

Latin America Energy Outlook

A satellite view of the Earth showing Latin America and the Caribbean region. The landmasses are shown in green and brown, with the surrounding oceans in deep blue. White clouds are scattered across the scene, particularly over the Atlantic and Pacific Oceans. The title 'Latin America Energy Outlook' is overlaid in large white text at the top.

Overview: Chile

International
Energy Agency

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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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Chile



6TH

largest share of solar in electricity generation in the world

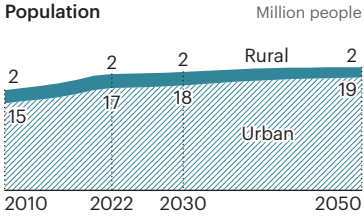
TOP

copper producer in the world

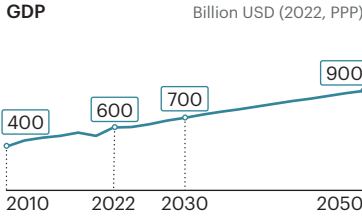
2ND

largest lithium producer in the world

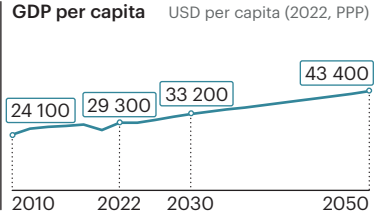
Population



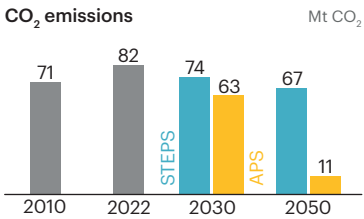
GDP



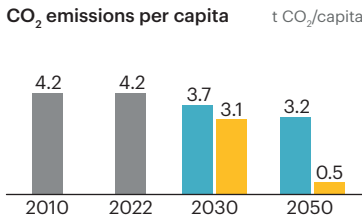
GDP per capita



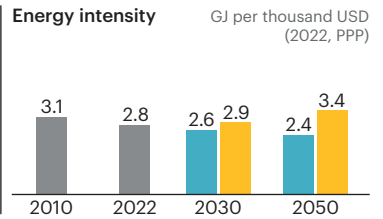
CO₂ emissions



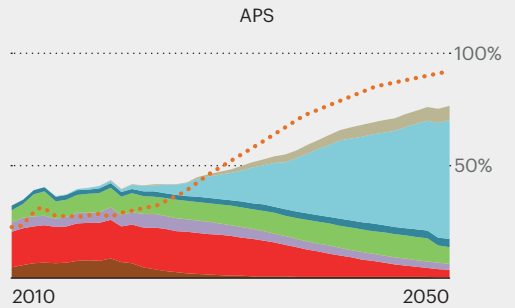
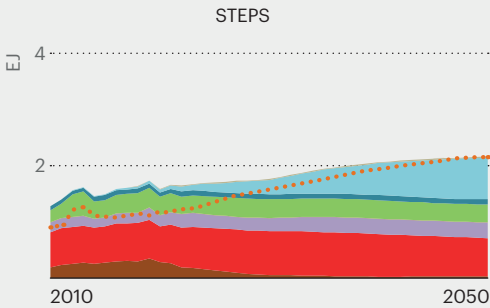
CO₂ emissions per capita



Energy intensity

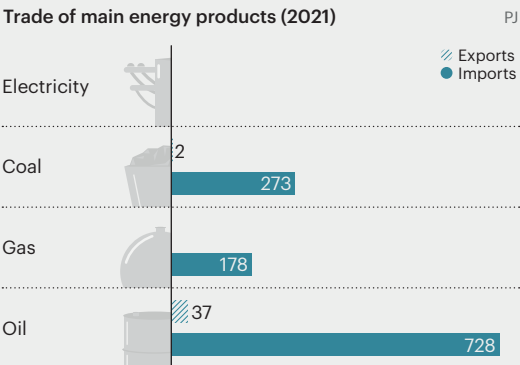


Primary energy supply and share of low-emissions sources



● Coal
 ● Oil
 ● Natural gas
 ● Nuclear
 ● Bioenergy
 ● Hydro
 ● Wind and solar
 ● Other
 ● Share of low-emissions (right axis)

Trade of main energy products (2021)



Trade of non-energy products (2021)

