WORLD ENERGY COUNCIL

World Energy **Trilemma Index**

Summary

2020

In partnership with Oliver Wyman

ABOUT

WORLD ENERGY COUNCIL

The World Energy Council is the principal impartial network of energy leaders and practitioners promoting an affordable, stable and environmentally sensitive energy system for the greatest benefit of all.

Formed in 1923, the Council represents the entire energy spectrum, with over 3,000 member organisations in over 80 countries, drawn from governments, private and state corporations, academia, NGOs and energy stakeholders. We inform global, regional and national energy strategies by hosting high-level events including the World Energy Congress and publishing authoritative studies, and work through our extensive member network to facilitate the world's energy policy dialogue.

Further details at www.worldenergy.org and @WECouncil

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WORLD ENERGY TRILEMMA INDEX 2020

The World Energy Council's definition of energy sustainability is based on three core dimensions: Energy Security, Energy Equity, and Environmental Sustainability of Energy Systems.

Balancing these three goals constitutes a 'Trilemma' and balanced systems enable prosperity and competitiveness of individual countries.

The World Energy Trilemma Index has been prepared annually since 2010 by the World Energy Council in partnership with global consultancy Oliver Wyman, along with Marsh & McLennan Advantage of its parent Marsh & McLennan Companies. It presents a comparative ranking of 128 countries' energy systems. It provides an assessment of a country's energy system performance, reflecting balance and robustness in the three Trilemma dimensions.

Access the complete Index results, national Trilemma profiles and the interactive Trilemma Index tool to find out more about countries' Trilemma performance and what it takes to build a sustainable energy system: https://trilemma.worldenergy.org

World Energy Trilemma Index 2020, published by the World Energy Council in partnership with OLIVER WYMAN.

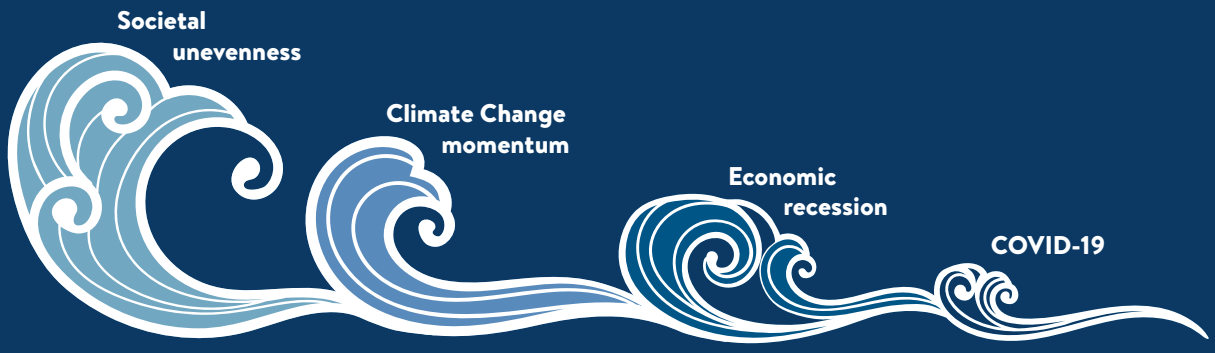
PLACING PEOPLE AT THE CENTRE OF THE ENERGY DEBATE

This has been a turbulent year for economies and societies throughout the world. The COVID-19 global pandemic has affected everyone and has had a significant and uneven impact across the worldwide energy industry. It has also reminded us all why energy matters.

The pandemic has highlighted the many links between multiple national and international policy agendas. The World Energy Council has been active for decades in developing integrated policy approaches to deal with interconnected energy challenges.

The crisis is having a deep – and likely lasting – impact on the pace and direction of the global energy transition. New business patterns, ways of working and societal behaviours are emerging, with implications for future energy demand, as well as the supply mix. Within the energy sector, clear "winners" and "losers" have emerged, with informed commentators and corporate planners, in many cases, having to go back to their drawing boards.

Figure 1: A brutal health shock which impacts on pre-existing tensions in energy systems



Recovery will not be easy, and transformation is also still possible

No crisis happens in a vacuum. A bigger-picture understanding is an essential place to start to make sense of what is happening now. Many governments are concerned to mitigate the risk of global economic contraction, triggered by lockdown-led recessions, whilst also addressing the challenges of climate change.

Figure 2: Enduring mission – better energy for better lives

Even before the pandemic, our worldwide expert energy community was discussing the next era for energy. In recent years, the process of global energy transition has been driven by the interaction of broader trends in Digitisation, Decarbonisation and Decentralisation. The 24th World Energy Congress, held in Abu Dhabi in 2019, noted the emergence of a '4th D' – Disruption-as-usual'. Delegates discussed the emergence of new leadership mindset – a shift from supply-centric to "customer-centric" energy systems. New challenges for the energy industry as a whole were also highlighted, including the sector's ability to maintain its social licence to operate in this new era of disruption-as-usual and social change.

Our new Vision of Humanising Energy

In response, the Council developed a new vision 2025 focused on Humanising Energy that considers:

The migration of value creation towards the end-user and the potential for demand-side disruptive innovation to reshape supply;

Increasing gaps in productive energy access within and between countries – despite some progress in closing the basic energy access gap on a worldwide basis;

The urgent need to plug in people and engage those impacted by energy transition in designing and managing the process – including workers and local communities;

The need to reconnect the "market" price of new technologies and the full cost to society of faster transformation and resilience of the whole energy system.

The World Energy Council has facilitated the exchange of impacts, actions and outlooks throughout its worldwide community to distil emerging lessons from the pandemic in relation to energy. Whilst certain trends, such as digitisation of energy have grown stronger, we note differences in responses and expectations about the possible return to normalcy. This reinforces the Council's role in engaging regional, technological and societal diversity as strengths.

