INTRODUCTION

Energy, Environment, and History

> It was the best of times, it was the worst of times . . .
> Charles Dickens, *A Tale of Two Cities*

Picture Mexico in 1850. The majority of Mexicans lived in villages and practiced some form of agriculture and animal husbandry: slash and burn in the tropical lowlands; rain-fed agriculture in the temperate central highlands and the Bajío;[1] and a mix of ranching and limited irrigation in the arid north. Humans and animals powered every stage of food production. Urban centers were small, few, and far between. Of the country's seven and a half million people, no more than one in twenty lived in a city. Trade and travel depended on human and animal muscle power. Manufacturing took place in small urban workshops or river-powered factories. Like other agrarian societies, population and economic growth were slow and subject to periodic declines. Despite enormous disparities between regions, classes, genders, and races, all mid-nineteenth-century Mexicans lived in a world of low energy consumption where life's necessities came from the land. But if preindustrial Mexico was not a paradise of plenty, neither did its people live in harmony with their surroundings. Deforestation, pollution, and environmental degradation were common but largely limited to specific areas like mining regions. In short, 1850s Mexico was an agricultural society under tight energy constraints, where economic activity, cultural practices, attitudes towards nature, and urban and population growth depended on the diffuse flow of the sun's energy.

One hundred years later, the Mexico of the mid-nineteenth century was wholly transformed. By 1950, Mexico had undergone a fossil fuel revolution that turned the former agrarian country into a rapidly industrializing nation. Beginning in the 1880s, various environmental, political, and social

[1] Located in north-central Mexico with an important history of agricultural and mining production dating back to colonial times.

pressures prompted Mexican industry to power parts of production with coal. Vast oil deposits discovered in northern Veracruz in the early twentieth century further accelerated the country's transition to fossil fuels. By the mid-twentieth century, fossil fuels had become the cornerstone of Mexico's society and economy. From cigarettes, cotton cloth, and steel; to trains, cars, and the tracks and roads they rode on; to the electricity that powered industrial machinery and lighted houses and buildings across the country, fossil fuels underwrote the nation's growth. Cities now concentrated about 40 percent of the population in fossil-fueled economic hubs. Mexico City alone housed around four million people, and some 60,000 civilian cars and thousands of buses transporting more than 1,000,000 passengers daily had replaced most of the draft animals that had once clomped through the streets. Urban and rural areas were now connected by a road network totaling over 21,000 km, almost as large as the country's railroad system. In the countryside, food production was rapidly mechanizing with the onset of Mexico's Green Revolution: over 20,000 tractors ploughed land increasingly dependent on petrochemical fertilizers.

Fossil fuels underpinned the longest economic boom in Mexico's history, the country's *trente glorieuses* averaging 7 percent growth annually between 1940 and 1970. But this fossil-fueled revolution was a gamble. While it brought great economic benefits to substantial sectors of Mexico's population, it left many others behind. It also caused massive environmental change as well as unsustainable demographic, urban, and economic growth that has persisted into the present.

How and why did this century-long transformation occur? To answer these questions, *Fueling Mexico* goes back to the 1830s, when Mexican officials and elites began industrializing parts of the country using water and wood for fuel. By the 1880s, this industrial model confronted an energy, ecological, and social bottleneck. Factories exploited most available river water yet suffered shortages during the drought season. Wood-burning steam engines depleted many forests, to the great concern of conservationists and government officials. Peasant communities clashed with factories over these scarce resources. In the midst of a railroad construction boom following just a few decades of industrialization, Mexican elites found themselves short on energy. But what could power Mexican industry if not wood and water? Looking to their peers in the north and across the Atlantic, the nation's political and economic leaders seemed to find the answer.

Starting in the 1880s, Mexican industrialists began supplementing wood and water with coal. There was just one problem: Mexico was not a coal

country. This coal mainly came from abroad or from distant domestic deposits in Mexico's north, making it expensive. Railroads and important industries adopted coal but continued championing a cheaper and more abundant fossil energy source. Cue oil. Unlike coal, oil was plentiful in Mexico. After 1900, oil gradually became the favored fuel for manufacture, transport, and electricity generation, displacing – though not eliminating – coal. By the 1950s, fossil fuels – oil, coal, and natural gas – formed the bedrock of Mexico's economy and society.