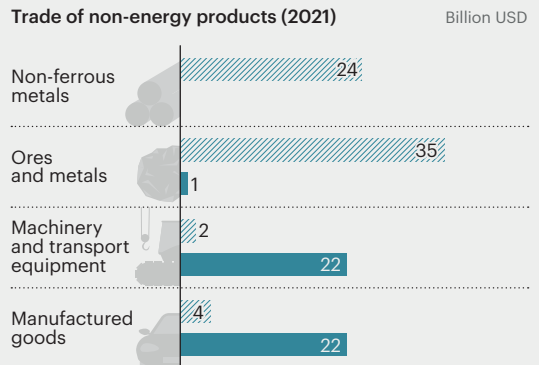


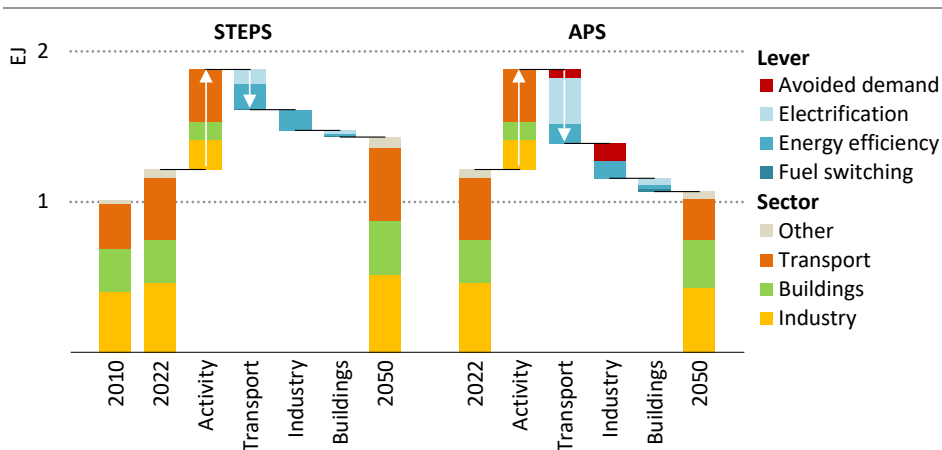
Table 1 ▶ Recent policy developments in Chile

| | Policy | Publication year |
|------------------------------|--|------------------|
| Economy-wide measures | • Climate Change Law 21455: Binding 2050 net zero GHG emissions target. | 2022 |
| | • NDC (update): GHG emissions peak no later than 2025 and reach 95 Mt CO ₂ -eq by 2030. | 2021 |
| | • 2022-2026 National Energy Efficiency Plan: Reduce energy intensity on a national basis of at least 13% by 2030 relative to 2019. | 2022 |
| | • Industry and power: CO ₂ tax of USD 5/t CO ₂ . | 2017 |
| Critical minerals | • National Lithium Strategy: Aims to increase public participation and public-private partnerships in the lithium supply chain; proposes the creation of research institutes and a national lithium company (announced). | 2023 |
| | • National Mining Policy 2050: Reach carbon neutrality in mining by 2040. | 2022 |
| Hydrogen | • National Hydrogen Strategy: Electrolysis capacity targets (operating and under development) of 5 GW by 2025 and 25 GW by 2030. Aim to reach USD 2.5 billion/year from exports of hydrogen and derivatives by 2030. | 2020 |
| Power | • Phase out or retrofit coal-fired power plants no later than 2040. | 2019 |
| Industry | • Energy Efficiency Law 21305: By 2023, mandatory energy management system for large energy consumers (consumption of over 50 T cal/year). | 2021 |
| Transport | • Law 21505 promoting electricity storage and electromobility introduced an eight-year gradual tax exemption scheme for electric and hybrid vehicles. | 2022 |
| | • National Electromobility Strategy 2035 targets: 100% of new light-duty and medium-duty vehicles, and new urban public transport vehicles to be zero emissions. | 2021 |
| Buildings | • National Energy Policy 2050 target: 100% low-emissions heating and cooking in urban centres in 2040, and 100% of new buildings are net zero energy use by 2050. | 2022 |

Table 2 ▶ Major infrastructure projects in Chile

| | Project | Size | Date online | Status | Description |
|--|--|--|-------------|--------|------------------------------|
| Hydrogen/ammonia | H ₂ Magallanes | 1 400 kt H ₂ /year (capacity) | 2025 | ● | Dedicated wind |
| | Gente Grande Magallanes | 630 kt H ₂ /year (production) | 2028 | ● | Dedicated wind |
| | Faraday | 180 kt H ₂ /year (production) | 2027 | ● | Grid + dedicated |
| Synfuels | Haru Oni (phase 2) | 75 mill. litres synfuel/year | 2025 | ● | Dedicated renewables |
| Transmission, interconnections | Kimal-Lo Aguirre high voltage direct current transmission line | 3 000 MW- 600 kV | 2029 | ● | 1 500 km at permitting stage |
| Status ● Feasibility study ● Under construction | | | | | |

