

World Energy Trilemma Index | 2018

**EXECUTIVE SUMMARY
IN PARTNERSHIP WITH OLIVER WYMAN**

The World Energy Council's Energy Trilemma Index ranks countries' energy performance on three dimensions, Energy Security, Energy Equity, and Environmental Sustainability, based on global and national data. The results show impacts of decisions and changes, suggesting where policy coherence and integrated policy innovation can help develop well calibrated energy systems in the context of the Grand Energy Transition.

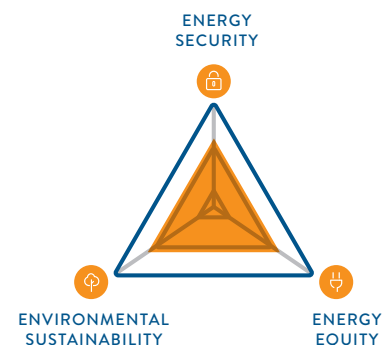
Robust energy systems are secure, equitable and environmentally sustainable, showing a carefully managed balance between the three dimensions. Maintaining this balance in the context of rapid transition to decentralised, decarbonised, and digital systems is challenging: there are risks of passive trade-offs between equally critical priorities. The 2018 Energy Trilemma Index Report shows that many countries are managing the balance successfully, with eight nations achieving a top AAA balance score.

The Energy Trilemma once more ranks Denmark, Switzerland and Sweden at the top, recognising the well-balanced energy systems in these countries. Denmark also achieves the highest score for Energy Security, followed by Slovenia and Canada, all demonstrating secure, diverse and resilient systems. The Energy Equity dimension ranking is topped by smaller countries, where connectivity is managed well, as well as countries where energy is affordable due to government policies and subsidies: Qatar tops the list, followed by Luxemburg, Bahrain and the Netherlands. The Environmental Sustainability ranking identifies countries with low carbon and energy intensity, resulting in lower emissions: this highlights lower energy users per capita, including the Philippines, Costa Rica and Uruguay.

Trends and the balance within the three dimensions also provide valuable information in helping countries address their energy trilemma. Decision makers in both the public and private sectors are encouraged to look at trends in performance over the years, particularly in each dimension, and to compare their countries against peer groups – including regional or GDP group peers.

