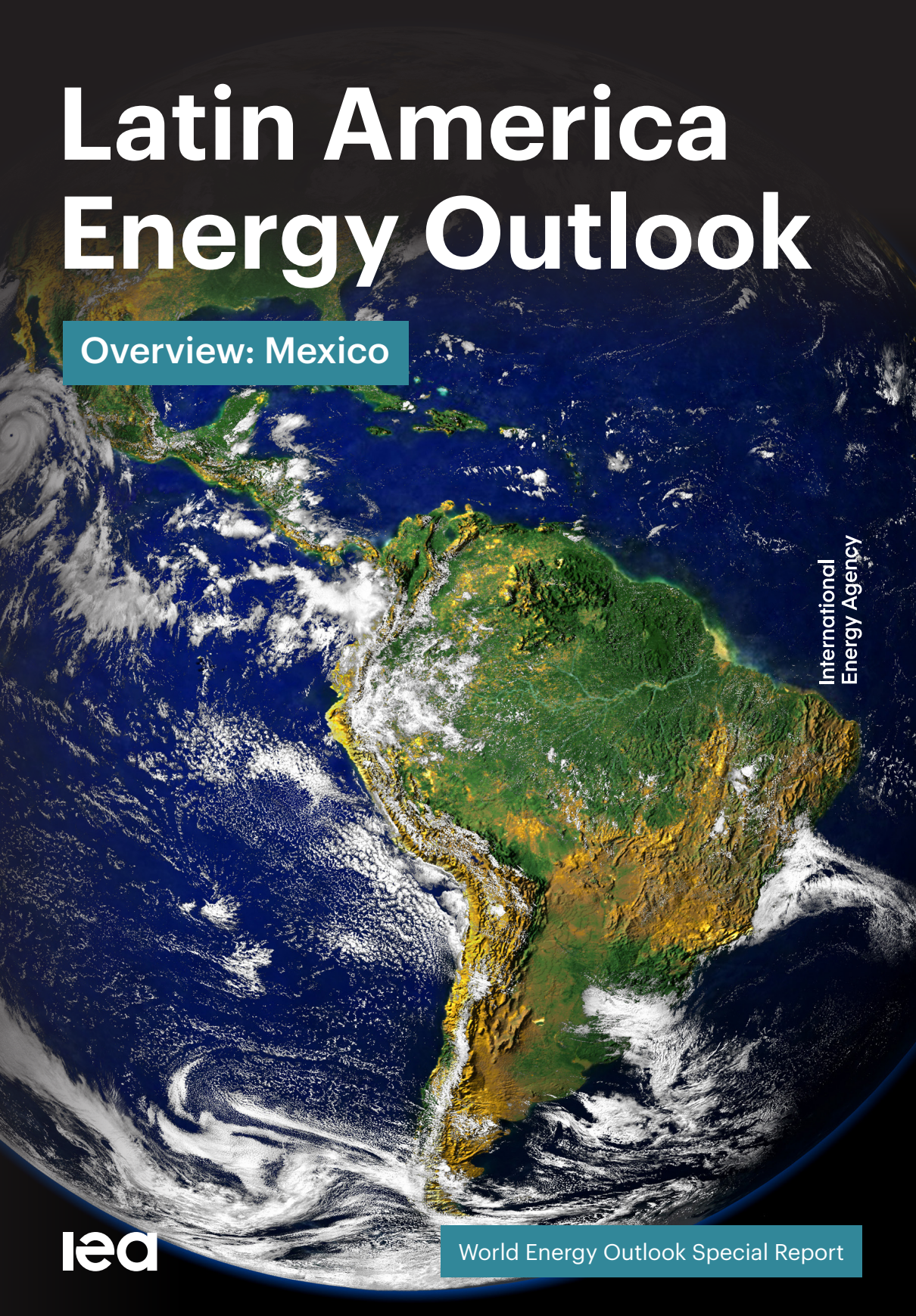
Latin America Energy Outlook

Overview: Mexico



International Energy Agency

World Energy Outlook Special Report

INTERNATIONAL ENERGY AGENCY

The IEA examines the full spectrum of energy issues including oil, gas and coal supply and demand, renewable energy technologies, electricity markets, energy efficiency, access to energy, demand side management and much more. Through its work, the IEA advocates policies that will enhance the reliability, affordability and sustainability of energy in its 31 member countries, 13 association countries and beyond.

