer is that we build "Interstate 2.0." I initially said it should be 20,000 miles of grade-separated, higher-speed rail. It really should be 30,000 miles and should use the huge, wide, existing—and paid for—rail rights-of-way in partnership with the private freight railroads and the states. We should give the private railroads their 25 percent investment tax credit to encourage them to upgrade and double- and triple-track their main lines in order to increase speeds and double freight/passenger capacity. States could build or lease high-speed track on their ROWs to run new, modern, intermodal passenger trains. Most of these high-speed tracks should be grade-separated as were the Interstate highways. Our objective is to enable Amtrak and its partners to run

frequent and safe 110–125 MPH passenger trains. We have the technology to do this with a high degree of safety. It will cut the number of highway fatalities and drastically reduce the wear and tear on the highways as well as the cost of maintaining them.

Intermodal and high-speed passenger-rail visionaries have finally been heard by the president. A huge 2.0 work program puts America on the way to creating an "ethical" intermodal freight and passenger transportation network. We can electrify it by midcentury. It will then truly be an "ethical and sustainable" system. President Obama will be the twenty-first century's Eisenhower because he will have created "Interstate 2.0," a high-speed rail network reconnecting our center cities, major airports, and ports—thus recapturing the vital role of the intercity train, bus, and transit industries.

By the way of explanation: *An "ethical transportation system" is one that (1) does not injure or kill; (2) does not pollute and is environmentally benign; (3) does not waste fuel; and (4) does not cost too much. It uses the strengths of each mode of transportation.* We can build a twenty-first-century intermodal transportation system using the "steel wheel and steel rail" as the fundamental element. Early in this century we can electrify all of North American rail, thereby providing a new source of energy for our transportation system.

We have started. This is Phase 1—$10.1 billion and a number of federally designated, high-speed rail corridors in different regions of the country. Amtrak has survived and will show the American people that a truly integrated, intermodal, passenger transportation system is coming. By using our existing freight-rail ROWs and not destroying more green fields, we can actually create a much better transportation system than Europe.

It is an exciting new era that we are entering. Thank you.

—Gilbert E. Carmichael
Founding Chairman, ITI Board of Directors, Intermodal Transportation Institute, University of Denver
President, Missouth Properties
Federal Railroad Administrator under President George H. W. Bush, 1989–93

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INTRODUCTION

Moving from Disaster to Opportunity

Transitioning the Transportation Sector from Oil Dependence

John L. Renne and Billy Fields

In the spring and summer of 2010, America was transfixed by the image of oil spewing into the Gulf of Mexico from the collapsed remnants of the *Deepwater Horizon* oil platform. Images of majestic pelicans floundering in oil and the personal stories of the eleven crew members who lost their lives when the oil platform exploded were interspersed with camera shots of the seemingly never-ending stream of oil emanating from a broken pipe a mile below the Gulf's surface. While the *Deepwater Horizon* disaster became the poster child for corporate greed and neglect, few considered how America's transportation dependence on oil helped stimulate demand for the oil pouring into the Gulf. Seventy percent of all oil consumed in the United States goes to the transportation sector, mostly powering single-occupant vehicles that Americans use for 82 percent of all trips.[1]

To put this in the context of the *Deepwater Horizon* disaster, imagine that 70 percent of the 68,000 square miles of oil that was floating in the Gulf of Mexico was destined to be consumed by America's transportation sector.[2] The area covered by the oil intended for the transportation sector would cover an area slightly larger than the entire state of Pennsylvania (47,600 square miles). Perhaps more shocking is that, despite the massive amount of oil spilled in the Gulf of Mexico, the quantity used by the transportation sector alone would be consumed in just under three days.[3]

The shocking images from 2010 (e.g., figs. 0.1 and 0.2) have now mostly given way to a slow-motion aftermath of impacts. The Official Selection Documentary of the 2011 Cannes Film Festival, *The Big Fix*, details how pervasive the disaster was—and still

Figure 0.1 Oil-spill impacts on the white sandy beaches of Gulf Shores, Alabama. (Source: istockphoto.com.)