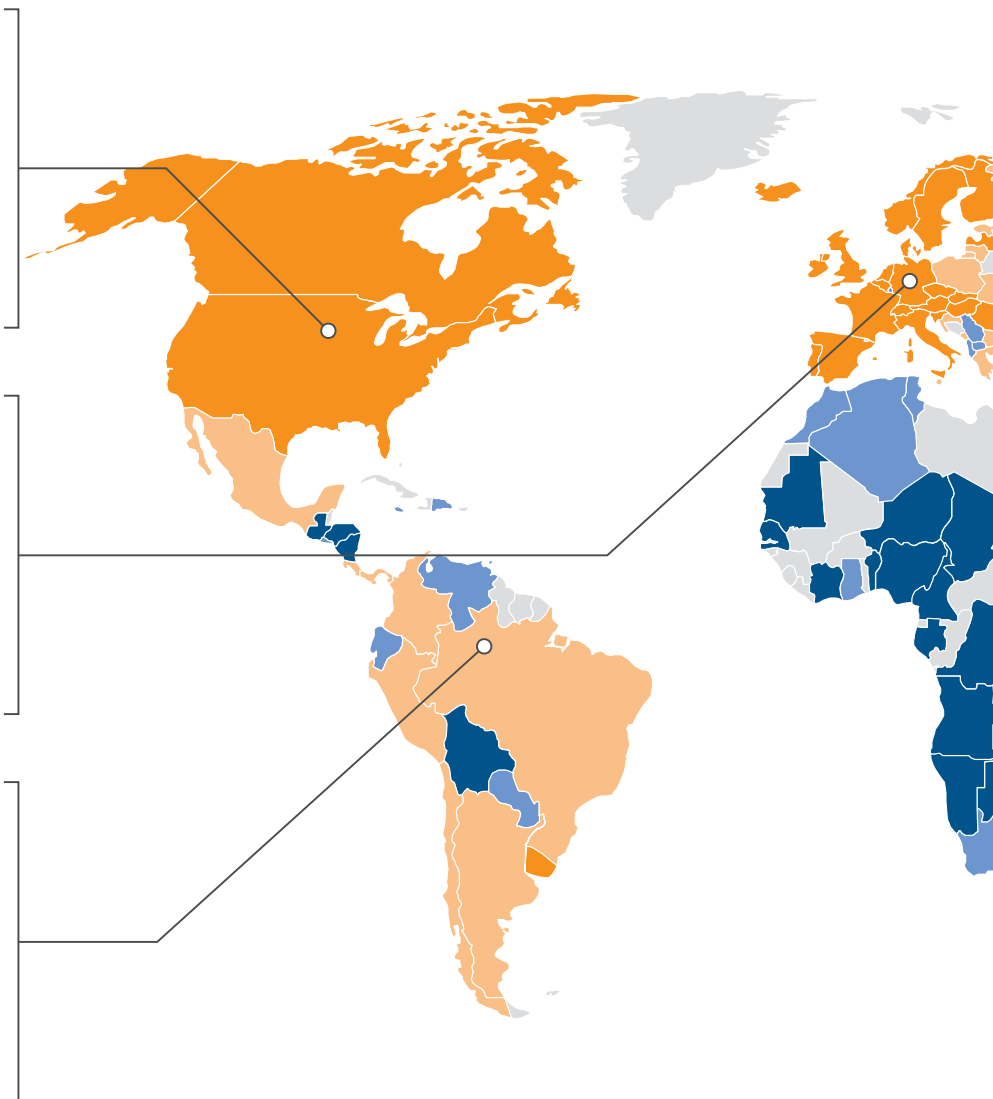
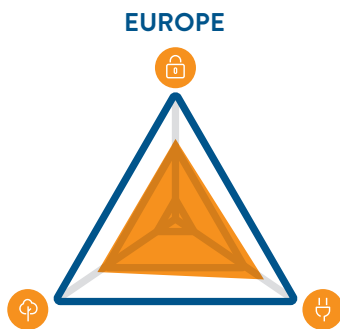
TRILEMMA INDEX 2018: TOP 10 COUNTRIES

- | | |
|-------------------|----------------|
| 1. Denmark | 6. Slovenia |
| 2. Switzerland | 7. Germany |
| 3. Sweden | 8. New Zealand |
| 4. Netherlands | 9. Norway |
| 5. United Kingdom | 10. France |





WORLD ENERGY TRILEMMA INDEX 2018: REGIONAL OVERVIEWS



NORTH AMERICA

STRONG PERFORMANCE IN FACING NEW ENERGY TRANSITION CHALLENGES

With a rich endowment of fossil, renewable and nuclear resources, the region is characterised by sustained reliability and reasonable energy prices. However, the region faces two main challenges: securing energy supply and ensuring grid reliability whilst addressing challenges connected to transitioning to cleaner sources of energy. The US has energy abundance with new unconventional sources, and renewed a push towards cleaner energy policy at the sub-national level. Canada remains committed to the Paris agreement, addressing reliability and sustainability challenges. Mexico's incoming government is yet to announce a position on energy and climate change. The region will need to improve the resilience of aging infrastructure especially in the context of demand, extreme weather and new cyber risks.