For over a century, successive Mexican governments and industrial elites fostered the transition to fossil fuels. They were convinced that fossil energy would overcome the environmental, energy, and social limits to growth of wood- and-water-based industrialization. Yet the shift failed to truly solve Mexico's energy problems. Rather, it resulted in a paradox of perennial scarcity amidst energy abundance: every new influx of fossil energy into the economy encouraged new applications. This led to increased demands, prompting the quest for and consumption of even more fossil fuels. Fossil power locked Mexico into a cycle of endless, fossil-fueled growth – with profound environmental and social consequences.

Mexico and Energy

By placing the fossil fuel energy transition at the center of Mexico's modern history, this book moves beyond traditional scholarly approaches and reconceptualizes critical junctures in Mexican history. Discussion of Mexico's oil history has focused on topics such as production, oil's role as an export commodity, labor struggles, and contentious relations between Mexican governments and oil multinationals.[2] The few existing analyses of coal tend to fall into the arena of labor and economic history.[3] (Virtually no historical scholarship exists on natural gas.) While important, these approaches largely overlook two crucial elements: the significance of

[2] An overview of this literature is Marcelo Bucheli, "Major Trends in the Historiography of the Latin American Oil Industry," *The Business History Review* 84, no. 2 (2010): 339–62.

[3] See Roberto R. Calderón, *Mexican Coal Mining Labor in Texas and Coahuila, 1880–1930* (College Station: Texas A&M University Press, 2000); Camilo Contreras, "Geografía del mercado de trabajo en la cuenca carbonífera de Coahuila," *Frontera Norte* 13, no. Esp (2001); Camilo Contreras and Moisés Gámez, *Procesos y espacios mineros. Fundición en el centro y noreste de México durante el Porfiriato* (Tijuana: El Colegio de la Frontera, 2004); Ma. Teresa Sánchez, "La minería del carbón y su impacto geográfico-económico en el centro-oriente y noreste de Coahuila, México," *Investigaciones Geográficas. Boletín del Instituto de Geografía*, no. 31 (1995): 93–112; Juan Luis Sariego, *Enclaves y minerales en el Norte de México: Historia social de los mineros de Cananea y Nueva Rosita 1900–1970* (México, D. F.: CIESAS – Centro de Investigaciones y Estudios Superiores en Antropología Social, 2010).

domestic consumption and the underlying unity in the history of these energy sources.[4] Between the 1880s and the 1950s, Mexico's consumption of fossil fuels followed an upward trend, moving the country from an energy regime based on solar energy accumulated in plants and human and animal muscle to one based on ancient sunlight concentrated in fossil fuels. This shift to coal, oil, and natural gas became the main agent of environmental, economic, and social change in Mexico from the late nineteenth into the twentieth century. This book shows that the introduction of coal in the 1880s, the adoption of oil in the first half of the twentieth century, and the consumption of natural gas beginning in the 1940s were all part of the same process – Mexico becoming a fossil-fueled society.

Habitual periodizations of modern Mexico include political and social events like the outbreak of the Mexican Revolution in 1910; the 1929 foundation of the PRI party and one-party system that ruled Mexico until 2000; and the nationalization of the oil industry in 1938. From the standpoint of energy and environmental history, however, the 1880s marked the real turning point in Mexico's modern history, when certain industries began using coal as fuel. Analyzing Mexico's history from this perspective underlines a fundamental continuity between people and movements that the historical literature traditionally contrasts. From the 1880s on, many Mexicans – including most members of the elite, some middle sectors, revolutionaries, and post-revolutionary regimes – agreed that fossil fuels represented the country's ticket to modernity and industrial prosperity. (Those who disagreed, like the Huastec indigenous people of northern Veracruz, were ignored or repressed.) The violent political, social, and cultural disputes that characterized twentieth-century Mexico often reflected different views on how the benefits and burdens of a fossil-fueled society should be shared.

