

# 2018 Energy Trilemma Index

Benchmarking the Performance  
of National Energy Systems

# Navigating the Energy Trilemma

## **ENERGY SECURITY**

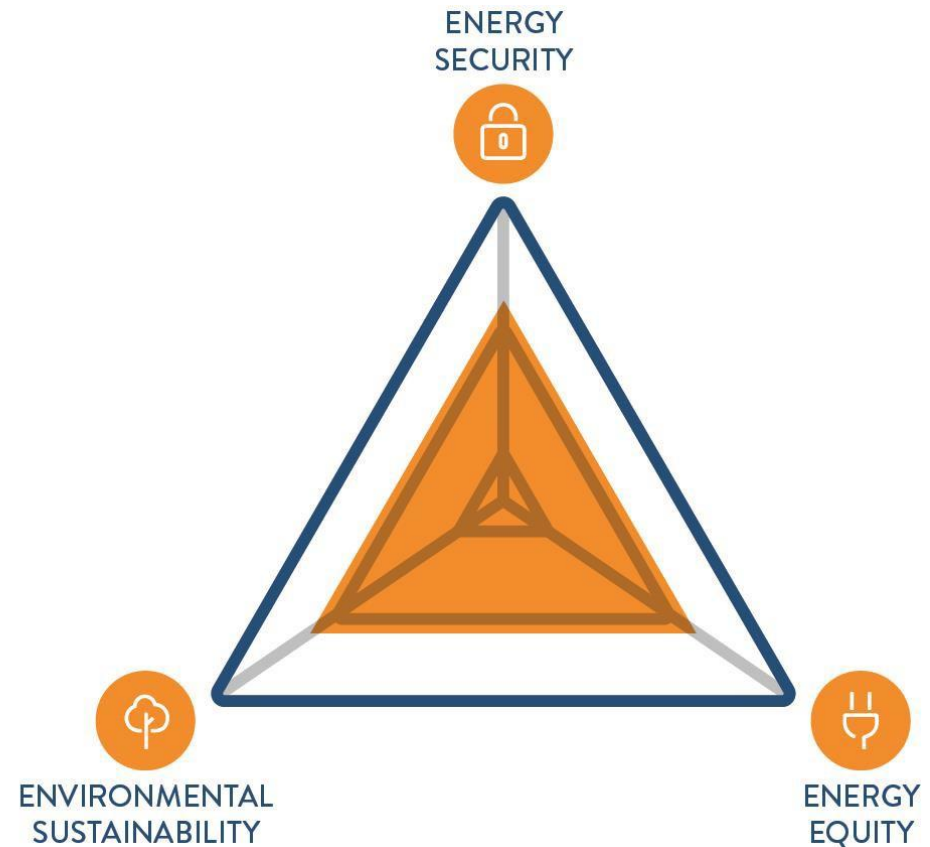
Effective management of primary energy supply from domestic and external sources, reliability of energy infrastructure, and ability of energy providers to meet current and future demand.

## **ENERGY EQUITY**

Accessibility and affordability of energy supply across the population.

