Compact Cities Electrified: Energy Outlook

BRIEF FOR POLICYMAKERS

ITDP

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ITDP thanks these reviewers and contributors for their generous and valuable support, but all errors remain the responsibility of the authors alone. This project is supported by the FIA Foundation. The FIA Foundation is an international charity supporting safe and healthy journeys for all.

PUBLISHED

September 2026.

COVER IMAGE
Electric bus from the TransJakarta BRT system.
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1. Executive Summary

The ongoing closure of the Strait of Hormuz is disrupting the world's energy supply, creating acute challenges to countries around the world. ITDP and UC-Davis examined the potential long-term impacts on oil and gas imports from shifting urban passenger transport toward dramatically more electric vehicles as well as a mode shift toward much greater rates of walking, cycling, and public transport. Across the six countries studied (Brazil, China, India, Indonesia, Mexico, and the United States), key findings include:

- **Electrification and mode shift can dramatically reduce countries' exposure to future energy crises, reducing urban passenger transport energy consumption by approximately 70% and liquid fuel demand by 85% by 2050.**
- **The largest benefits come from a combined electrification and mode shift approach,** which could reduce gross oil and gas imports by **11% to 57%** by 2050. Across all six countries, annual imports would fall by **roughly 2.5 billion barrels of oil equivalent** compared to *Business as Usual*.
- **Demand reduction prepares countries for future oil crises, while fuel subsidies make countries more vulnerable.** While energy sector subventions provide temporary price relief, they increase overall fossil fuel consumption, leaving countries exposed to future price shocks and draining foreign currency reserves.
- **Transport electrification is more affordable than ever.** While oil and gas markets remain volatile, battery costs **have fallen by more than 90% since the early 2010s,** improving the financial case for electrifying transport systems.
- Policies that reduce oil dependence save money, protect foreign currency reserves, improve health, and lead to better cities. Beyond energy security, electrified urban transport, built around public transport, walking, and cycling, can lower public and private transport costs, improve air quality, reduce traffic deaths, and support long-term economic resilience.

2. Introduction

The Iran war continues to cause major disruption to the global oil supply, leading to widespread market volatility and rapid price increases. At one point, oil prices rose by more than 60%, reflecting the scale of supply disruption and revealing the vulnerability of countries dependent on imported oil and gas.[1] Those countries are experiencing severe economic and social impacts, with particularly acute consequences for low-income populations. Across affected countries, especially low- and middle-income countries (LMICs), impacts have included: school closures, remote work requirements, mandated four-day workweeks for government offices, fuel shortages and dry pumps, broad inflationary pressures from transport costs, reduced public-sector fuel allowances, foreign currency depletion, and power shortages and brownouts.[2]

Today's energy crisis bears notable similarities to the 1970s oil crises. Faced with fuel shortages and economic disruption at the time, many countries pursued structural changes rather than short-term fixes, investing in efficiency, alternative energy, and reduced oil dependence.[3] Examples of this occurred in France and Japan, both of which enacted policies to incentivize low-carbon and more efficient energy systems that decreased reliance on oil and gas.[4] [5] These long-term investments left both countries better positioned to withstand future energy price shocks and supply disruptions.

In a new era of oil crises, it is paramount to create policies that similarly reduce dependence, which for mobility puts a focus on the electrification of transport vehicles and a shift toward less fuel-intensive modes of transport within compact cities. Private passenger vehicles (cars and 2-wheelers) consume 60% of transport energy, which overwhelmingly (95%) comes from oil and gas.[6] Some countries, such as China and Ethiopia, recognized this vulnerability to oil shocks and shifted their policies to support efficient, electric mobility. Ethiopia banned the import of internal-combustion-engine vehicles in 2024 and has invested heavily in walking and cycling infrastructure, and public transport. China has led the world in the development of electric vehicles while also investing heavily in urban metros. Other countries, however, are going in the opposite direction and debating the implementation of fuel subsidies, which would drive up demand for oil and gas, leaving countries even more vulnerable to future fuel shocks.

This report shows that smarter policies for urban passenger transport can dramatically reduce vulnerability to oil shocks while saving money for both governments and individuals, improving air quality, and increasing road safety.

1 International Energy Agency (IEA), *The Middle East and Global Energy Markets*, 2026. https://www.iea.org/topics/the-middle-east-and-global-energy-markets
2 Power, John. (March 25, 2026). Al Jazeera, *From Pakistan to Egypt, Iran war drives up prices in Global South*. https://www.aljazeera.com/economy/2026/3/25/from-pakistan-to-egypt-iran-war-drives-up-fuel-prices-in-the-global-south
3 International Energy Agency (IEA). "Timeline of selected emergency response and energy security policy coverage, 1970–2025" https://www.iea.org/data-and-statistics/charts/timeline-of-selected-emergency-response-and-energy-security-policy-coverage-1970-2025
4 International Atomic Energy Agency (IAEA). (2020). "The beginning of nuclear energy in France: Messmer's plan." https://inis.iaea.org/records/czje0-6cv23
5 Sinha, R. P. (1974). Japan and the Oil Crisis. *The World Today, 30*(8), 335–344. http://www.jstor.org/stable/40395212
6 Stanford Energy Learning Hub. (March 2026). *Fast Facts About Energy for Transportation*. https://understand-energy.stanford.edu/energy-services/energy-transportation

This study investigates six countries (Brazil. China, India, Indonesia, Mexico, and the United States) that contain nearly half of the world's population. The countries represent a variety of oil and gas producers and importers, and five of the six are LMICs. The report examines four possible scenarios for urban passenger transport:

- **Business as Usual (BAU):** Each country's current trends of decline, stagnation, or slow growth in public transport, walking, and cycling use combined with steady or rapid growth in car usage and gradual electrification of vehicles.
- **Electrification (Only):** The fastest feasible replacement of internal-combustion vehicles with electric ones, reaching 100% of new vehicle sales by 2050.
- **Mode Shift (Only):** The fastest feasible transformation of city-planning priorities in favor of compact land use and public transport, walking, and cycling, along with strong efforts to limit private car use.
- **Electrification + Mode Shift:** The combination of the previous two scenarios.