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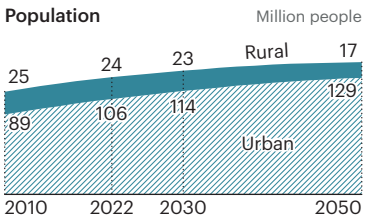
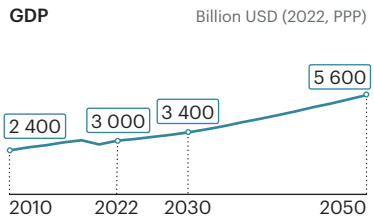
Mexico

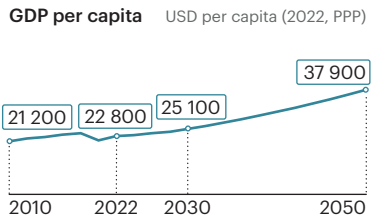
2ND
largest economy in Latin America and the Caribbean

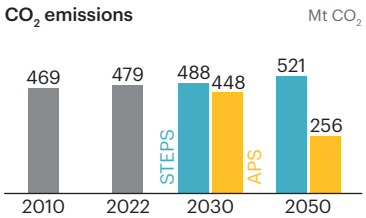
2ND
largest steel producer in Latin America and the Caribbean

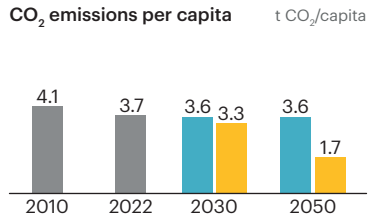
11TH
largest oil producer in the world

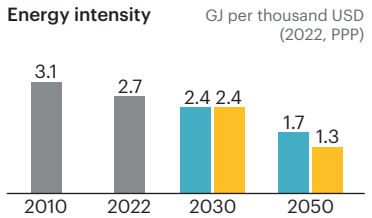




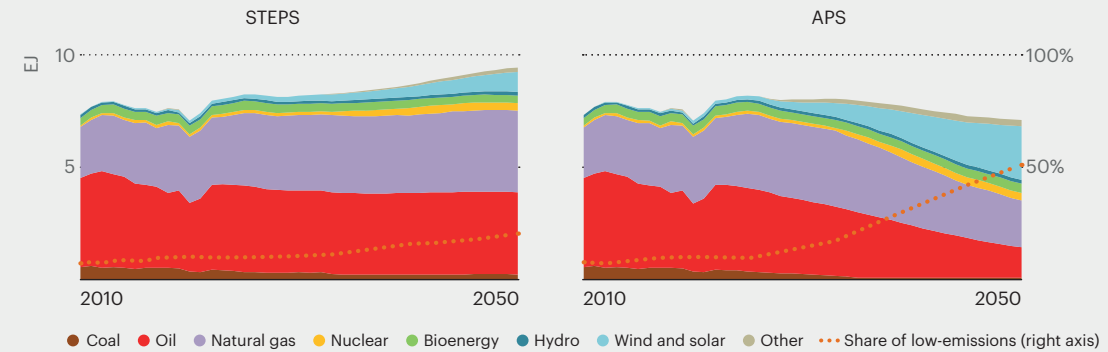




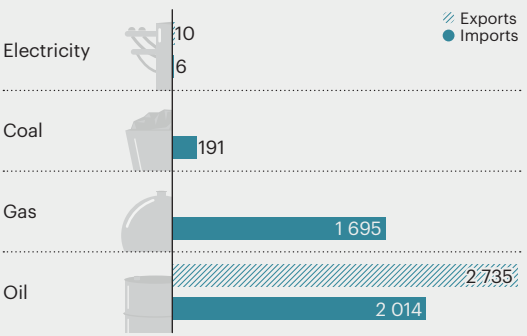




Primary energy supply and share of low-emissions sources



Trade of main energy products (2021)



Trade of non-energy products (2021)