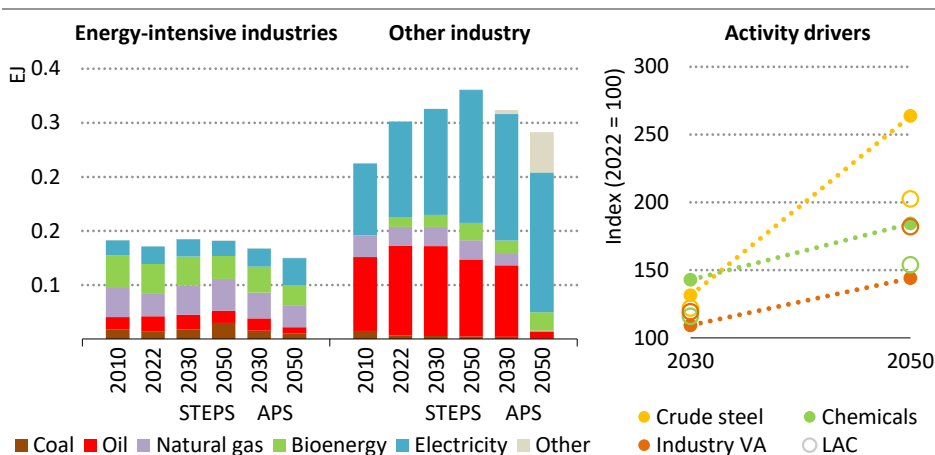
Figure 1 ▶ Final energy consumption by scenario in Chile



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- Industry and transport account for 72% of final energy consumption today. Transport and industry drive up final energy consumption by nearly 20% in the STEPS by 2050.
- In the APS, final energy consumption in 2050 is 25% lower than in the STEPS due to electrification and energy efficiency gains in transport.

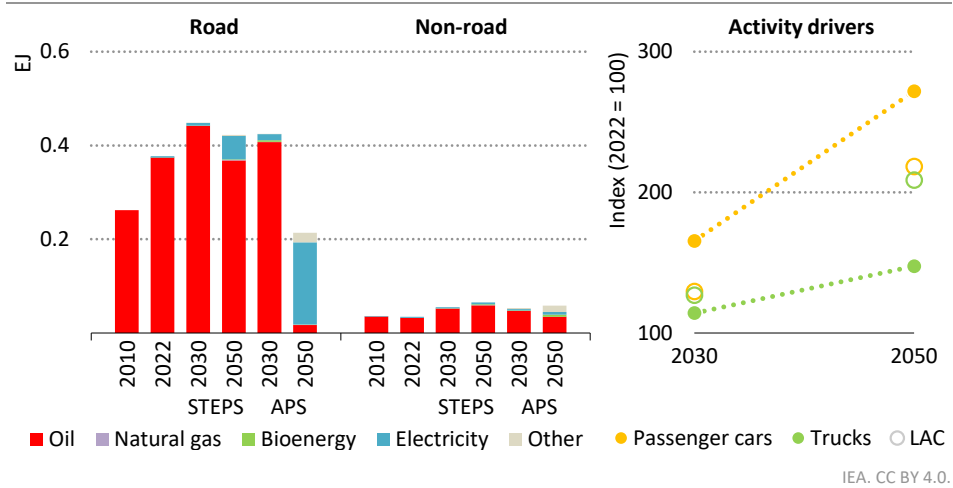
Figure 2 ▶ Fuel consumption in industry by type and scenario in Chile