In the space of months, people have adopted new behaviours and learned new ways of working, living, relating and doing business. We even have new vocabulary to describe this – "to Zoom" and to "self-isolate".

We believe that our vision of "humanising energy" has come of age.

The “energy+” (“energy plus”) agenda

Energy affects all aspects of human life – material security, wellbeing, convenience, comfort and community – and impacts planetary health. It also fuels new dreams and ambitions.

We are addressing the connected challenges agenda, which recognises the need for more energy and climate neutrality in a new context of affordability and equity.

We remain committed to providing a neutral and safe space to carefully navigate the new geopolitics of clean energy, which extends beyond oil and gas, to include non-energy resources, data and technology.

Strengthening the worldwide ‘energy+’ community movement

With a strong track record of over 97 years, the World Energy Council has a role to inspire, inform and impact the recovery and transformation ambitions of societies everywhere as they seek to build back better.

We are globally networked and locally strong. Our members come from across the public, private and civil society sectors, and include all energy forms – heat, power, fuels and storage. We engage wider energy system shapers – users, investors, entrepreneurs and policy innovators.

Importantly, we are vehemently impartial – we do not advocate for any form of energy over another – and we are not passive.

Using the World Energy Trilemma Index as an interactive leadership tool

This year, we celebrate the 10th anniversary of the World Energy Trilemma Index. Since 2010, the Report has provided an independent and objective rating of a country’s energy policy and performance using verified global and country-specific data to assess management of three core dimensions: Energy Security, Energy Equity and Environmental Sustainability. The World Energy Trilemma Index enables countries to keep track of their own progress and to learn with and from each other about what’s working and what’s not.

The annual assessment is designed as a tool to be used, not a report to be read and placed on a shelf. In this report we also suggest ‘how to’ use the World Energy Trilemma Index as an energy policy pathfinding tool.

In the highly fragmented, crowded and increasingly polarised energy leadership environment, our interactive ‘energy+’ leadership toolkit is more important than ever. By engaging diversity as a strength and understanding the energy future through the interaction of actions of key players I believe humanity as whole can learn to flourish through this global crisis.

Dr Angela Wilkinson
Secretary General
& CEO

EXECUTIVE SUMMARY

This year we celebrate the 10th anniversary of the World Energy Trilemma Index following its initial launch in 2010 as an energy policy pathfinding tool. Countries develop different energy policies based upon their domestic circumstances with varying natural resources, geographies, and socio-economic systems. This divergence of differing systems and contexts mean that there is no single golden path for successful energy transition, and instead, each country will need to determine its own best energy policy pathway considering its national situation and priorities. This means that direct comparisons between the rankings and scores of countries can be less informative, but instead help provide a conversation opening. But countries can and should learn from each other, by learning what policies work and why such policies might be successful within some contexts but not in others. The Energy Trilemma Index can help countries and energy stakeholders in an on-going dialogue to determine what areas of energy policies need to improve and examples from other countries that may help to determine which options might be more suitable.

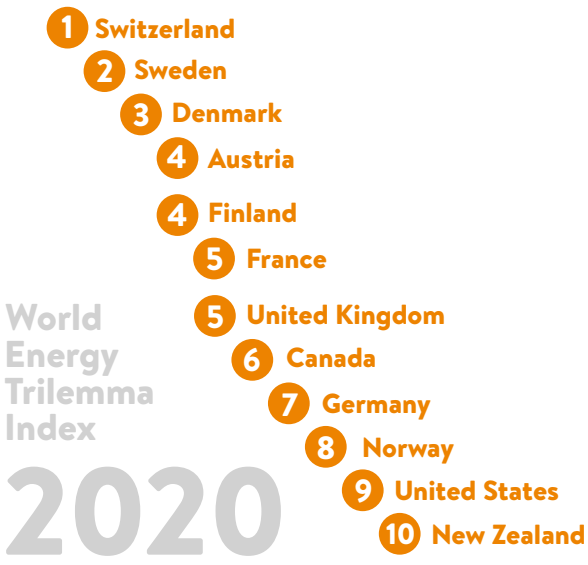
While 2020 has been overshadowed by the COVID-19 pandemic, the Energy Trilemma reflects historical energy policy performance that does not include this year's data. The impact of the pandemic will become evident in the 2021 Trilemma (to be launched in October 2021) as annual data for 2020 becomes available. Some implications of the pandemic for energy are already visible - with the increased focus on digitalisation and depressed global demand, although the longer-term implications for energy systems and transition remain unclear.

2020 RESULTS

In this year's Trilemma, the overall scores top ten ranks remain dominated by OECD countries, which illustrates the benefit of longstanding active energy policies. The top three ranking countries of Switzerland, Sweden and Denmark have overall scores of 84 and above. The top ten ranks have a strong European flavour with Canada, the United States and New Zealand breaking the OECD European monopoly. This year we have introduced tied ranks due to the closeness of some country scores; for example, Austria and Finland have the same score and are ranked 4th while the UK and France also share the same score to be ranked 5th. The closeness of the scores also prompted the use of the broader ranking definition so that the top ten ranks include more than ten countries due to tied ranks with equal scores.

The path followed by the greatest improvers since 2000 reveals the importance of diversifying energy systems and increasing access. The top three countries improving their overall Trilemma performance are Cambodia, Myanmar and Kenya. These countries have low overall ranks but have made significant and sustained efforts to improve their energy systems.

