



**Germán Vergara.** *Fueling Mexico: Energy and Environment, 1850-1950.* Studies in Environment and History Series. Cambridge: Cambridge University Press, 2021. 300 pp. \$99.99, cloth, ISBN 978-1-108-92397-2.

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*Fueling Mexico* is a powerful and foundational work of history. It provides an energy framework that until this book's publication had not been fully applied to Mexican history. Its revisioning of historical change through energy regime transitions will make historians of Mexico rethink the importance of energy production and use in modern Mexican history.

Author Germán Vergara is particularly interested in how and why Mexican state officials, business leaders, conservationists, and everyday people transitioned to fossil fuels. He is interested in the consequences of these transformations. In his words, “amidst all other development of the twentieth century—the wars and revolutions, the pivotal changes in society, politics, and environment—fossil fuels seeped further and deeper into life. They became the foundation upon which so much of Mexico’s history in the second half of the twentieth century was built. It only follows that fossil energy underwrote the country’s success as well as its failures” (p. 220). The transition to fossil fuels started regionally, and it built on historical and geographic circumstances, but it became national. For Vergara, fossil fuels allowed some people to build centers of dynamic vibrancy, but it came at the expense of extreme inequality and severe environmental damage.

Vergara is not the first historian to examine change through an environmental or energy lens, but he is the first to create a chronological history of Mexico based specifically around energy use. *Fueling Mexico* will force historians of Mexico to consider its framework and rethink the importance of energy transformation in relation to all other developments. It provides a model for a paradigm shift in focus and chronology. It also expands and reorients narratives based on energy and environmental transformation, which have commonly focused on the industrial revolution in Europe and the United States.

The first chapter begins with an overview of Mexico in 1850, a time in which a handful of miners and textile mill owners had imported steam engines but the vast majority of the country was powered by the “solar energy regime,” Vergara’s preferred terminology for pre-fossil fuel energy systems (p. 16). He chooses the 1850s because during the decade there was a marked increase in steam power and attempts at industrialization. He uses this chapter to delve into the colonial and early Mexican history of energy production, giving specific attention to mining, domestic wood-fuel consumption, and hydroelectricity. Over 90 percent of Mexico was rural in 1850 and the predominant fuel sources were wood, water, and

muscle. Geography determined some elements of energy use. Most people burned wood or wood charcoal for cooking, warmth, and to fuel early steam engines. In areas where hungry industries devoured energy sources, which was especially true of mining centers, deforestation became widespread, creating islands of exhausted environments.

Vergara demonstrates that mining had already caused severe deforestation by the 1850s and that industrialization, urbanization, and the economy as a whole were limited by the solar energy regime and limited infrastructure. Fuel woods were costly, especially in areas that desired them the most. The pre-fossil fuel energy regime kept cities relatively small. In 1850, the average population size of state capitals in Mexico was 24,000. It is what the pre-fossil fuel energy system could maintain.

In the following chapter, Vergara tracks change and continuity in energy use during the late nineteenth century. Steam engines became increasingly common by the 1860s, and during the subsequent decades they expanded alongside railroad networks and new industries in iron, glass, and textiles. Many textile operations, however, continued to run on water power, including Querétaro's Hercules textile factory, which in the 1870s possessed one of the tallest overshot water wheels in the world. Other urban textile enterprises adopted steam. By 1880, "virtually all of Mexico's mining districts had adopted steam engines in some capacity" (p. 66). But these engines relied mostly on fuelwood until coal became more common in the 1880s. This increased wood consumption "had enormous environmental effects" (p. 61). Many Mexican engineers, conservationists, and technical experts argued that wood scarcity had become a serious issue. Economically, Mexico had hit a bottleneck. Some of these experts proposed the same solution for both problems: coal.

As Vergara makes clear, "unlike European and US coal, Mexican coal never became a household

fuel, nor did it form the bedrock of Mexican industry. Instead, coal acted as an energy bridge between the nineteenth century's ecologically embedded, wood-and-water based industrialization and the twentieth century's oil-powered industrial model" (p. 95). Vergara concedes that coal was never *the* driving force of Mexican domestic energy use or industrialization broadly, but he does argue that it was nonetheless important. Coal in northern Mexico proved especially transformative. US railroad companies reacting to laws privatizing subsoil rights mined coal and used it for their trains. Northern Mexican and US capitalists sought out Mexican coal to fuel coke and intertwined iron and steel industries. Coal drove the expansion of railroad infrastructure, spurred the industrialization of Monterrey, and fueled thermo-electric plants in Mexico City. It also spurred the imaginations of technical elites.

But petroleum was the defining fuel of the mid-twentieth century. For Vergara, "Mexico's incipient oil revolution literally powered the country's social revolution, making the Mexican Revolution one of history's first oil-fueled wars" (pp. 193-194). Vergara adeptly shows how oil became the foundation of revolutionary and postrevolutionary change. Social and energy transitions occurred simultaneously. By the early 1920s Mexico had become the world's second-largest producer of petroleum. By the time that president Lázaro Cárdenas nationalized the oil industry in 1938, "Mexico consumed 76 % of its oil production" (p. 134). Governments from the 1920s to the 1940s expanded roads, irrigation, airports, and manufacturing. By 1960, shipping via trucks surpassed the total cargo moved by trains. In the production of electric power, hydroelectric plants produced substantial power, but thermoelectric production, especially oil-powered thermal plants, became more predominant by 1960.

Vergara concludes with the 1950s, a decade during which he sees the "fossil-fueled society" becoming more complete (p. 176). That is not to say

that energy distribution was equal or that there were no communities still reliant on the solar energy regime. For Vergara, economic inequality and energy inequality went hand in hand. Most wealth went to those with the greatest access to fossil-fueled power. But despite uneven access and contests over energy, few places remained unaffected by the petroleum economy. In 1930, Mexico had 1,400 km of roads. In 1960, Mexico had 45,000 km of roads. Mexico's largest urban areas exploded in size, consuming more people and, in turn, consuming more energy. Fossil fuels dramatically altered rural areas, too. The Green Revolution included new synthetic fertilizers, tractors, and petroleum-powered pumps for irrigation. By the end

of the 1950s Mexico had the most mechanized rural sector in Latin America.

Vergara's history is one of contingencies, global forces, new technologies, and fuel addiction. "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" (p. 3). The book is well researched and well written, and it will be of immense interest to students of Mexican history and scholars interested in how energy, technology, expertise, and social politics have affected environmental and economic change.

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