This analysis shows that **a combination of Mode Shift and Electrification policy scenarios can reduce annual fuel consumption in urban passenger transport by 70% and liquid fuel demand by 85% in the six countries by 2050.** For both net importers and net exporters, this reduction in demand would significantly reduce gross oil and gas imports. Specifically, we see the following reductions in all three categories:

- Electrification: **~9% (China) to 51% (Indonesia) reduction** in oil and gas imports in 2050
- Mode Shift: **~7% (China) to 32% (Indonesia) reduction** in oil and gas imports in 2050
- Combined: **~11% (China) to 57% (Indonesia) reduction** in oil and gas imports in 2050

Table 1. 2050 Projected Gross Oil and Gas Imports in Millions of Barrels of Oil Equivalent (MBOE)

	2050 BAU (MBOE)	2050 EV+ MS Scenario (MBOE)	% Change
Brazil	381	187	-51%
China	5,619	4,987	-11%
India	2,668	2,217	-17%
Indonesia	449	194	-57%
Mexico	729	479	-34%
United States	2,737	1,916	-30%
6 Country Total	**12,582**	**9,980**	**-21%**

The combination of both electrification and mode shift policies is particularly important, because it provides the greatest impact and also because mode shift and electrification each act as an insurance policy for the other if efforts are less successful than anticipated.

As a result of policies and incentives promoting electric vehicles, China is already much better positioned now than in the past to face future oil crises. India, another major importer of oil and gas, already has strong national government support for electrification, especially around bus electrification, and there is a strong case for further policies to incentivize the growth of electrified public transport, which could lead to reductions in imports of nearly 20%. Brazil, Mexico, and the United States, major oil producers, have an opportunity to use the upside from increased export profits to subsidize a transition away from fossil fuel dependence, as was done previously in countries such as Norway. Despite being producers, the US still imports significant amounts of oil and gas, and better urban passenger transport policies could reduce imports by 30% to 50% by 2050. Most notably, Indonesia has a particularly high percentage of oil and gas imports going to urban passenger transport and could slash oil and gas imports in half through urban passenger transport reforms and a shift to EVs, policies in line with the current president’s priorities. This would radically change the volatility and cost of energy in Indonesia.

Reducing oil and gas dependence not only lowers energy demand but also directly reduces exposure to global supply shocks, improving economic resilience. In some cases, aggressive policies could dramatically reduce oil and gas imports, with huge benefits of economic savings for the importing countries. The decisions made now will have an exponential effect on the growth and well-being of each country moving forward, setting the stage for future resilience and energy independence for decades to come. The fuel and oil subsidies, on the other hand, will only provide a temporary fix.

3. Methodology

This analysis compares gross oil and gas imports with the potential demand reductions for oil and gas that come from vehicle electrification scenarios and mode shift policy scenarios. The analysis covers six countries, accounting for nearly half of the world's population: Brazil, China, India, Indonesia, Mexico, and the United States. The analysis examines oil products, crude oil, and natural gas, which we collectively refer to as "oil and gas."

3.1 FOSSIL FUEL GROSS IMPORTS

For past gross oil and gas imports, we use the IEA's country and regional oil product, crude oil, and natural gas data[7]—specifically, the import data from 2000–2023/2024 (depending on data availability) for each of the six countries.

We then project a *Business as Usual* import scenario, assuming that domestic oil and gas production, as well as consumption outside of urban transport, will remain at 2025 levels through 2050. We add in the BAU projections for change in urban transport oil and gas demand calculated as part of prior Compact Cities Scenario Electrified modeling efforts (see below for details). While this approach does not account for many of the likely changes that will affect fossil fuel imports, we believe it still provides a useful baseline for considering the impacts of reducing oil and gas demand via urban transport policy. Our aim is to avoid overstating ITDP's limited ability to project future fossil fuel production and transport consumption (outside of urban passenger transport) trends.

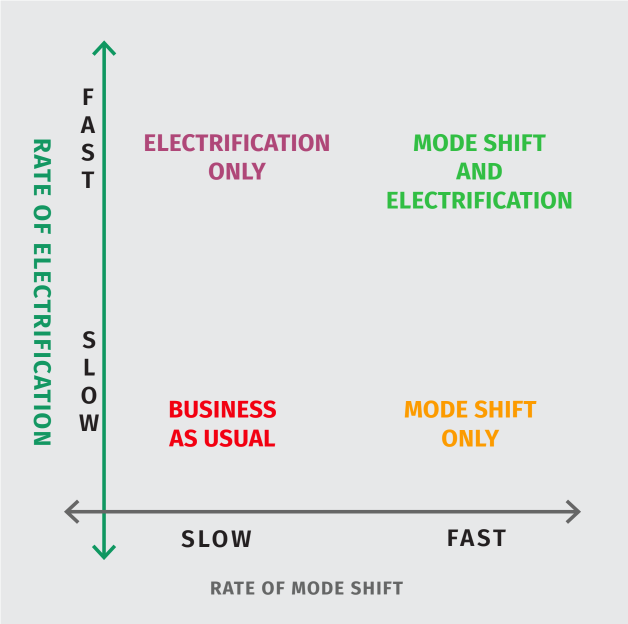
3.2 PROJECTED FOSSIL FUEL CONSUMPTION SCENARIOS

We then incorporate the scenarios for future fossil fuel consumption for urban passenger transport from the Compact City Scenario Electrified[8] (CCSE) to assess potential impacts on gross fossil fuel imports. This model looks at four potential avenues for developing the transport sector: *Business as Usual* (BAU), *High vehicle electrification* (High EV), *Mode Shift* (MS), and both *Electrification and Mode Shift* at the same time (EV+MS), diagrammed in Figure 1.

7 IEA. *Brazil/Oil*. https://www.iea.org/countries/brazil/oil; IEA. *China/Oil*. https://www.iea.org/countries/china/oil; IEA. *India/Oil*. https://www.iea.org/countries/india/oil; IEA. *Indonesia/Oil*. https://www.iea.org/countries/indonesia/oil; IEA. *Mexico/Oil*. https://www.iea.org/countries/mexico/oil; IEA. *United States/Oil*. https://www.iea.org/countries/united-states/oil; IEA. *Brazil/Natural Gas*. https://www.iea.org/countries/brazil/natural-gas; IEA. *China/Natural Gas*. https://www.iea.org/countries/china/natural-gas; IEA. *India/Natural Gas*. https://www.iea.org/countries/india/natural-gas; IEA. *Indonesia/Natural Gas*. https://www.iea.org/countries/indonesia/natural-gas; IEA. Mexico/Natural Gas. https://www.iea.org/countries/mexico/natural-gas; IEA. *United States/Natural Gas*. https://www.iea.org/countries/united-states/natural-gas

8 Institute for Transportation and Development Policy, and University of California Davis. (2026). *Compact Cities Electrified: The Benefits of Small Vehicles*. https://itdp.org/publication/compact-cities-electrified-the-benefits-of-small-vehicles/

Figure 1. CCSE Scenarios



In the scenario modeling for CCSE, we identified the impact of electrification, mode shift, and the combination of the two on seven different categories: greenhouse gas (GHG) emissions, direct public and private costs, air pollution, public health, road safety, energy consumption, and battery material requirements. This analysis examines the energy-consumption impacts for each country in each scenario (BAU, EV, MS, and MS+EV) in the context of oil and gas imports. The detailed CCSE analyses can be found here.