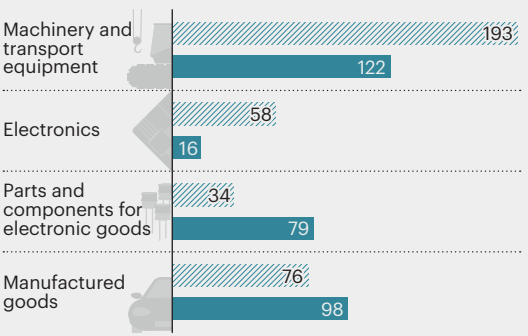


Table 1 ▷ **Recent policy developments in Mexico**

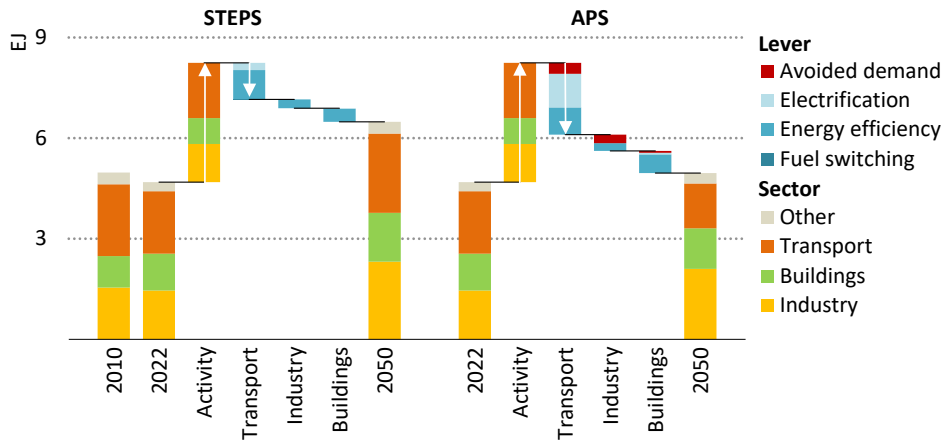
	Policy	Publication year
Economy-wide measures	• NDC: Conditional target of GHG emissions reduction of 40% from business-as-usual by 2030.	2022
	• Carbon Tax: Special Tax Law on Production and Services was amended to levy a tax on the carbon content of fuels from 2014. The carbon tax is updated annually. So far, natural gas is excluded.	2012
AFOLU	• National strategy for REDD+ 2017-2030: Goal of net zero deforestation by 2030.	2017
Critical minerals	• A decree granted the federal government the rights to explore, exploit and export lithium through the state-owned company LitioMx.	2022
Oil and gas production	• Global Methane Pledge: Mexico joined the initiative to reduce global anthropogenic methane emissions by 30% from 2020 levels by 2030.	2021
	• General Administrative Provisions on methane from the hydrocarbon sector: Regulated entities must submit plans to prevent methane emissions, including actions and targets.	2018
Power	• *Ley de Transición Energética*: Sets a target for clean energy to have a 35% share in electricity generation by 2024.	2015
Industry	• Provisions of *Ley de Transición Energética* define the procedure for voluntary agreements on energy efficiency for large industrial consumers.	2017
Transport	• Energy efficiency of light-duty vehicles: Mexico published the standard project PROY-NOM-163-SEMARNAT-SCFI-2023 to update the existing fuel efficiency standard for new light-duty vehicles from 2025.	2023
	• Draft National Strategy for Electric Mobility: Sets targets for 100% of passenger vehicle sales to be electric or plug-in hybrid by 2040 and 100% to be electric by 2050.	2023
Buildings	• Energy efficiency requirements for home appliances: NOM-028-ENER-2017 for light bulbs, NOM-015-ENER-2018 for household refrigerators and freezers, NOM-023-ENER-2018 for air conditioners.	2018

Table 2 ▷ **Major infrastructure projects in Mexico**

	Project	Size	Date online	Status	Description
Hydrogen/ ammonia	Mexican Green Hydrogen Hub, phase 1	10 kt H_2/year (capacity)	2025	●	Dedicated solar PV
	Energía Los Cabos	4 kt H_2/year (capacity)	2024	●	Dedicated solar PV
	Delicias Solar	6 kt H_2/year (capacity)	2026	●	Dedicated solar PV
Oil and gas	Energía Costa Azul Liquefaction plant	3 Mt/year	2024	●	Build liquefaction capacity to export LNG
	Olmeca refinery	340 000 b/d	2023	●	Increase national refining