An energy-centric approach sheds new light on pivotal events in Mexican history. Inasmuch as scholars have discussed the role of energy sources during the Mexican Revolution, they have largely focused on how revolutionary factions used oil export revenues to fund their military actions and governments.[5] But deeper connections were at play. By the time the 1910 Revolution broke out, Mexico's energy revolution had been underway for over

[4] On consumption, there are exceptions. See, for instance, María del Mar Rubio, "Oil and Economy in Mexico, 1900–1930s," *JEL* N5, no. Q33 (2005); Luz María Uthoff, "La industria del petróleo en México, 1911–1938: del auge exportador al abastecimiento del mercado interno. Una aproximación a su estudio," *América Latina en la Historia Económica*, no. 33 (2010): 7–30.

[5] Linda B. Hall and Don M. Coerver, "Oil and the Mexican Revolution: The Southwestern Connection," *The Americas* 41, no. 2 (1984): 229–44; Francis Galan, "There Will Be Blood: Oil, Rebels, and Counterrevolution in the Gulf of Mexico Borderlands, 1900–1920," in *New Frontiers in Latin American Borderlands* (Newcastle upon Tyne: Cambridge Scholars Publishing, 2012), 7–19.

two decades. The wrenching social and economic dislocations that led to the Mexican Revolution were partly driven by fossil-fueled technologies in manufacturing, transport, and mining. During the war, coal and oil fueled the railroads that transported armies and materiel. In turn, the armed conflict shaped the pace and direction of Mexico's energy transition by severely disrupting coal mining while leaving the oil industry virtually intact, accelerating the transition to oil as the country's main source of energy. Take another example: oil's role in the political maneuverings of the country's postrevolutionary regimes.[6] Yes, oil revenues padded the state's coffers and helped solidify government legitimacy. But that is not the only story of oil in twentieth-century Mexico. Fossil fuels directly powered unprecedented industrial and economic growth between 1940 and 1970, the so-called Mexican economic miracle. This epic period of growth dramatically transformed Mexico's society – for better or worse – by the increasing exploitation of fossil fuels. Indeed, the miracle's rapid growth introduced fossil fuels to virtually every aspect of Mexico's society by fostering patterns of urban, population, and economic growth that required ever more energy.

By focusing on energy, the book deliberately downplays certain actors and events typically featured in modern Mexican history, instead directing attention to underexamined figures and moments. Every self-respecting historian writing about oil in Mexico is more or less obligated to examine the Cardenista period (1934–40) and the oil expropriation from US and British oil corporations. This book does neither. From the perspective of Mexico's shift to oil energy, the Cardenista expropriation marked no significant change. Mexico's upward trend of oil consumption preceded the expropriation and continued after it, unabated. One could argue that the expropriation simply made official the fact that Mexico ran on oil. While Cárdenas's vision of a modern, prosperous Mexico may have differed from those of peers and predecessors, he never questioned that oil would power this vision. The book spends little time with these well-examined topics in favor of those previously overlooked, including the expansion of the oil pipeline network, the growth of motor traffic and the road system, and industrial patterns of fossil energy consumption.

Although vast, the historiography on Mexico lacks a systematic account of the role energy sources played in the country's industrialization.[7] Historians have examined in detail the development of specific sectors

[6] Jonathan C. Brown and Alan Knight, eds., *The Mexican Petroleum Industry in the Twentieth Century* (Austin: University of Texas Press, 1992).

[7] An overview of the historiography on Mexican industrialization is Aurora Gómez Galvarriato, "Industrialización, empresas y trabajadores industriales, del Porfiriato a la Revolución: La nueva historiografía," *Historia Mexicana* 52, no. 3 (2003): 773–804. For examples of historians of Mexico's

like textiles and steel; regional industrialization; the role of preindustrial artisanal traditions; banking and early manufacturing; the emergence of an industrial working class; the political economy of industrialization; industrialization and economic "backwardness"; and the general history of industry over the centuries.[8] The historiography's lack of a methodical consideration of energy and industrialization is all the more remarkable considering that records show nineteenth- and twentieth-century Mexicans were very concerned with it. Scholars of industrialization elsewhere in the world have written extensively about the critical connection between energy and industry since the nineteenth century.[9] Given that

industrialization who discuss energy, see Edward Beatty, *Technology and the Search for Progress in Modern Mexico* (Berkeley: University of California Press, 2015); Gustavo Garza, *El proceso de industrialización en la ciudad de México, 1821–1970* (México, D. F.: El Colegio de México, Centro de Estudios Demográficos y de Desarrollo Urbano, 1985); Dawn Keremitsis, *The Cotton Textile Industry in Porfiriato, Mexico, 1870–1910* (New York: Garland Publishers, 1987).