3.3 PROJECTING FUTURE FOSSIL FUEL IMPORT SCENARIOS

The projections are calculated by subtracting the energy-consumption reductions for the four categories for 2030, 2040, and 2050 from the BAU import projection.

The methodology for defining the previous CCSE scenarios has been described in detail in the previous series of country-level reports.[9] In summary: Our modeling approach began with developing national urban-level data and BAU projections using industry-standard projections of transportation activity and trends through 2050, drawing on the International Energy Agency's Mobility Model and subsequent models. We adjusted the model's BAU scenario using country-specific data tailored to each geography.

Mode Shift scenarios were then developed based on assessments of urban structure and the feasibility of transforming transportation systems; these scenarios result in markedly different travel mode shares in 2050 compared with the BAU case.

9 Institute for Transportation and Development Policy, and University of California, Davis. (2021). *The Compact City Scenario: Electrified*. https://itdp.org/publication/the-compact-city-scenario-electrified/

We also developed *High vehicle electrification* (High EV) scenarios informed by an evaluation of recent national electrification policies and targets. Both the *Mode Shift* and *High EV* scenarios were further refined through an extensive, iterative review process involving country-level and international experts from academia, government, and civil society and non-governmental organizations.

The energy consumption modeling was calculated using the industry-standard Activity, Structure, Intensity, Fuel (**ASIF**) framework to relate different elements of travel and estimate GHG emissions from vehicles:

Activity: Travel per capita

Structure: Share of modes used (a function of vehicle sales and stocks by mode and technology type)

Intensity: Efficiency of modes, measured in fuel use per kilometer

Fuel: Carbon intensity of fuels used by different modes, measured as carbon emissions per unit of fuel

3.4 ASSUMPTIONS

For the purposes of this analysis, we define oil and gas as crude oil, oil products, and natural gas, as they are defined by the IEA. We use gross imports instead of net imports to better reflect the economic vulnerability to trade disruptions due to war, natural disasters, and other events. Because transport accounts for consumption of both oil and gas, we include them together; an analysis of data disaggregated by fuel type was beyond the scope of this project.

The data has been converted from joules (typically petajoules) to millions of barrels of oil equivalent (MBOE), as a barrel of oil is something most people can conceptualize. We also assume that additional electricity demand from the increased prevalence of electric vehicles is not met by additional oil- or gas-based electricity generation.

The results of this analysis aggregate all oil and gas demand and imports into one number. Reductions to passenger fuel consumption and in a country that domestically produces all of its own transport fuel might have no impact on imports.

In addition, because we did not project changes to domestic oil and gas production and demand outside of urban passenger transport, the BAU import projections miss some important details. Because of this, in countries where the growth in domestic oil and gas production is outpacing demand (i.e., imports are likely to decline faster than indicated in the analysis), we are likely understating the impacts. This is potentially the case in the US and Brazil. In countries where the growth in domestic oil and gas demand is outpacing the growth in production (i.e., imports are likely to increase faster than indicated in the analysis), we are likely overstating the impacts. This is likely the case in China, India, and Mexico.

4. Discussion

The full results of the analysis are shown in Tables 2 and 3 below.

Table 2. 2035 and 2050 Projected Gross Oil and Gas Imports

	2035 Projected Imports (MBOE)				2050 Projected Imports (MBOE)			
	BAU	EV Scenario	MS Scenario	EV+ MS Scenario	BAU	EV Scenario	MS Scenario	EV+ MS Scenario
Brazil	363	313	314	282	381	206	281	187
China	5,771	5,597	5,468	5,387	5,619	5,099	5,217	4,987
India	2,498	2,386	2,401	2,343	2,668	2,267	2,397	2,217
Indonesia	393	324	341	305	449	220	307	194
Mexico	726	644	661	610	729	499	606	479
United States	3,300	2,966	2,967	2,785	2,737	1,954	2,380	1,916
6 Country Total	13,053	12,230	12,153	11,712	12,582	10,244	11,188	9,980

Table 3. 2035 and 2050 Projected Percent Change in Gross Oil and Gas Imports

	2035 Projected Change in Imports from BAU				2050 Projected Change in Imports from BAU			
	BAU	EV Scenario	MS Scenario	EV+ MS Scenario	BAU	EV Scenario	MS Scenario	EV+ MS Scenario
Brazil	-	-14%	-13%	-22%	-	-46%	-26%	-51%
China	-	-3%	-5%	-7%	-	-9%	-7%	11%
India	-	-4%	-4%	-6%	-	-15%	-10%	-17%
Indonesia	-	-17%	-13%	-23%	-	-51%	-32%	-57%
Mexico	-	-11%	-9%	-16%	-	-32%	-17%	-34%
United States	-	-10%	-10%	-16%	-	-29%	-13%	-30%
6 Country Total	-	-6%	-7%	-10%	-	-19%	-11%	-21%

Based on the analysis, we find compelling evidence that **robust investment and policy support of *Electrification* (shifts to EVs) and *Mode Shift* (shifts to walking, cycling, and public transport) can lead to a significant reduction in oil and gas imports,** a combined 2,500 MBOE (2.5 billion barrels of oil equivalent) annual reduction by 2050. This in turn would dramatically reduce vulnerability to future energy crises. We see similar impacts from both Electrification and Mode Shift policies, with slightly greater reductions from electrification policies, and much larger impacts by 2050, assuming a robust policy agenda has been developed over many years. In summary, we found the following reductions in future oil and gas imports across the geographies studied:

- Electrification: ~3% to 17% reduction in 2035, ~9% to 51% reduction in 2050
- Mode Shift: ~4% to 13% reduction in 2035, ~7% to 32% reduction in 2050
- Combined: ~6% to 23% reduction in 2035, ~11% to 57% reduction in 2050

Considering that oil and natural gas markets have experienced price volatility over the past several decades, while battery costs have fallen by more than 90% since the early 2010s,[10] **the improving economics of electrification and energy storage make the transition away from fossil fuels increasingly attractive.**