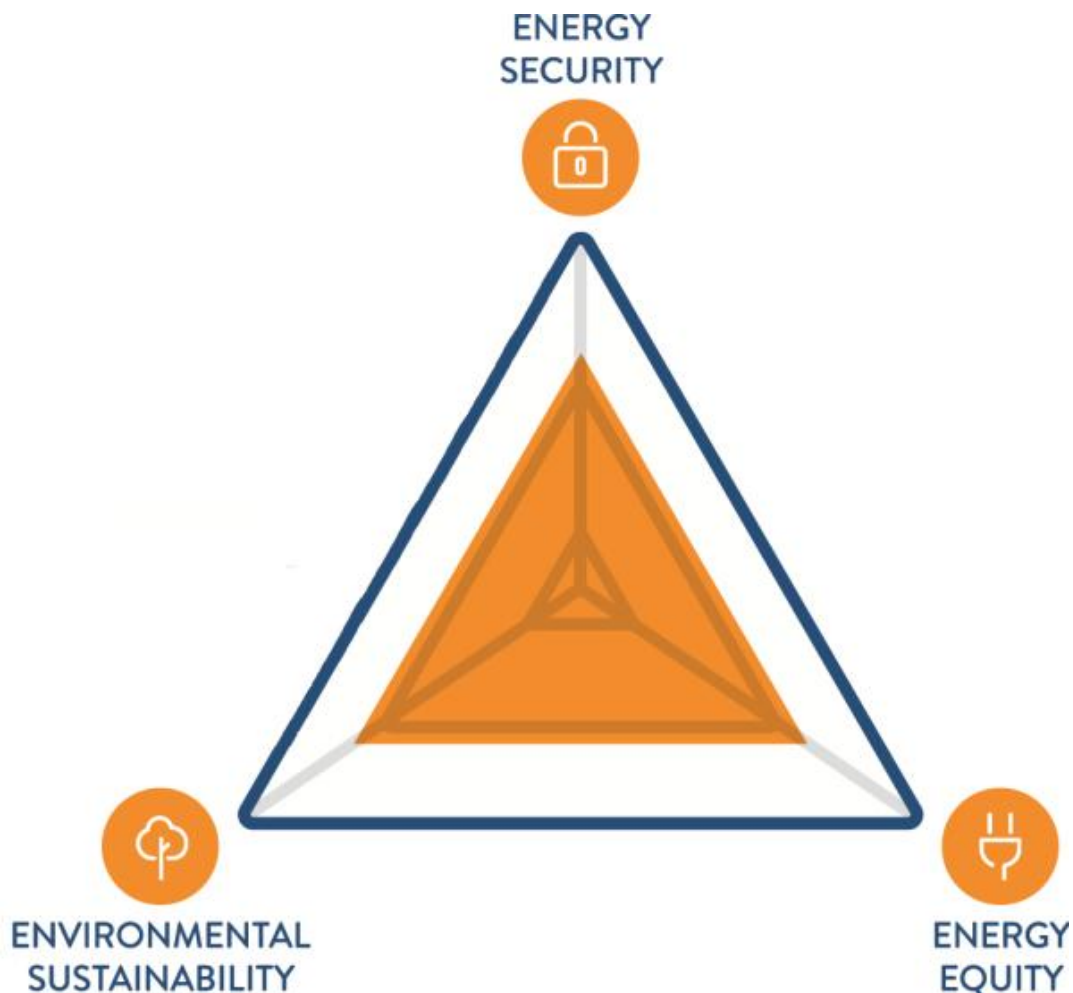
## **ENVIRONMENTAL SUSTAINABILITY**

Encompasses achievement of supply- and demand-side energy efficiencies and development of energy supply from renewable and other low-carbon sources.







# 2018 Trilemma Index Rankings - Overall Top 15 Countries

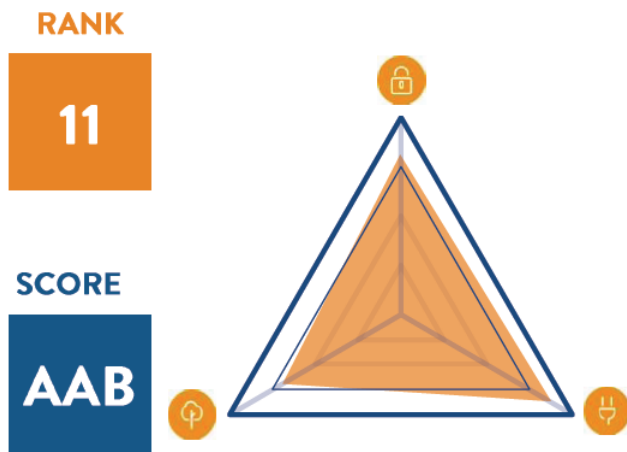
1. Denmark
2. Switzerland
3. Sweden
4. Netherlands
5. United Kingdom
6. Slovenia
7. Germany
8. New Zealand
9. Norway
10. France
- 11. Austria**
12. Finland
13. Canada
14. United States
15. Israel



# 2018 Trilemma Index - Top 15 Rankings for Dimensions

 Overall	 Energy Security	 Energy Equity	 Environmental Sustainability
1. Denmark	1. Denmark	1. Qatar	1. Philippines
2. Switzerland	2. Slovenia	2. Luxembourg	2. Costa Rica
3. Sweden	3. Canada	3. Bahrain	3. Uruguay
4. Netherlands	4. Sweden	4. Netherlands	4. Switzerland
5. United Kingdom	5. Finland	5. Kuwait	5. Dominican Republic
6. Slovenia	6. Romania	6. Switzerland	6. Colombia
7. Germany	7. United States	7. Canada	7. Malta
8. New Zealand	8. Ukraine	8. Czech Republic	8. Norway
9. Norway	9. Venezuela	9. Oman	9. Singapore
10. France	10. Netherlands	10. Saudi Arabia	10. Ireland
<b>11. Austria</b>	11. Latvia	11. Denmark	11. Albania
12. Finland	12. Germany	12. United Arab Emirates	12. Azerbaijan
13. Canada	13. New Zealand	<b>13. Austria</b>	13. Hong Kong
14. United States	14. Czech Republic	14. United States	14. United Kingdom
15. Israel	<b>15. Austria</b>	15. Norway	15. France

