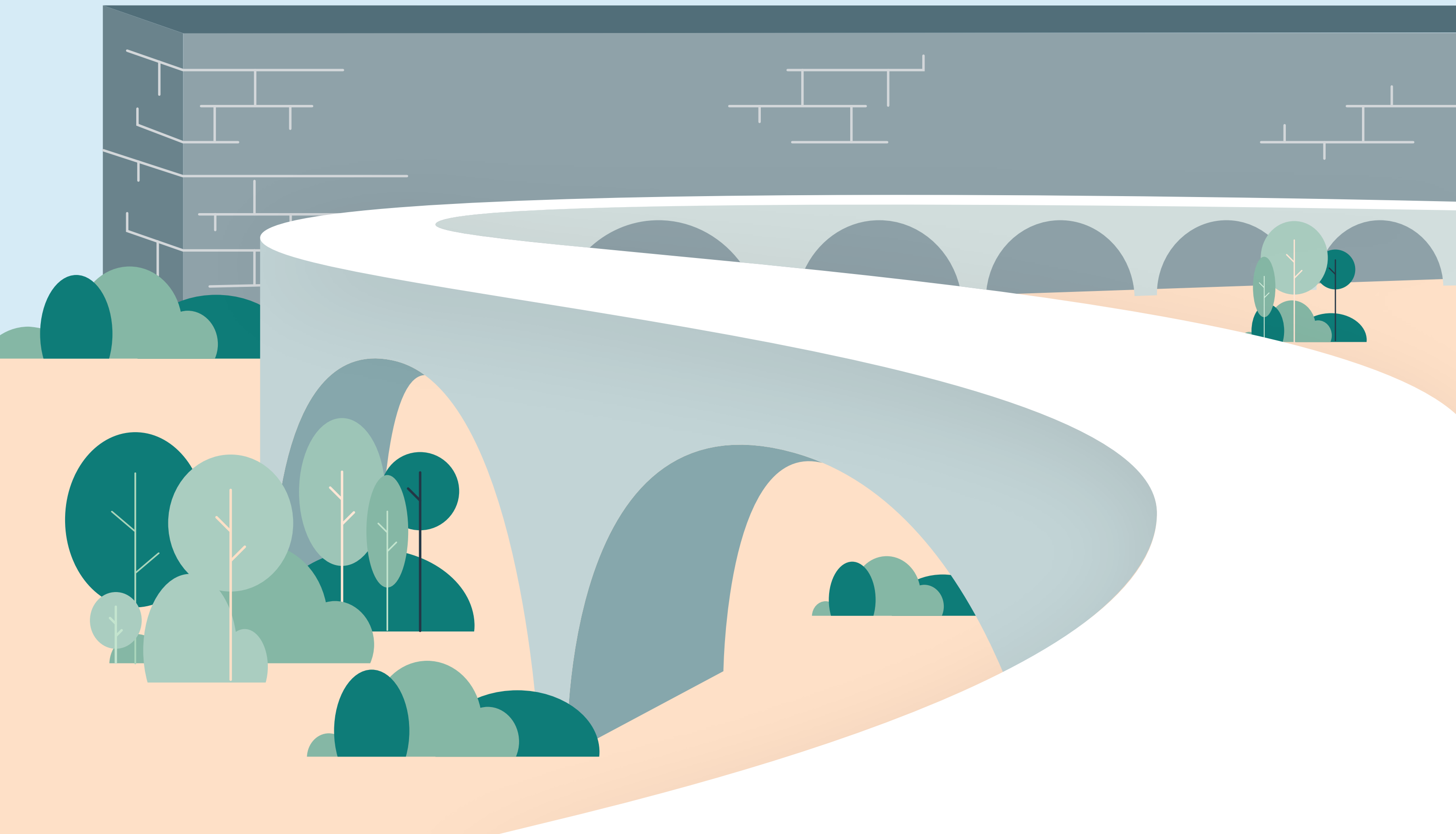
2024

Energy Perspectives

Key Insights

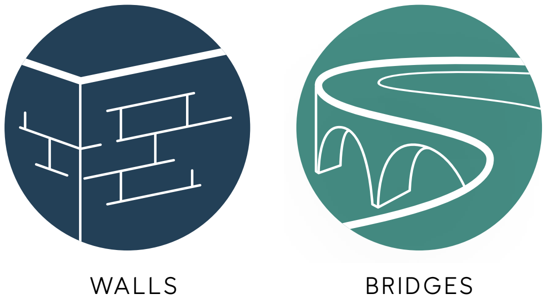


Key insights from Energy Perspectives 2024

Energy Perspectives presents two scenarios for economic and energy market development, *Walls* and *Bridges**

Walls builds on current energy market trends and energy and climate policies, assuming climate action to progress at a slowly accelerating pace in the future.

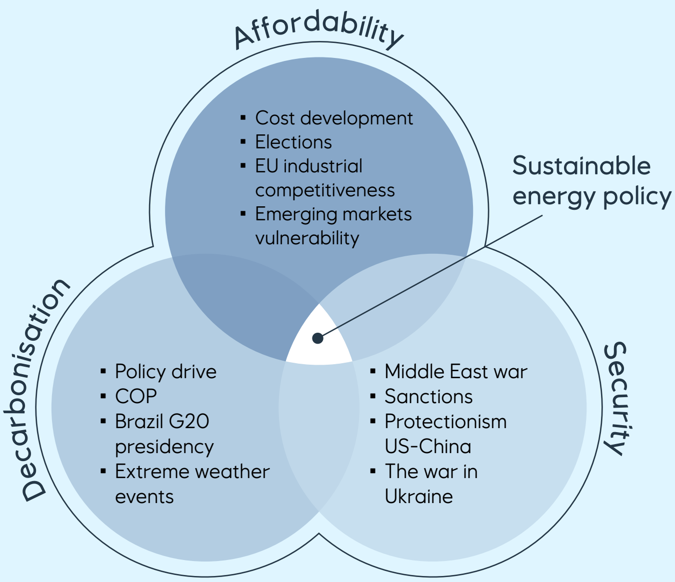
Bridges EP23 is a normative back-cast scenario complying with the 1.5°C carbon budget, demonstrating the enormous and sustained effort required to reach this target, on top of all the changes in *Walls*.



