New Zealand in a changing energy world

Benchmarking New Zealand's Energy System

WORLD ENERGY COUNCIL | BusinessNZ Energy Council








Contents

Executive Summary

For more than a decade, New Zealand has played a significant role in the ongoing development of the World Energy Council's (WECs) annual Energy Trilemma Report, contributing to advancements and participating in methodology reviews. The Trilemma Report provides insights into how countries are performing year-on-year on the key pillars of energy security, sustainability and affordability. New Zealand has consistently ranked in the top 10 worldwide and the trilemma terminology has become commonplace within the country's energy sector. This year, however, marks the first occasion where WEC will not release its report, as a substantial software upgrade and indicator updates are currently in progress to enhance future insights.

In response, the BusinessNZ Energy Council (BEC), serving as the New Zealand member committee for WEC, has elected to benchmark New Zealand's energy system against 15 countries. These nations have historically ranked among the top and bottom trilemma performers, are key trading partners of New Zealand, or share similar geographic or economic characteristics.

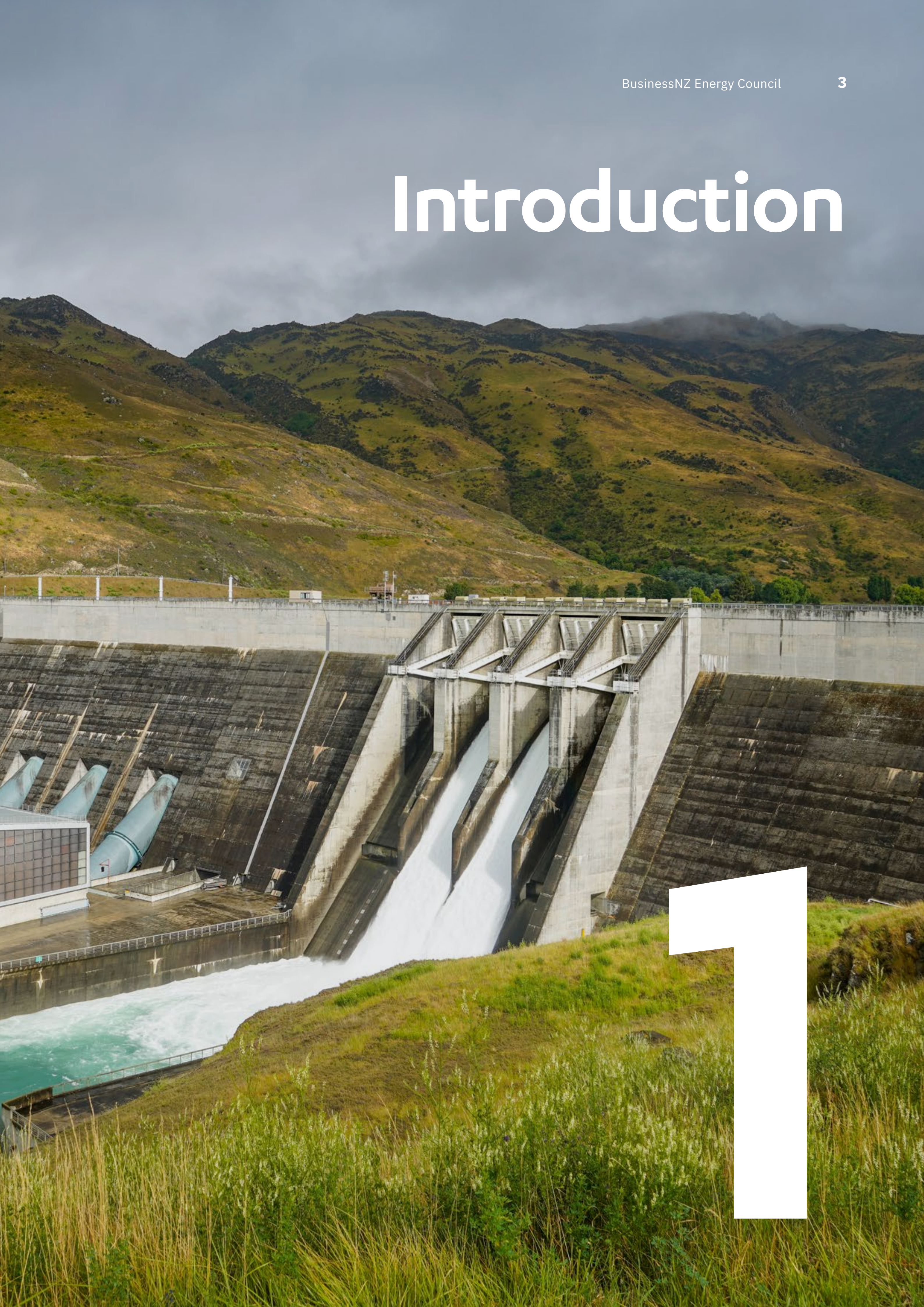
New Zealand has balanced high renewable electricity penetration with low prices, broad energy access and relatively low energy poverty. Nevertheless, New Zealand's reliance on water resources, combined with heightened concerns over supply security resulting from steep reductions in gas supply have revealed vulnerabilities within the nation's energy system. This has sparked a renewed discussion regarding the future direction of New Zealand's energy sector. It was in this context that we framed our research by looking into all three aspects of the energy trilemma.

Across the 14 metrics we explored, New Zealand performs generally well when compared to the countries. New Zealand continues to excel in air quality (2nd), renewable electricity share (4th) and low energy poverty (3rd). However, it performs worst for wholesale electricity price volatility and struggles with energy intensity (9th) and energy import dependency (10th). On average, New Zealand placed 5th among the 16 countries. When we measured how much its results stood out from the average across all metrics, New Zealand ranked even higher, coming in 3rd overall. This shows that New Zealand's energy system is performing well overall, but areas of underperformance highlight the need for ongoing investment, clear long-term policies, and a balanced approach to achieving net zero.

Insights from this report are intended to support ongoing discussions across government, industry and communities. The main aim of the report is to identify New Zealand's strengths and areas for improvement relative to other countries, rather than to rank countries or provide specific recommendations.

New Zealand has consistently ranked in the top 10 worldwide and the trilemma terminology has become commonplace within the country's energy sector.

Introduction



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1. Introduction

1.1 Purpose and Scope of the Report

This report has been undertaken to provide a comprehensive and evidence-based understanding of how New Zealand's energy sector performs in comparison to a selected group of international peers. The primary objective is to identify New Zealand's strengths and areas for improvement by systematically benchmarking its energy sector against those of other countries using the latest available data and performance metrics.

The aim of this report is not to provide actionable recommendations and policy changes for New Zealand but to instead provide insights into how other countries have found success. While policy learnings can be valuable, no two countries are the same and thus like-for-like recommendations contain risk.

In a similar vein, the primary purpose of this report is not simply to rank New Zealand — since any ranking would inherently be influenced by the selection of countries included — but rather to use these rankings as a tool to frame and understand New Zealand's energy sector performance in the broader international context. This approach helps highlight relative strengths and weaknesses and supports more meaningful comparisons rather than focusing narrowly on position alone. While we do have total and categorical rankings shown within this report, these should not be seen as indicative of global rankings.

Through primarily quantitative analysis, we aim to showcase what New Zealand is doing well, as well as highlight challenges and opportunities for further improvement. By comparing New Zealand's performance with leading countries in specific areas, the report showcases best practices and innovative policy measures that have enabled these nations to excel. Similarly, by examining the underlying causes of underperformance in certain countries, we identify common pitfalls, policy missteps, and systemic challenges that New Zealand should seek to avoid.

Throughout the report, we present key economic, political, technological, and social factors that shape energy sector outcomes and countries' relative rankings. By analysing these drivers and their impact, we seek to provide insights for policy makers, industry stakeholders, and the wider public. Ultimately, our goal is to help equip New Zealand's energy sector with the knowledge and international context necessary to make informed strategic decisions, ensuring the sector's resilience, sustainability, and continued contribution to national well-being.

We chose 15 countries to compare New Zealand to across this study. These countries were chosen for a combination of factors; they were selected to represent performance diversity (top and bottom performers on the World Energy Council Trilemma Index), significance as New Zealand trading partners, and comparability in geography or economy. The aim of this spread of countries was to provide us with information of strategies New Zealand could follow or look to avoid and how similar countries have managed energy challenges. These countries are Australia, Canada, Chile, China, Germany, Greece, Iceland, Ireland, New Zealand, Norway, Pakistan, Qatar, South Africa, Switzerland, Uruguay and the USA. While there are countries that could easily have also been included, we chose not to expand selection to keep data collection manageable.

We chose 14 quantitative factors to compare the selected countries against, which were spread across the three aspects of the energy trilemma: security, sustainability and affordability. These three aspects gave us a rounded analysis of the many competing factors of a successful energy sector. Within these quantitative factors we have woven more qualitative factors that can help to explain the underlying factors behind each country's positioning.

It is important to note that while we have strived to use the most accurate approach possible, there remain certain factors and limitations that could not be fully accounted for in this analysis. Cross-country benchmarking inevitably involves working with data that can differ in quality, definition, and reporting frequency. For some indicators, the most recent data available varies by country, creating unavoidable time lags or gaps in direct comparability. Additionally, while we looked to unify metrics and terminology, structural differences, such as differing market regulations, social conditions, or resource endowments, can influence performance in ways that quantitative indicators alone may not fully reflect.

Ultimately, these methodological constraints do not diminish the value of the benchmarking exercise but rather inform a more nuanced and critical interpretation of the findings. We encourage stakeholders to use this report as a foundation for informed discussion, while recognising the evolving nature of both the data and the energy sector itself.

This report has been undertaken to provide a comprehensive and evidence-based understanding of how New Zealand's energy sector performs in comparison to a selected group of international peers.

1.2 Methodology

This section provides a structured outline of the methodology that was used through the data collection process of this report. The approach prioritises transparency and the use of the most recent and reliable data sources to ensure accurate and meaningful comparisons.

Research design:

- We undertook primarily a quantitative, comparative research approach supported by qualitative contextual analysis. The rationale behind this approach was that it enables a balanced evaluation of measurable energy sector performance alongside interpretation of broader economic, political, and social factors.
- Quantitative metrics provide objective, data-driven insights into the pillars of energy security, sustainability, and affordability. Qualitative factors help explain underlying reasons behind these metrics, enhancing the depth and applicability of findings.

Country selection:

- 15 countries were selected based on:
  a) Performance diversity as indicated by top and bottom rankings in the World Energy Council's Energy Trilemma Index.
  b) Economic and geographical comparability to New Zealand.
  c) Importance as trading partners to New Zealand.
- This selection ensures a comprehensive perspective spanning a variety of energy sector contexts to inform lessons and potential strategies for New Zealand. It allows us to look at not only what makes top performers do well, but also why bottom performers struggle.

Data Collection:

- Quantitative data was primarily taken from official government databases, international institutions including the International Energy Agency (IEA), World Energy Council, World Bank, and peer-reviewed scholarly research.

- 14 quantitative metrics were selected covering the three pillars of the energy trilemma:
  a) Energy security.
  b) Energy sustainability.
  c) Energy affordability.
- Qualitative factors, such as policy frameworks, regulatory environments, and social-economic conditions, were incorporated through governmental, institutional or scholarly reports.
- Data relevancy was sought after by using data from the most recent available data typically from 2023-2024.
- For this report we are not including nuclear within the definition of renewables.

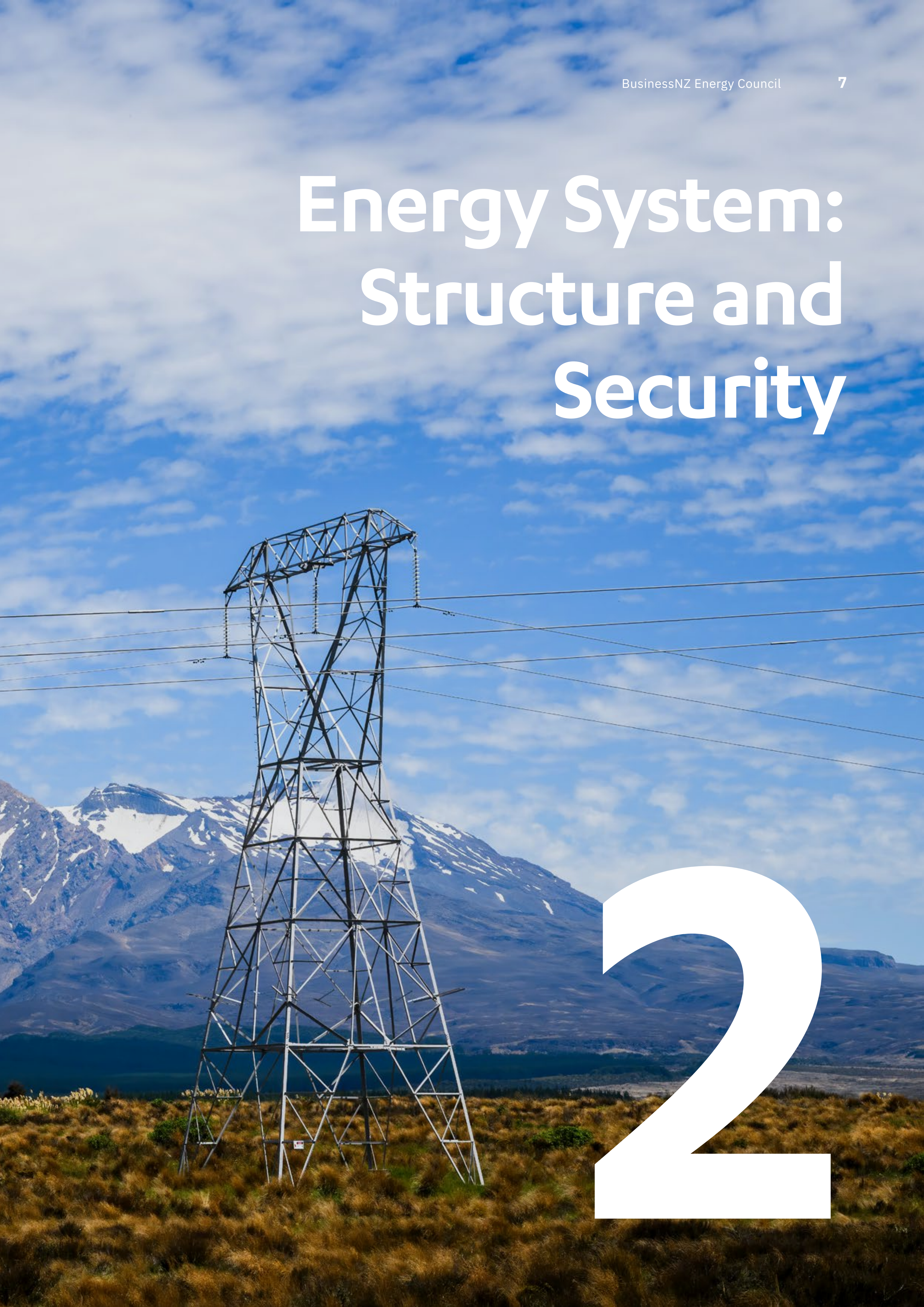
Data analysis:

- To allow for cross-country comparisons data was normalised. The units that are used for these normalisations are indicated where relevant.
- Were relevant the raw data was converted through calculations to better indicate performance in certain metrics. This is discussed when it occurs.

Limitations and challenges:

- Variability in data definitions, collection methods, and reporting periods across countries can affect direct comparability of certain indicators. This also has the potential to present room for misinterpretation.
- Some qualitative factors (e.g., political stability, cultural attitudes) are inherently difficult to measure but play important roles in an energy sector's performance.
- We are aware that because we have not looked at every country, the selection that we have chosen risks skewing the data, although this would have been the case no matter what countries we selected.
- These limitations are highlighted through the report when needed.

Throughout the report, we present key economic, political, technological, and social factors that shape energy sector outcomes and countries' relative rankings. By analysing these drivers and their impact, we seek to provide insights for policy makers, industry stakeholders, and the wider public.



Energy System: Structure and Security

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2. Energy System: Structure and Security

2.1 Energy Import Dependency

When exploring the security of a country's energy system, an interesting metric to look at is how reliant that country is on imported energy. For this analysis we took the total energy imports of a country and then divided them by the total energy consumption of that country to find a percentage value of how much of the country's total energy consumption is imported. Energy Imports / Total Energy Consumption = Energy Import Dependency.

The two top performing countries within this context were Qatar (1st) with 0% of their energy consumed coming from imports and the USA (2nd) at 32.8%. This is unsurprising as Qatar and the USA both have large domestic oil and gas reserves.

New Zealand, in contrast, while having a degree of domestic crude oil production, no longer has any refining capacity following the closure of the Marsden Point Refinery. Due to this, all refined engine fuel must be imported. Additionally, coal continues to be imported into New Zealand to help firm intermittent generation. This reality has meant that New Zealand ranks 10th out of the 16 countries in this study for energy import dependency with 57.9% of energy consumed imported.