Figure 0.2 Oil-spill impacts on wildlife. Louisiana's coast is a critical stopover habitat for hundreds of species of nesting and migratory seabirds and other waterfowl, including many of North America's most at-risk species. (Source: US Coast Guard, www.ecy.wa.gov/programs/spills/Special_Focus/BP_LA_Oilspill/photo_gallery/wildliferescue_pelican.jpg.)

is—on local economies trying to recover, and it illuminates the uncertain long-term environmental and health impacts on marine populations and coastal communities.[4]

With the disaster receding into our collective memories, proposals for transformative policy response have now given way to inaction. The policy window for change from this disaster has closed, while the demand for oil for the transportation sector continues unabated (see fig. 0.3). The impacts of oil extraction and dependence are often perceived as necessary evils that must be accepted in order to maintain modern standards of living. We are repulsed by the string of oil disasters, but feel powerless to find transformative solutions that can decrease oil dependence.

The chapters in *Transport Beyond Oil* were crafted to provide a data-driven platform to discuss realistic opportunities to transition the transportation sector away from oil dependence. The book addresses the systemic problems underlying America's oil dependence and provides detailed policy alternatives that can help to chart a new course. The chapters throughout the book show how the United States can alter its course of transportation oil dependence and move toward a future with a new economic foundation, greater livability, and an improved environment for the twenty-first century.

Peak Oil and Extreme Oil Impact on Household Budgets and Environmental Disasters

Petroleum is both a scarce natural resource and a ubiquitous product available at your neighborhood gas station for a unit cost cheaper than that of the bottled water you can also purchase there. The concept of peak oil helps to explain how scarcity and availability interact. Proponents of the peak oil concept argue that the Earth has about 50 percent of its oil reserves remaining; however, production capacity has peaked and supplies will not be able to match even current demand. Anyone who has taken a basic economics course could point out that a market with high demand and limited supply will result in upward pressure on the cost of a commodity. Since oil is used universally to manufacture and transport virtually all other commodities, an increase in oil cost results in an increase in the production cost of all other goods. While the peak oil concept was once hotly debated, scientists, government officials, and oil companies have generally accepted peak oil as a fact, along with the implication of increasing prices. The question of when the global peak will occur is still subject to some debate, but most agree that, despite recent discoveries, the global peak will occur during the first quarter of the twenty-first century.

Related to peak oil is the concept of extreme oil. The extraction of the first half of the world's oil supplies, which occurred mainly during the twentieth century,

was relatively easy as this oil was located in large oil reserves. The second half of the world's reserves is much harder and more expensive to extract. Therefore, higher extraction costs will ultimately result in higher consumer prices, adding to the price of petroleum-based transport. And as the *Deepwater Horizon* disaster made clear, the search for extreme oil through more complex extraction technologies also results in increased potential for accidents that are difficult to control. Extracting oil from a mile below the ocean's surface can result in mega-disasters that could take months to control, with impacts possibly lingering for decades. Meanwhile, demand continues to grow.

Independently, peak oil and extreme oil could have a significant inflationary impact on the cost of petroleum-based products for Americans. The combined effect could result in serious national economic instability. The average American spends 18 percent of their household budget on transportation. An additional 12 percent is spent on food, 9 percent on home heating and household operations, and 10 percent on apparel, personal care products, and home furnishings. Thus, approximately half of all purchases are directly related to oil prices, since petroleum is a significant raw material for the manufacture and transport of all of these products.[5]

While financial demands of transportation oil dependence will strain individual and community budgets, the environmental impacts of oil dependence provide both significant short- and long-term challenges. As noted above, the *Deepwater Horizon* Oil Spill in 2010, which served as the impetus for writing this book, was one of the largest global environmental disasters in history. However, the environmental consequences of our automobile-dependent transportation system extend well beyond oil spills. Climate change resulting from greenhouse-gas emissions, air pollution, and water pollution are all serious threats to our local and global ecosystems. These impacts are addressed in greater detail in subsequent chapters.

How Does America Address Oil Addiction and Car Dependence?