EUROPE

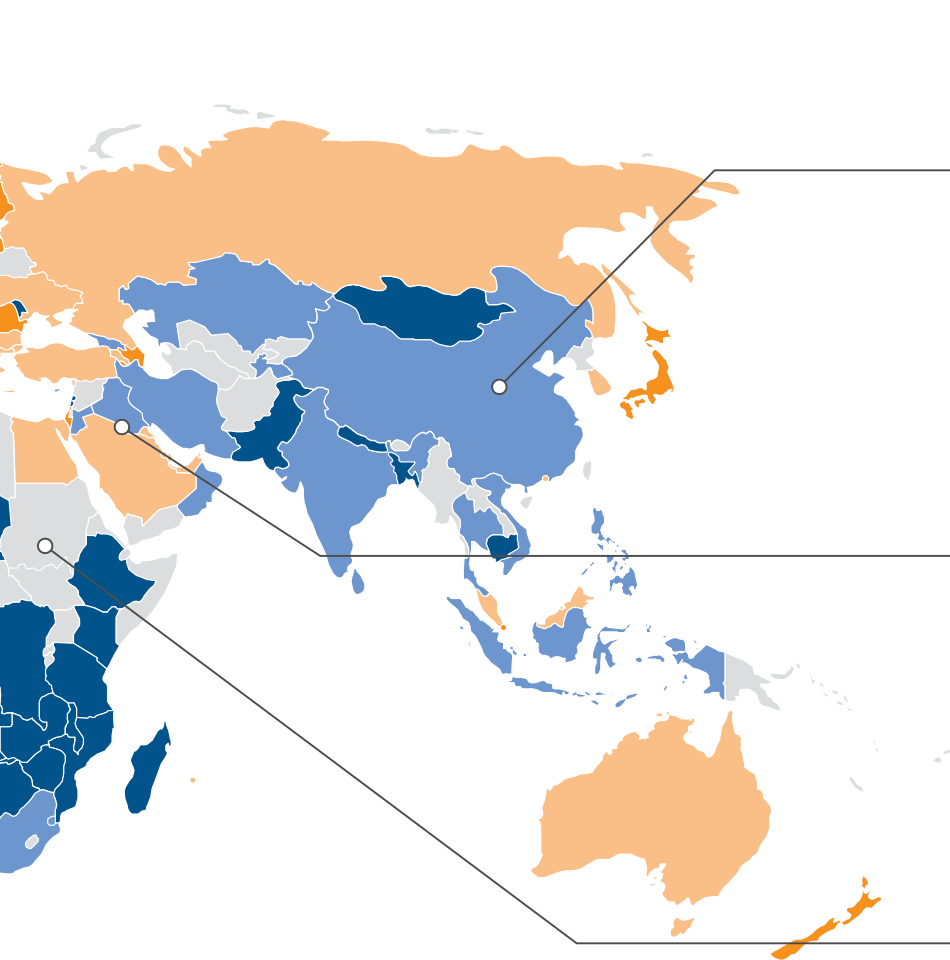
COOPERATION IN POLICY MAKING NEEDED TO MAINTAIN STRONG TRILEMMA PERFORMANCE

The European region is characterised by strong performance on energy sustainability and affordability, while longer term challenges remain in energy security. The harmonisation of market design will realise the potential of regional integration for successfully navigating the energy transition. The continued development of a common European energy market is impacted by divergence in national regulations that need coordination to avoid mixed signals for market players, for example to secure suitable investments to integrate electricity markets. Ensuring energy security while digitising, decarbonising and decentralising the energy system will require stronger cooperation in regional and sub-regional policymaking.

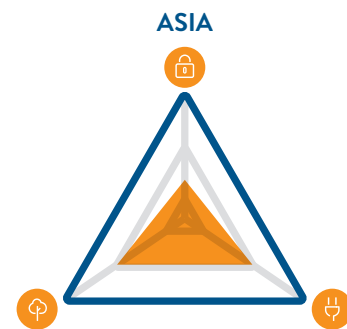
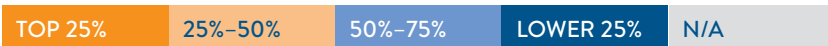
LATIN AMERICA AND CARIBBEAN (LAC)

ENABLING REGIONAL INTEGRATION AND USE OF RENEWABLES

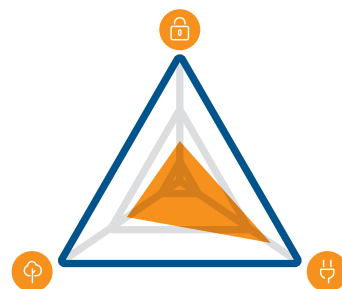
The region has a number of initiatives to increase diversification of energy sources, increase energy security, and improve energy access and affordability. Policy innovations have allowed development of a regional grid and improved use of renewables. Renewables continue to be an action priority issue to improve energy security, but the region's existing hydro infrastructure and further potential is challenged by shifting hydrological cycles and extreme weather. A focus on wind and solar is allowing some countries to balance reliance on hydropower and fossil fuels, and also improve rural energy access in a region challenged by wealth inequalities. Further grid integration and energy diversification will support improved trilemma performance.