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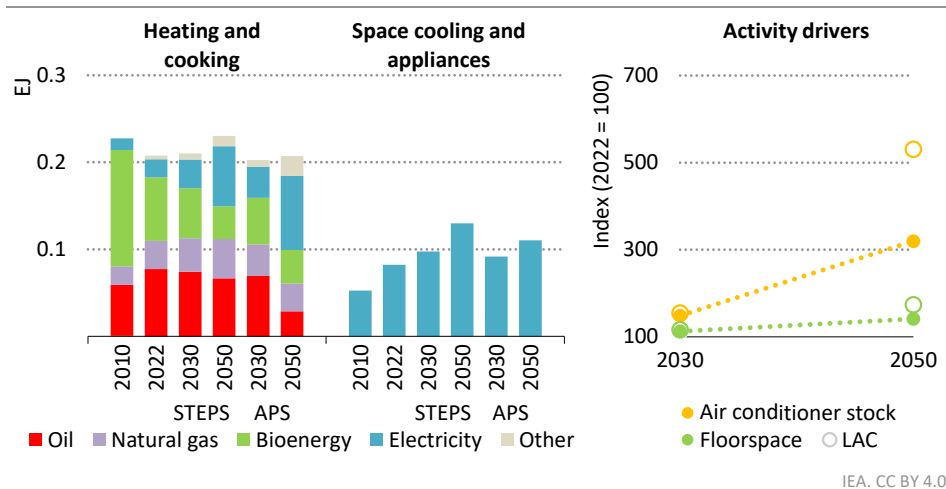
- Light industries, mostly mining, currently account for over 50% of energy consumption in industry in Chile. By 2050, steel industry output is above 2.5-times higher than today.
- In the APS, accelerated electrification and adoption of hydrogen-fuelled trucks in the mining sector bring about steep declines in emissions.

Figure 3 ▶ Fuel consumption in transport by type and scenario in Chile



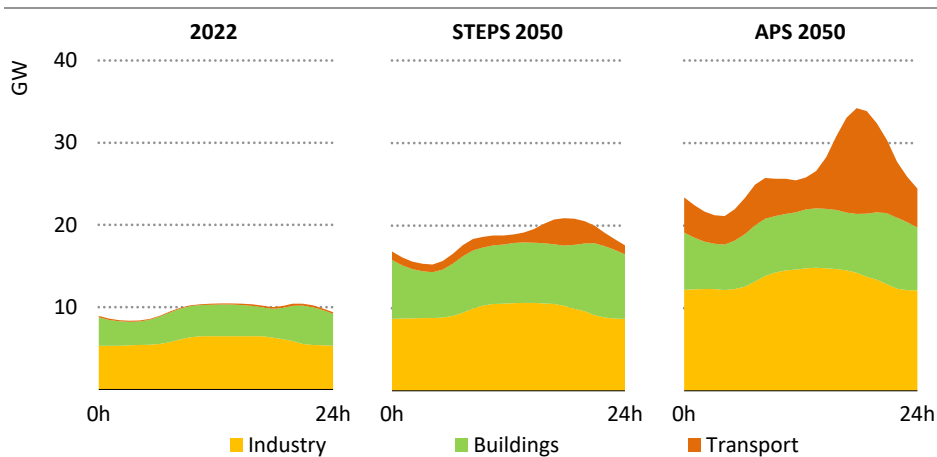
- Chile’s geography means that most passengers and freight travel by road. Fuel consumption for transport is dominated by oil use in road transport.
- Chile has the ninth-largest electric bus fleet in the world. In the APS, its ambitious fuel economy and electromobility plans boost EV sales.

Figure 4 ▶ Fuel consumption in buildings by type and scenario in Chile



- Oil and bioenergy meet most heating and cooking needs today. By 2050, firewood use for heating, relevant in the central and southern regions, is dramatically lower in both scenarios.
- The shift away from oil and firewood use in heating and cooking and rising sales of household appliances are the drivers of additional electricity demand.

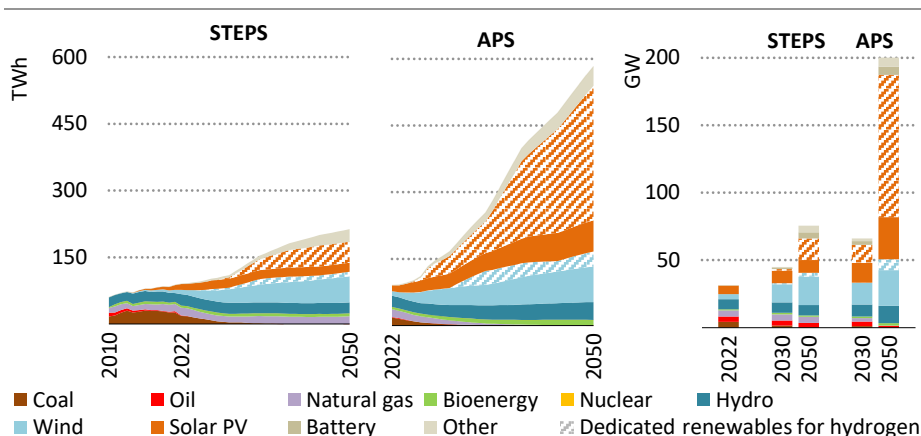
Figure 5 ▶ Average electricity daily load profile by scenario in Chile



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- By 2050, peak electricity demand doubles in the STEPS and triples in the APS; it grows by up to 15% (STEPS) and 60% (APS) faster than average electricity demand.
- The increase in daily peak demand is mainly driven by light industries (mining) and the uptake of EVs. Demand management could help to smooth evening peak demand.