[8] The literature on Mexican industrialization is too vast to fully list here. Some prominent examples are: Edward Beatty, *Institutions and Investment: The Political Basis of Industrialization in Mexico before 1911* (Stanford: Stanford University Press, 2001); William E. Cole, *Steel and Economic Growth in Mexico* (Austin: University of Texas Press, 2014); Susan M. Gauss, *Made in Mexico: Regions, Nation, and the State in the Rise of Mexican Industrialism, 1920s-1940s* (University Park: Penn State University Press, 2011); Aurora Gómez Galvarriato, *La industria textil en México* (México, D.F.: Instituto Mora: Colegio de Michoacán: Colegio de México: Instituto de Investigaciones Históricas-UNAM, 1999), and *Industry and Revolution: Social and Economic Change in the Orizaba Valley, Mexico* (Cambridge, Massachusetts: Harvard University Press, 2013); Stephen H. Haber, *Industry and Underdevelopment: The Industrialization of Mexico, 1890–1940* (Stanford: Stanford University Press, 1989); Luis Jáuregui and Ma. Eugenia Romero, eds., *La industria mexicana y su historia: siglos XVIII, XIX, XX* (México, D.F.: Facultad de Economía, Universidad NacionalAutónoma de México, 1997); John Lear, *Workers, Neighbors, and Citizens: The Revolution in Mexico City* (Lincoln: University of Nebraska Press, 2001); Robert A. Potash, *Mexican Government and Industrial Development in the Early Republic: The Banco de Avío* (Amherst: University of Massachusetts Press, 1983); Armando Razo, *Social Foundations of Limited Dictatorship: Networks and Private Protection during Mexico's Early Industrialization* (Stanford: Stanford University Press, 2008); Francisco Rodríguez Garza, *Protoindustralización, industrialización y desindustrialización en la historia de México* (México, D. F.: Universidad Autónoma Metropolitana, Unidad Azcapotzalco, División de Ciencias Sociales y Humanidades, Coordinación de Difusión y Publicaciones: Ediciones y Gráficos Eón, 2009).

[9] Dolores Greenberg, "Reassessing the Power Patterns of the Industrial Revolution: An Anglo-American Comparison," *The American Historical Review* 87, no. 5 (1982): 1237–61, and "Energy Systems and Social Change," *Science* 220, no. 4603 (1983): 1265; Louis C. Hunter, *A History of Industrial Power in the United States, 1780–1930* (Charlottesville: Published for the Eleutherian Mills-Hagley Foundation by the University Press of Virginia, 1979); William Stanley Jevons, *The Coal Question: an Enquiry Concerning the Progress of the Nation, and the Probable Exhaustion of Our Coal-Mines* (London: Macmillan, 1865); Astrid Kander, Paolo Malanima, and Paul Warde, *Power to the People: Energy in Europe over the Last Five Centuries* (Princeton: Princeton University Press, 2013); Kenneth Pomeranz, *The Great Divergence: China, Europe, and the Making of the Modern World Economy* (Princeton: Princeton University Press, 2000); Rolf Peter Sieferle, *The Subterranean Forest: Energy Systems and the Industrial Revolution* (Cambridge: The White Horse Press, 2001); Theodore Steinberg, *Nature Incorporated: Industrialization and the Waters of New England* (Cambridge: Cambridge University Press, 2003); Edward A. Wrigley, *Energy and the English Industrial Revolution* (Cambridge: Cambridge University Press, 2010);

new forms of power needed to mechanize production were central to industrialization everywhere,[10] the history of Mexico's industrialization warrants detailed appraisal of the energy it exploited. Building on the solid scholarship on Mexico's industrialization, *Fueling Mexico* seeks to provide such an account.