This year's Energy Perspectives presents an updated version of the Walls scenario, while maintaining the Bridges scenario as outlined in the 2023 outlook.

Competing priorities are influencing policy makers' approach to economic, climate and energy policies

Geopolitical tensions, wars and economic development are drawing focus away from energy transition goals. However, a growing sense of urgency around climate change and its adverse effects will keep the long-term decarbonisation agenda in focus.



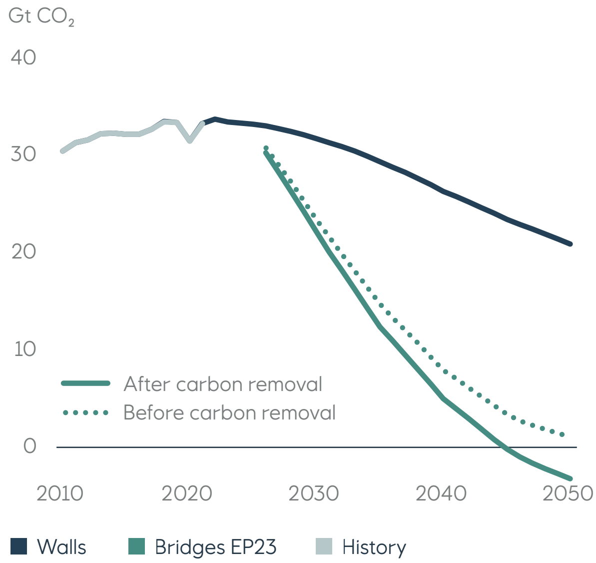
Climate pledges are not enough to avoid global warming above 1.5°C

In *Walls*, the 1.5°C carbon budget is exhausted by 2033.