# Austria 2018 Trilemma Index



	2016	2017	2018	Trend	Score
<b>Overall rank and balance score</b>	<b>10</b>	<b>12</b>	<b>11</b>	►	<b>AAB</b>
Energy performance					
Energy security	20	18	15	►	A
Energy equity	6	8	13	►	A
Environmental sustainability	23	30	37	►	B
Contextual performance	16	22	22	►	

## TRENDS AND OUTLOOK

- Austria improves by 1 place in this year's Index, to rank 11. A strong performance across the board, especially for energy security and energy equity, results in a well-rounded trilemma profile of AAB.
- The Austria internal energy supply is based on a balanced mix of energy sources. The following numbers represent the energy consumption of 2017, which are in total: appr. 36% oil, 33% renewables, combustible waste and others, 22% gas, and 9% coal. The production of nuclear energy has been banned since 1978 according to the Federal Law for a non-nuclear Austria. 36% of Austria's energy needs are produced locally and the country relies on energy imports in order to satisfy its energy demand.
- Austria's energy supply is of a high quality and at affordable prices, making energy poverty is less stringent than in many other EU countries.
- Energy policy developments in Austria and targets for 2020 are compatible and in line with EU policy, including: an increase of the share of energy consumption produced from renewable resources to 34% by 2020; reducing greenhouse gas emissions by 16% from 2005 levels for sectors not included in the EU Emissions Trading Scheme (EU ETS) and 21% from 2005 levels for sectors included in EU-ETS; and a 20% improvement in energy efficiency till 2020.
- Austria is already close to achieving its 2020 renewable energy target of 34%. Austria is at risk of missing its 2020 target for energy efficiency. The GHG-emission target will be missed without further efforts.
- The Austrian government unveiled its new energy and climate strategy on April 3rd, 2018. The paper called "#mission2030" is to help Austria reach the EU climate goals. The Austrian government is aiming for all electricity to come from renewable sources by 2030 (2017: about 70%) and for a fully decarbonised energy sector by 2050.

# Find Out More

- Trilemma Tool
  - Regional profiles
  - Interactive Map and Pathway Calculator
  - Optimised version for mobile devices
  - Accessible at
    - ▶ <https://trilemma.worldenergy.org>
- Access the full report at
  - ▶ <https://www.worldenergy.org/publications/>

# Thank you

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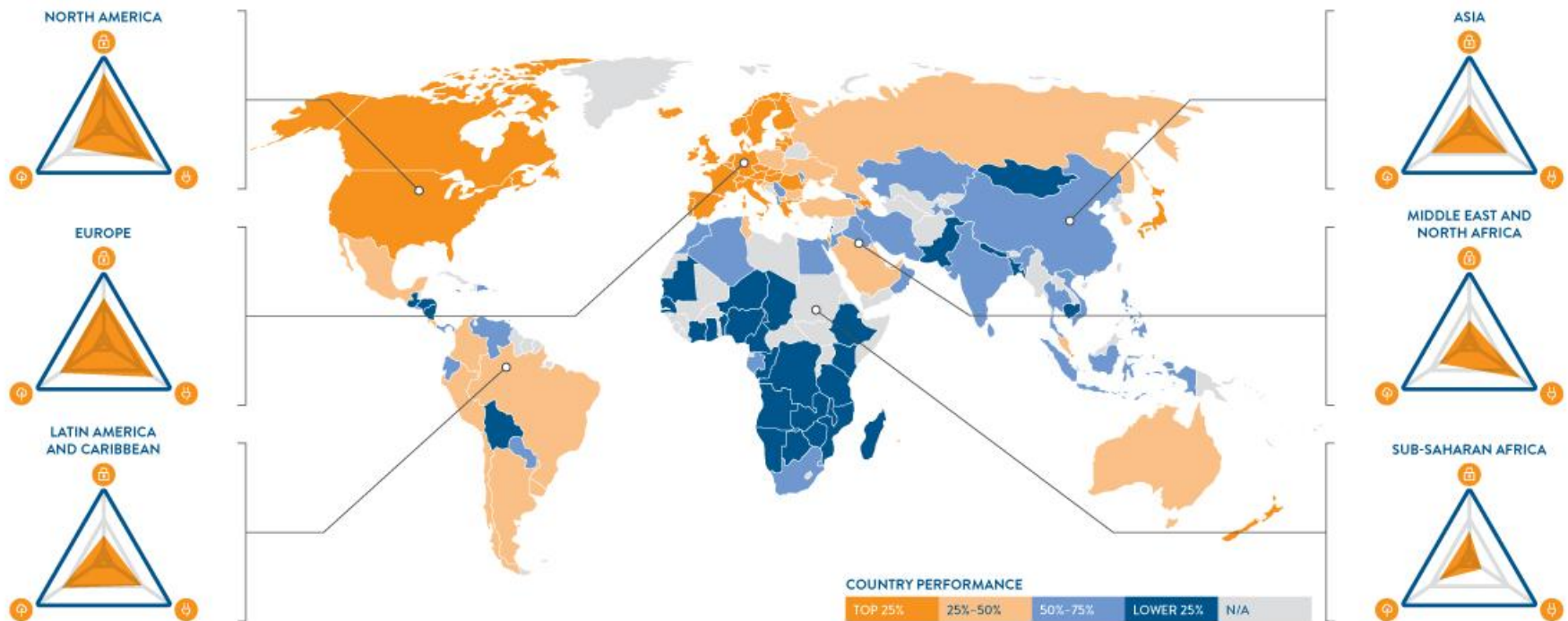
Back up slides