Figure 3: The TOP 10 ranks of World Energy Trilemma Index 2020



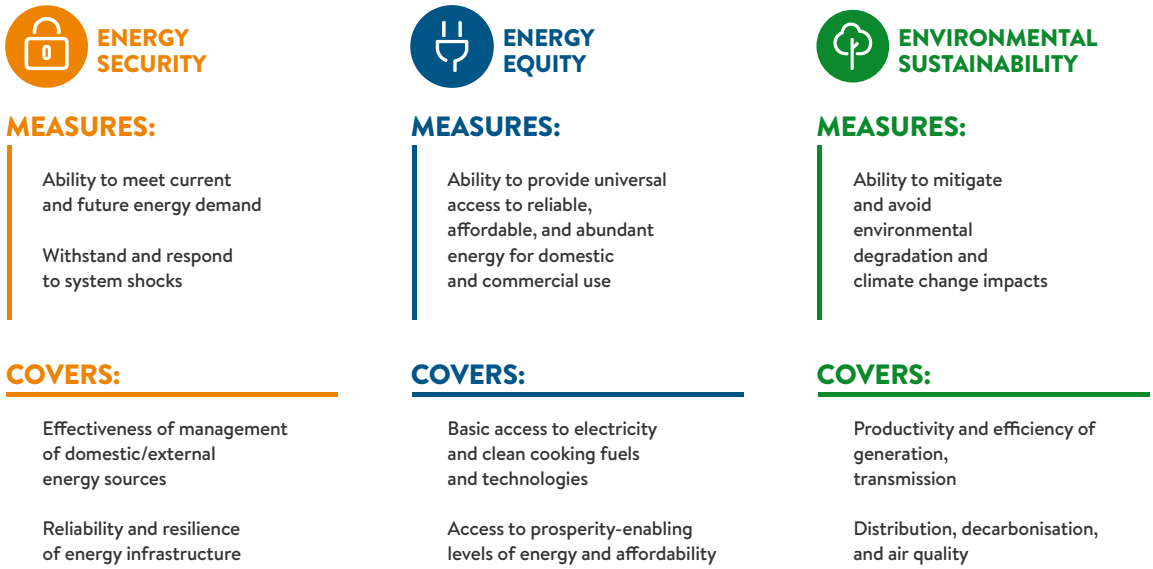
In the **Energy Security** dimension, the top ten ranks include countries with significant hydrocarbon resources alongside countries focused on diversifying and decarbonising their energy systems with Canada, Finland and Romania topping the list of best performers. Significant natural resource endowment strongly underpins good performance, although hydrocarbon resources abundance can also be a "resource" curse: the performance of some hydrocarbon-rich countries is declining as they concentrate their energy systems rather than diversifying them. Diversifying a country's energy mix improves energy security scores and leads to a stronger emphasis on system resilience.

The **Energy Equity** top ten ranks benefit from producer countries with low energy costs for consumers – implicit subsidies – that may be more challenging moving forward in a more volatile price environment post-COVID-19. Luxembourg, Qatar and Kuwait head the list of the top ten performers for the dimension; all are small, wealthy nations with high GDP, strong interconnections, low energy prices through subsidy and/or significant easily extractable energy resources. Price subsidies (either explicit or implicit) tend to hinder energy supply diversification and reduce Trilemma scores in the other dimensions. The greatest improvers since 2000 share a common focus on policies to increase access to energy and to make energy more affordable to consumers. Kenya and Bangladesh have seen massive improvements in access to electricity, largely due to implementation of government policy.

Access to reliable and affordable energy is an enabler of economic prosperity, but increasing emphasis is now being paid to quality of energy supply. More than 800 million people still do not have access to basic energy, particularly in Sub-Saharan Africa – continued progress on UN Sustainable Development Goal 7 is an imperative with pathfinding from top improving countries providing practical examples.

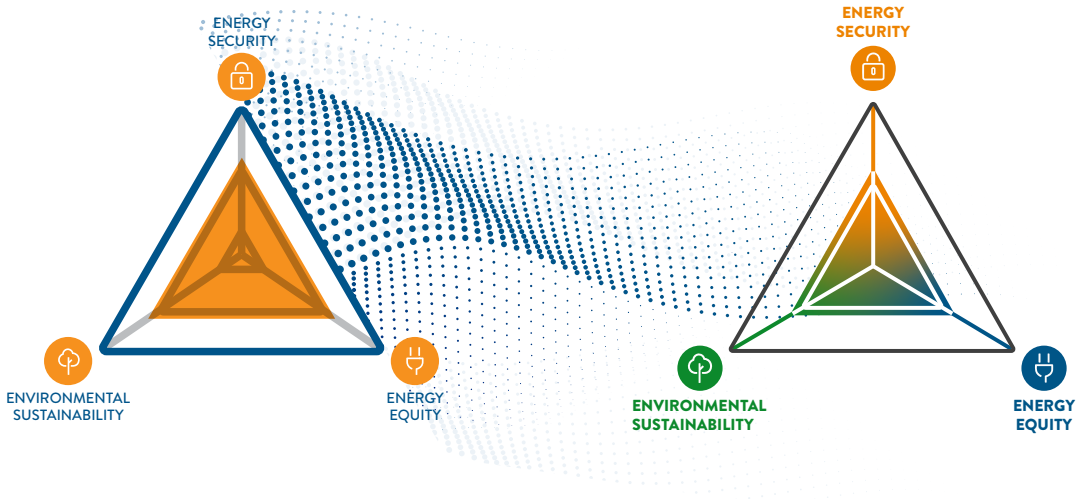
In the **Environmental Sustainability** dimension, the top ten rank showcases strong policy efforts to decarbonise and diversify energy systems with the top three being Switzerland, Sweden and Norway. A diversified energy system, supported by strong policy instruments to reduce GHG emissions significantly, coupled with energy efficiency measures, deliver a strong performance in the environmental sustainability dimension. Driving down energy intensity can assist countries yet to decarbonise their energy mix. Ensuring an inclusive decarbonisation that leaves no communities behind will be essential to humanise energy transition. The greatest improvers since 2000 show continued policy efforts together with some anomalies – Ukraine reduced imports and increased nuclear generation since 2015 – and geopolitical events.