Ireland (16th) and Switzerland (15th) emerged as the worst performers with import percentages of 92.7% and 90.5% respectively. Both Ireland and Switzerland have virtually no domestic oil, gas or coal reserves and thus must import. Additionally, Ireland continues to have a heavy reliance on fossil fuels for its energy needs, exacerbating import reliance. These countries are both integrated with other countries in the EU which can help mitigate these dependencies.

These results suggest that countries unable to produce necessary fossil fuels domestically are forced to rely on imports and are worse off in terms of energy security. But interestingly, Iceland seems to prove this wrong. With no significant fossil fuel reserves, Iceland ranks an impressive 3rd place in our import dependency ranking, with 34.1% of their total energy consumption imported. Iceland has been able to leverage its renewable energy sources and growing uptake of electric transportation (14% of total passerger car fleet are EVs) to reduce its reliance on fossil fuels.

Looking forward, a reduction in New Zealands import dependency must come from either:

a) A decrease in fossil fuel consumption through the electrification of systems that currently rely on legacy fuels.

b) The incorporation of other green domestic fuels (or, the expansion of domestic production of oil, coal and gas).

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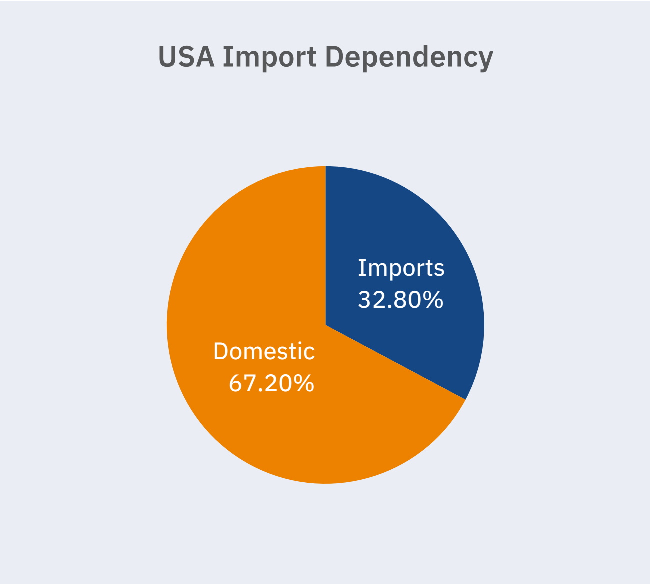
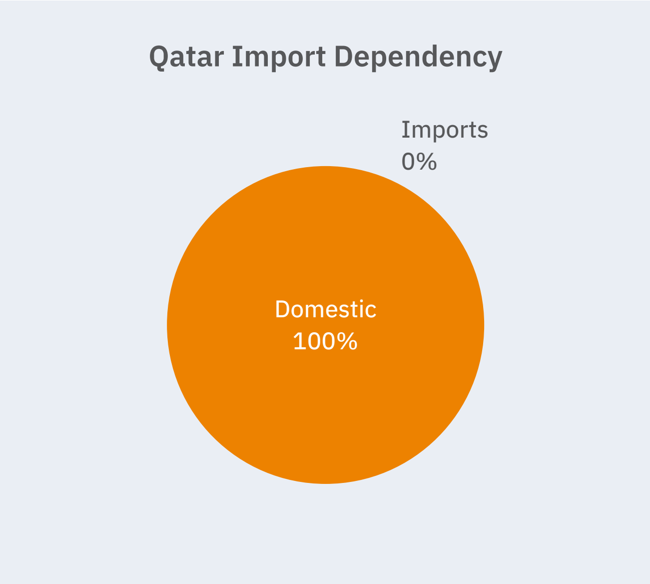
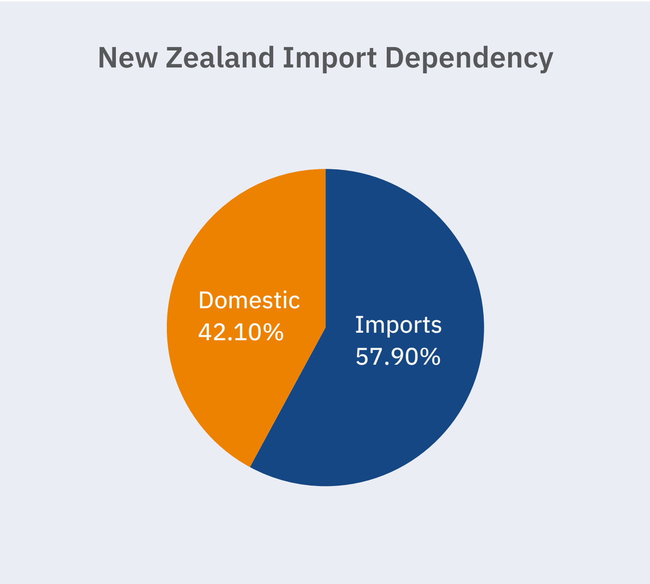
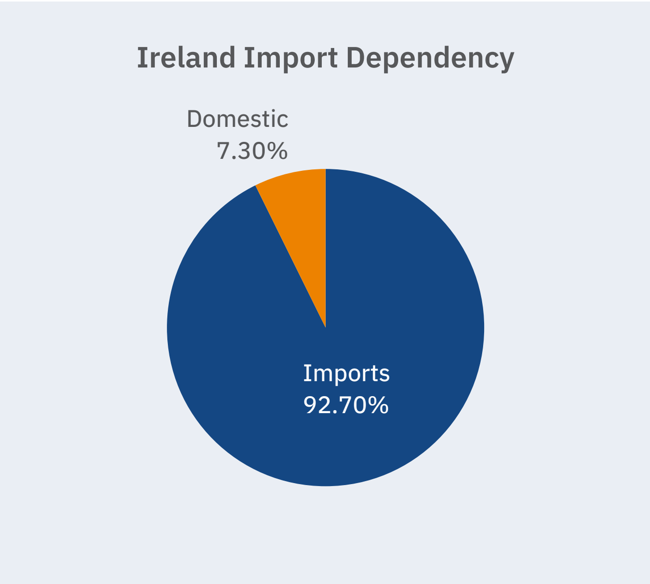
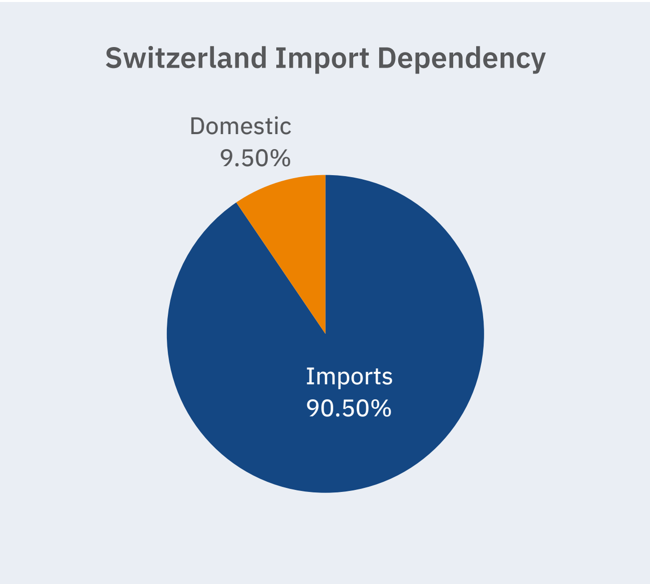
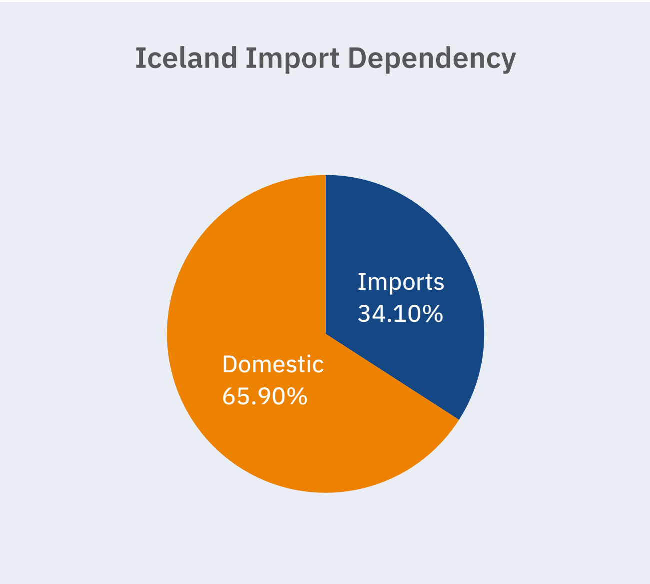

USA Import Dependency
Imports
32.80%
Domestic
67.20%

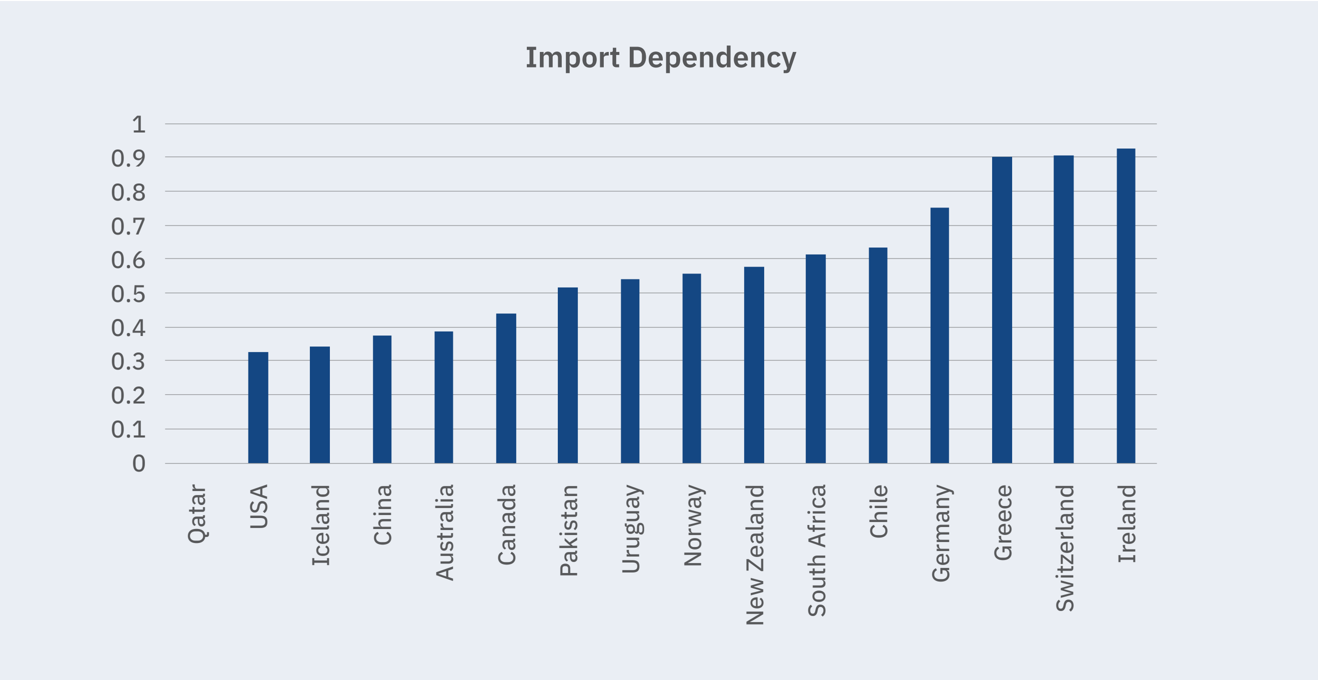

Qatar Import Dependency
Imports
0%
Domestic
100%


New Zealand Import Dependency
Domestic
42.10%
Imports
57.90%


Ireland Import Dependency
Domestic
7.30%
Imports
92.70%


Switzerland Import Dependency
Domestic
9.50%
Imports
90.50%


Iceland Import Dependency
Imports
34.10%
Domestic
65.90%



2.2 Diversity of Electricity Generation

Having a diverse electricity system helps reduce the risk of externalities (e.g. commodity price shocks, dry years, and lack of sun). This is the same generally for most ecosystems where biodiversity is important to maintaining resilience. Due to this we used the Shannon Index – traditionally used to estimate species diversity in ecology – to determine the diversity of electricity generation where each 0.1% of generation was treated as 1 individual within a population of 1000.

Shannon Index (H) = $-\sum_{i=1}^{S} pi \log (pi)$

Where pi is the proportion of individuals in species i and S is the total number of species.

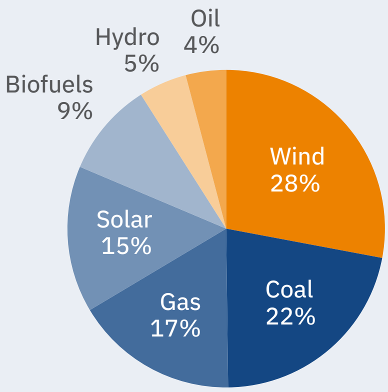
We then calculated the evenness from the Shannon Index which gave us a score between 0 and 1 where the closer to 1 a country gets the more diverse its generation is. The formula for this is the ratio of the observed Shannon Index to the maximum possible Shannon Index for the same number of species.

Evenness = H / Log (S)

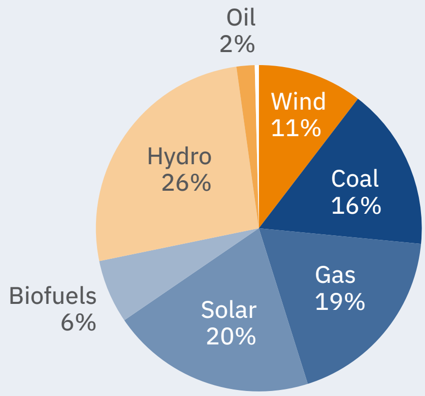
We found that Chile (1st) and Germany (2nd) were the top-performing countries with an evenness score of 0.872 and 0.843 respectively. Germany has a strong uptake of both wind (27.9% of generation) and solar (14.9%) while continuing to generate from both coal (21.8%) and natural gas (16.6%). Chile has balanced hydro (26%), solar (20.3%) and wind (10.4%) generation while again maintaining coal (16.1%) and natural gas (18.6%) generation.

The lowest performers for this metric were, unsurprisingly, countries that are blessed with abundance in one or two types of generation. The lowest-scoring country was Qatar with an evenness score of 0.052. Almost all of Qatar's electricity generation comes from natural gas (98.9%) while

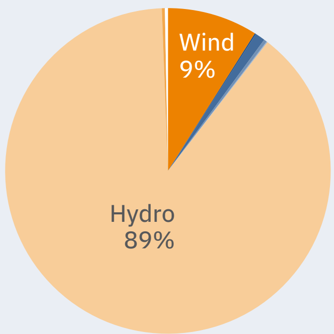
German Electricity Diversity



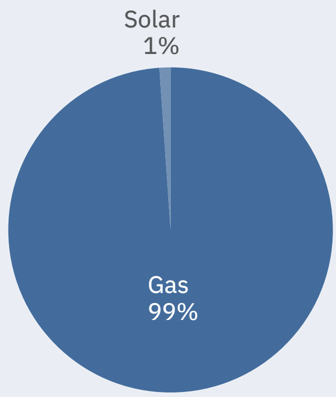
Chilean Electricity Diversity



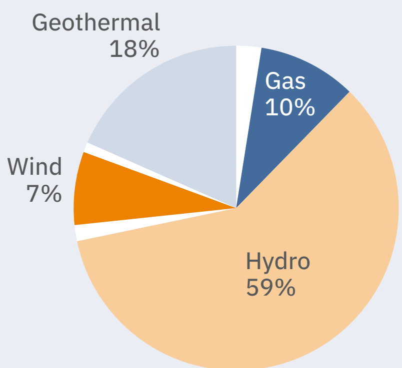
Norwegian Electiricy Diversity



Qatar electricity Diversity



New Zealand Electricity Diversity



there is a small use of solar generation (1.1%) in addition. The second lowest was Norway with an evenness score of 0.216. Norway has large hydroelectric generation (89.1%) which is complemented by wind (9%), but other generation is limited. However, Norway does have 18 months of hydro storage making the country's hydro system very resilient in terms of dry year risk.

New Zealand falls in between these two groups ranking 9th in diversity of electricity generation with a evenness score of 0.599. New Zealand through the 1900s built a collection of hydroelectric dams primarily in the South Island that still act as the backbone of electricity generation in the country (59.5%). The country is also fortunate to have a geological structure that permits the development of geothermal generation (18.4%) as well as natural gas reserves (9.8%). Additional renewable generation to complement large-scale hydro is being developed with wind (7.3%) and solar (1%) growing in importance. When compared to Norway's hydro system though, New Zealand has a significantly smaller degree of hydro storage, exposing it to longer dry spells.