In *Bridges EP23*, current commitments are met, and further commitments are made that enable emissions to remain within the 1.5°C carbon budget with the help of carbon removal technologies.

Source: IEA (history), Equinor (projections) →

Annual global energy-related CO_2 emissions

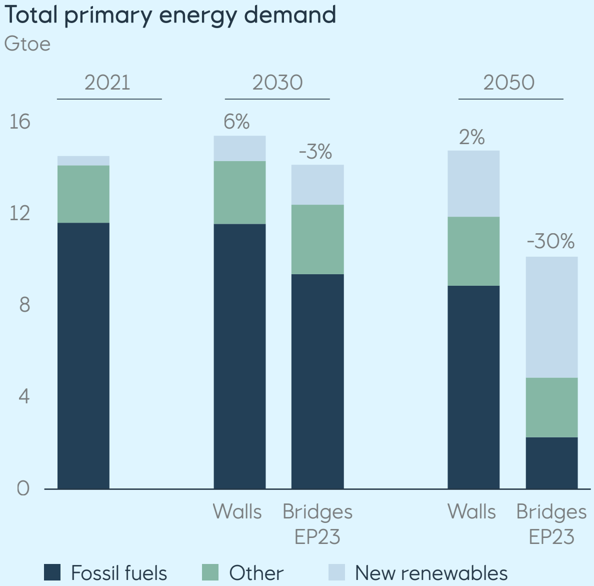


The energy transition is significant in *Walls* and radical in *Bridges EP23*

Despite growth in the global population and GDP, total primary energy demand peaks in the late 2030s in *Walls* as rapidly declining demand in industrialised regions outweighs a continued growth in most emerging regions.

In *Bridges EP23*, total primary energy demand peaks in 2025, before going into sharp decline and ending up at a global demand level in 2050 that is 30% lower than that observed in 2021.

Source: IEA (history), Equinor (projections) →

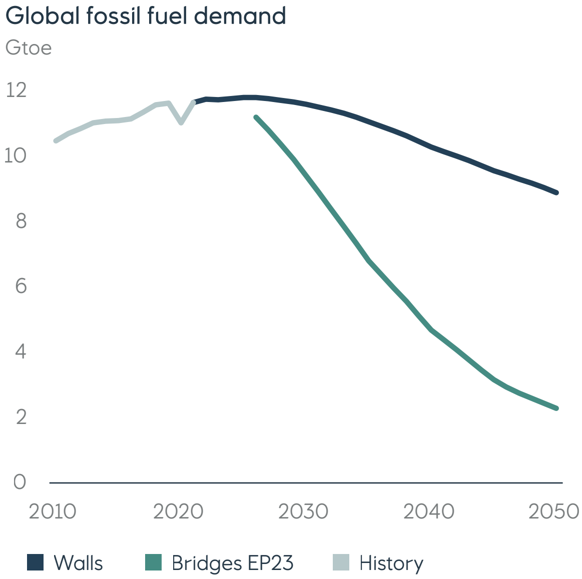


Peak demand for fossil fuels arrives before 2030

In *Walls*, combined fossil fuel demand peaks in 2025, followed by a gentle downward trajectory. Coal, oil and gas demand peak in 2022, 2027 and 2035, respectively.

In *Bridges EP23*, fossil fuel demand declines at a rapid pace from 2025. By 2050, all remaining fossil fuel use is either fully abated, compensated by carbon removal or used as feedstock in the petrochemical and other non-energy sectors.