Figure 4: Trilemma Index dimensions



Energy transition brings globally unprecedented change to the energy sector as countries seek to decarbonise while energy policies and regulations themselves tend to lag with incremental step changes. This means that the Energy Trilemma Index needs to evolve continually in order to remain relevant by including the indicators that best reflect the evolving energy sector by modifying data sources or indicator coverage. Changes to the 2020 Trilemma have been incremental and focused on refining the model, although we are evolving the visual presentation. The dimension chapters include summary graphics and text with colour coding to highlight key insights. We have also evolving the graphical presentation of the Trilemma triangle to move away from the orange block towards a colourful composition that better reflects the uniqueness of each Trilemma triangle. The three Trilemma dimension have their own colour aligned with their chapter colouring so the mix for each triangle reflects the differing balances between the dimensions. This multi-colour approach also reflects that energy transition is not single coloured and will reflect a spectrum of differing pathways dependent upon varying national circumstances.

Figure 5: Spectrum of differing pathways are now reflected in the Trilemma balance triangle



Lastly, we cannot lose sight of the impact of the COVID-19 pandemic. We expect the post-pandemic recovery to reshape energy policies and the agenda for Energy Transition, where the Trilemma as a pathfinding tool should become the indispensable guide to a more equitable, sustainable and affordable energy future.

Sir Philip Lowe
Chair
World Energy Trilemma

Martin Young
Senior Director
Business Insights and Scenarios

2020 TRILEMMA RESULTS

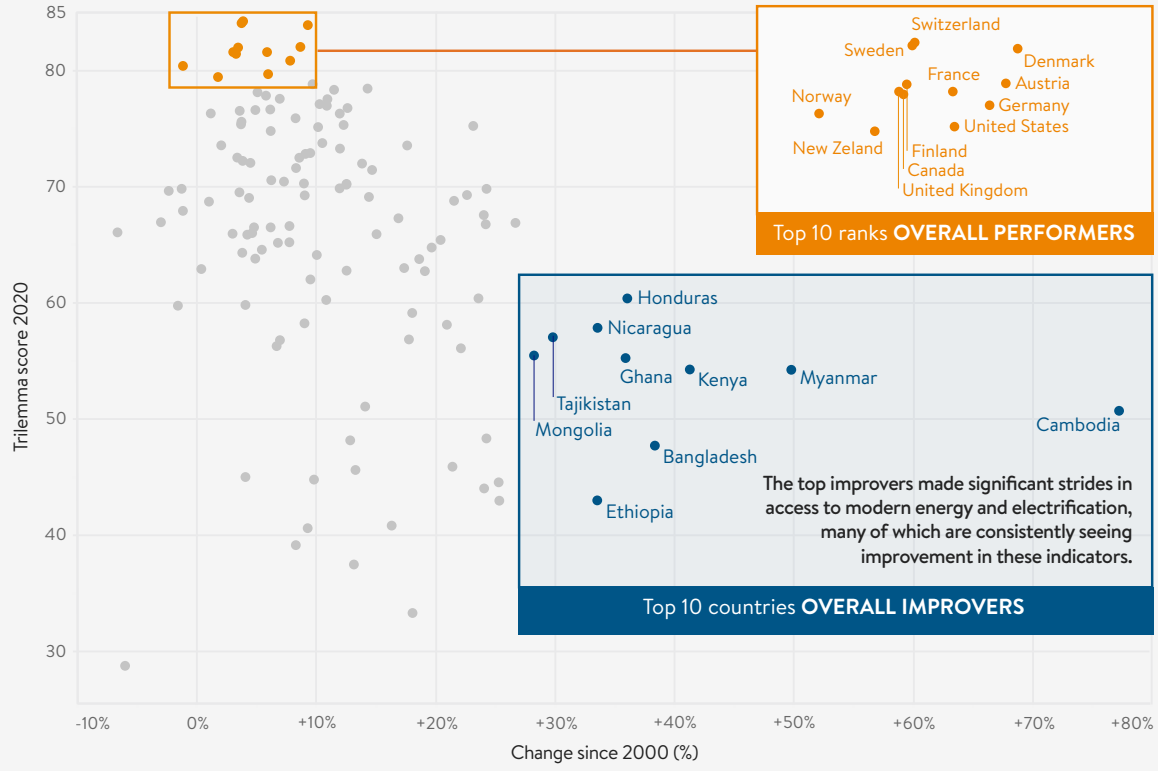
World Energy Trilemma Index

Reflects a nation's capacity to meet current and future energy demand reliably, withstand and bounce back swiftly from system shocks with minimal disruption to supplies.

Assesses a country's ability to provide universal access to affordable, fairly priced and abundant energy for domestic and commercial use.

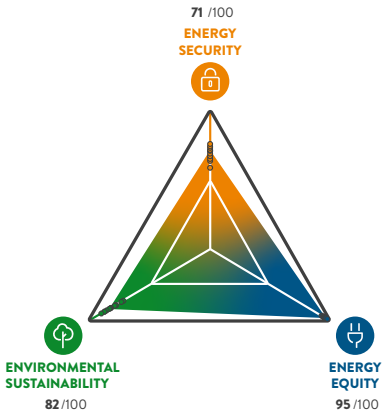
Represents the transition of a country's energy system towards mitigating and avoiding potential environmental harm and climate change impacts.