Centering energy in Mexico's industrialization shifts the scale of analysis in novel ways. The energy transitions happened first at the local level, so the story of Mexico's industrialization shifts perspective from the nation-state to subnational regions such as the Valley of Mexico or Monterrey. This regional unit of analysis illuminates the similarities between the trajectories of Mexico's industrializing regions and those in Europe and the USA. It was not Britain, the USA, or Mexico, but London and the Midlands, the Northeast, and Mexico City and the Monterrey area that first adopted fossil fuels for industrial power. A regional focus also challenges narratives that starkly oppose European and US industrial "success" to Mexican or Latin American "failure," which only become convincing at the national level.[11] A regionally based approach makes it easier to examine these transitions on their own terms and understand them as part of a multifaceted global process of industrialization.[12] The Valley of Mexico, along with other *regions* within Mexico and Latin America, was

[10] Kenneth Pomeranz defines "industrialization" as the increased use of "energy from sources that never were, or have not recently been, alive (for instance, coal, moving water, electricity and so on, rather than muscle or wood) in manufacturing, transportation, and other parts of life." See "Introduction: What Is 'Industrialization' and What Does It Have to Do with the 'Pacific World'?," in *The Pacific in the Age of Early Industrialization* (Farnham, Surrey; Burlington: Ashgate, 2009), XIII.

[11] Victor Bulmer-Thomas, *The Economic History of Latin America since Independence* (New York: Cambridge University Press, 2014); John H. Coatsworth and Alan M. Taylor, eds., *Latin America and the World Economy since 1800* (Cambridge: Harvard University/David Rockefeller Center for Latin American Studies, 1998); Stephen H. Haber, ed., *How Latin America Fell Behind: Essays on the Economic Histories of Brazil and Mexico, 1800–1914* (Stanford: Stanford University Press, 1997).

[12] Pomeranz identifies two basic paths to industrialization. One was the "North Atlantic path" of Western Europe, the USA, and Canada. Following Kaoru Sugihara's essay "Agriculture and Industrialization: The Japanese Experience," Pomeranz characterizes the North Atlantic path by "exceptionally favorable ratios of land and other resources to population, as well as by the growth of markets and (after about 1750) increasingly rapid technological changes. High labor productivity in both agriculture and industry was partly a result of these ratios and of labor-saving technologies that were selected to exploit them." By contrast, the "East Asian path was different, in part because of very different factor endowments. Labor-absorbing innovations were often critical to raising living standards – for example, double-cropping, breeding silkworms so that they would need maximum attention during the off-season for rice, creating higher-quality cloth through more complex kinds of weaving and so on." Pomeranz suggests that Latin America's path, at least along the Pacific, more closely resembled Southeast Asia, featuring raw material exports, enclave economies, and cheap labor. See Pomeranz, "Introduction: What Is 'Industrialization' and What Does It Have to Do with the 'Pacific World'?," in *The Pacific in the Age of Early Industrialization*, XVII–XXXIV, XLIII–XLVIII.

as much a part of the global industrial revolution as the Midlands, the Ruhr or New England.

Mexico's energy transition to fossil fuels is a story about Mexico, but it is not an exclusively Mexican story. Similar transitions took place elsewhere in the world, including most of Europe, the rest of North America, and parts of Latin America and East Asia. In all cases, industrial growth and its need for vast amounts of cheap energy primarily drove the shift to fossil fuels. Mexico's adoption of fossil fuels followed analogous stages to those abroad, moving from wood and water to coal and then to oil (and natural gas, to a lesser degree). In Mexico, as elsewhere, stages overlapped substantially, with earlier sources of energy coexisting beside new ones. Regional particularities aside, fossil-fueled industrialization worldwide happened roughly over the same period, followed a similar sequence, and was shaped by analogous factors. Energy thus highlights Mexico's connection to the rest of the world as well as the connection between national and global history.

Energy and History

Historians have been trying for several decades to understand how energy sources and transitions shape historical change. Carlo Cipolla's *The Economic History of World Population* was one of the first studies to explicitly frame its narrative from the perspective of energy use.[13] Others, especially US scholars, studied the environmental, social, and economic impact of successive energy sources from the late eighteenth to the late twentieth century, both nationally and in specific cities or regions.[14] The work of Vaclav Smil stands out for its sheer volume, scope, and commitment to interdisciplinarity. Combining insights from energetics, Earth and environmental science, and history, Smil has surveyed the manifold implications of humanity's energy habits in many geographical contexts over the past 40 years.[15]

[13] Carlo M. Cipolla, *The Economic History of World Population* (Baltimore: Penguin Books, 1970).