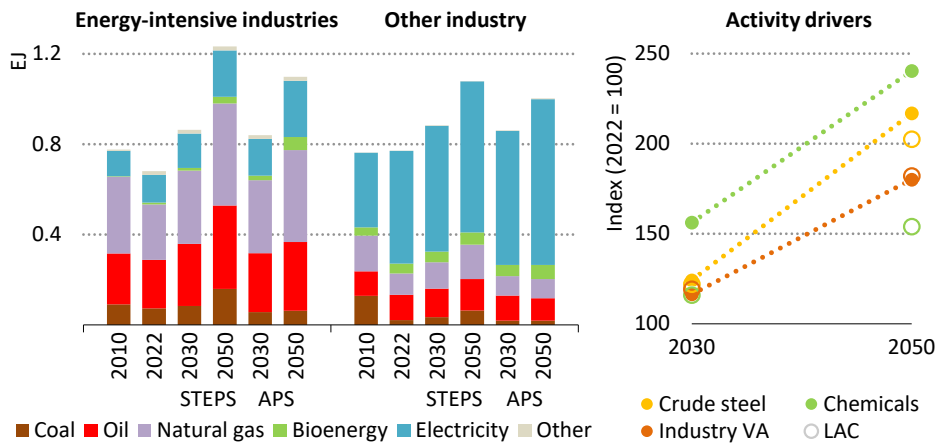
Status ● Feasibility study ● Under construction

Figure 1 ▷ **Final energy consumption by scenario in Mexico**



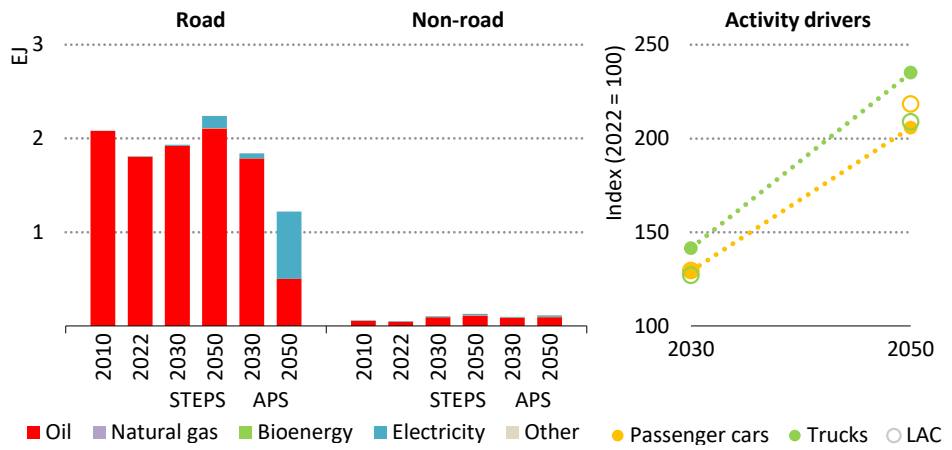
- Today, transport accounts for around 40% of total final energy consumption in Mexico.
- Total final energy consumption increases nearly 40% in the STEPS by 2050. Accelerated energy efficiency gains and electrification reduce this to 6% in the APS.

Figure 2 ▷ **Fuel consumption in industry by type and scenario in Mexico**



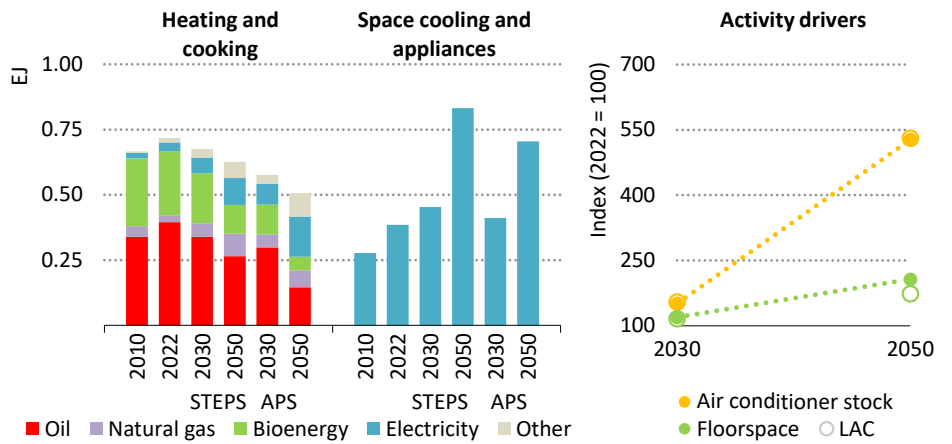
- With strong cement and steel industries, Mexico accounts for 20% of industrial energy use in the region, and for a quarter of the increase in demand by 2050 in the STEPS.
- In both the STEPS and APS, the share of fossil fuels in energy consumption in industry in Mexico remains high. In the APS, the share of bioenergy remains low compared to other LAC countries.