2020 Trilemma score against the difference of 2000 score



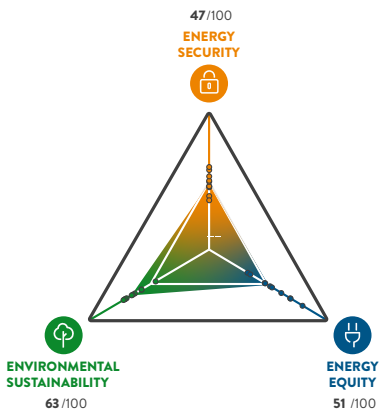
2020 TOP PERFORMERS AND IMPROVERS

TOP 10 RANK OVERALL PERFORMERS



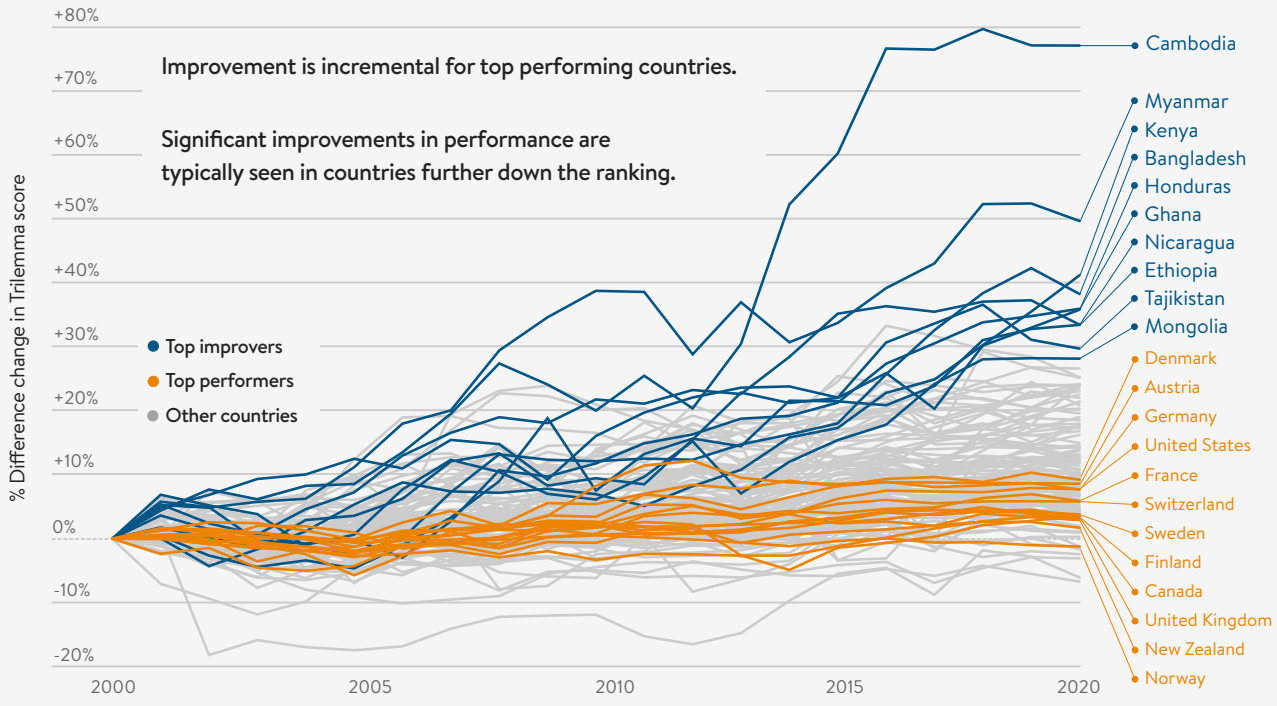
Rank		Grade	Score
1	Switzerland	AAAa	84.3
2	Sweden	ABAa	84.2
3	Denmark	AAAa	84.0
4	Austria	AAAa	82.1
4	Finland	ABAa	82.1
5	France	AAAa	81.7
5	United Kingdom	AAAa	81.7
6	Canada	AABa	81.5
7	Germany	AAAa	80.9
8	Norway	BAAa	80.5
9	United States	AABa	79.8
10	New Zealand	AAAa	79.5