Having a diverse electricity system helps reduce the risk of externalities (e.g. commodity price shocks, dry years, and lack of sun).

2.3 Strategic Fuel Reserves

The International Energy Agency's (IEA) benchmark for engine fuel security is for countries to hold emergency reserves equivalent to at least 90 days of net imports. Most IEA countries adhere to this rule, either through direct government stockpiling, industry obligations or a combination of the two. Net oil exporters are exempt from this requirement as there is the assumption that in the case of an emergency the country can supply themselves. This does not take into account however that for many countries, domestic refining isn't directly suited for domestic crude oil. For example, much of the crude oil that the USA develops is considered light and is exported, while it imports heavy oil from countries like Canada, Mexico and Venezuela.

While not all of the countries we looked at are members of the IEA, we still used the 90-day benchmark as a standard for best international practice.

The countries reviewed fell into three groups: (1) those complying with or exempt from IEA recommendations—Norway, Canada, Switzerland, Germany, Greece, Ireland, USA, and Qatar; (2) those not meeting IEA recommendations—Iceland, Chile, Australia, New Zealand, China, and South Africa; and (3) those lacking reliable data—Uruguay and Pakistan.

Australia and New Zealand stand out among IEA members for not fully meeting the 90-day stockholding recommendation through domestic reserves alone. New Zealand relies on a combination of domestic commercial stocks, which sit at less than 30 days, and ticket arrangements. These give the country contractual rights to access stocks offshore. This hybrid system means that New Zealand technically complies with the IEA standard, but its physical onshore reserves remain low. This presents a vulnerability for New Zealand as shipments take time, and contents can become contaminated with water en route. The government has recently introduced minimum stockholding obligations, but these remain well below the 90-days.

Australia has historically maintained low levels of fuel reserves, instead depending on market mechanisms to manage import volumes. Recently Australia has moved to enhance fuel security by increasing domestic stockholding requirements and securing access to external reserves through international partners. But, despite these efforts, Australia remains below the 90-day target.

China, while not a member of the IEA, is actively taking steps to maintain 90-day oil stockpiles. Beijing has been rapidly expanding its strategic petroleum reserves aiming at improving domestic resilience. Estimates for China's total oil stockpile vary but it is likely that it still sits below 90 days, although climbing.

Taken together, the results from our selected countries indicate the achievement of the IEA benchmark of 90 days is largely shaped by national circumstances. Countries with secure domestic production or advantageous geographical circumstances can more easily meet stockholding thresholds. Import-dependent nations located further away from centres of production can struggle with hitting stockholding targets, instead opting for more complex strategies as seen with New Zealand's ticket arrangements. However, in an era of increasing geopolitical and logistical uncertainty, countries seem to be moving towards models that put precedence on increasing in-hand reserve volumes, as seen with Australia and China.

The achievement of the IEA benchmark of 90 days is largely shaped by national circumstances. Countries with secure domestic production or advantageous geographical circumstances can more easily meet stockholding thresholds.

3 Renewable Energy and Decarbonisation

3. Renewable Energy and Decarbonisation

3.1 Share of Renewables in Total Energy Consumption

The spread of the share of renewables across the countries we looked at indicates radical differences in the ability and willingness of states to decarbonise. Iceland has emerged as clearly the strongest performer with a renewable share of 79.8% for total energy consumption. As mentioned earlier, Iceland has a reasonably high EV uptake at 14% and almost all of the space heating that takes place in the country is from geothermal heat which makes up 25.4% of all energy use, with their 100% renewable electricity system making up another 51.3%. Additionally, only 10.1% of Iceland's energy goes towards transportation, indicating efficient engines and the benefits of EVs for renewable systems.

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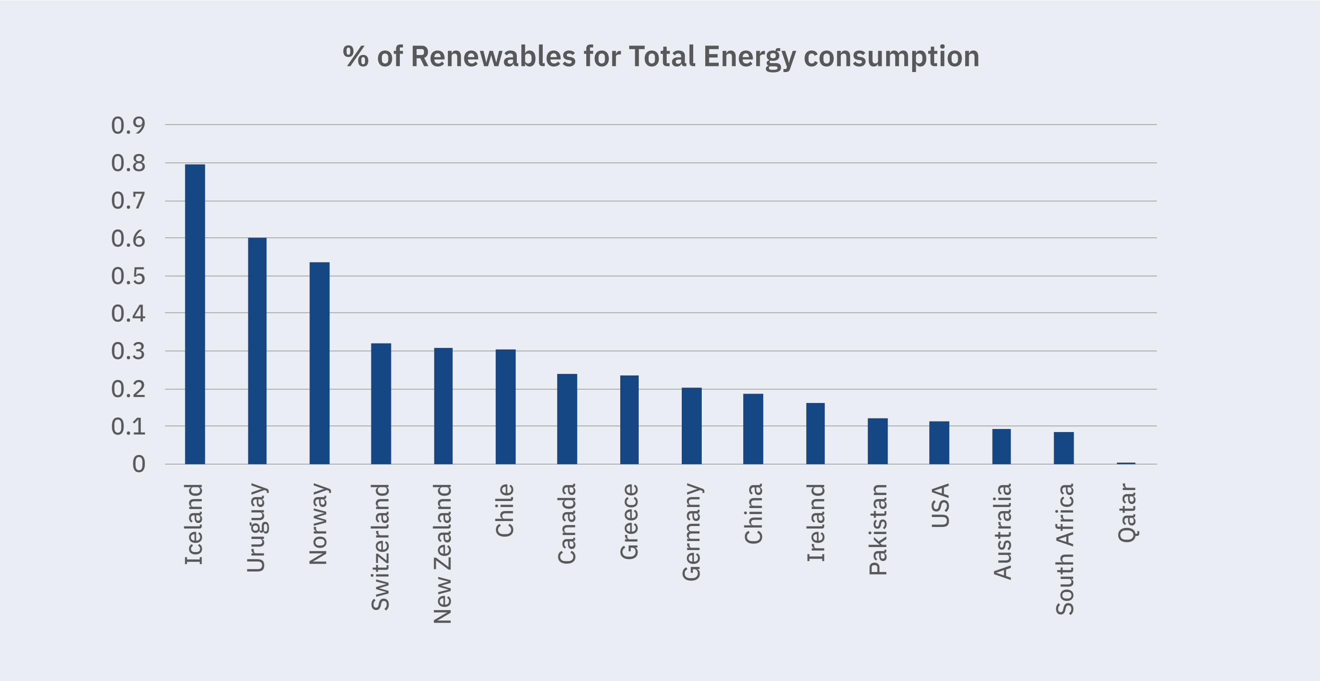


Uruguay is another top performer with 60% of total energy consumption coming from renewables. In 2010 the then-Minister of Energy, Mining and Industry, Roberto Kreimerman, signed decree 354 on the promotion of renewable energies. This decree favours certain activities related to the renewable energy industry and grants tax incentives such as exemptions from VAT and import taxes and fees, aimed at increasing investment. Uruguay's electricity generation is almost entirely renewable but the largest proportion of renewable energy generation in the country is from biofuels, with pulp and paper being the main consumer; these industries can then use the waste from their own activities to generate energy.

What Iceland and Uruguay have in common are electricity systems that are entirely or almost entirely renewable, and then complementary renewable energy generation outside of electricity. For Iceland this is geothermal/geoheat and for Uruguay it is Biofuel.

New Zealand sits in the upper middle of performers (5th) for renewable energy consumption, with 30.8%. New Zealand does have similarities to Iceland and Uruguay in that a large proportion of electricity generation is renewable at 87.7% but, unlike the top performers, New Zealand does not have a significant complimentary renewable source of energy outside of electricity. Instead oil, natural gas and coal continue to make up a large share of final consumption. Additionally, while Uruguay has a similar share of electricity in its total energy consumption, Iceland's share of electricity in total energy consumption is double that of New Zealand.

The lowest performing countries were Qatar (last), South Africa (15th) and Australia (14th). Qatar is by far the worst performing country with only 0.2% of energy consumption coming from renewables. South Africa and Australia perform slightly better with 8.4% and 9.4% respectively.

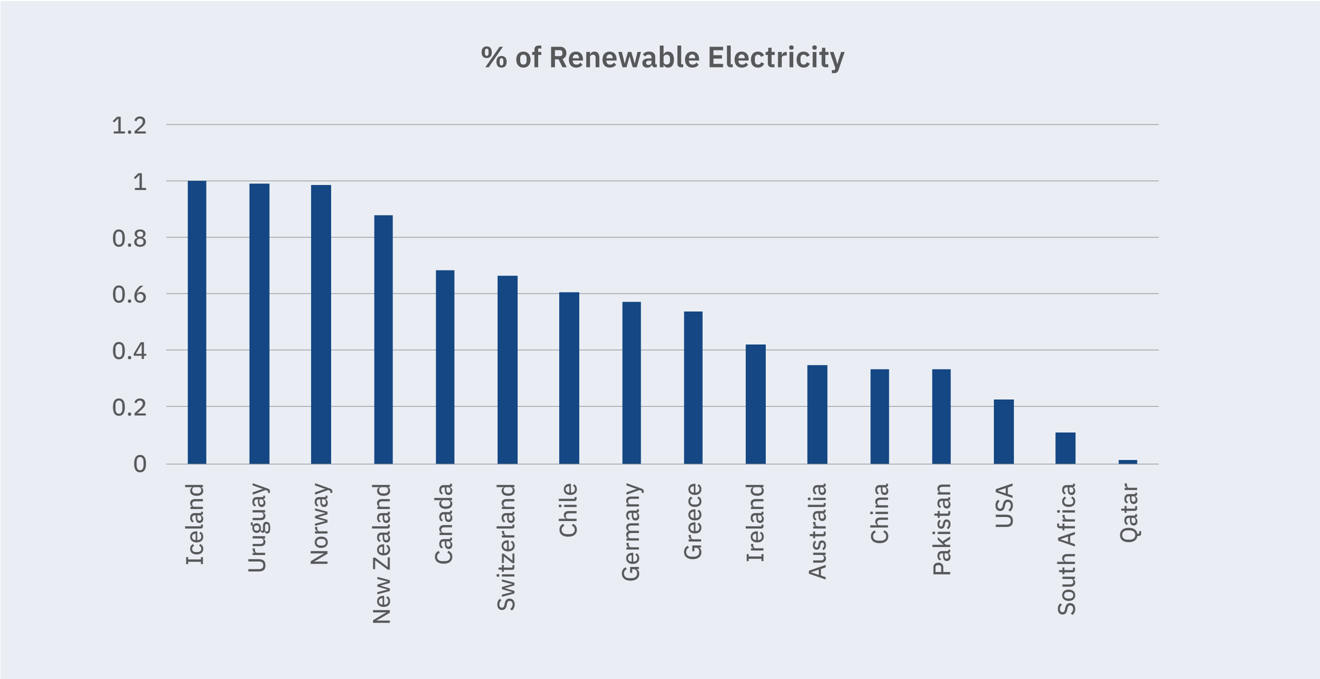
3.2 Share of Renewables in Electricity Generation

Iceland and Uruguay take the top two spots for renewable electricity generation as well, but the top spots have become closer with Norway and New Zealand moving closer to the leading countries. There has been a slight reshuffle particularly in the middle of the pack and the middle of the pack has also become closer to the top performers.

We see an overall greater performance for the share of renewables in electricity generation when compared to renewables in energy consumption. This is unsurprising as the electricity sector is generally easier to decarbonise as wind, solar and hydro can be integrated into national grids. Energy-intensive sectors such as transport and industry are harder to decarbonise, as it is often more expensive, or operational constraints limit the uptake of renewable options.

- ↑ Australia rose from 14th in renewable share in energy consumption to 11th in share of renewables in electricity generation.
- ↑ New Zealand rose from 5th in renewable share in energy consumption to 4th in share of renewables in electricity generation.
- ↑ Canada rose from 7th in share of renewables in energy consumption to 5th in share of renewables in electricity generation.
- ↓ Switzerland fell from 4th in share of renewables in energy consumption to 6th in share of renewables in electricity generation.

Australia, New Zealand and Canada all have a greater percentage of their total energy consumption coming from their industrial sectors than Switzerland. Switzerland also has a larger share of total energy consumption coming from residential users than countries whose ranking improved. Residential energy consumption is generally far easier to electrify and then decarbonise than energy consumption for industry.



We see an overall greater performance for the share of renewables in electricity generation when compared to renewables in energy consumption. This is unsurprising as the electricity sector is generally easier to decarbonise

Energy Efficiency and Affordability

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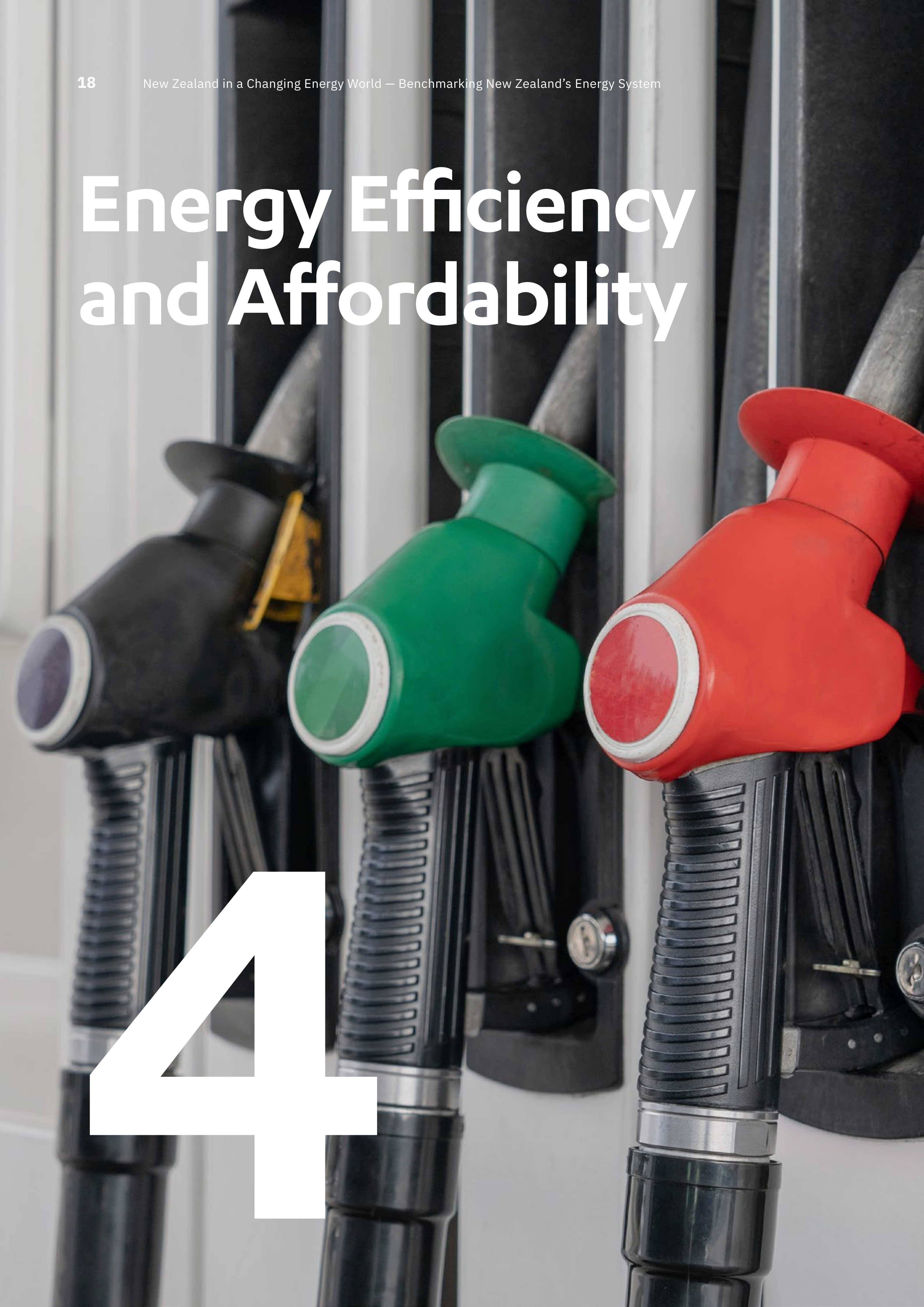