[14] A pioneering US work is Sam H. Schurr et al., *Energy in the American Economy, 1850–1975* (Baltimore: Johns Hopkins, 1960). See also Hunter, *A History of Industrial Power in the United States, 1780–1930*; Martin V. Melosi, *Coping with Abundance: Energy and Environment in Industrial America* (Philadelphia: Temple University Press, 1985); David E. Nye, *Consuming Power: A Social History of American Energies* (Cambridge, Massachusetts: MIT Press, 1999); Harold L. Platt, *The Electric City: Energy and the Growth of the Chicago Area, 1880–1930* (Chicago: University of Chicago Press, 1991); Theodore Steinberg, *Nature Incorporated: Industrialization and the Waters of New England*.

[15] Particularly relevant are Vaclav Smil, *Energy in World History: Essays in World History* (Boulder: Westview Press, 1994), *Enriching the Earth: Fritz Haber, Carl Bosch, and the Transformation of World Food Production* (Cambridge, Massachusetts; London: The MIT Press, 2004), *Energy Transitions:*

Interest in energy history grew rapidly from the 1990s onward, no doubt due to energy's significance to industrial civilization and increased awareness of climate change. Some scholars studied the impact that fuelwood and coal availability had on the timing and development of British and German industrialization.[16] Others explored why parts of western Europe industrialized while regions in Asia with similar levels of economic development did not.[17] Some authors focused on specific fuels or regions, emphasized infrastructure's role in energy transitions, examined energy over the *longue durée*, or explained the shift to fossil energy as a result of capitalist efforts to control labor.[18] Others underlined the role of coal in achieving sustained economic growth during industrialization, previously unattainable under the "organic energy regime."[19]

This connection between fossil energy and modern economic growth has been the focus of a burgeoning literature, only partially written by historians and published within the last two decades.[20] Innovative and often of excellent quality, this work frequently examines the economics of energy transitions, particularly the relationship between increased energy consumption – mostly coal- and-oil-based – and economic growth over time.[21] Such an emphasis has supported the development of sophisticated

History, Requirements, Prospects (Santa Barbara: Praeger, 2010), and *Energy and Civilization: A History* (Cambridge, Massachusetts: The MIT Press, 2017).

[16] Sieferle, *The Subterranean Forest.* [17] Pomeranz, *The Great Divergence.*

[18] Barbara Freese, *Coal: A Human History* (Cambridge: Perseus, 2003); James C. Williams, *Energy and the Making of Modern California* (Akron: University of Akron Press, 1997); Christopher F. Jones, *Routes of Power: Energy and Modern America* (Cambridge: Harvard University Press, 2014); Jean-Claude Debeir, Jean-Paul Deléage, and Daniel Hémery, *In the Servitude of Power: Energy and Civilisation through the Ages* (London; Atlantic Highlands: Zed Books, 1991); Andreas Malm, *Fossil Capital: The Rise of Steam Power and the Roots of Global Warming* (London; New York: Verso, 2016).

[19] Wrigley, *Energy and the English Industrial Revolution*.

[20] See Kathleen Araújo, "The Emerging Field of Energy Transitions: Progress, Challenges, and Opportunities," *Energy Research & Social Science*, 2014, 112–21; Arnulf Grübler, "Energy Transitions Research: Insights and Cautionary Tales," *Energy Policy* 50 (2012): 8–16; Benjamin Sovacool, "What Are We Doing Here? Analyzing Fifteen Years of Energy Scholarship and Proposing a Social Science Research Agenda," *Energy Research & Social Science* 1 (2014): 1–29; Daniel Spreng, "Transdisciplinary Energy Research-Reflecting the Context," *Energy Research & Social Science* 1 (2014): 65–73.