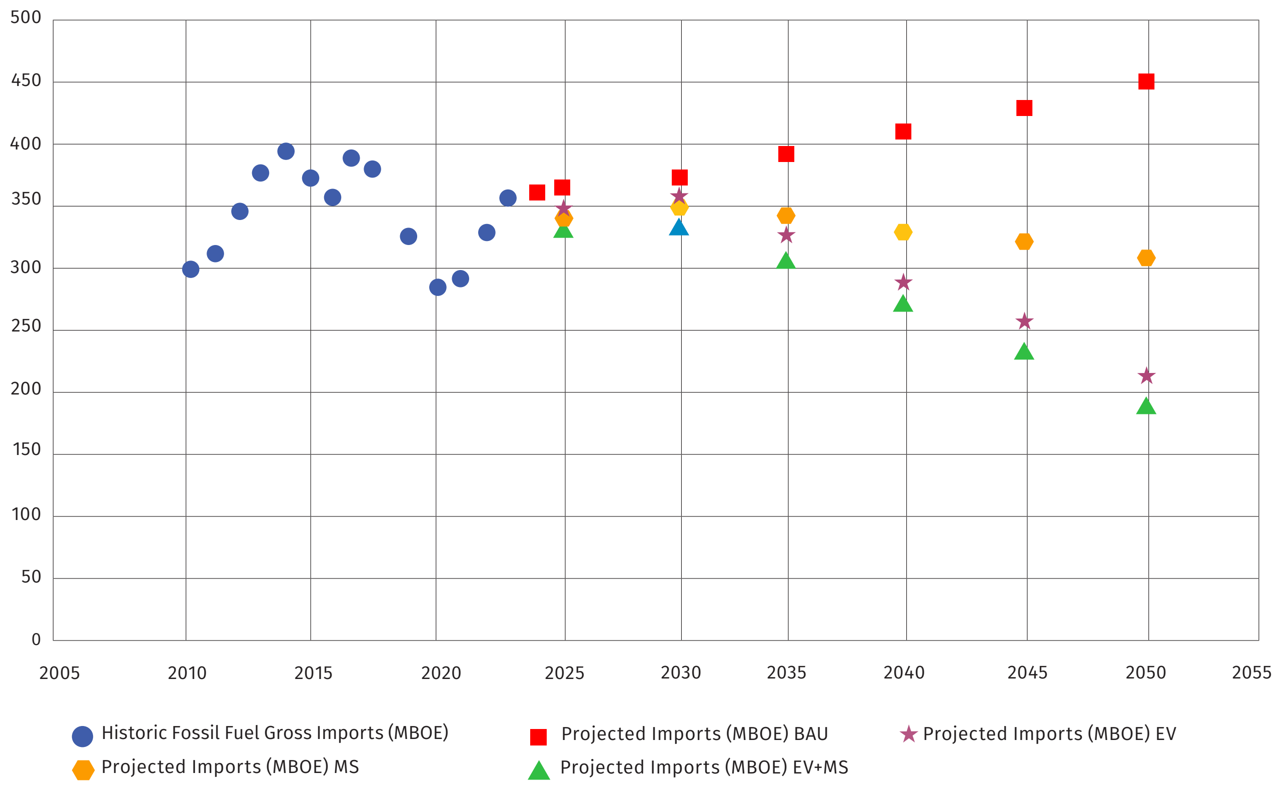
4.1 COUNTRY-LEVEL DISCUSSION

Results by country over time can be seen in Figures 2 through 7 below. Because we do not project future changes to production and demand outside of urban passenger transport, the trends are not always a linear continuation of current trends. A more detailed examination of the end-uses of oil and gas imports was beyond the scope of this analysis.

10 Bloomberg NEF. (2024). “Lithium-Ion Battery Pack Prices See Largest Drop Since 2017, Falling to $115 per Kilowatt-Hour.” https://about.bnef.com/insights/commodities/lithium-ion-battery-pack-prices-see-largest-drop-since-2017-falling-to-115-per-kilowatt-hour-bloombergnef/

4.1.1. INDONESIA

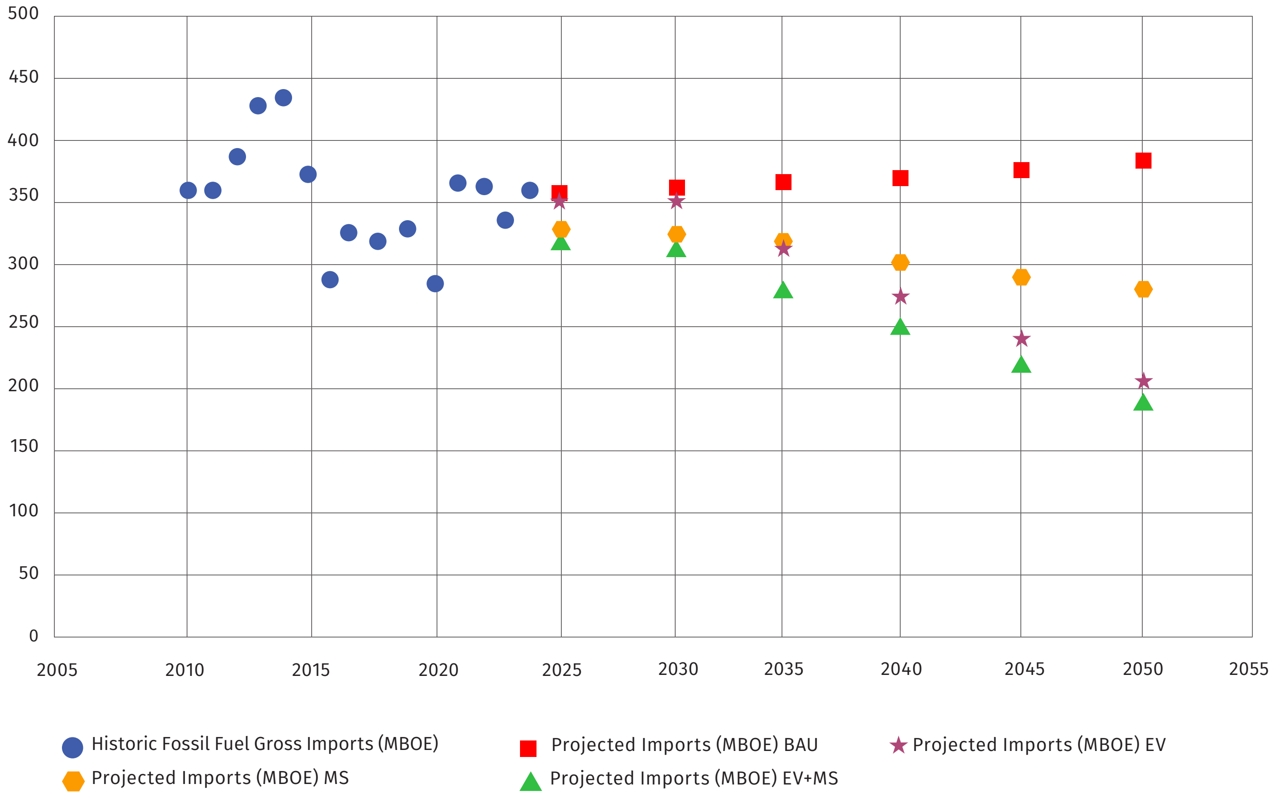
Figure 2. Indonesia Fuel Import Demand Forecast (MBOE)