Source: IEA (history), Equinor (projections) →



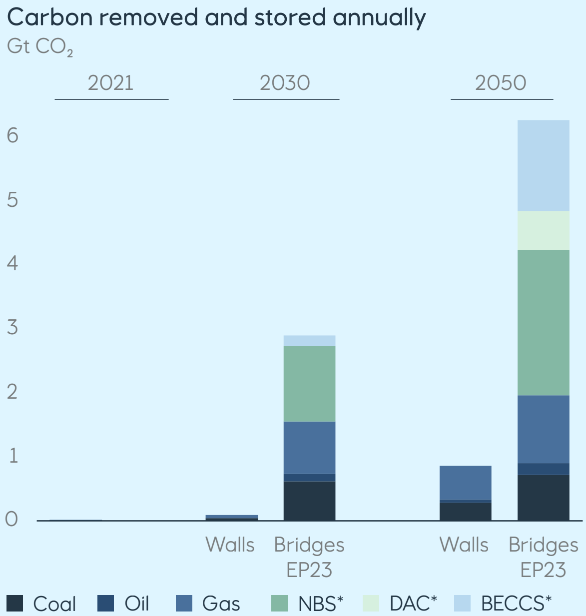
Carbon capture, utilisation and storage (CCUS) must play an essential role in the large-scale decarbonisation of the power and industry sectors

In *Walls*, CCUS on both coal and gas starts to accelerate after 2030.

In *Bridges EP23*, there is massive growth in CCUS even before 2030, and remaining unabated fossil fuel use in 2050 is compensated by carbon removal, direct air capture, etc.

Source: IEA (history), Equinor (projections) →

** Nature-based solutions (NBS), Bioenergy with carbon capture and storage (BECCS), Direct air capture (DAC)*

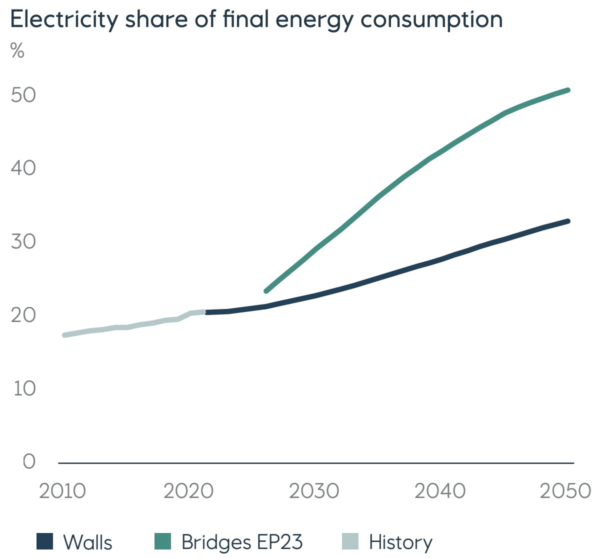


Energy consumption shifts towards electricity

In *Walls*, electrification accelerates steadily towards 2050, increasing its share by half.

In *Bridges EP23*, massive acceleration happens before 2030. By 2050, the share exceeds 50%, two and a half times as large as today.

Source: IEA (history) Equinor (projections) →



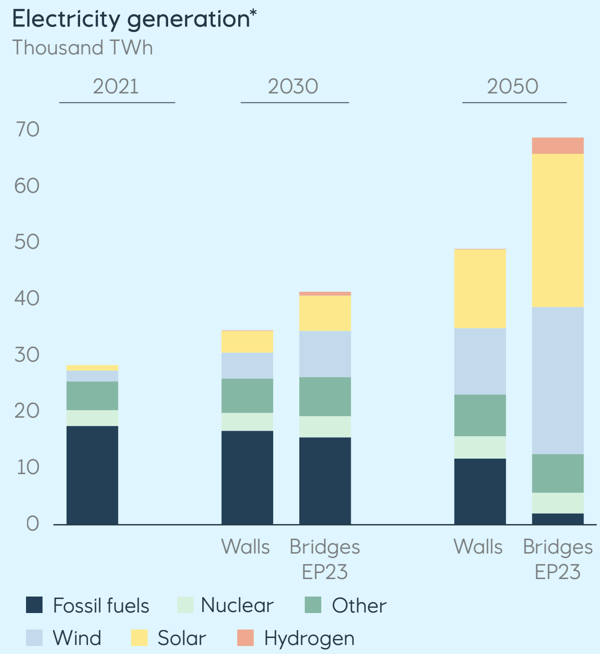
The key enabler to a sustainable energy transition is growth in decarbonised electricity

Low/zero carbon electricity production will increase significantly in both scenarios to help change the energy mix away from fossil fuels, and achieve higher energy efficiency and lower emissions.