Figure 3 ▷ **Fuel consumption in transport by type and scenario in Mexico**



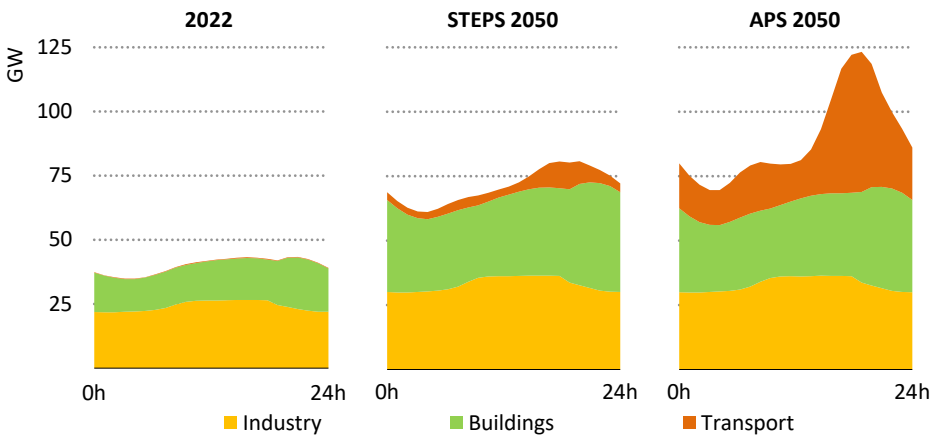
- Electrification increases in road transport after 2030 in both scenarios. In the APS, electricity accounts for over half of energy consumption in transport by 2050.
- A drop in oil demand in the APS is mainly driven by a shift to electromobility and by efficiency gains from more stringent fuel economy standards.

Figure 4 ▷ **Fuel consumption in buildings by type and scenario in Mexico**



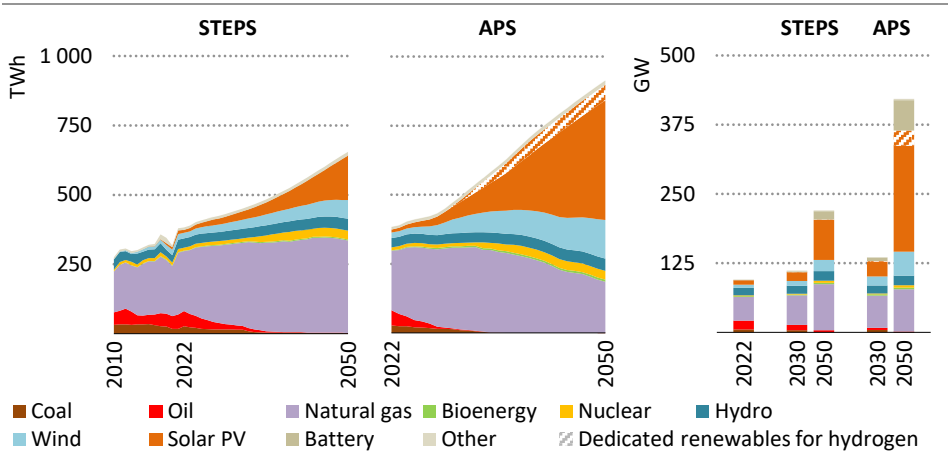
- Oil-derived fuel consumption slowly decreases in buildings as the use of electricity and natural gas increases. Electrification helps reduce the traditional use of biomass.
- Ownership of air conditioners more than triples by 2050, and is responsible for more than 40% of the increase in electricity consumption in Mexico's buildings sector in the STEPS. Energy-efficient appliances limit the size of the increase in the APS.