Indonesia (Figure 2) shows the highest potential reduction in oil and gas imports from electrification and mode shift policies, with more than a 50% reduction by 2050. This may be due to a relatively high percentage of imports going to passenger vehicle fuel.

4.1.2. BRAZIL

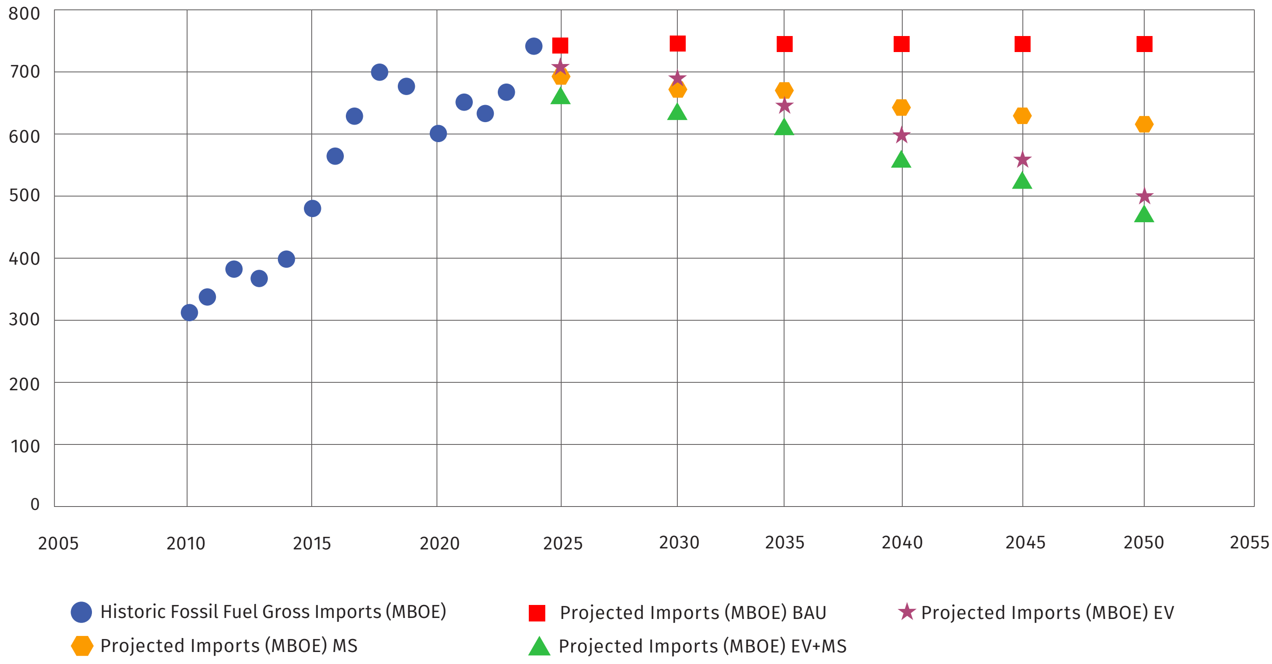
Figure 3. Brazil Fuel Import Demand Forecast (MBOE)



It is noteworthy that Brazil (Figure 3) is a net oil exporter as of 2025. Despite this, Brazil imports a significant amount of oil and gas, which could be decreased by nearly 50% via a reduction in domestic energy demand. There does not appear to be a clear trend in imports apart from urban passenger transport demand, so it is not clear if the projections may be overstating or understating likely scenarios.

4.1.3. MEXICO

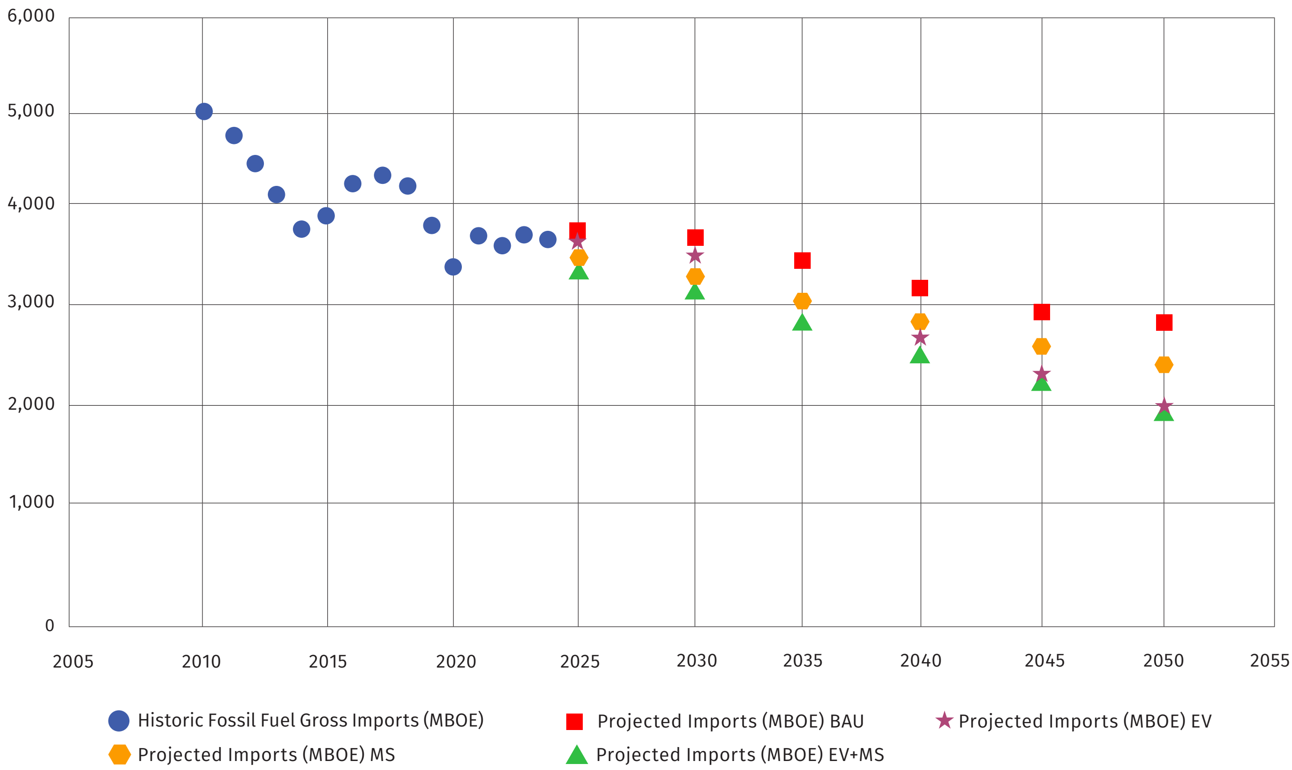
Figure 4. Mexico Fuel Import Demand Forecast (MBOE)