4. Energy Efficiency and Affordability

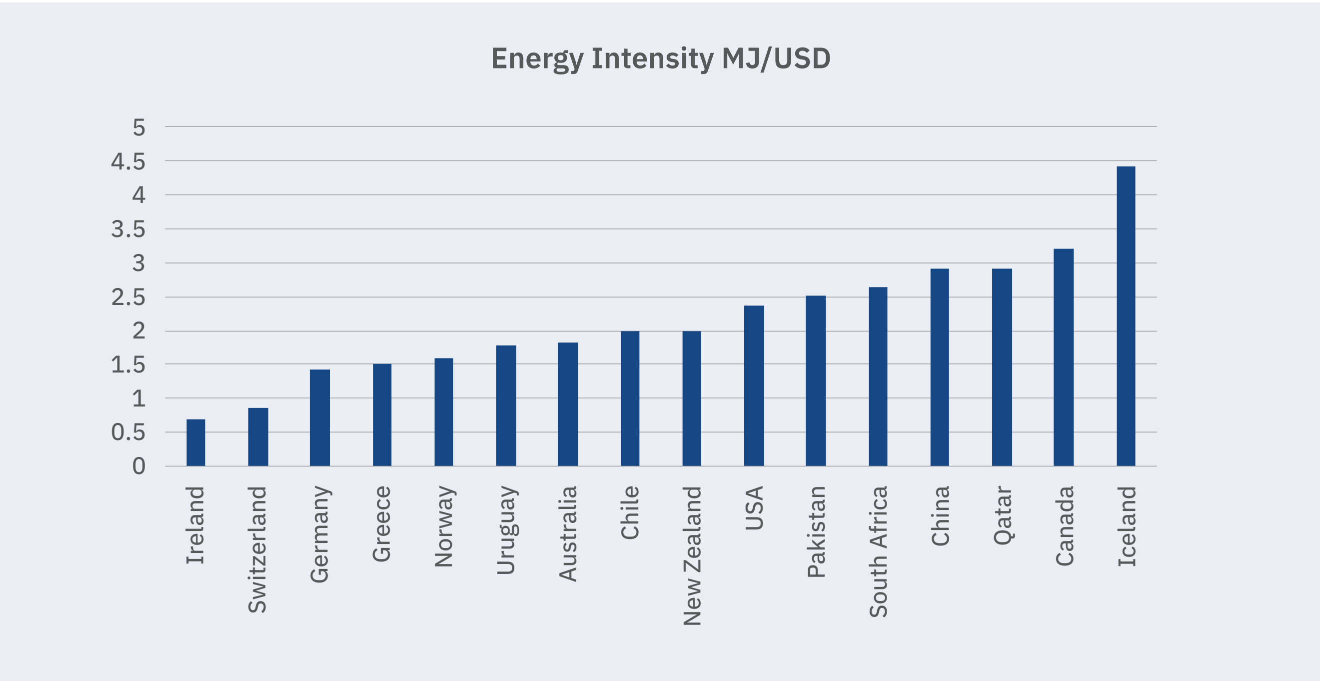
4.1 Energy Intensity

Low energy intensity is generally a good indicator of what a country produces and how they are producing it. Between countries with similar industries, it can reflect greater energy efficiency and resource optimisation. Reducing energy intensity has several benefits, including lower operational costs for businesses' improving economic competitiveness. It also helps to lower greenhouse gas emissions and supports sustainable growth.

We calculated the energy intensity of countries by taking each country's total energy consumption and dividing it by that country's GDP in USD. This then gave megajoules per US dollar (MJ/USD) value scores.

Total Energy Consumption / GDP = energy intensity

The top-performing countries were Ireland with 0.694 MJ/USD and Switzerland with 0.867 MJ/USD. These two countries share notable similarities: both rely heavily on energy imports, and their economies are dominated by high value-added industries. Ireland boasts strong information and communications technology (ICT), pharmaceutical and financial services industries. While Switzerland's service industries, including banking and insurance, make up a large portion of economic activity, they also have pharmaceuticals and chemicals as the cornerstone of exports coupled with advanced machinery, electronics and precision engineering.



In contrast the bottom-performing countries for energy intensity were Iceland and Canada, with 4.415 MJ/USD and 3.211 MJ/USD respectively. The inverse of the trend seen with Ireland and Switzerland seems to follow for the most energy-intensive countries: both Iceland and Canada are below average for their reliance on imported energy, with both having access to large domestic energy sources. Furthermore, as Iceland and Canada have had a degree of energy abundance, energy-intensive industries have set up in these countries. Iceland for instance is the 11th largest aluminium-producing country in the world, with three smelting plants with operating capacity of 800,000 metric tonnes per year. Power-intensive manufacturing is also growing as a share of GDP and exports. Canada has a diversified economy but a large portion of it continues to be resource based (featuring forestry and mining, which are among the most energy-intensive industries in the world).

New Zealand sits near the average in terms of energy intensity, ranking 9th among the countries studied. Its position reflects a balance between a growing service sector and a still-significant reliance on agriculture and resource-based industries, as well as a relatively high abundance of renewable electricity and historical natural gas reserves.

Low energy intensity seems to be closely linked to the presence of high-value, low-energy-consuming industries and a greater emphasis on services and advanced manufacturing. In contrast, countries with abundant domestic energy resources often attract or maintain energy-intensive industries, resulting in higher energy intensity scores. These structural differences in national economies are a key driver of the observed variation in energy intensity across countries.

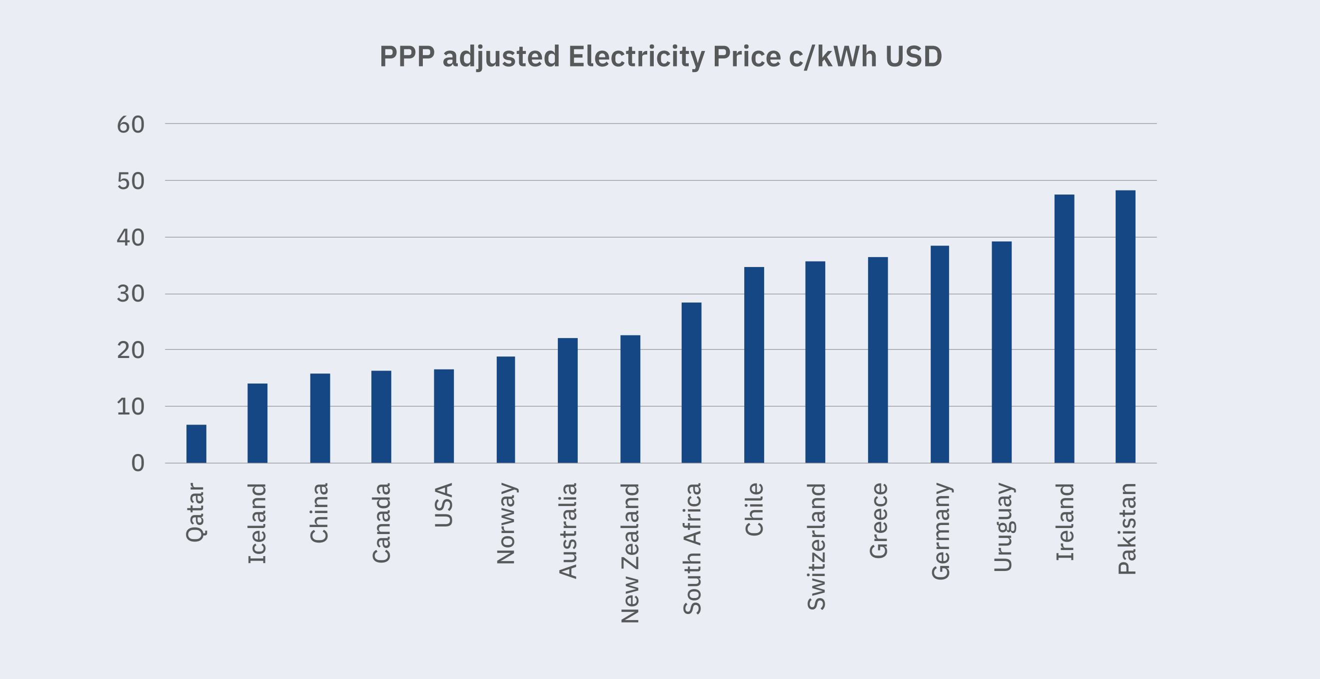
4.2 Purchasing Power Parity Adjusted Residential Electricity Price

Comparing residential electricity prices across countries can be misleading if only nominal rates are used, as these do not account for differences in local living costs and purchasing power. Purchasing Power Parity (PPP) is an economic metric that adjusts for these differences by equalising the purchasing power of different currencies. In essence, PPP conversion rates are designed so that a given amount of currency buys the same basket of goods and services in each country.

Applying PPP to electricity prices allows for a more accurate comparison of the real cost burden on households in different countries. For example, a nominally high electricity price in one country may actually be more affordable for residents if their overall cost of living is lower, and vice versa. To calculate the PPP adjustments of each of the countries we looked at we took PPP conversion factors from the World Bank. This value was then applied to the formula 'domestic nominal price/PPP conversion factor.' The results are then expressed in cents per Kilowatt hour (c/KWh). These values include taxes and levies.

Based on this methodology the top performing countries were Qatar (6.75 c/KWh), Iceland (14.01 c/KWh), China (15.87 c/KWh) and Canada (16.41 c/KWh).

Applying PPP to electricity prices allows for a more accurate comparison of the real cost burden on households in different countries.



Qatar has the lowest PPP-adjusted residential electricity price. This is unsurprising, as Qatar has abundant domestic energy reserves and subsidised electricity bills. The country's electricity sector benefits from large natural gas reserves, which provide a low-cost fuel base for power generation. This resource advantage allows Qatar to supply electricity at prices far below global averages. Additionally, the government historically subsidises electricity costs for consumers, keeping household bills affordable. Qatar's electricity market structure also supports low prices. The national utility, Kahramaa, procures new generation primarily through long-term public-private partnerships with Independent Power Producers (IPPs). This arrangement ensures stable supply and predictable pricing. Finally, Qatar's high GDP per capita (80,195.90 USD) means that when adjusting for purchasing power, electricity prices appear even more affordable relative to income.

Iceland has the second lowest PPP-adjusted residential electricity price. This affordability is largely due to the country's abundant, low-cost renewable energy resources, namely hydro and geothermal, which supply all of its electricity. Hydro and geothermal electricity have far lower marginal costs after infrastructure is built, compared to thermal generation. This means that, thanks to Iceland's 100% renewable generation, marginal costs are kept low. The reason why Uruguay which has the second-highest renewable share, is expensive in comparison is likely due to the large volume of biomass in its generation mix – which has a high marginal cost and a weaker purchasing power. The prevalence and stability of these resources means that Icelandic households benefit from both stable supply and low prices.

China follows in third, reflecting the extensive government regulation of residential electricity tariffs and ongoing state investment in power infrastructure and generation. Residential consumers in China are cross subsidised by commercial and industrial consumers, which means residential users often pay rates which are lower than the costs to generate. Additionally, China uses a tiered electricity pricing system where consumers pay a low rate for the initial consumption block. This ensures that the lowest socio-economic groups in China pay the least for electricity. Furthermore, China's generation capacity has been increasing faster than electricity demand, helping to keep downward pressure on prices.

Canada, ranking fourth, follows trends set by both Iceland and China. Like Iceland, Canada has a large portion of generation coming from relatively low-cost hydro resources with nuclear – which also has relatively low operating costs – and natural gas generation making up other important chunks. Like China, Canada's electricity rates are also set by regulators, with pricing based on generation, transmission and distribution costs.

The worst-performing countries were Ireland (47.53 c/KWh) and Pakistan (48.12 c/KWh).

In Ireland, high prices are driven by a combination of factors: substantial reliance on imported fossil fuels, limited domestic energy resources, and a relatively small electricity market. Ireland does import some electricity from interconnectors which link the country to Scotland and Wales, but total volume is limited. While we saw in this study that Ireland performs very well for low energy intensity, this efficiency has not translated into lower household electricity costs. Ireland's reliance on imports leaves the country vulnerable to supply shocks and fluctuating commodity markets. This vulnerability is reflected in the high PPP-adjusted prices faced by consumers.

Pakistan's high PPP-adjusted price comes from a myriad of factors. In 2023 the base tariff rate for electricity was raised substantially on the conditions of the International Monetary Fund (IMF) to secure the bailout package to shore up foreign exchange reserves, which had dropped to a historically low level in 2022 and 2023. Capacity payments have also burdened consumers as they have to make these payments even if they do not consume the electricity. These capacity payments are contractually required to be made in USD which was originally done to increase foreign direct investment. As the Pakistani Rupee has depreciated significantly from 2017, the cost of these dollar-linked payments has increased sharply in local currency terms. Due to the nature of these capacity payments Pakistani consumers are in the position where even if they decrease consumption, they will still be paying high electricity bills. The energy mix in Pakistan also plays a factor as the share of relatively expensive imported fossil fuels in generation remains high.

New Zealand sits in 8th with a PPP-adjusted residential electricity price of 22.74 c/KWh. New Zealand has a market driven electricity system with limited direct regulatory intervention on final retail prices. While similar to Iceland and Canada in having a large portion of generation coming from hydro, the New Zealand market does not have the same level of price regulation that is seen in these countries. However, price regulation, while helping to keep prices low, could come at a cost. In Iceland energy supply has expanded slower over the last few years and the gap between demand and available supply is expected to widen. A recent OECD report states that the absence of differentiated (or marginal) pricing in Iceland complicates demand management, indicating that regulated pricing may be a contributor to the widening gap.

Recent years have also seen increased network charges in New Zealand which, as there are no cross-subsidies or direct price controls, are passed directly onto residential consumers. That being said, New Zealand is performing at the average with prices comparable to Australia and PPP-adjusted prices are less than half of the worst performers.

Looking at post-tax petrol prices is valuable because it reflects the actual price paid by consumers at the pump. Post-tax PPP-adjusted prices help us understand the material impact of fuel costs on consumers.

4.3 Purchasing Power Parity Adjusted Unleaded Petrol Price Before and After Tax

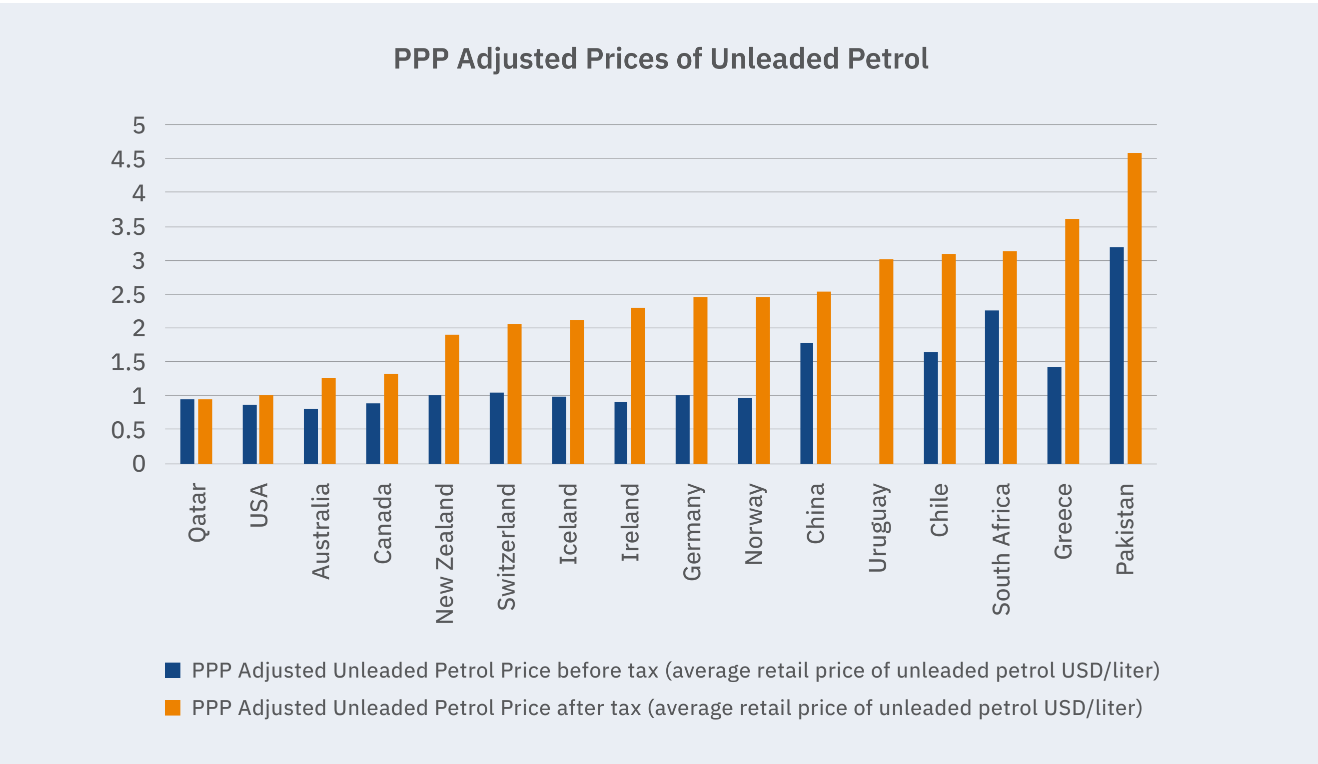
When analysing the PPP-adjusted price of unleaded petrol, it is important to consider prices before and after tax, as each provides distinct insights into the structure and impact of national fuel markets.