[21] Robert C. Allen, "Backward into the Future: The Shift to Coal and Implications for the Next Energy Transition," *Energy Policy* 50 (2012): 17–23; Carlo Bardini, "Without Coal in the Age of Steam: A Factor-Endowment Explanation of the Industrial Lag Before World War I," *The Journal of Economic History* 57, no. 3 (1997): 633–53; Mauricio Folchi and Mar Rubio, "El consumo de energía fósil y la especificidad de la transición energética en América Latina, 1900–1930" (III Simposio Latinoamerican y Caribeño de Historia Ambiental, Carmona, 2006); Roger Fouquet, "The Slow Search for Solutions: Lessons from Historical Energy Transitions by Sector and Service," *Energy Policy* 38 (2010): 6586–96; Maria Froeling, "Energy Use, Population and Growth, 1800–1970," *Journal of Popular Economics* 24 (2011): 1133–63; Ben Gales et al., "North versus South: Energy

quantitative historical series on energy production and consumption for individual countries and regions, above all western Europe.[22]

Energy humanities take a different approach to the study of energy.[23] Scholars in this emerging field also emphasize that key elements of modern societies – increasing urbanization, economic growth, and the massive expansion of global trade – were enabled by an equally massive influx of cheap energy from fossil fuels. But they are particularly attentive to how energy regimes mold human social relations and cultural practices that, in turn, shape energy use. Energy humanities frequently critiques energy research that narrowly privileges technical aspects; instead, it emphasizes the role of social structures and cultural practices in shaping energy systems. Energy humanities scholars also tend to call into question the foundations of modern energy systems. They point out that the fossil-fueled growth upon which modern industrial societies depend is unsustainable and inequitable. Taking cues from ecological economists, energy humanists criticize the "growth dogma" and desire for and possibility of endless growth on a finite planet.

Fueling Mexico draws on several insights from this sizable scholarship on energy. The book supports the broad claim that global energy transitions to fossil fuels have been a driving force behind environmental, social, and

Transition and Energy Intensity in Europe over 200 Years," *European Review of Economic History* II (2007): 219–53; Iñaki Iriarte-Goñi and María-Isabel Ayuda, "Not Only Subterranean Forests: Wood Consumption and Economic Development in Britain (1850–1938)," *Ecological Economics* 77, no. 77 (2012): 176–84; José Jofré González, "Patrones de consumo aparente de energías modernas en América Latina, 1890–2003" (PhD Dissertation, Universitat de Barcelona, 2012); Kander, Malanima, and Warde, *Power to the People*; Astrid Kander, "Economic Growth and the Transition from Traditional to Modern Energy in Sweden," *CAMA Working Paper*, no. 65 (September 2013): 1–35; Nuno Luis Madureira, "The Iron Industry Energy Transition," *Energy Policy* 50 (2012): 24–34; Paolo Malanima, "Energy Crisis and Growth, 1650–1850: The European Deviation in a Comparative Perspective," *Journal of Global History* 1 (2006): 101–21, and "Energy in History," in Mauro Agnoletti and Simonee Neri Serneri, eds., *The Basic Environmental History* (New York: Springer, 2014); María del Mar Rubio, et al., "Modern Energy Consumption and Economic Modernization in Latin American and the Caribbean between 1890 and 1925" (Working Paper); Rubio and Mauricio Folchi, "Will Small Energy Consumers Be Faster in Transition? Evidence from the Early Shift from Coal to Oil in Latin America," n.d.; Rubio, "Energía, economía y CO2: España, 1850–2000," *Cuadernos Económicos*, no. 70 (n.d): 52–75; Rubio et al., "Energy as an Indicator of Modernization in Latin America, 1890–1925," *Economic History Review* 63, no. 3 (2010); David Stern and Astrid Kander, "The Role of Energy in the Industrial Revolution and Modern Economic Growth," *The Energy Journal* 33, no. 3 (2012): 125–52; Paul Warde, *Energy Consumption in England & Wales, 1560–2000* (Roma: Consiglio nazionale delle ricerche, Istituto di studi sulle società del Mediterraneo, 2007).

[22] Kander, Malanima, and Warde, *Power to the People*.

[23] Dominic Boyer and Imre Szeman, eds., *Energy Humanities: An Anthology* (Baltimore: Johns Hopkins University Press, 2017).