Mexico (Figure 4) also produces large quantities of oil for export. Like Brazil, the introduction of mode shift and electrification policies could reduce demand and thus imports significantly by 2050 (34%). However, unlike Brazil, the trend for import may be increasing faster than the demand for fuel by the urban passenger transport sector, and the 34% figure may therefore overstate the reduction.

4.1.4. UNITED STATES

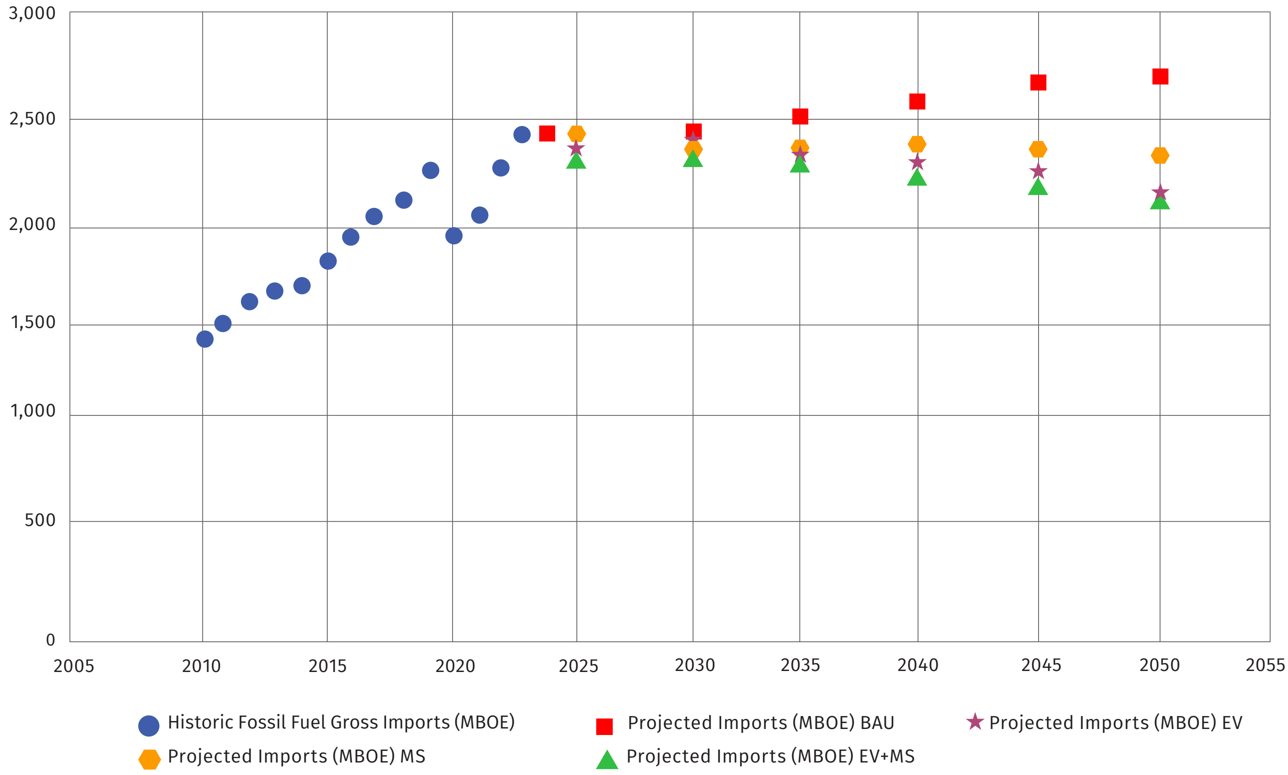
Figure 5. United States Fuel Import Demand Forecast (MBOE)



Like Brazil, the United States (Figure 5) is a net oil exporter, as of 2025. Also similar to Brazil, the country continues to import significant quantities of oil and gas, which mode shift and electrification policies could reduce by around 30% by 2050.