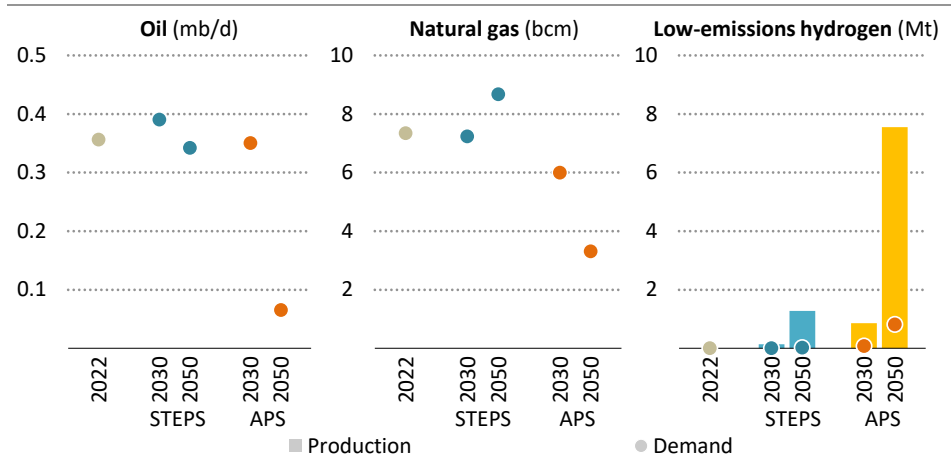
Figure 6 ▶ Electricity generation and capacity by fuel and scenario in Chile



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- Coal accounted for 20% of electricity generation in 2022. A big increase in wind and solar PV generation leads to coal being phased out of the electricity mix in both scenarios.
- Chile’s solar potential is the third-largest in the world. In the APS, dedicated solar PV for hydrogen production leads total installed capacity to rise to three-times the level in the STEPS.

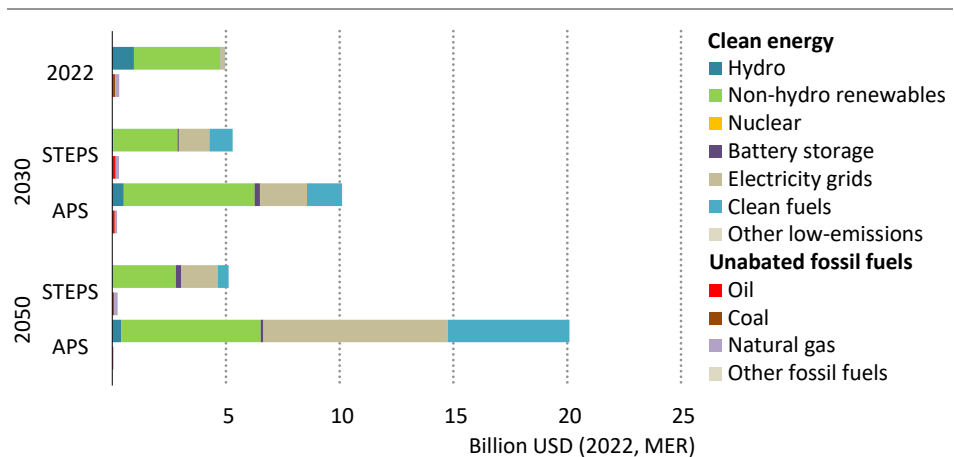
Figure 7 ▶ Fuel demand and production by scenario in Chile



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- In the STEPS, oil demand stagnates, while natural gas demand increases due to fuel switching in buildings and higher activity in energy-intensive industries.
- Hydrogen production is projected to reach around 7.5 Mt in 2050 in the APS, driven by domestic demand, particularly in transport and mining, and by international trade.

Figure 8 ▶ Annual investment in energy supply by type and scenario in Chile



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- Investment in clean energy supply accounts for over 1% of GDP in Chile in the STEPS in 2050 and 4% in the APS.
- In the APS, 40% of investment goes by 2050 to grids and 20% to hydrogen supply.

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 CO₂ 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 |
| H₂ | 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.

International Energy Agency (IEA)

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