TOP 10 COUNTRIES OVERALL IMPROVERS

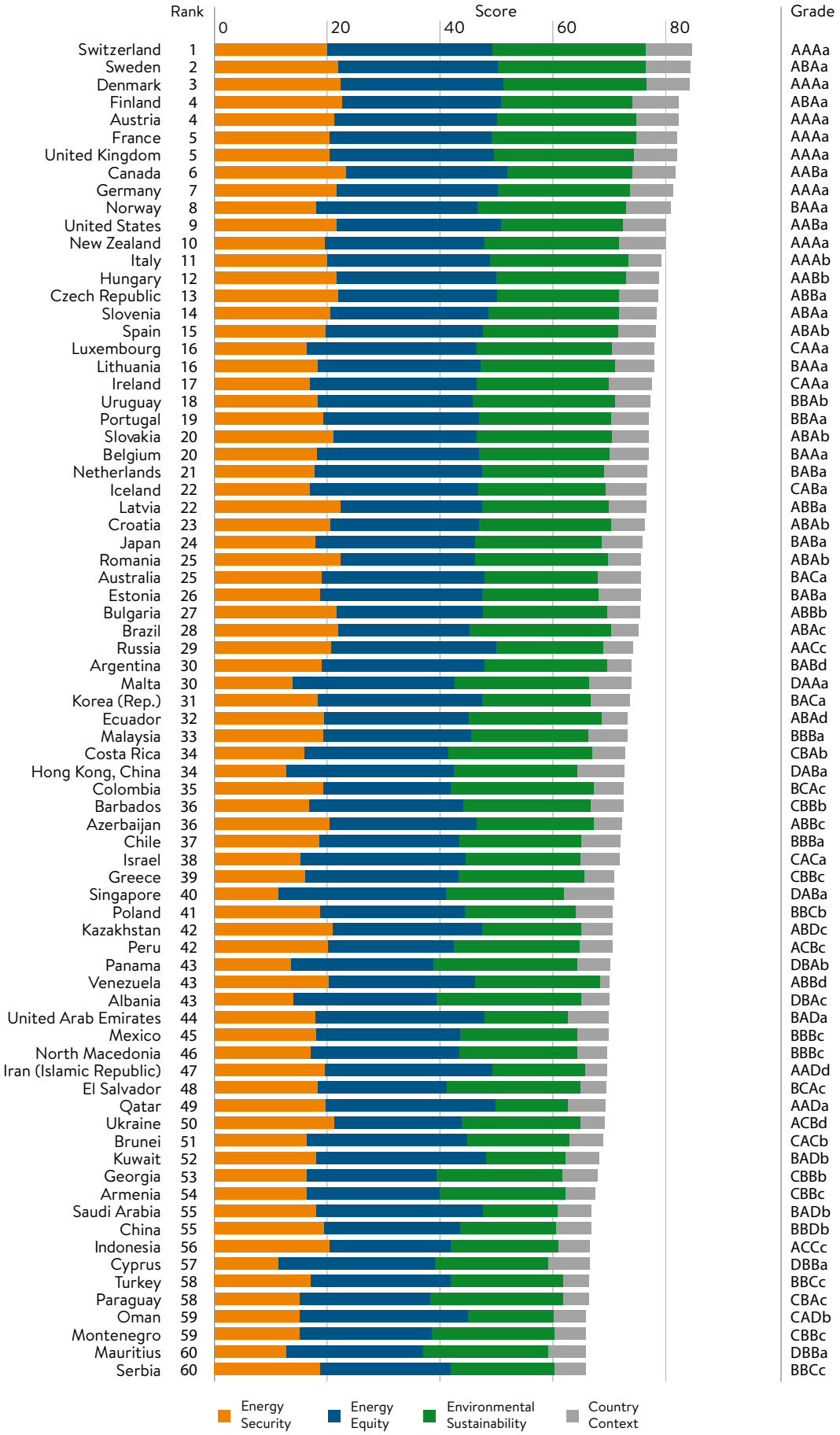


Rank		Grade	Score	Improvement since 2000
91	Cambodia	DDDd	50.8	77%
89	Myanmar	BDCd	54.3	50%
89	Kenya	BDBc	54.3	41%
94	Bangladesh	DDDd	47.8	38%
75	Honduras	CCBc	60.5	36%
88	Ghana	CDBc	55.3	36%
82	Nicaragua	CCBd	57.9	34%
101	Ethiopia	DDCd	43.1	33%
83	Tajikistan	DCCd	57.1	30%
87	Mongolia	DBDc	55.5	28%

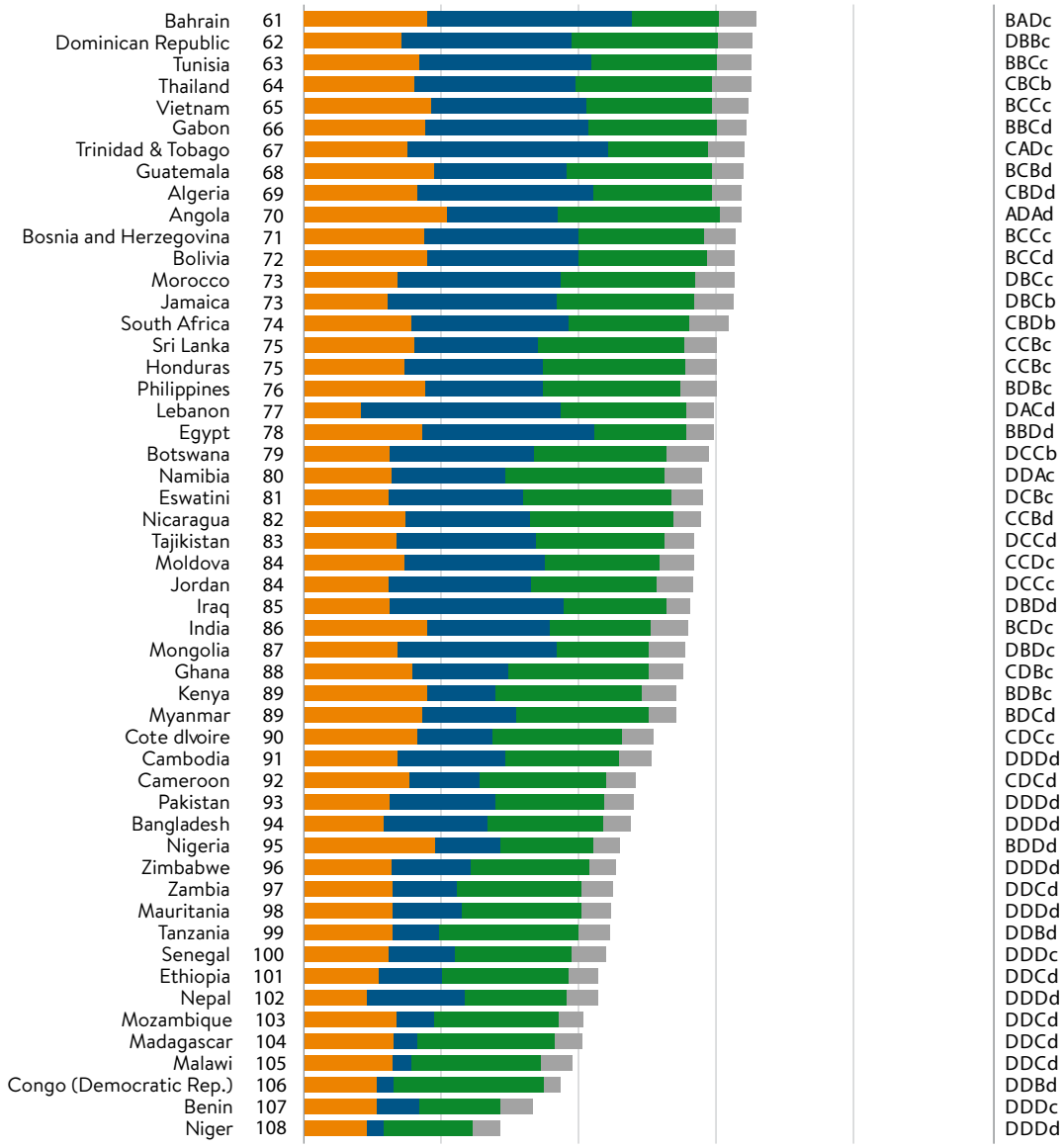
2020 Trilemma Indexed trends since the baseline of 2000