As America seeks to emerge from the Great Recession, our national and state highway trust funds are nearing bankruptcy. With hyper-partisanship dominating Congress, leaders have been unable to agree on a plan for maintaining the national transportation system beyond status quo policies. Economic stagnation, political gridlock, and the status quo result from decision makers trying to patch a broken system. As Richard Florida writes,

> our political and business leaders have utterly failed to appreciate and engage this economic transformation. They continue to look backward, with futile attempts

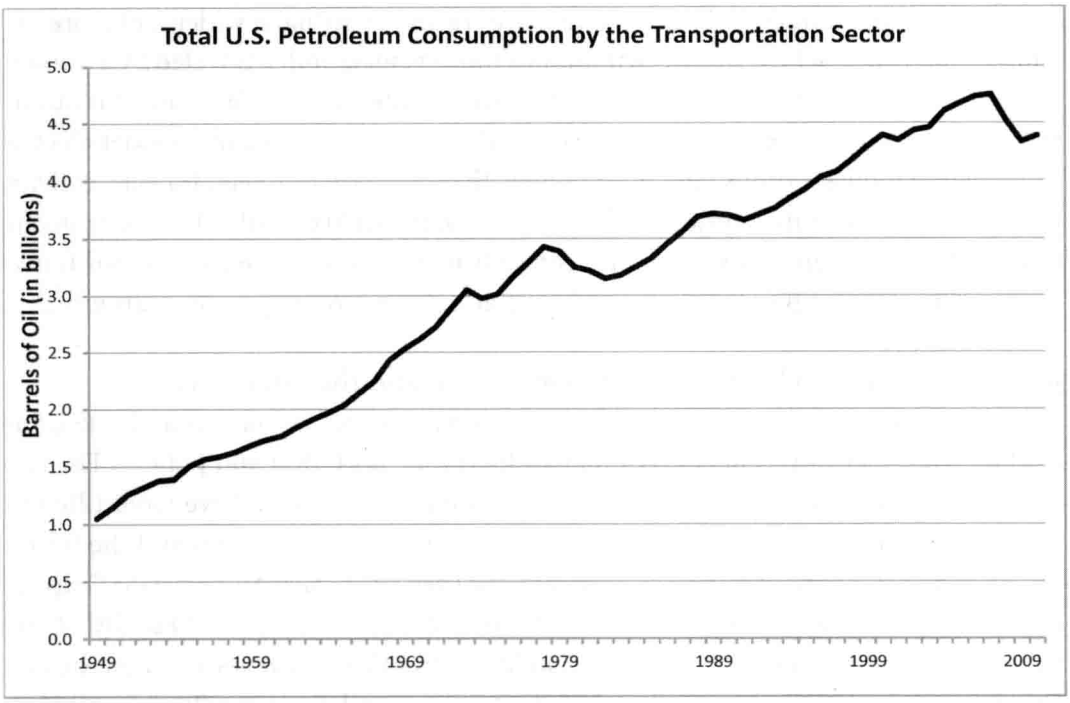

Figure 0.3 Transportation-sector petroleum-consumption estimates, 1949–2010 (in billion barrels of oil). (Source: US Energy Information Administration, Annual Energy Review, October 2011.)

to resuscitate the dysfunctional system of banks, sprawl, and the inefficient and energy-wasting way of life that was the underlying cause of the crisis.[6]

Some scholars contend that we are entering a period where new transportation innovations are needed to break our oil addiction.[7] As in the period after the Long Depression of 1873 and the Great Depression of the 1930s, the economy and society are presently experiencing fundamental changes that can enable new growth and productivity to emerge. These fundamental changes are putting pressure on our transportation sector. Yet change can be slow and painful, especially when we consider how addicted America is to the automobile and its main source of power—oil. Our ability to solve these national problems will determine either the recovery of America's economy or the devolution of our status as a superpower.

The oil consumption paradox exemplifies how problematic our addiction is. Our nation funds transportation through a highway trust fund with tax dollars received from gasoline sales. The less we drive, the more broke the trust fund becomes. So