The growth in electricity generation is enabled by significant growth in solar and wind.

Source: IEA (history) Equinor (projections) →

** Includes electricity used for grid and hydrogen production*



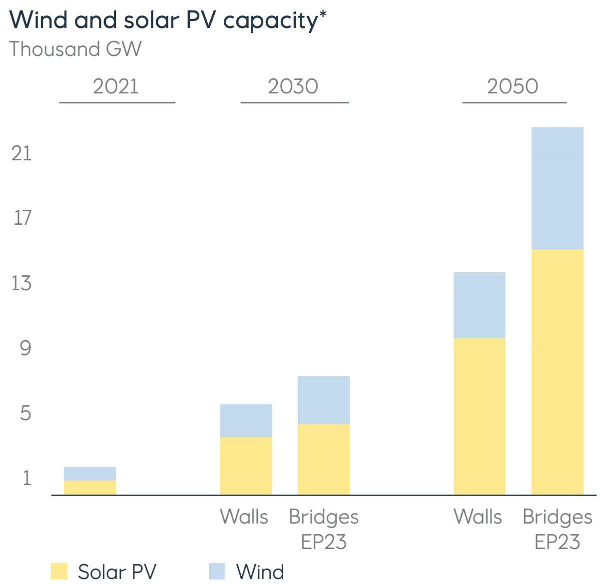
The growth of wind and solar photovoltaics (PV) capacity outruns all previous trends

In *Walls*, wind capacity is five times greater, and solar PV capacity ten times greater, in 2050 compared to 2021.

In *Bridges EP23*, wind capacity is nine times greater, and solar PV capacity is 16 times greater, in 2050 compared to 2021.

Source: IEA (history) Equinor (projections) →

** Includes wind and solar PV capacity for grid and hydrogen production*



Energy demand from industry and buildings continues to stay high, but electrification reduces the share of fossil fuels in both scenarios

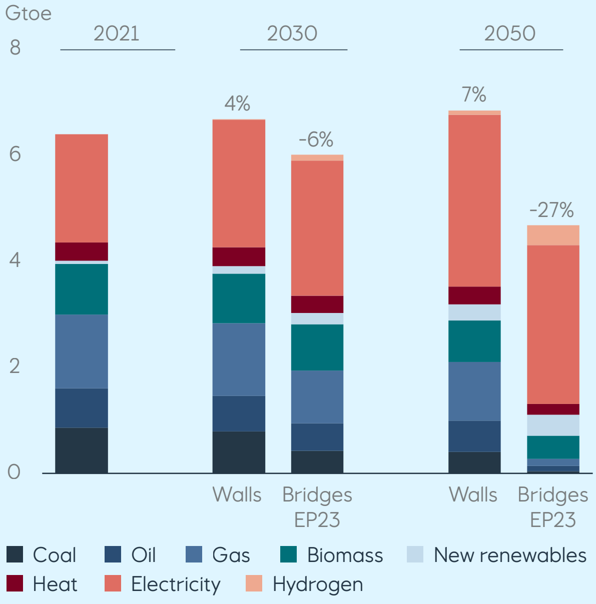
In *Walls*, demand from industry and buildings increases 7% by 2050, whilst demand declines by 27% in *Bridges EP23* over the same period.

The electricity share of energy demand from industry and buildings increases from 32% in 2021 to 47% and 64% in 2050 in *Walls* and *Bridges EP23*, respectively.