Looking at post-tax petrol prices is valuable because it reflects the actual price paid by consumers at the pump. This measure captures the real economic burden of fuel on households and businesses, especially when adjusted for purchasing power. In countries with high fuel taxes, post-tax prices can be significantly higher, directly influencing transport costs, inflation, and household budgets. Therefore, post-tax PPP-adjusted prices help us understand the material impact of fuel costs on consumers and how equitable or burdensome these prices are in the context of local income levels.

On the other hand, examining pre-tax petrol prices allows us to isolate the underlying efficiency and cost structure of domestic fuel markets. By removing the effect of taxes, we can compare the base cost of fuel supply across countries, which is shaped by factors such as domestic oil production, refining capacity, import dependence, and logistical efficiency. Before-tax prices also reveal how energy policy decisions, such as price controls, subsidies, or deregulation, affect the cost of fuel before government intervention. This makes pre-tax comparisons useful for assessing the efficiency, competitiveness, and policy orientation of national fuel supply systems.

The top performing countries are Qatar (0.95 USD/L for both pre- and post-tax), the USA (0.87 USD/L pre- and 1 USD/L post-tax) and Australia (0.81 USD/L pre- and 1.27 USD/L post-tax).

Qatar's petrol costs are consistent across pre- and post-tax prices; this is because Qatar does not levy excise or VAT on petrol. Unlike many countries where fuel prices are significantly increased by government-imposed taxes, Qatar's pricing structure is relatively straightforward and transparent, as the state sets prices in line with international oil price movements with minimal markup, keeping prices low. This approach is enabled by Qatar's abundant



domestic oil reserves, which allow the country to produce and refine fuel at low cost. As Qatar oil is nationalised and revenues return to the government there is no need to rely on fuel taxation as a source of revenue.

The USA in second is also a major producer of oil, especially after the Shale Oil Revolution which allowed for previously uneconomic fields to be efficiently tapped. In addition to this, the US also has one of the largest and most advanced refining sectors in the world. The US continues to import heavy crude oil from countries such as Canada, Mexico and Colombia to maintain output. This domestic supply of refined fuel helps to keep prices low, as transport and import costs are minimised. Moreover, the competitive nature and scale of the US energy market, coupled with relatively low fuel taxes, further contributes to the country's affordability.

Australia ranks third, although has actually the lowest pre-tax petrol prices of the countries looked at. Australia imports most of its refined petrol, sourcing from large refineries in the Asia-Pacific region, especially Singapore. The price of petrol in Australia is closely linked to the Singapore Mogas 95 unleaded benchmark, which performs well against other international fuel benchmarks, due to low import costs and high competition. Australian tax policy accounts for 0.46 USD/L in PPP-adjusted rates which is just over a third of what consumers pay at the pump.

The worst-performing countries are Pakistan (3.2 USD/L pre- and 4.59 USD/L post-tax) and Greece (1.43 USD/L pre- and 3.62 USD/L post-tax).

Many of the same issues that Pakistan faced for electricity pricing carry over into petrol pricing as well. Currency depreciation has meant that the Rupee-equivalent cost of the imports that Pakistan relies on have increased. International Monetary Fund-mandated reforms to reduce budget deficit and curtail energy subsidies also pushed prices higher.

Greece ranks as the second-worst performing country for PPP-adjusted petrol prices. Interestingly though, the country's before-tax price of petrol is far more competitive than after-tax. 65% of the prices that consumers pay at the pump come from excise duty, VAT and carbon taxes, making taxation the dominant factor in petrol affordability for households. These taxes were implemented after Greece's financial crisis and are an important source of revenue for the Greek government. While nominal prices are comparable to other European nations, in PPP terms they are among the highest due to the weaker purchasing power of Greek nationals.

New Zealand performs well, ranking 5th with a pre-tax PPP-adjusted price of 1.01 USD/L and a post-tax price of 1.91 USD/L. New Zealand is similar to Australia in importing refined fuel from the Asia-Pacific region, especially Singapore. As such New Zealand also takes advantage of the Singapore Mogas 95 unleaded benchmark's performance. Differences between the two countries can be seen in a 0.20 USD/L difference in before-tax prices and a 0.64 USD/L after-tax difference in PPP terms. Australia benefits from being closer to refining centres which helps reduce shipping costs, and also benefits from greater economies of scale than New Zealand. Additionally, New Zealand has higher tax on petrol at the pump which accounts for the larger difference between the Australian-NZ after-tax prices.

When we look at the 10 top-performing countries for before-tax PPP-adjusted petrol prices, we see that there is very little variation between them. The difference between 1st and 10th is only 0.23 USD/L. Whereas looking at the difference between 1st and 10th for after-tax prices we see that there is a 1.51 USD/L difference. This indicates that the greatest impact on differences between countries' fuel costs (with some exceptions) are taxes.

Note that for Uruguay we were unable to find reliable tax figures for engine fuels which is why only the post-tax value is shown.

4.4 Electricity Wholesale Price Volatility

Volatility in the electricity wholesale market can be a key indicator of the stability and predictability of a country's electricity system if considered alongside the systems risk management capabilities and whether wholesale volatility is a known feature of the system. Wholesale price volatility is not necessarily a positive or negative, but should be interpreted alongside other metrics and an understanding of the relevant features of the country's electricity system. Fluctuations in wholesale prices not only impact on the costs faced by retailers and large consumers but also provide critical signals for investment, system reliability and market efficiency. Volatility is to a degree a natural occurrence as electricity systems become more renewable, but it should still be managed effectively.

When looking at determining the volatility of a wholesale market for this study we would have ideally looked at the daily wholesale prices over the 2024 period for all countries. Unfortunately, this was not possible. Many of the countries that we looked at do not have a wholesale market and thus were ineligible and for many of the countries that do, we were unable to find daily prices. Therefore, we looked at the monthly average wholesale prices for 2024. As this is based on the monthly average, results will appear less volatile than they would have been with daily prices.

Volatility in the electricity wholesale market can be a key indicator of the stability and predictability of a country's electricity system.

With these figures we found the mean wholesale price for the year and used that in the formula:

$$\sigma = \sqrt{\left(\Sigma(x_i - \mu)^2 / N\right)}$$

This formula represents the process of finding the standard variation by finding the sum of all dataset values (monthly prices) subtracted by the mean squared. This is then divided by the total number of data points (12) and finally square rooted. Once the standard variation was found we took that and divided by the mean again to find the coefficient of variation which essentially is a percentage value of how large the standard deviation is compared to our mean. The larger the coefficient of variation is the more volatile the market.

A worked example of this in practice is below:

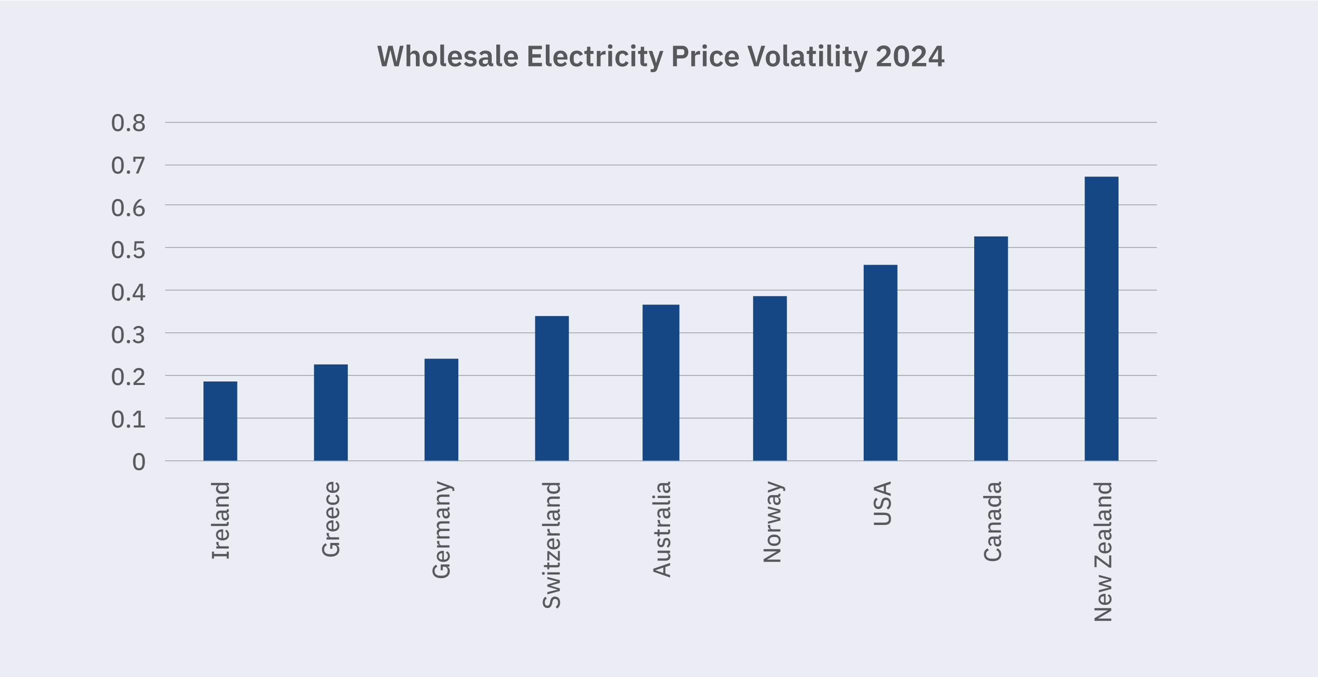
Company A records its profits over the four quarters of the year in its financial report.

- Q1= \$10, Q2= \$20, Q3= \$50 and Q4= \$0
- The mean profit for each quarter over the year was (10+20+50+0)/4 = 20
- $(10-20)^2 = 100$, $(20-20)^2 = 0$, $(50-20)^2 = 900$ and $(0-20)^2 = 400$
- (100+0+900+400)/4 = 350
- The standard deviation was $\sqrt{350} = 18.7$
- And so, the coefficient of variation was 18.7/20 = 93.5%

As we would expect, in this example Company A has quite high volatility.

Nine countries in our study were able to be looked at and their ranking is below.

The least volatile countries were Ireland (18.34%) and Greece (22.27%), and the most volatile countries were Canada (52.84%) and New Zealand (66.69%).



Ireland's wholesale electricity market stands out for its relatively low price volatility, which is the result of several interconnected factors. A key element is Ireland's strong international interconnection through the East-West and Greenlink HVDC cables linking it to Great Britian. These HVDC cables provide a total transfer capacity of 1GW between Ireland and Great Britian, assisting with smoothing out price spikes and the balancing of domestic supply and demand. Ireland is currently also working on a 700MW HVDC cable, the Celtic Interconnector, which will link it to mainland France. Ireland has also operated a sophisticated capacity remuneration mechanism (CRM) since 2018. Within the CRM, generators, storage units, interconnectors and demand-side participants compete in capacity auctions to receive contracts to supply (or reduce demand) during periods of system stress.

Greece is similarly connected to international supply with an HVDC cable connecting the country to Italy and interconnections to many of its Balkan neighbors. Additionally, Greece is currently working on the development of the Great Sea Interconnector, which will connect the power grids of Greece, Cyprus and Israel. Greece also has a CRM which compensates generators, storage and other resources for being available during system stress. Greek authorities set the total capacity needed for a future period. Then, similar to Ireland, participants submit bids into a central auction. Contracts for these capacity payments can last up to 10 years showing that the Greek CRM places greater emphasis on long-term contracts.

In contrast, New Zealand operates under an energy-only market with no formal capacity payments, meaning generators receive payment only for energy that is used. While there is a degree of demand response within New Zealand it is not to the degree see in the capacity markets of Greece and Ireland. New Zealand is also not connected to any international electricity supply which means all demand and supply must be balanced through domestic generation. Additionally, New Zealand's highly renewable electricity mix is vulnerable to shifting weather and other environmental changes. This means that for years when there is little rainfall, the ability of hydro to generate is reduced, which can exacerbate price volatility. An increase in system diversity could help to manage volatility by providing greater flexibility.

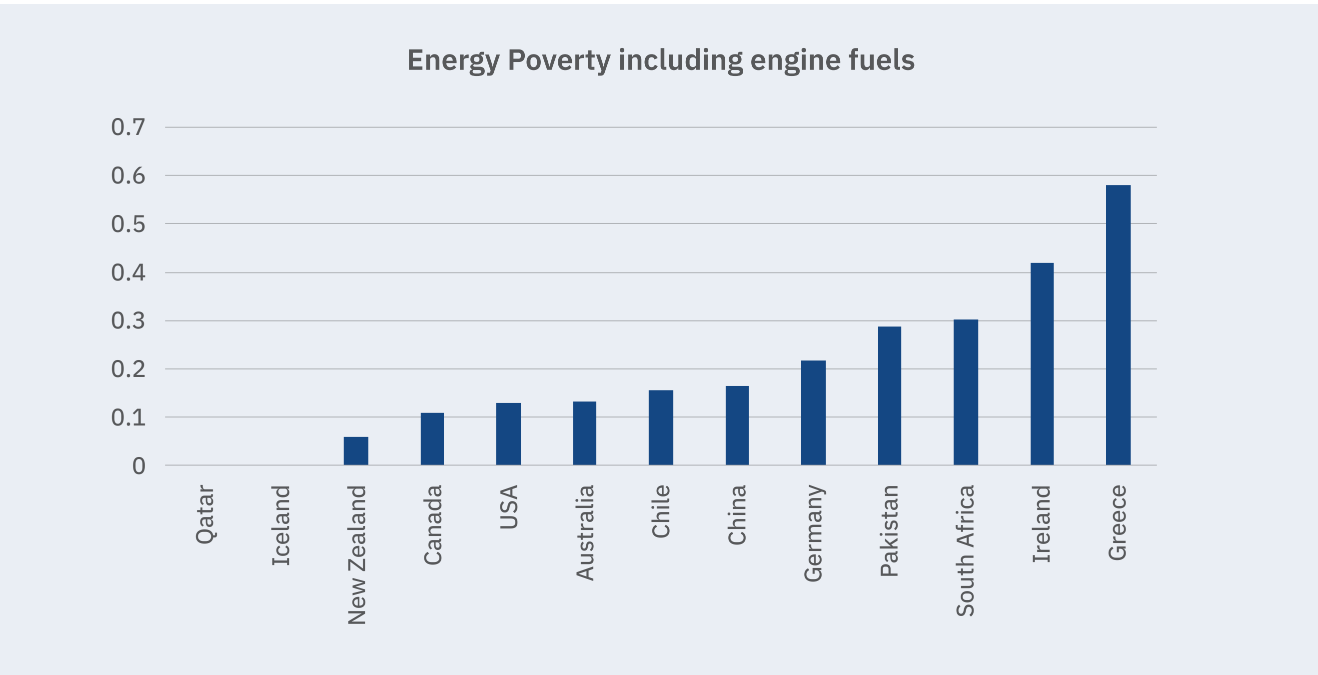
2024 was also a more volatile than usual year for New Zealand. Record low hydro levels were coupled with rapidly diminishing supplies of natural gas. These two factors meant that as the country moved into higher winter demad peaks, supply struggled to keep up.

Literature in the field underscores that there is no single, universally accepted metric for energy poverty.

4.5 Energy Poverty

When it comes to benchmarking energy poverty internationally, we faced significant challenges due to variations in measurement approaches and data availability. The most common methods are the 10% method, the low-income high cost (LIHC) indicator, self-reported measures and multi-tier/multi-dimensional frameworks. Each of these methods has their own pros and cons. We opted for the 10% method, which defines energy poverty as households spending more than 10% of their income on energy, because of its relative simplicity and comparability, this approach does not capture the full complexity of the issue, especially in countries where data or adoption of this method are lacking.

Switzerland, Norway and Uruguay are examples from our country list where the 10% method could not be used, with studies into energy poverty in these countries using more subjective, multi-dimensional and composite measures that are much harder to benchmark against.



Literature in the field underscores that there is no single, universally accepted metric for energy poverty. Concepts like multi-tier or multi-dimensional frameworks account for a broader number of factors but tend to require more complex data collection and are less standardised, complicating the direct international comparisons we are trying to make.

There is a lack of consistent studies of energy poverty in many countries, which means that the base years for the data in this report have varied. As a result, benchmarking should be seen as indicative rather than a definitive ranking of the countries in question.

Qatar and Iceland both lead with a reported 0% of households being energy poor and Ireland ranked second highest with a reported 42% of households being energy poor while Greece ranked highest with 58% of households reported as energy poor.

Qatar and Iceland reporting 0% of households experiencing energy poverty reflects a combination of factors. As previously discussed, both countries benefit from abundant, affordable and reliable energy sources. Qatar has consistent access to natural gas and Iceland to large-scale low-cost hydro and geothermal. Additionally, Qatar, as also previously stated, subsidises domestic electricity consumption, keeping costs for consumers low.