4.1.5. INDIA

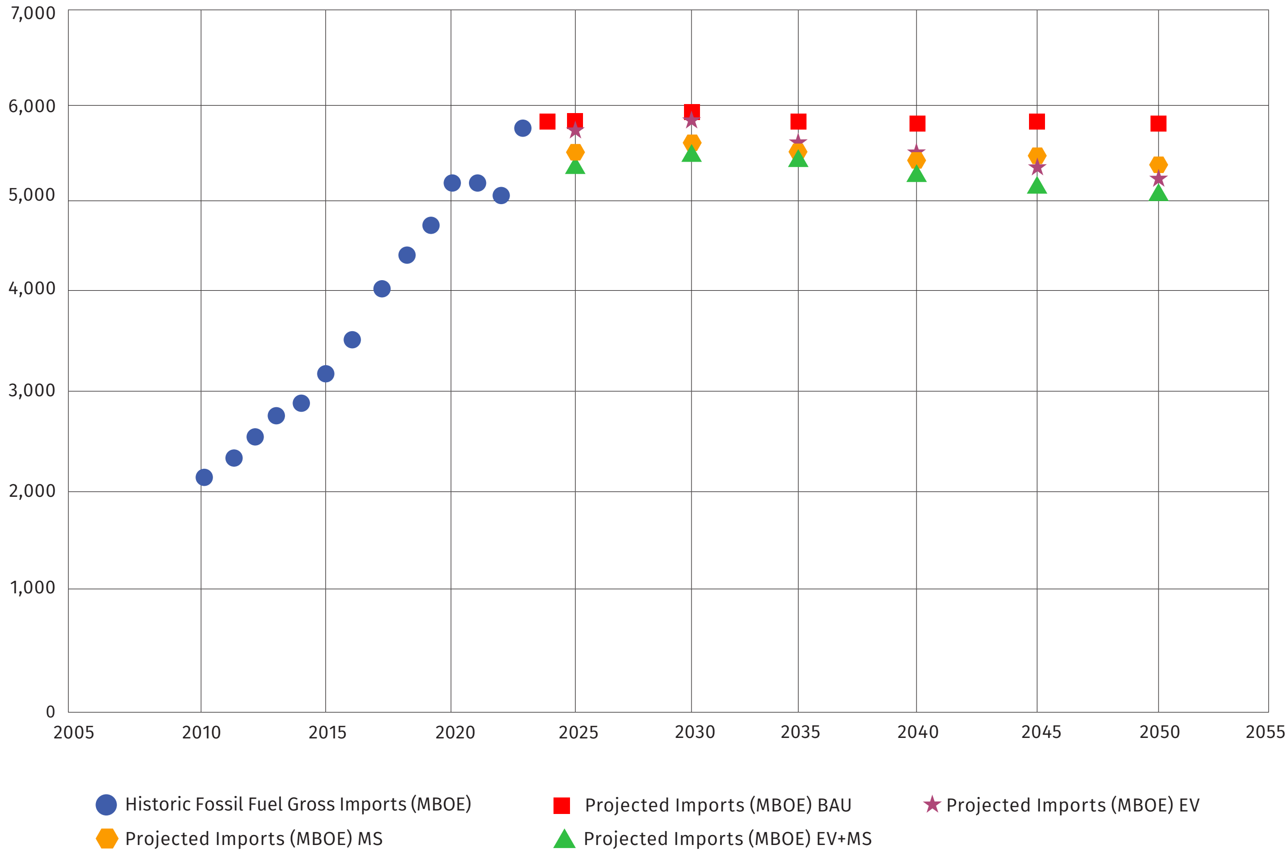
Figure 6. India Fuel Import Demand Forecast (MBOE)



India (Figure 6) shows the second-lowest, but still significant, reduction in oil and gas imports from electrification and mode shift policies. India may show a lower impact because a higher portion of oil and gas imports go to freight trucking than in other countries. While we only project changes in urban transport oil and gas demand after 2025, the import trend line from 2020 to 2025 suggests that imports may grow faster than in the BAU shown, leading to a smaller reduction than the analysis projects.

4.1.6. CHINA

Figure 7. China Fuel Import Demand Forecast (MBOE)



The impact of electrification and mode shift scenarios in China (Figure 7) is lowest, because of the country's existing progress in electrification as well as higher portions of fossil fuel imports going to industrial uses. Despite this, there is still a significant reduction by 2050.

These scenarios all would have an impact on those import levels. None of the scenarios result in import reductions that exceed baseline gross import levels. Even though imports are not eliminated, the reduction in fuel demand can significantly change a country's exposure to global energy markets.

4.2 POLICY GUIDANCE

In response to the most recent energy crisis, many governments considered two policy options in response: price relief measures, such as fuel subsidies; and efforts to reduce oil and gas demand.

To better insulate countries from future price shocks, the clear policy priority is to reduce demand. Fuel subsidies, by contrast, encourage increased fuel consumption and demand, which is expensive and regressive,[11] leaving countries more vulnerable to future price shocks. In addition, the largest beneficiaries of fuel subsidies are wealthier, private-vehicle owners who consume the greatest quantities of fuel and thus receive the largest amounts of subsidy.[12] Fuel subsidies are also expensive and delay investment needed for structural, long-term solutions, such as public transport and vehicle electrification. On the other hand, policies that reduce oil and gas dependency also improve overall urban mobility in the cities via a system of safe, shared electric mobility that saves governments USD $600 billion, reduces urban passenger PM2.5 air pollution by 67%, and prevents 170,000 road deaths annually by 2050.[13]

In Brazil, a study showed that a $0.10 reais reduction in gasoline taxes (USD $0.02) could cost $800 million reais (~$154 million USD) for just two months within a larger $30 billion reais (about USD $5.8 billion) package.[14] In contrast, the Brazilian National Bank for Economic and Social Development estimated that with $20 billion reais per year, the country could make "consistent progress" in transport infrastructure, including rail systems, BRTs, and the electrification of bus fleets,[15] which would create permanent reductions to oil dependency—a much smarter use of the country's financial resources.

11 Institute for Transportation and Development Policy. "ITDP's Response to the Iran Energy Crisis." 29 May 2026. https://itdp.org/2026/05/29/itdp-response-to-the-iran-energy-crisis

12 Institute for Transportation and Development Policy Brasil. "A crise energética como oportunidade perdida para transformar a mobilidade no Brasil." 21 May 2026. https://itdpbrasil.org/a-crise-energetica-como-oportunidade-perdida-para-transformar-a-mobilidade-no-brasil

13 Institute for Transportation and Development Policy, and University of California Davis. (2026). *Compact Cities Electrified: The Benefits of Small Vehicles.* https://itdp.org/publication/compact-cities-electrified-the-benefits-of-small-vehicles/

14 Institute for Transportation and Development Policy Brasil. "A crise energética como oportunidade perdida para transformar a mobilidade no Brasil." 21 May 2026. https://itdpbrasil.org/a-crise-energetica-como-oportunidade-perdida-para-transformar-a-mobilidade-no-brasil

15 *Ibid.*

4.3 POLICY PRIORITIES

Policy interventions that reduce fuel demand—particularly those aligned with compact urban development and transport system reform—can reduce exposure to disruptions in oil and gas imports.

The *Mode Shift* scenario is based around moving people away from cars and toward walking, cycling, and public transport. Much of this is focused on preventing an increase in car travel moving forward.[16] In the CCSE, we have identified the following ways to work toward mode shift:

- *Land Use* – Policies that support dense, mixed-use neighborhoods, where people live within a short distance of daily needs and transport that facilitates rapid connections to jobs and other services.
- *Walking and Cycling* – Comprehensive networks of high-quality footpaths, dedicated protected bicycle lanes, and cycle-friendly streets, as well as public bikeshare systems that connect to public transport systems.
- *Public Transit* – Good service (fast, frequent, and reliable) via zero-emission vehicles that is accessible to everyone. This is achieved with reliable funding and effective government management.
- *Car Control* – Effective management of parking (e.g., via charges); implementation of low-emissions zones or congestion pricing to restrict vehicle use in designated areas.