Source: IEA (history), Equinor (projections) →

Industrial and Buildings fuel mix

Gtoe



Electrification and hydrogen-based fuels will contribute to the decarbonisation of transport

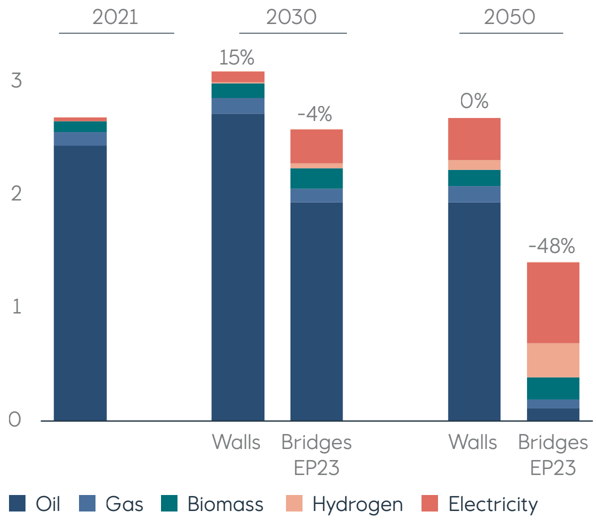
In both scenarios, electric vehicles replace internal combustion engines in road transport.

In *Bridges EP23*, further decarbonisation is achieved by increasing use of hydrogen-based fuels in aviation and marine transport.

Source: IEA (history), Equinor (projections) →

Transport fuel mix

Gtoe



The petrochemical sector is the only sector with continuous growth in fossil fuel demand to 2040 in both scenarios

In *Walls*, petrochemical feedstock demand accounts for 10% of total gas demand and 23% of total oil* demand in 2050.

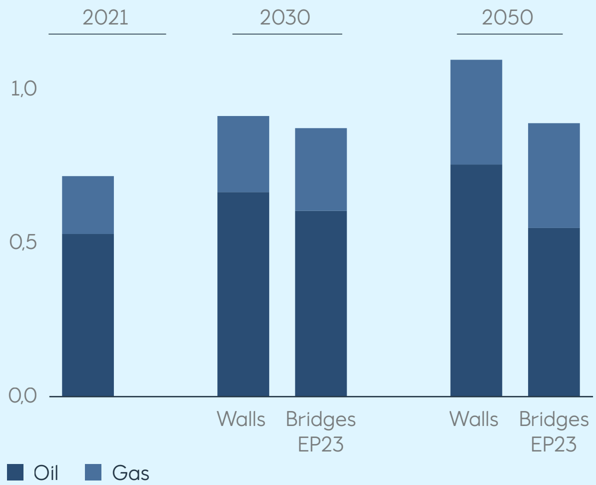
In *Bridges EP23*, petrochemical feedstock demand peaks in 2040 and plateaus towards 2050 where it accounts for 34% of total gas demand and 50% of total oil demand.

** Oil here refers to total liquids including biofuels.*

Source: IEA (history), Equinor (projections) →

Petrochemical feedstock

Gtoe



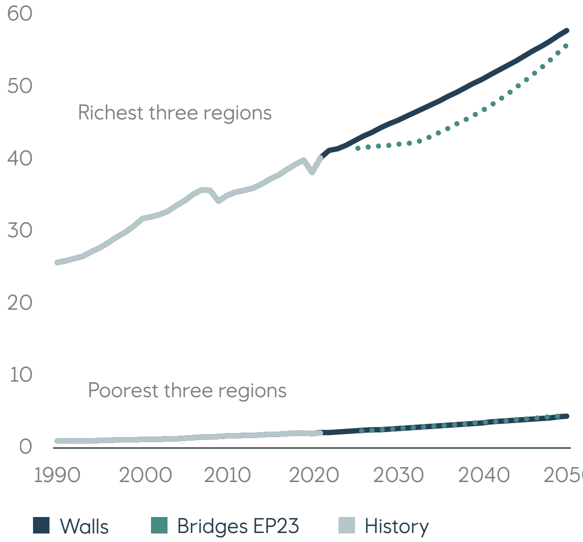
GDP per capita continues to grow globally, but the significant inequalities across regions persist

In 2050 GDP per capita is more than 13 times greater in the three richest regions compared to the three poorest regions.