WORLD ENERGY TRILEMMA INDEX 2020



WORLD ENERGY COUNCIL



What does the country's performance show?

GRADE

Range of values: A (best), B, C, D (worst)
Example: AAAa, ABAc, BCDb, DCDd
Meaning: A grade is given for performance in three main dimensions (1st letter for Security, 2nd Equity, 3rd Sustainability) which cover 90% of the overall grade and an additional dimension (4th letter for Country Context) which covers the remaining 10%. The value of the grade depends on which quartile the country's score falls into:

- Grade A: top 25% countries
- Grade B: between top 25% and 50%
- Grade C: between 50% and 75%
- Grade D: between 75% and 100%

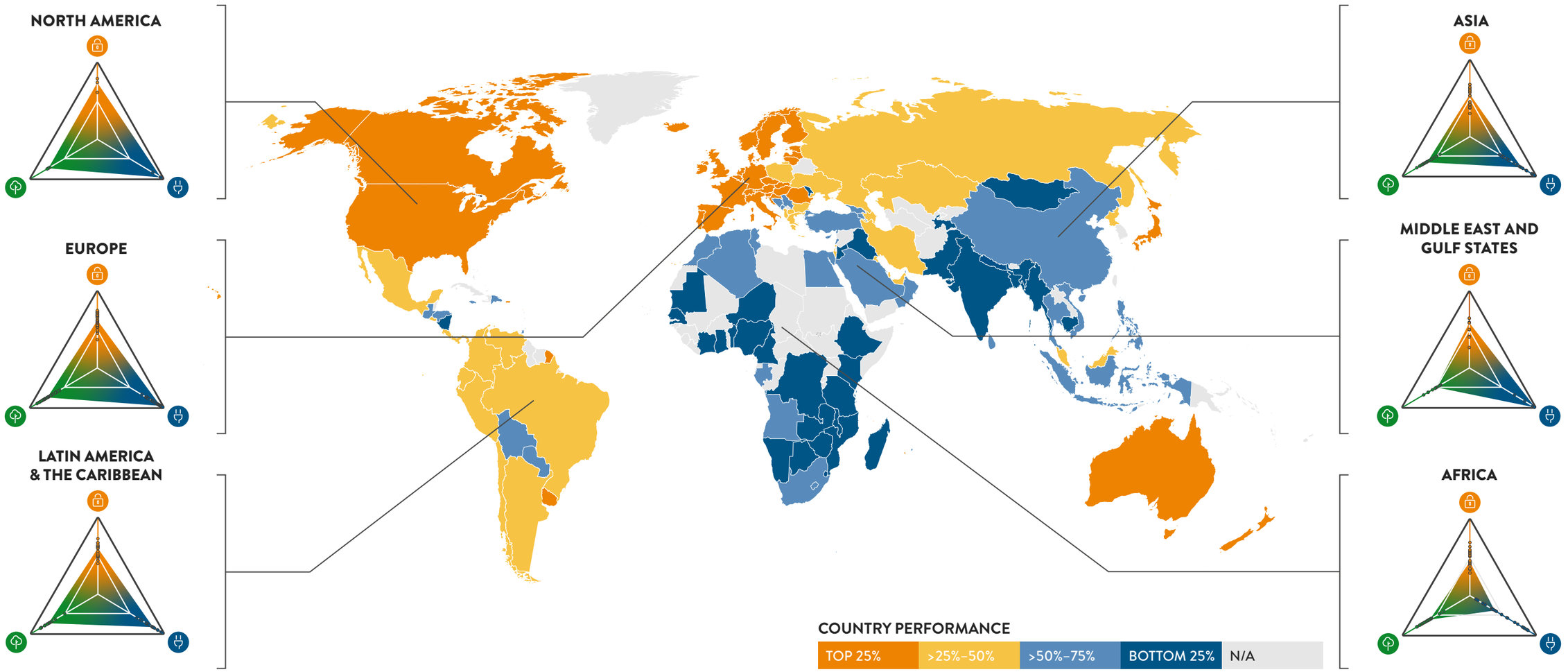
RANK

Range of values: 1 (best) ... 125 (worst)
Example: Shared rank 4 determined by the 4th best score value of 82.1
Meaning: The rank provides only a very short and limited information about a country's performance – it only informs where the country lies in the full Index, therefore the grade, the score, the context and especially the full indexed history of the country's performance should be taken into account when comparing with others.
We have used dense ranking approach because some scores are tied at one decimal place.