Ireland's high energy poverty rates can be attributed to high base energy costs but in the study done by the Sustainable Energy Authority of Ireland, from which we sourced our data, the use of the 10% rule is viewed as a significant minority who spend 10% or more of their income on energy costs and who may not be actually experiencing energy poverty but can instead actually afford to spend a high proportion of their oncome on energy costs.

Greece presents a particularly relevant case study, as elevated levels of energy poverty can be attributed to a combination of lower average incomes, longstanding inefficiencies in building infrastructure, and comparatively high energy prices relative to household earnings. Their recent economic crisis deepened vulnerability, putting further pressure on households' energy bills.

Environmental and Health Impacts

5

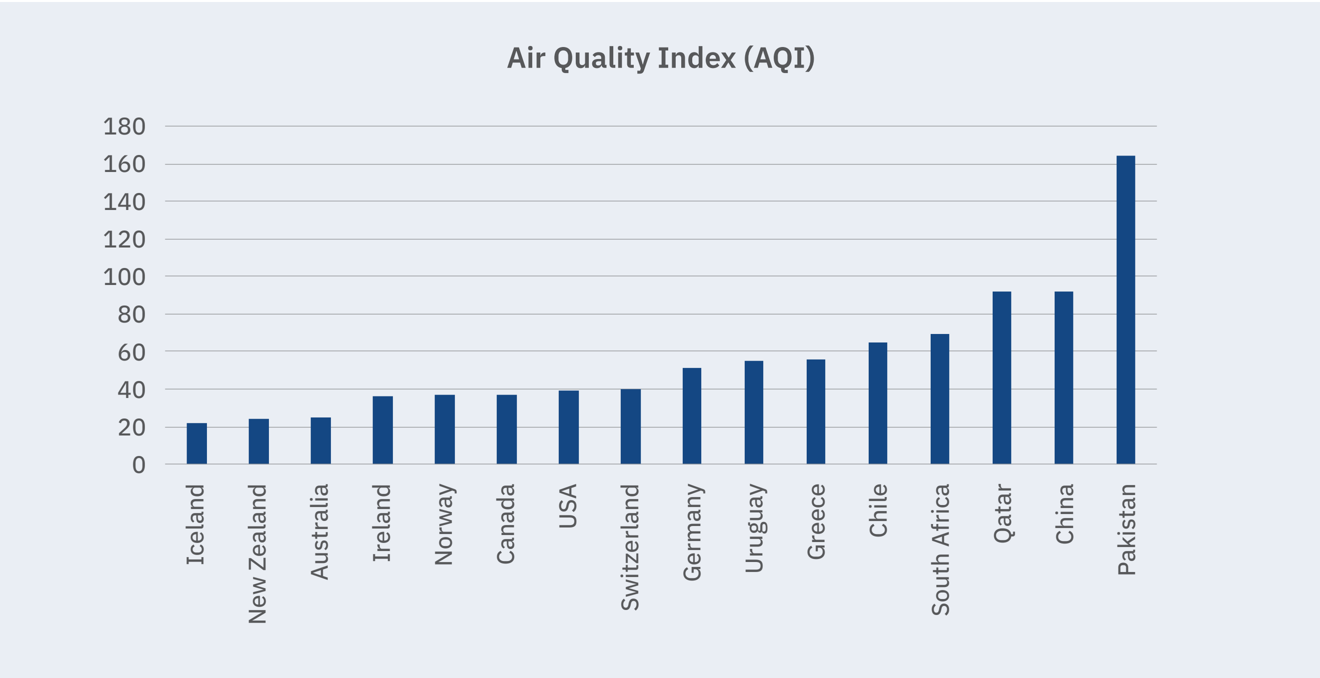
5. Environmental and Health Impacts

5.1 Air Quality

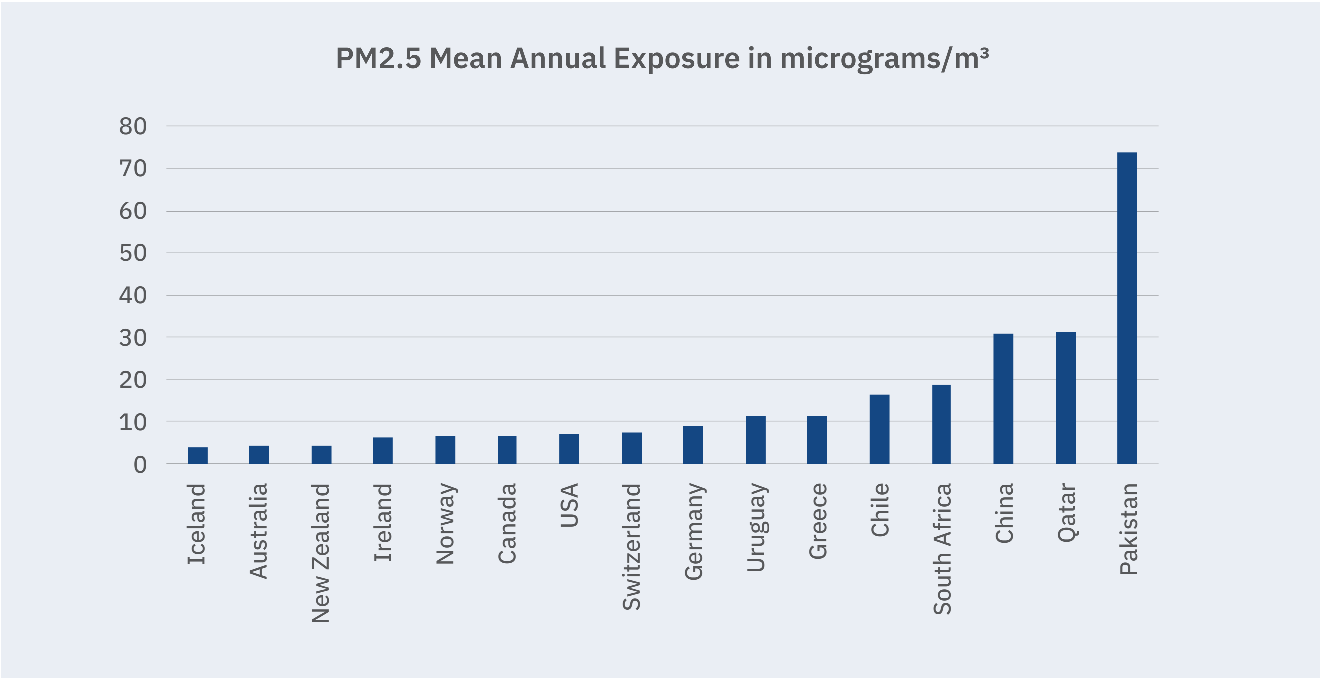
The Air Quality Index (AQI) is a standardised and commonly used way to report and communicate how polluted the air currently is or historically has been. The higher the AQI the greater the level of pollution. It is scaled from 0-500 with low values (0-50) considered good air quality and high values (over 300) indicating high levels of pollution. It covers five major air pollutants including ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide and nitrogen dioxide.

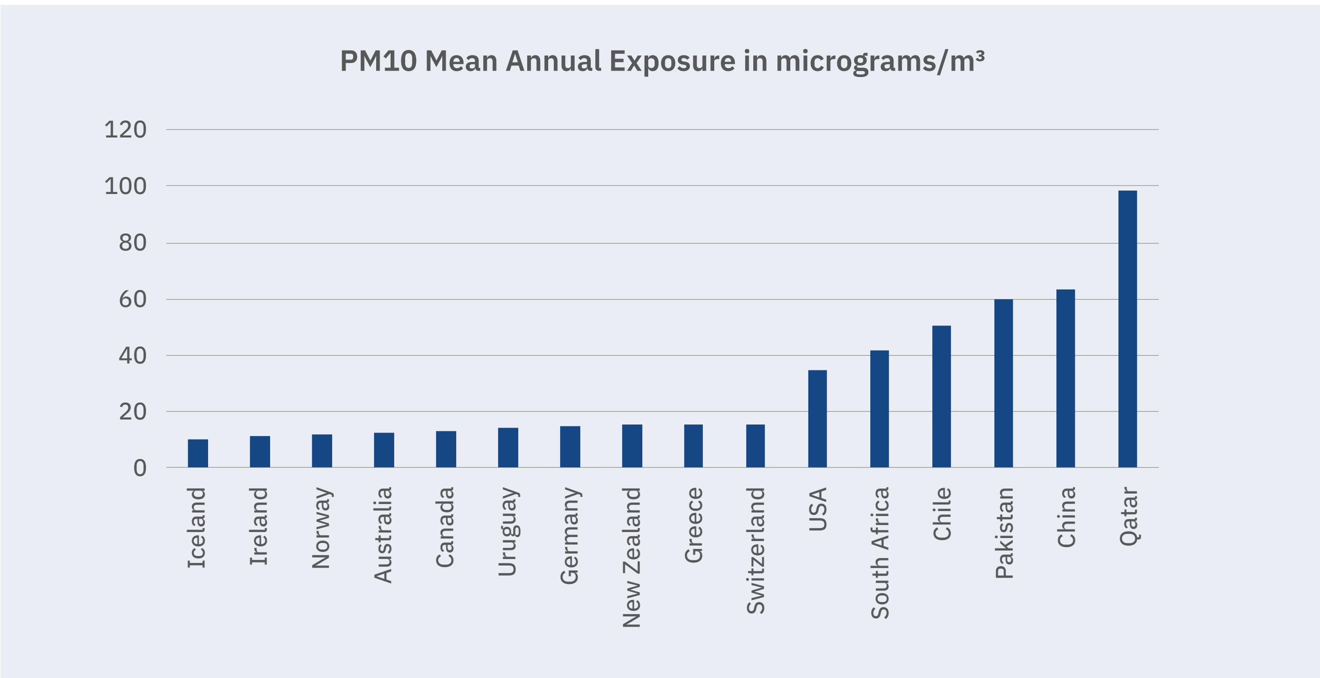
Iceland, New Zealand and Australia are the top performing countries with AQI scores of 22, 24 and 25 respectively. Conversely the worst performing countries are Qatar, China and Pakistan with scores of 92, 92 and 164 respectively. Iceland and New Zealand benefit from highly renewable electricity sectors which help to minimise fossil fuel emissions. All three of the top performers are also among the most sparsely populated of the countries we have looked at and all of them are island nations. All have relatively high levels of wealth and greater access to pollutant mitigating technology.

The bottom performers tend to be more densely populated and have higher consumptions of fossil fuels. However, there are also environmental factors that contribute to AQI scores. For example, PM2.5 and PM10 levels can be affected by dust, sand and other naturally occurring particulate matters. Qatar is predominantly desert and thus naturally has more dust and sand in the air. China and Pakistan also have large sections of land classified as desert. While Australia is also largely desert its sparsity of population through the country contributes to lower AQI scores.



The Air Quality Index (AQI) is a standardised and commonly used way to report and communicate how polluted the air currently is or historically has been.



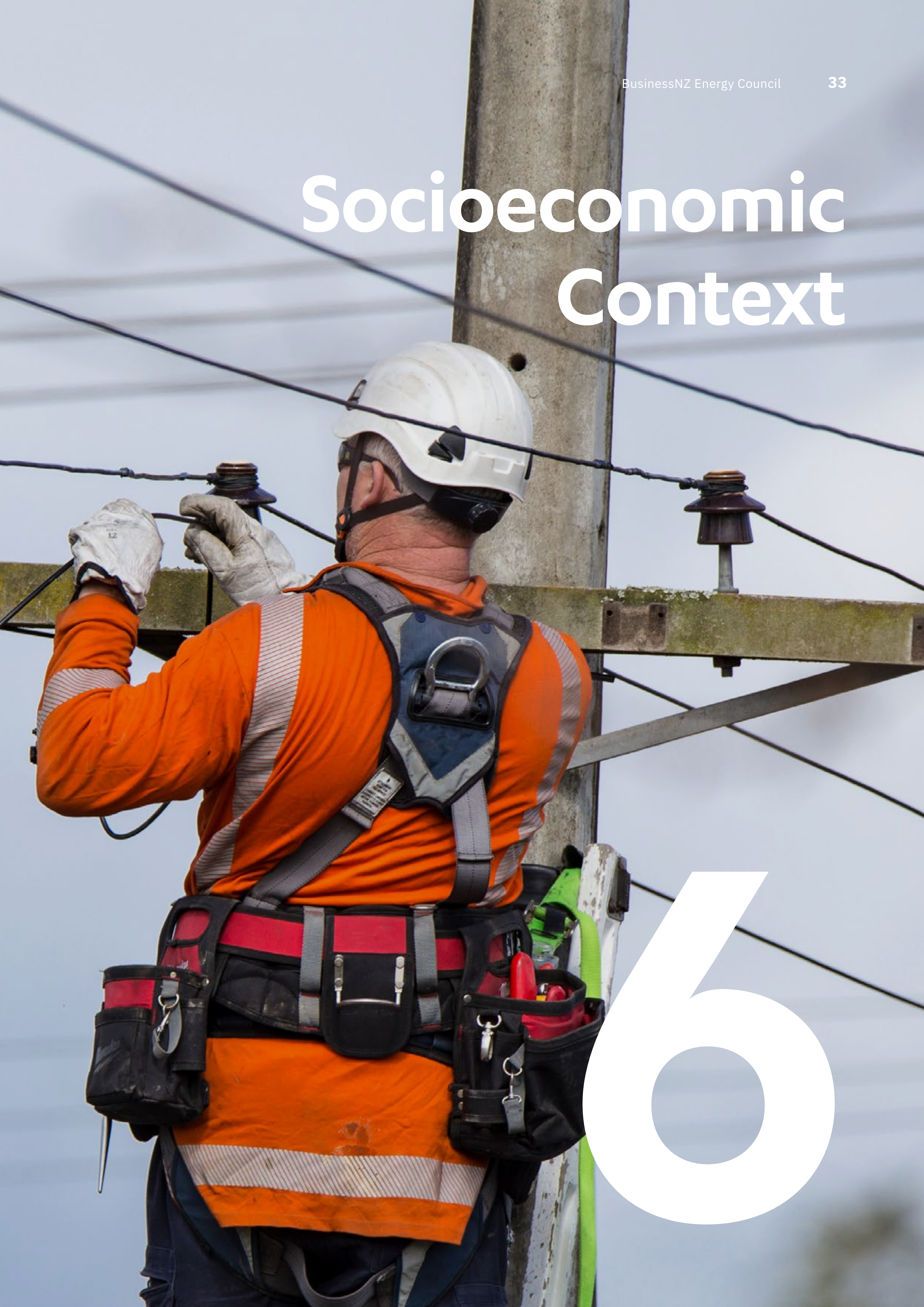


Although AQI is influenced by the combustion of fossil fuels, it is also determined by numerous other factors, including certain geographical characteristics of a country.

To find an actual ranking of pollution excluding geographical effects, it is necessary to differentiate between PM10 (coarse) and PM2.5 (fine) particulate matter. PM10 includes dust, pollen, and industrial emissions while PM2.5 includes emissions from combustion, factory emissions, agricultural burning and some industrial processes. We can see from this that a high PM2.5 is more indicative of human induced pollution and high PM10 levels can more likely be attributed to geographical conditions.

While our three worst-performing countries remain the same across both PM2.5 and PM10 results, the shifting of order indicates that for Qatar a larger portion of their overall AQI score is coming from geographical conditions.

Socioeconomic Context



6

6. Socioeconomic Context

This section provides context for the rest of the metrics.