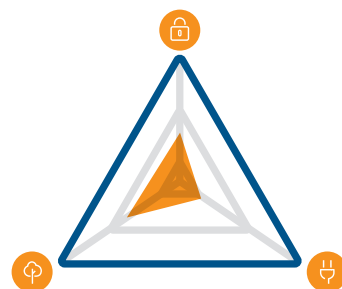
COUNTRY PERFORMANCE



MIDDLE EAST, GULF STATES AND NORTH AFRICA



SUB-SAHARAN AFRICA



ASIA

APPLYING MULTIPLE APPROACHES TO MEET RISING ENERGY DEMANDS

A large and diverse region for energy resources and physical, and economic contexts, Asia faces common challenges of rising energy demands, expanding energy access and meeting climate commitments. Countries are exploring a range of options to improve energy trilemma performance including diversification of the energy mix through renewables and energy storage, energy efficiency and a focus on e-vehicles. Renewable energy has nearly doubled in the region in five years with China and India leading the pace. Yet projected reliance on fossil fuels and imports of fossil fuels remains high, impacting energy security and the area continues to explore options for regional grid and pipeline networks.

MIDDLE EAST, GULF STATES AND NORTH AFRICA

PRESSURES TO IMPROVE ENERGY SECURITY

Many countries perform strongly in energy access and affordability dimensions but face significant challenges with respect to energy security and environmental sustainability of systems. Countries are challenged by high energy intensity and GHG emissions and a high penetration of conventional energy resources. Combined with increasing water scarcity, if the growing demands for electricity, water, and cooling, are not addressed, Energy Security and Environmental Sustainability dimensions could be threatened even further. Going forward, renewable and nuclear energy programmes are expected to be deployed, specifically in the United Arab Emirates, diversifying energy sources, reducing GHG emissions, and improving system resilience.

SUB-SAHARAN AFRICA

BOLD ACTIONS AND POLICIES NEEDED TO IMPROVE ENERGY PERFORMANCE

With 46 countries and a population of nearly one billion, the region continues to be greatly challenged in all three aspects of the energy trilemma due to large infrastructure gaps. The existing stock of power infrastructure is also suffering from inefficiencies and insufficient quality of supply to support growing energy demand. To unlock the region's resource potential and meet future energy demand, the region must take bold and more collaborative actions to attract investment by improving energy policies and the regulatory framework, building institutional capacity and improving its on-grid and off-grid energy supply. Developing more cross-border infrastructure can improve regional resources exchange.

ABOUT THIS REPORT

The World Energy Council considers energy sustainability to be defined by three core dimensions – Energy Security, Energy Equity, and Environmental Sustainability. Together, they constitute a ‘trilemma’, and achieving high performance on all three dimensions entails complex interwoven links between public and private actors, governments and regulators, economic and social factors, national resources, environmental concerns, and individual consumer behaviours.

The World Energy Trilemma Index, prepared annually by the World Energy Council in partnership with global consultancy Oliver Wyman, along with the Global Risk Center of its parent Marsh & McLennan Companies since 2010, is a comparative ranking of 125 countries’ energy systems. It provides an assessment of a country’s energy system performance, reflecting strength and balance in the three Trilemma dimensions.

Readers can use the Trilemma assessment to guide the attention of policy makers and energy communities to consider the future preparedness, agility, and adaptability of national energy systems. The Trilemma framework defines energy system sustainability in terms of their agility, adaptability, and transformability needed to keep pace with shifting context and emerging risks.

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.

We are the UN-accredited global energy body, representing the entire energy spectrum, with member organisations in over 90 countries.

Further details at www.worldenergy.org and [@WECouncil](https://twitter.com/WECouncil)

The full report can be found at www.worldenergy.org/publications

The interactive online tool for the World Energy Trilemma Index can be accessed at <https://trilemma.worldenergy.org/>

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