In the richest regions the growth in GDP per capita takes a different path in *Bridges EP23* than in *Walls*. Initially the energy transition in *Bridges EP23* is more costly, but the economic growth catches up by 2050 in part due to avoidance of some of the costs resulting from climate change.

Source: Oxford Economics International 2024 (history), Equinor (projections), UN (population) →

GDP per capita in the richest and poorest regions
Real thousand USD at market exchange rates



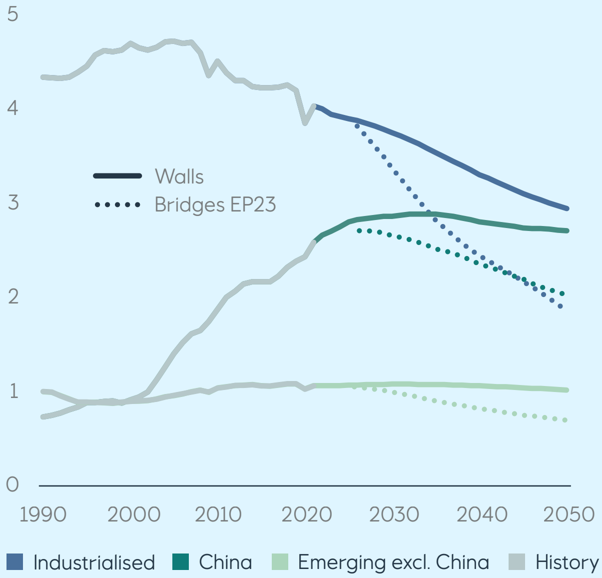
Primary energy demand per capita remains significantly higher in the industrialised regions and China than in the emerging regions

Per capita energy demand in the industrialised regions declines, with electrification boosting energy efficiency in the transport and residential sectors.

In the emerging regions per capita energy demand increases linked to economic and population growth are countered by electrification and efficiency developments.

Source: IEA (history), Equinor (projections), UN (population) →

Primary energy demand per capita
toe per capita



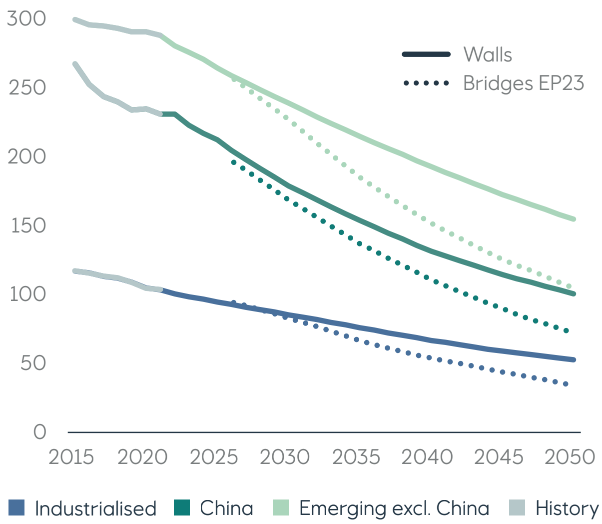
Energy intensity is approximately halved in all regions by 2050 aided by electrification and other efficiency gains

The emerging regions excluding China are much less energy efficient than the industrialised regions with energy intensity being three times as high.

The level of efficiency gains required to reduce energy intensity in the emerging regions is significantly greater than in the industrialised regions.

Source: Oxford Economics International 2024 (history), Equinor (projections) →

Energy intensity by region
toe per million USD



Acknowledgements and disclaimer

Acknowledgements

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