6.1 Economic Breakdown

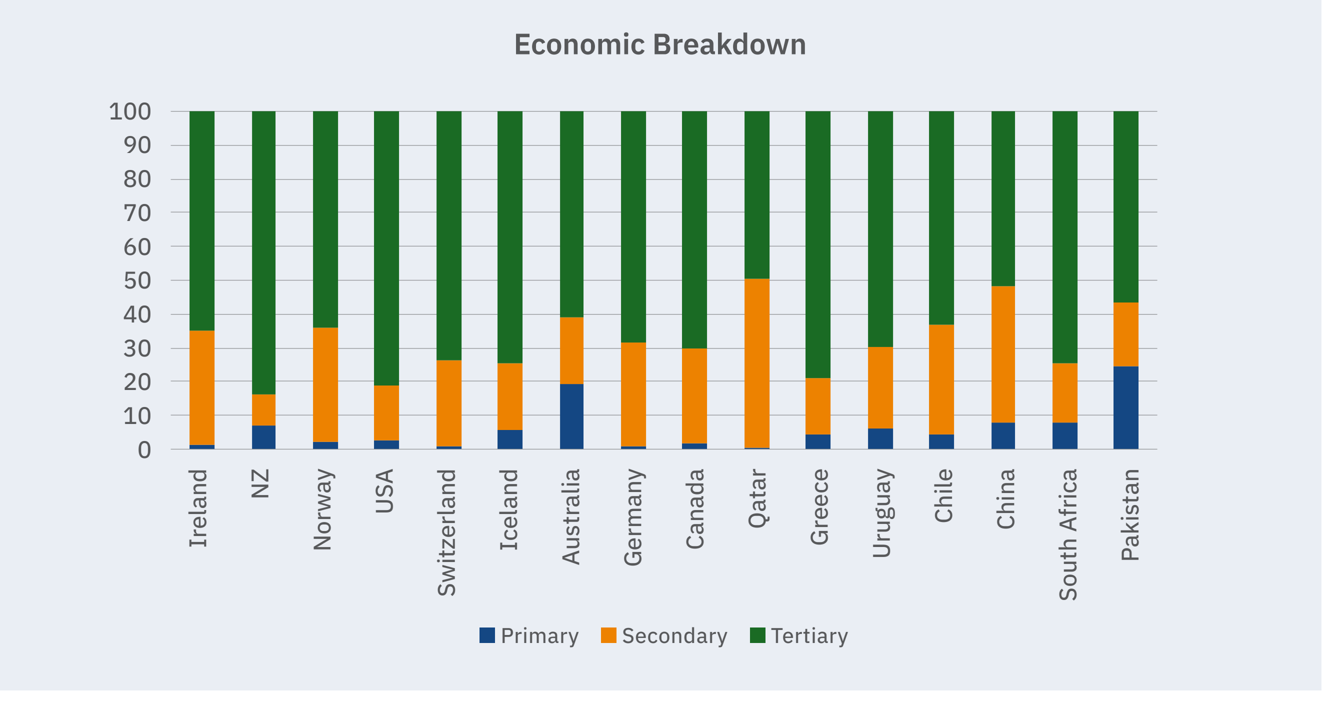
Tertiary economic activity is services; it involves activities related to trade, transportation, education, healthcare, finance, retail, tourism, and other service-based industries.

Secondary economic activity is the process of transforming raw materials from the primary sector into finished goods or products. This sector includes manufacturing, processing, construction, and industrial production.

Primary economic activity is the direct extraction and harvesting of natural resources from the earth. These activities use natural resources in their raw forms and include agriculture, fishing, forestry, mining, and hunting.

We would expect each of these activities to have different energy profiles.

Each country's economic activity is split up below:



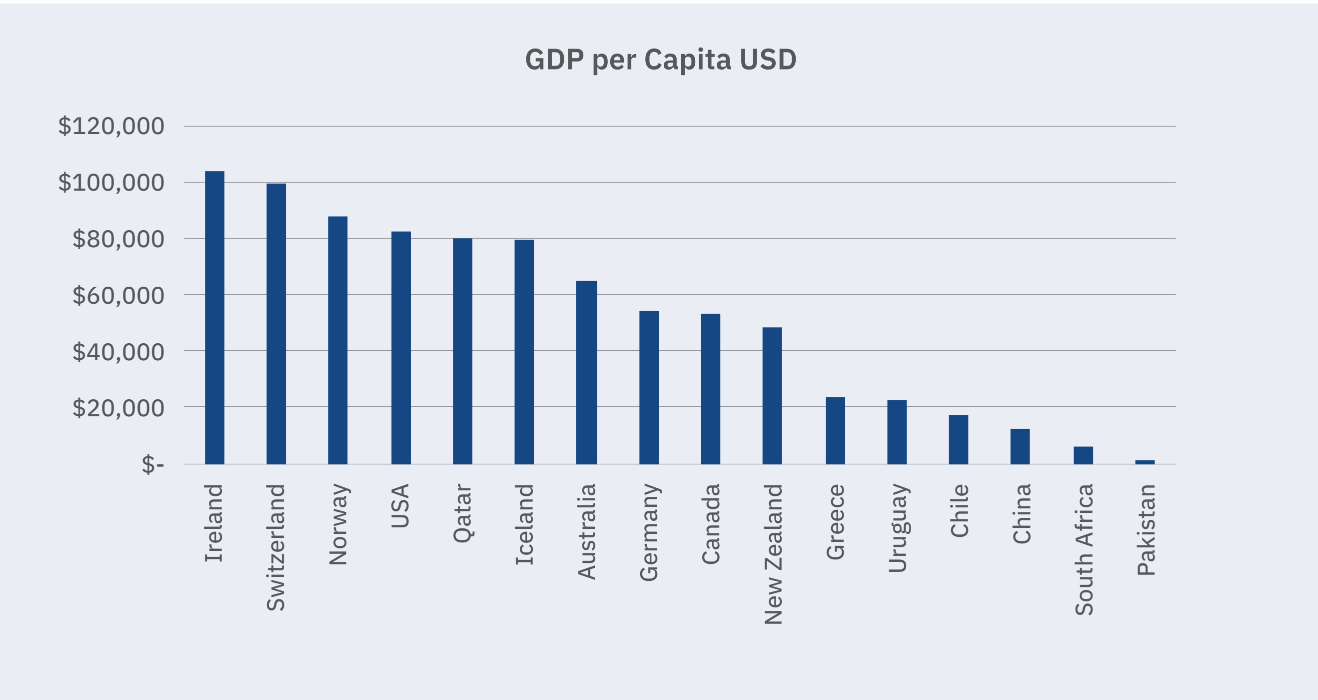
	Tertiary	Secondary	Primary
Ireland	65.0%	33.7%	1.3%
New Zealand	83.9%	9.3%	6.8%
Norway	64%	33.7%	2.3%
USA	81.2%	16.3%	2.5%
Switzerland	73.8%	25.5	0.6%
Iceland	74.5%	19.7%	5.8%
Australia	61.1%	19.5%	19.4%
Germany	68.6%	30.7%	0.7%
Canada	70.2%	28.2%	1.6%
Qatar	49.5%	50.3%	0.2%
Greece	79.1%	16.9%	4.1%
Uruguay	69.7%	24.1%	6.2%
Chile	63%	32.8%	4.2%
China	51.6%	40.5%	7.9%
South Africa	74.8%	17.5%	7.7%
Pakistan	56.5%	19.1%	24.4%

6.2 GDP Per Capita

GDP per capita is a useful indicator for measuring the average economic output produced per capita in a country. It indicates the overall wealth of a country's population. Countries with higher GDP per capita generally have greater resources at their disposal, both in terms of private income and public finances. This economic capacity can be used to invest in new technologies, such as emerging energy systems. A higher GDP per capita also gives governments greater fiscal ability to design and implement supporting policies which could be subsidies or incentives for renewable energy, R&D funding or infrastructure projects.

Countries with lower GDP per capita may face budgetary constraints that limit their ability to adopt new technologies or provide adequate policy support or infrastructure investment. This can slow progress towards improving energy affordability, security and sustainability.

The GDP per capita figures above provide some context for each country's performance in the metrics that we have looked at throughout this study and show us some practical limitations that countries may be facing.



International Benchmarking

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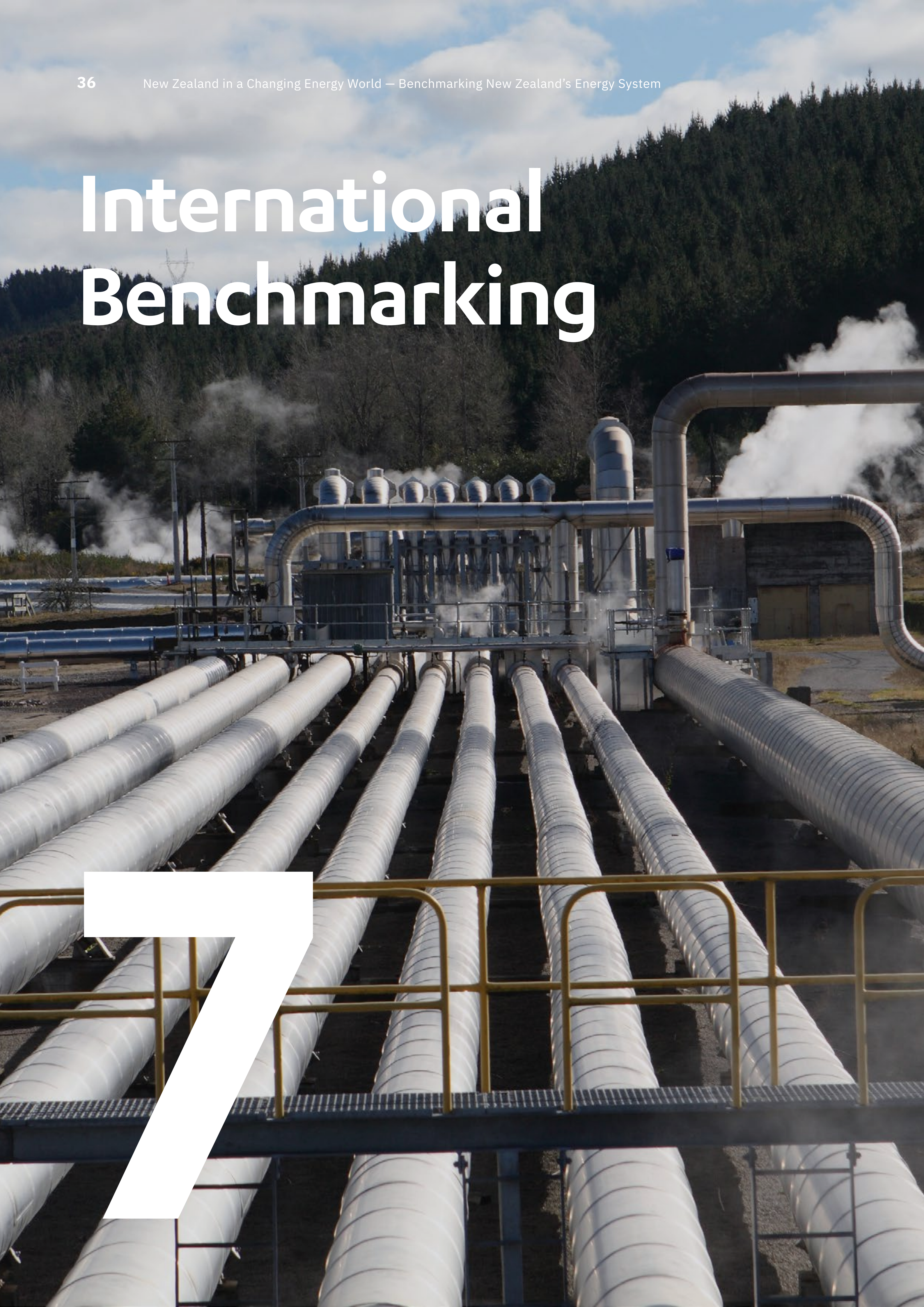
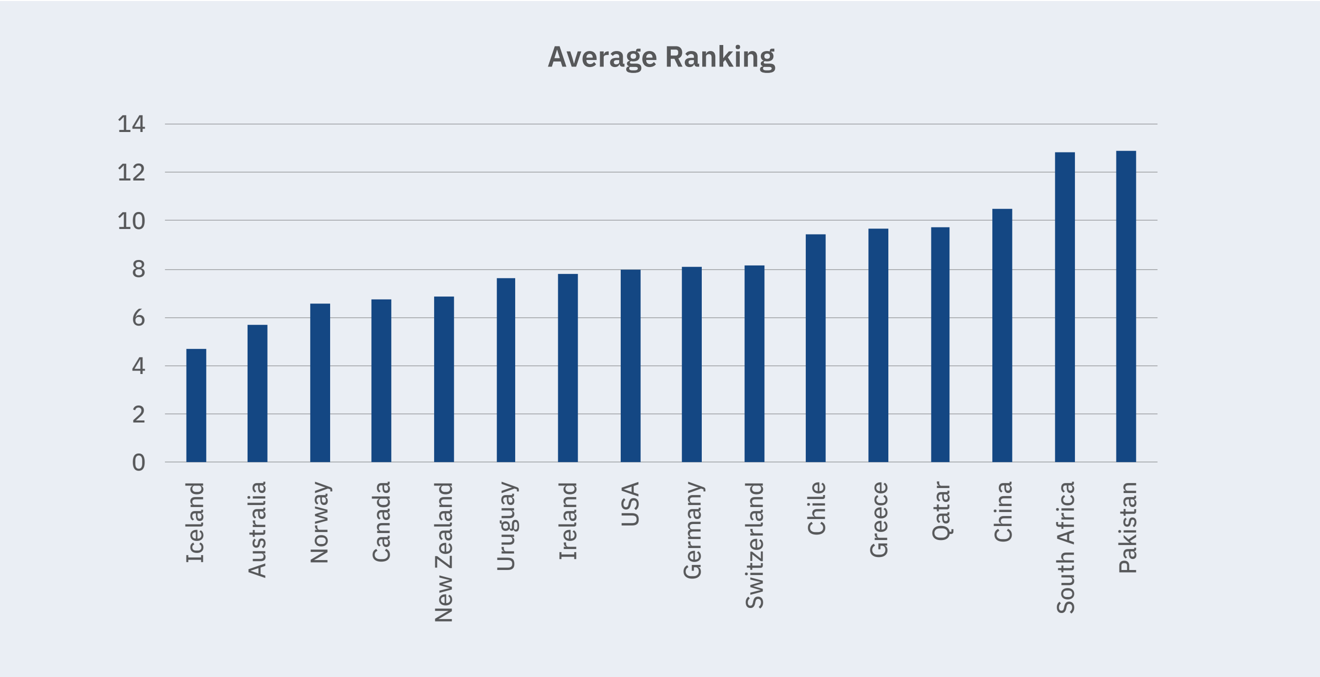
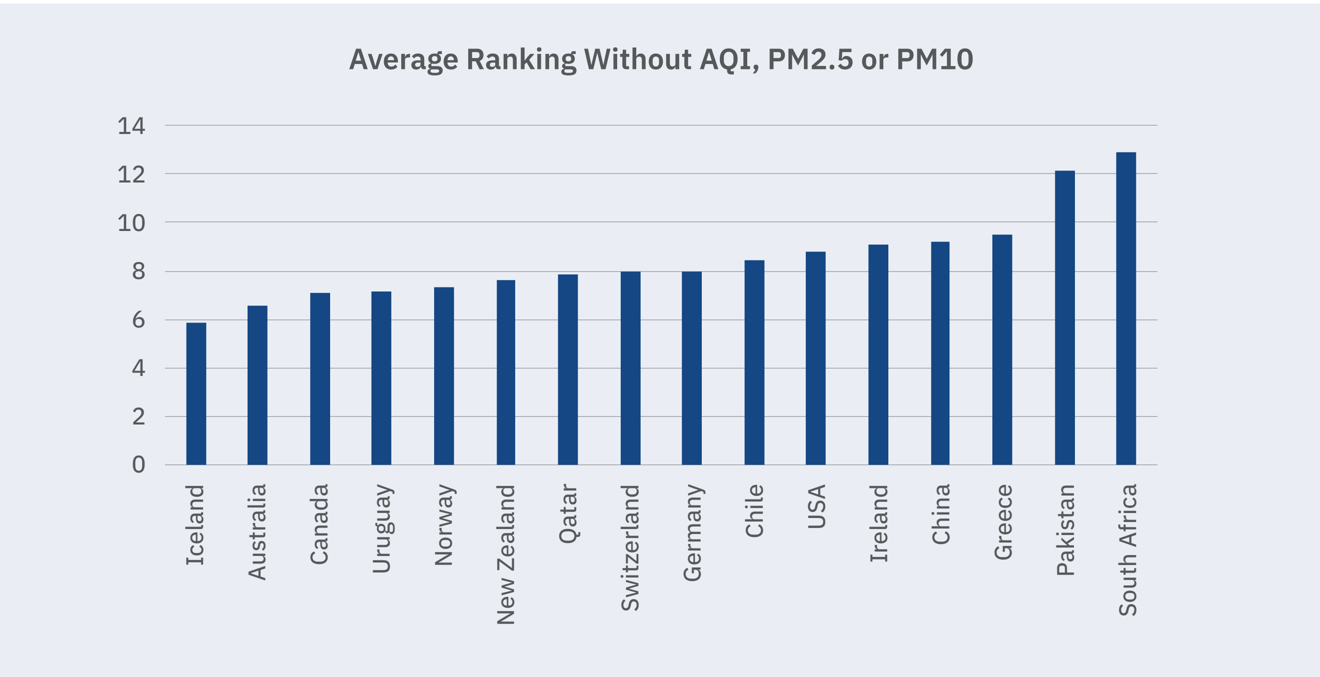


7. International Benchmarking

7.1 Comparative Tables and Charts

Here is the average ranking when taking the sum of how each country has ranked for each metric and then dividing by the total number of metrics. Higher rankings indicate weaker performance, while lower rankings reflect stronger performance.