Figure 5 ▷ **Average electricity daily load profile by scenario in Mexico**



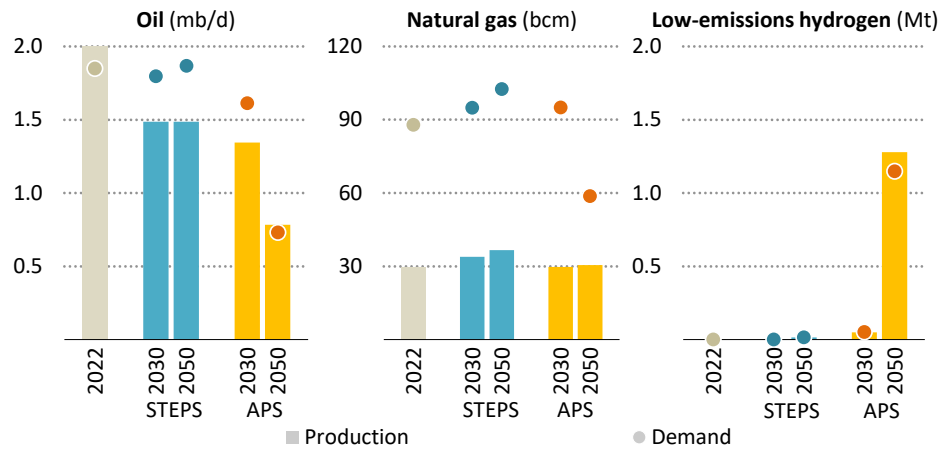
- In both scenarios, electricity consumption in buildings almost doubles from current levels. It contributes to a total peak demand increase of 40% in the APS by 2050.
- The gap between peak demand in the STEPS and APS reflects higher uptake of EVs which account for nearly 45% of daily peak in the APS. Smart charging could smooth the peaks.

Figure 6 ▷ **Electricity generation and capacity by fuel and scenario in Mexico**



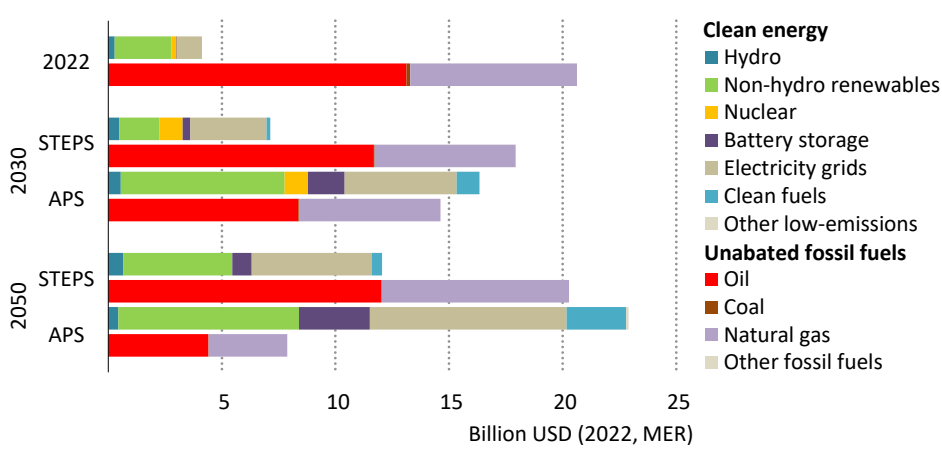
- Natural gas dominates the power mix in Mexico today. In the STEPS, natural gas and solar PV together meet over 95% of electricity generation growth to 2050.
- The APS sees much higher electricity demand by 2050 than the STEPS, with solar PV and wind meeting almost all the additional demand.

Figure 7 ▷ **Fuel demand and production by scenario in Mexico**



- In the STEPS, natural gas production increases nearly 25% by 2050, but the gap with demand widens; oil production falls, then plateaus as demand remains steady.
- In the APS, natural gas demand drops sharply after 2030 as use in the power sector declines; oil production follows demand downwards and falls by 60%.

Figure 8 ▷ **Annual investment in energy supply by type and scenario in Mexico**



- Investment in clean energy supply accounts for 0.5% of GDP in Mexico in the STEPS in 2050 and 0.9% in the APS.
- In the STEPS, most investment is still directed to fossil fuels in 2050. In the APS, investment in clean energy is 3-times higher than investment in fossil fuels by 2050.