The *CCSE Electrification* scenario is based around electrifying vehicles, including the following polices:

- *Cost Parity* – Implement policies to level the cost of EVs to that of equivalent ICEs.
- *Charging* – Support charging networks that enable affordable and cost-competitive charging where it is needed.
- *Aggregated Procurement* – Develop national standards and facilitate larger-scale procurement, especially for buses, to incentive larger-scale production and lower costs.
- *Supply-Side Regulations* – Require lower- and zero-emissions vehicles over time.

16 Institute for Transportation and Development Policy, and University of California, Davis. (2021). *The Compact City Scenario- Electrified. ITDP.* https://itdp.org/publication/the-compact-city-scenario-electrified/

5. Conclusion

The connection between energy demand and transport system structure is clear: resilience depends on reducing demand, not just managing supply. Countries that maintain car-dependent systems and continue subsidizing fossil fuel use remain exposed to recurring crises.

In contrast, countries that invest in compact cities, enable mode shift, and electrify transport can significantly reduce their oil import dependence, exposure to price shocks, and fiscal vulnerability. These same investments save money in the long term through the reduction of energy and infrastructure costs while increasing mobility in cities, boosting access to jobs and opportunities, improving health, and reducing greenhouse gas emissions. Thus, the most effective response to energy crises is not to shield economies from high fuel prices but to reduce their dependence on fuel altogether.

Appendix: Country-Level Examples

NETHERLANDS

In Amsterdam, cyclists have the right of way everywhere except in the city center, where trams have the right of way. These regulations were established after the oil crisis and have made Dutch cities the most bicycle-friendly in the world. **SOURCE:** cloudwalkerBR via Shutterstock.

In response to the increase in car ownership in the 1950s and 1960s, grassroots groups like the "Stop de Kindermoord" (Stop Child Murder) advocated against car-centric policies because of the dangers to children.[17] Simultaneously, the Dutch government banned personal vehicle use on Sundays during the 1973 oil crisis to conserve fuel, paving the way for long-term policy and infrastructure changes.[18] After these events in the 1970s, the Netherlands began to reprioritize cycling infrastructure. Advocacy groups designed cycling paths that they wanted to see in their cities, and over time, local governments across the country began to adopt policies that reduced speed limits and limited car mobility in various areas, particularly in city centers.[19] Local governments had specific budget allocations for bicycle implementation, and the Dutch Ministry of Transport required bicycle infrastructure in its Master Plan for Bicycles in the 1990s.[20] Now, with robust bicycle networks in many cities throughout the Netherlands, more than 25% of people's trips are made by bicycle. Between 1986 and 1991, 470,000 trips were made by bike daily, and that number grew to 604,000 a day from 2004 to 2008.[21] In 2015, total crude and petroleum product imports were 199,000 million kg, and in 2025, that number was 176,234 million kg.[22]

17 M. Bruno, H.-J. Dekker, & L. Lindenberg Lemos. (2021). "Mobility protests in the Netherlands of the 1970s: Activism, innovation, and transitions." *Environmental Innovation and Societal Transitions, 40, 521–535.* https://doi.org/10.1016/j.eist.2021.10.001

18 Mason, J. (2019). *America, the Netherlands, and the Oil Crisis: 50 Years Later. ITDP.* https://itdp.org/2019/04/26/america-the-netherlands-and-the-oil-crisis-50-years-later/

19 M. Bruno, H.-J. Dekker, & L. Lindenberg Lemos. (2021). "Mobility protests in the Netherlands of the 1970s: Activism, innovation, and transitions." *Environmental Innovation and Societal Transitions, 40, 521–535.* https://doi.org/10.1016/j.eist.2021.10.001

20 Centre for Public Impact. (2016). *The Rise of Cycling in the Urban Areas of the Netherlands.* https://centreforpublicimpact.org/public-impact-fundamentals/the-rise-of-cycling-in-the-urban-areas-of-the-netherlands/

21 Center for Public Impact. (2016).

22 Centraal Bureau voor de Statistiek (Statistics Netherlands). (n.d.). *Crude and Petroleum Products Balance Sheet; Supply and Consumption (Table 84596ENG).* https://www.cbs.nl/en-gb/figures/detail/84596ENG

ETHIOPIA

Ethiopia has adopted the electrification of public transportation as one of its most powerful strategies to balance economic growth with environmental sustainability. **SOURCE:** Yohannes Ezra via Shutterstock.

In 2024, the Ethiopian government imposed an import ban on fossil fuel–powered vehicles across the country. Prior to the ban, the government had subsidized the price of gasoline, costing it billions of dollars in the previous decade.[23] Car ownership before the ban was also virtually impossible for many Ethiopians, with a rate of one vehicle for every 100 people in the country.[24] At that time, vehicles with internation-combustion engines faced a15% VAT; up to 100% excise tax; 10% surtax; and 3% withholding tax.[25] Now, electric vehicles imported to Ethiopia are only subject to 15% custom duty if the vehicles are fully assembled and complete, 5% for parts and semi-assembled vehicles, or no tax for vehicles shipped in parts and assembled locally.[26] This has reduced the barrier for entry for vehicle ownership, with EV ownership increasing from 1% to 6% since 2024.[27] Currently there are 17 EV assembly plants in the country, with a goal of having 60 plants by 2030. Since the ICE vehicle import ban only started in 2024, there have yet to be studies assessing the long-term impacts. There is an expected impact on air quality and health benefits, a reduction in CO2 emissions, car maintenance savings, and fuel import savings. Currently, there are 30,000 passenger and commercial electric vehicles, and the Ethiopian government expects there to be 148,000 passenger EVs and 4,855 commercial EVs by 2032.[28] There have been some concerns with the lack of charging infrastructure and maintenance knowledge.[29]

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24 International Trade Administration. (2024). *Ethiopia Automotive EV Market. U.S. Department of Commerce.* https://www.trade.gov/market-intelligence/ethiopia-automotive-ev-market
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26 Energy Connects. (2026). *Electric Vehicle Sales Boom as Ethiopia Bans Fossil-Fuel Car Imports.* https://www.energyconnects.com/news/renewables/2026/february/electric-vehicle-sales-boom-as-ethiopia-bans-fossil-fuel-car-imports/
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SEPTEMBER 2026