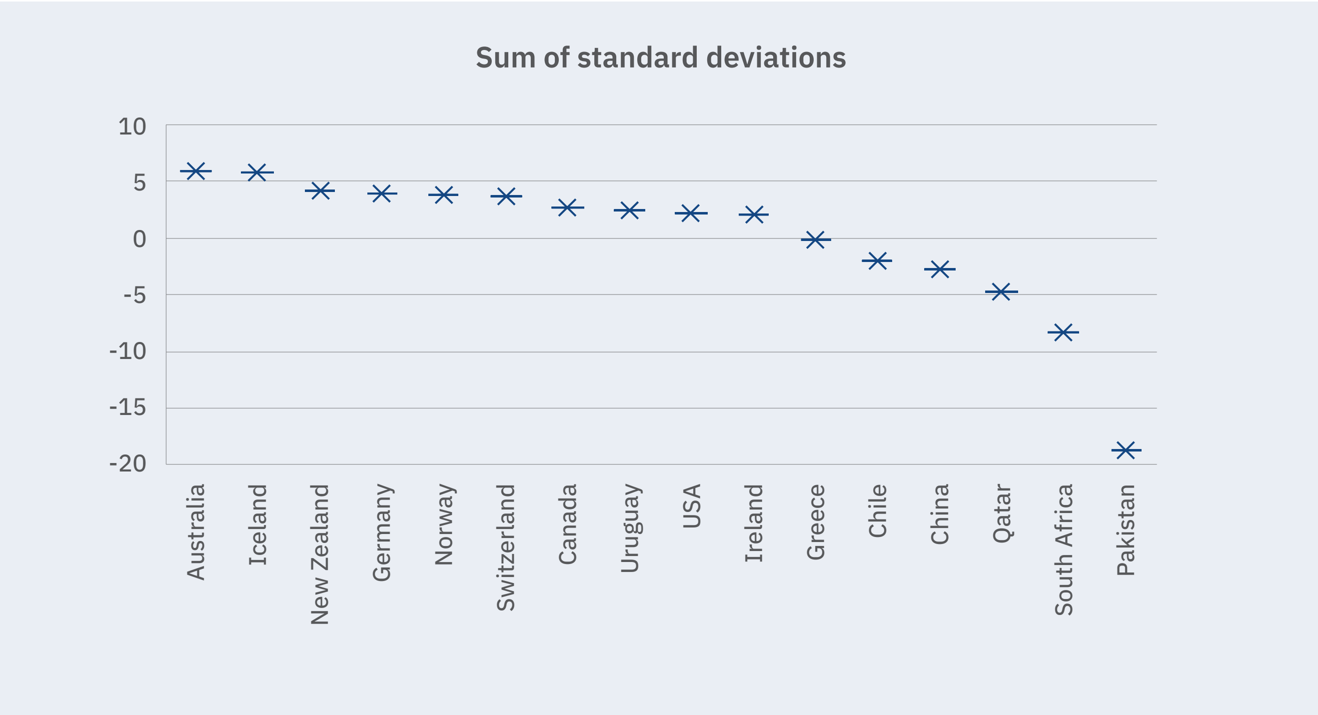


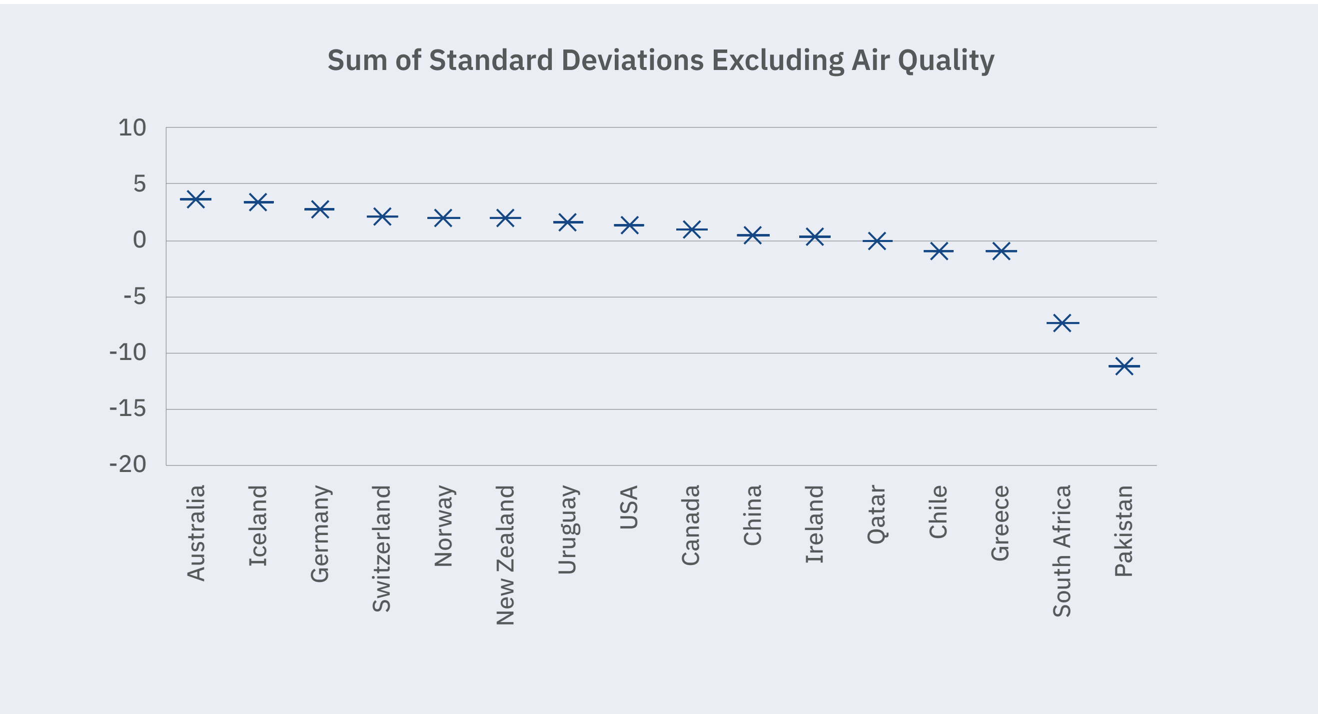


Here is an alternative ranking method that more accurately reflects result quality for each metric. We took the number of standard deviations away from the mean each country was for each metric and then found the sum of all standard deviations.

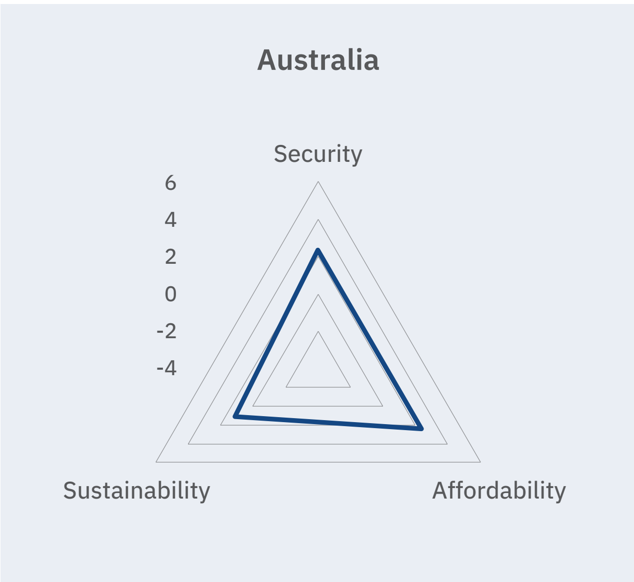
Positive scores indicate that a country is performing better than average and negative scores indicate a country is performing worse than average.

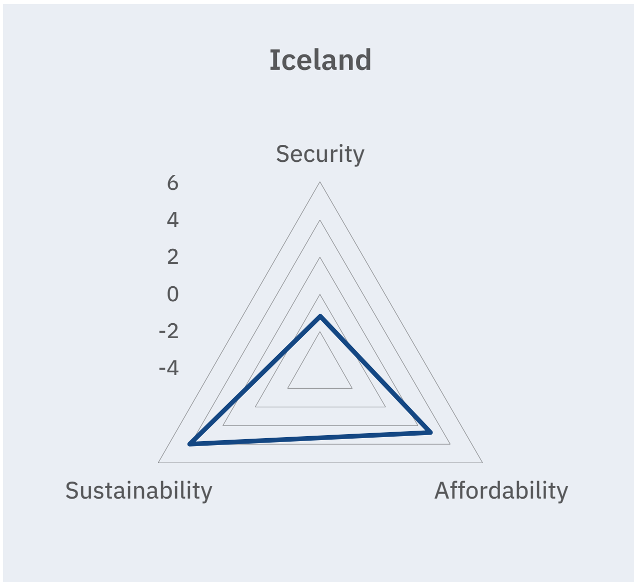
Using this method 0 is the average performance.

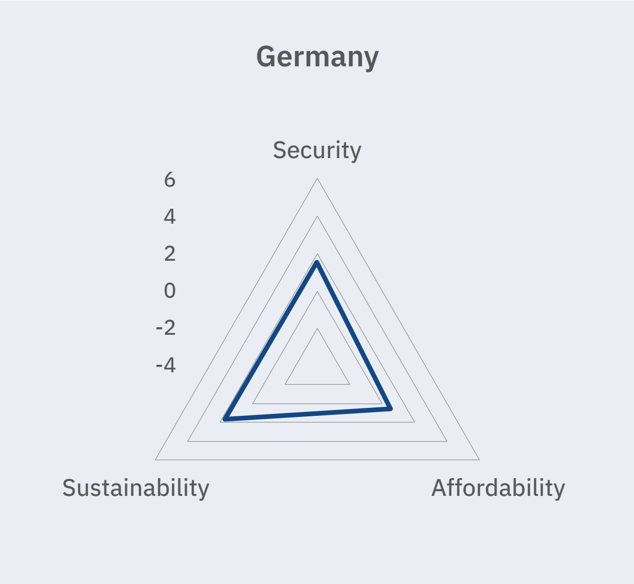


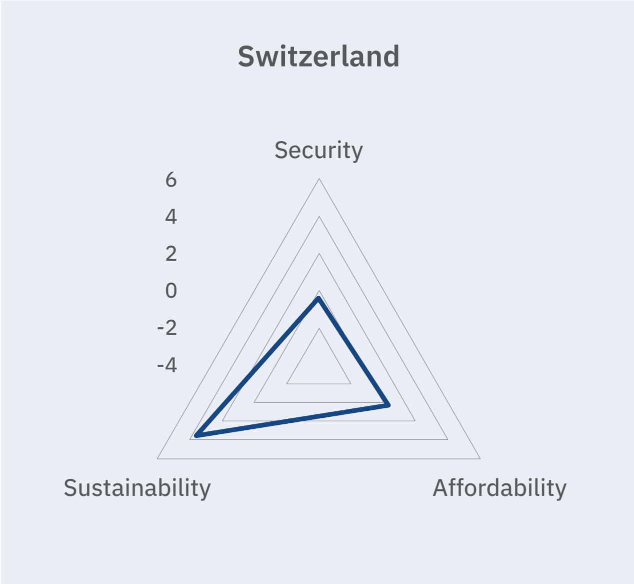


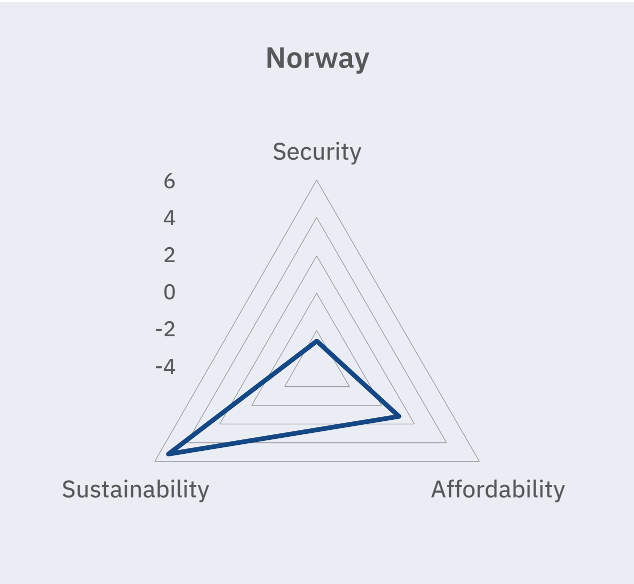
Below is the sum of standard deviations for the top 6 countries split into the categories of security, affordability and sustainability.











Note that Norway performs relatively poorly for energy security as for this report we have not taken into account the level of hydro storage available to countries. With about 18 months of hydro storage, Norway likely performs much better for energy security.

Conclusions

8

8. Conclusions

This report has benchmarked New Zealand's energy sector against 15 countries over 14 quantitative metrics covering the three pillars of the energy trilemma: security, sustainability and affordability.

Across the quantitative metrics we have found the average rank for New Zealand using two different methods. The first is to simply find the average of the rank numbers across each metric. This gives New Zealand a score of 6.85 which puts the country in 5th overall. The country is on par with Norway (3rd) and Canada (4th), while trailing behind Iceland (1st) and Australia (2nd). This indicates that generally New Zealand's energy sector is in a good position, but there have been some concerning outcomes found. Of the countries looked at, New Zealand ranks last in electricity wholesale volatility, 10th for import dependence and 9th for both generation diversity and energy intensity.

If AQI and air pollution metrics (PM2.5 and PM10) are not considered, then NZ slips to 6th place. We considered this factor because geography influences how countries perform in these metrics. This analysis demonstrates that even when air quality – an area where New Zealand excels – is excluded, the country continues to achieve strong results.

The second method looked at how much New Zealand's results for each metric differed from the average, then added those differences to get an overall score. Using this method allows us to better understand the quality of each result rather than just its placing. For metrics such as the PPP price of unleaded petrol before tax, where effectively the top 10 countries all have similar prices, it weights similar scores more evenly.

In other words, instead of just saying who comes first, second or third for each metric, this approach looks at how far each country's results are from the average. It measures the real difference between countries, so if several countries have almost the same score, they aren't unfairly spread out in the rankings. This method helps us see not just who is ahead, but by how much and gives a clearer picture when the actual numbers are very close together.

Using this method New Zealand scored 4.17 which means that over the whole data set New Zealand was 4.17 standard deviations above the average. This puts the country in 3rd, only trailing behind Australia in 1st and Iceland in 2nd with scores of 5.97 and 5.79 respectively. If we also exclude AQI and air pollution metrics (PM2.5 and PM10) from this method, then NZ slips 3 places to 6th, with Germany, Switzerland and Norway climbing up. Looking at New Zealand's position from the mean when the metrics have been bundled into the categories of Security, Affordability and Sustainability we see the following:

Security = 0.40, Affordability = 0.11, Sustainability = 3.66. The average score is 0 for all categories.

Affordability is New Zealand's lowest result, with the country ranking 10th overall. This is influenced by New Zealand's score for wholesale price volatility which is -1.97. The other metrics within affordability are the PPP prices for electricity, unleaded petrol (before and after tax) and energy poverty where New Zealand scores 0.40, 0.48, 0.47 and 0.73 respectively. A large part of the results scored for wholesale price volatility were the culmination of low hydro levels and diminished gas supply last winter.

For the category of security New Zealand ranks 6th. While not having fuel reserves in line with IEA recommendations, New Zealand does have a relatively diversified electricity system and an import dependency in line with the mean of our data set.

Sustainability is, unsurprisingly, New Zealand's strongest category, supported by highly renewable electricity generation and a relatively high level of renewable energy consumption. The country also has a lower than average energy intensity and air quality statistics well below average.

It is important to emphasise that the primary aim of this report has not been to assign New Zealand a definitive position in an international ranking. Because any ranking is inherently shaped by the particular selection of countries, the true value of these comparisons lies in how they help frame New Zealand's energy sector performance within the context of each metric.

Throughout this analysis, rankings have served as a tool to highlight New Zealand's relative strengths and weaknesses, enabling more meaningful insight than a narrow focus on position alone could provide. While overall and categorical rankings are presented, these should be interpreted as contextual benchmarks rather than absolute standings on a global scale.

Overall, these findings highlight both New Zealand's strengths and areas for improvement as the energy sector faces new challenges and opportunities. While New Zealand's high rankings in sustainability reflect the country's renewable legacy, the results for affordability and security demonstrate strong interconnectivity and the need for continued vigilance and targeted action. As pressures from decarbonisation, changing climates, and global energy trends intensify, ensuring greater resilience and affordability will be vital.

The insights from this benchmarking exercise are intended to support ongoing discussions across government, industry, and communities. We hope this report helps encourage a proactive approach to addressing weaknesses and building on our existing advantages for a more secure, sustainable, and affordable energy future.

While New Zealand's high rankings in sustainability reflect the country's renewable legacy, the results for affordability and security demonstrate strong interconnectivity and the need for continued vigilance and targeted action.

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