Notes

Units

Area	ha	hectares
Distance	km	kilometre
Emissions	Gt CO_2	gigatonnes of carbon dioxide
	Mt CO_2	million tonnes of carbon dioxide
	Mt CO_2-eq	million tonnes of carbon-dioxide equivalent (using 100-year global warming potentials for different greenhouse gases)
	t CO_2-eq	tonnes of carbon-dioxide equivalent
Energy	EJ	exajoule (1 joule x 10^{18})
	PJ	petajoule (1 joule x 10^{15})
	TWh	terawatt-hour
	Tcal	teracalorie (1 calorie x 10^{12})
Gas	bcm	billion cubic metres
	bcm/d	billion cubic metres per day
	mcm/d	million cubic metres per day
Mass	kg	kilogramme
	kt	kilotonnes (1 tonne = 1 000 kg)
Monetary	USD million	1 US dollar x 10^6
	USD billion	1 US dollar x 10^9
Oil	mb/d	million barrels per day
	b/d	barrels per day
Power	GW	gigawatt
	MW	megawatt
	kV	kilovolt

Terms

Activity drivers for industry include production levels (Mt) and value added (USD 2022, PPP); for transport, vehicle-kilometres (km) for passenger cars and tonne-km for trucks; for buildings, air conditioning (million units) and floorspace (million square metres). The activity numbers presented correspond to the Stated Policies Scenario (STEPS) indexed on the 2022 value.

Bioenergy refers to bioenergy and waste.

Clean fuels refers to biofuels, hydrogen and hydrogen-related fuels.

Daily average electricity load profiles do not factor in electricity demand generated by dedicated renewable sources connected to electrolysers, and they also do not consider the influence of demand-response mechanisms.

Energy-intensive industries include chemicals, iron and steel, non-metallic minerals (cement and other), non-ferrous metals (aluminium and other) and pulp, paper and printing.

Heating and cooking in buildings refers to energy demand for space and water heating, and cooking.

Hydrogen demand excludes both hydrogen exports and the hydrogen used for producing hydrogen-based fuels which are exported.

Investment data are presented in real terms in year-2022 US dollars.

Large-scale CCUS projects refer only to facilities with a planned capture capacity higher than 100 000 tonnes of CO_2 per year.

Low-emissions hydrogen projects considered are those with an announced capacity for 2030.

Non-road transport includes rail, domestic navigation, domestic aviation, pipeline and other non-specified transport.

Other for power generation and capacity refers to geothermal, concentrated solar power, marine, non-renewable waste and other non-specified sources.

Other for final consumption in sectors refers to non-renewable waste, hydrogen, solar thermal and geothermal.

Other in a sector category refers to agriculture and other non-energy uses.

Other fossil fuels in energy supply investment refer to non-renewable waste and other supply sources.

Other fuel shifts include bioenergy, nuclear, solar thermal, geothermal and natural gas.

Other industry refers to the construction, food and tobacco, machinery, mining and quarrying, textile and leather, transport equipment, wood industry branches and remaining industry.

Other low-emissions in energy supply investment include heat pumps, CCUS, electricity generation from hydrogen, electricity generation from ammonia and direct air capture.

Road transport includes six vehicle categories (passenger cars, buses, two/three-wheelers, light-duty vans and trucks, and medium and heavy trucks).

SDG 7 refers to Sustainable Development Goal (SDG) 7: "ensure access to affordable, reliable, sustainable and modern energy for all", adopted by the United Nations in 2015.

Solar potential data is calculated based on the average potential at national level assessed in kilowatt-hour per kilowatt peak per day (2020).

Total final consumption includes consumption by the various end-use sectors (industry, transport, buildings, agriculture, and other non- energy use). It excludes international marine and aviation bunkers, except at world level where it is included in the transport sector.

Acronyms

Scenarios: **STEPS** = Stated Policies Scenario; **APS** = Announced Pledges Scenario.

AFOLU	agriculture, forestry and other land use
BECCS	bioenergy with carbon capture and storage
CCUS	carbon capture, utilisation and storage
CNG	compressed natural gas
EV	electric vehicle
GDP	gross domestic product
GHG	greenhouse gases
H_2	hydrogen
HVDC	high voltage direct current
ICE	internal combustion engine
MEPS	minimum energy performance standards
MER	market exchange rate
NDC	Nationally Determined Contribution
PPP	purchasing power parity
PV	photovoltaics
SDG	Sustainable Development Goals
VA	value added
ZEV	zero emissions vehicle

The policy tables include existing policies and announcements as of the end of September 2023. The same applies to the tables of existing and announced projects.

The IEA does not use colours to refer to the various hydrogen production routes. However, when referring to specific policy announcements, programmes, regulations and projects where an authority uses colour to define a hydrogen production route, e.g. green hydrogen, we use that terminology to report developments in this review.

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