SCORE

Range of values: 100 (best) ... 0 (worst)
Example: 84.3, 53.4, 32.1
Meaning: A score value is given for overall performance as well as for each dimension (Security, Equity, Sustainability, Country Context) determined by country's performance in the indicators; the score can change even if the data did not change because the score reflects performance in comparison with other countries who may have improved in a given indicator.

Please note that because the Methodology has evolved direct comparisons of ranking, grades and scores to previous reports is not possible. Historical performance has been recalculated using the same revised Methodology back to the Index year 2000.



NORTH AMERICA

REGIONAL EFFORTS
NEED TO BE ALIGNED TO IMPROVE
TRILEMMA OUTCOMES

As a significant energy producer, energy plays a critically important and highly valued part in North American economies. Diversity amongst the three countries is greatest in environmental sustainability policy, with the US drifting away from international commitments on climate change, Mexico reverting to energy self-sufficiency by reducing energy imports and providing energy that is abundant and cheap, and Canada working on an action plan to achieve net-zero emissions by 2050.
Energy Security is widely seen as a positive continental strength, although reinforcing cooperation within the region remains crucial on this dimension. Regarding Energy Equity, North America has widespread access to energy and energy services, although there are concerns that some communities are being left behind.

EUROPE

A GREEN RECOVERY
TO ACCELERATE
THE ENERGY TRANSITION

European countries continue to perform strongly in the overall Trilemma top ten rankings. In general, the region is oriented towards sustainability and affordability of energy sector, while long-term energy security and harmonisation of market designs in national legislations remain as challenges.
The imminent economic crisis looming in the wake of the COVID-19 pandemic is likely to change the scores of many countries in the coming years, and the recovery measures that they apply will determine whether that change is positive or negative.
This crisis might bring about an opportunity to link energy transition with economic recovery, although such opportunity can become a trade-off instead for the most impacted economies.

LATIN AMERICA & THE CARIBBEAN (LAC)

FURTHER EFFORTS
FOR AN ADEQUATE REGULATORY
FRAMEWORK ARE NEEDED

The Latin America and Caribbean region seems to be moving forward in the right direction, although regulatory support continues to be insufficient to further advance the energy transition in the region. Significant efforts have been made to diversify the energy mix, reduce dependence on hydro, and improve energy security. Those efforts have focused on incorporating renewable power generation into the system, which has consequently improved environmental sustainability. Nonetheless, the top performers of the region in this dimension are not as a result of good policies, but rather, due to the abundance of natural clean energy resources. In contrast, the development of strong social policies have allowed the region to maintain good and stable performance in the energy equity dimension.

ASIA

INNOVATION KEY
TO IMPROVING
TRILEMMA PERFORMANCE

Asia is one of the most dynamic and diverse regions in the world, with countries among the top and the bottom ranks of the 2020 Trilemma. Energy equity scores have generally increased, primarily due to successful deployment of modern and affordable energy across the region. Asia remains the largest energy importer in the world and its energy security is expected to become even more challenging.
The region presents dramatic improvements in sustainability, with governments investing in transition to clean energy, and increasing private competition and incentives in the renewable sector.
The COVID-19 crisis could have negative and positive effects on the energy systems of the region, which will be exploring further.

MIDDLE EAST AND GULF STATES (MEGS)

THE TIME TO FOCUS
ON ENERGY DIVERSIFICATION
IS NOW

MEGS countries score highly in the area of energy equity as a result of providing affordable and near-universal energy. However, the uneven distribution of resources and limited cross-border cooperation negatively impact their energy security scores. Environmental Sustainability is also a regional challenge due to low deployment of renewable energy and the absence of energy efficiency measures.
Recently, several countries have undertaken reforms to diversify their economies and set ambitious renewable energy targets for 2030. Nonetheless, given the impact of COVID-19 and the reliance of public funds on oil and gas revenues, it is likely that these reforms will be delayed as spending on infrastructure, health, digitalisation, and fiscal stimuli to kick-start a post-COVID recovery is prioritised.

AFRICA

PROGRESS TOWARDS ENERGY EQUITY
AND SECURITY CAN BE
ENVIRONMENTALLY SUSTAINABLE

There are large disparities amongst African countries, in terms of demographics, mineral resources, economic development, industrialisation, etc. Consequently, energy performance and the path to energy transition differs across the continent. On the Energy Equity dimension, the region continues to be challenged with the world's lowest level of electricity access – 54 % overall and 45% for Sub-Saharan Africa.
Most African countries tend to score C or D on Energy Security, which means they don't have reliable and secure energy supply systems, due to different country-specific factors.
Lastly, on the Sustainability dimension, the performance of five countries in particular stands out with the implementation of national climate action plans. However, this dimension remains challenging for the other African countries.

WORLD ENERGY COUNCIL

Algeria
Argentina
Armenia
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Bahrain
Belgium
Bolivia
Bosnia & Herzegovina
Botswana
Bulgaria
Cameroon
Chad
Chile
China
Colombia
Congo (Dem. Rep.)
Côte d'Ivoire
Croatia
Cyprus
Dominican Republic
Ecuador
Egypt (Arab Rep.)
Estonia
Eswatini (Kingdom of)
Ethiopia
Finland
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Greece
Hong Kong, China
Hungary
Iceland
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62–64 Cornhill
London EC3V 3NH
United Kingdom
T (+44) 20 7734 5996
F (+44) 20 7734 5926
E info@worldenergy.org

www.worldenergy.org | @WECouncil