# Regional Index Results

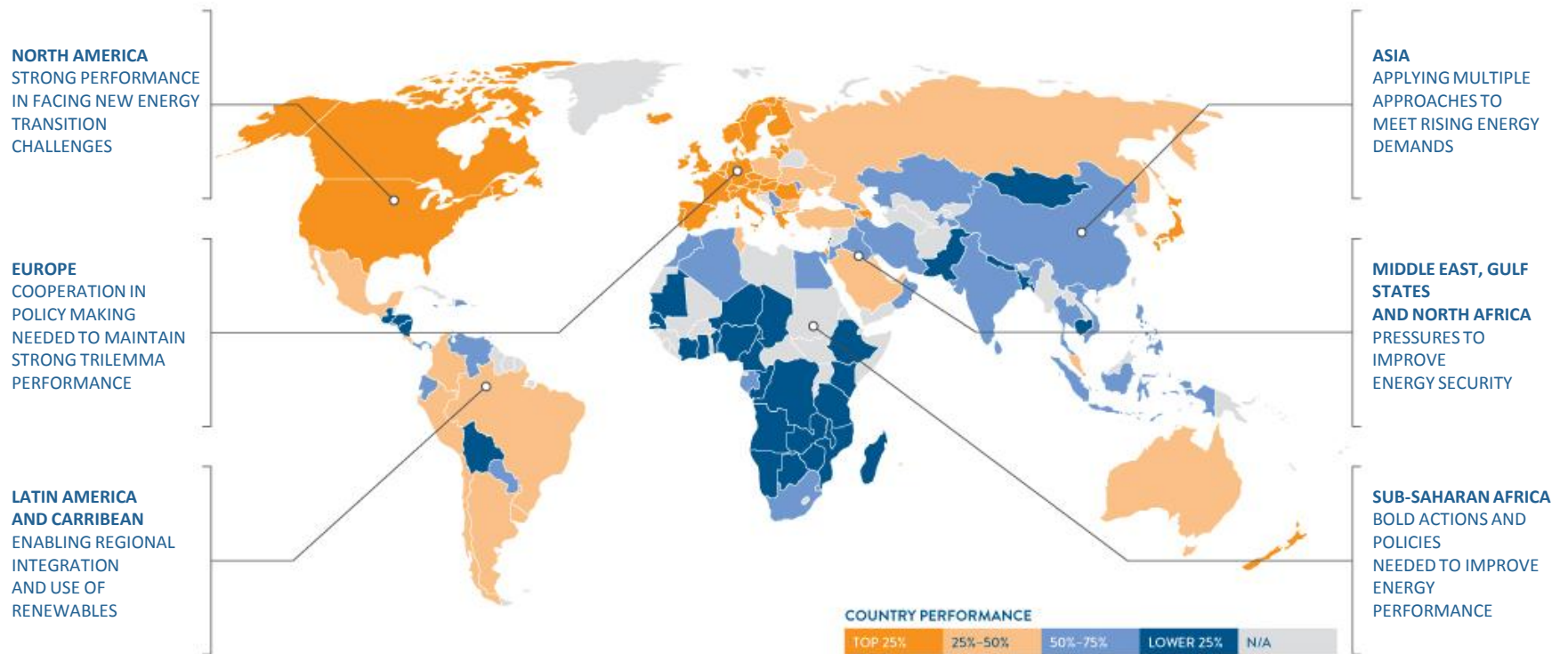


# Regional Overviews

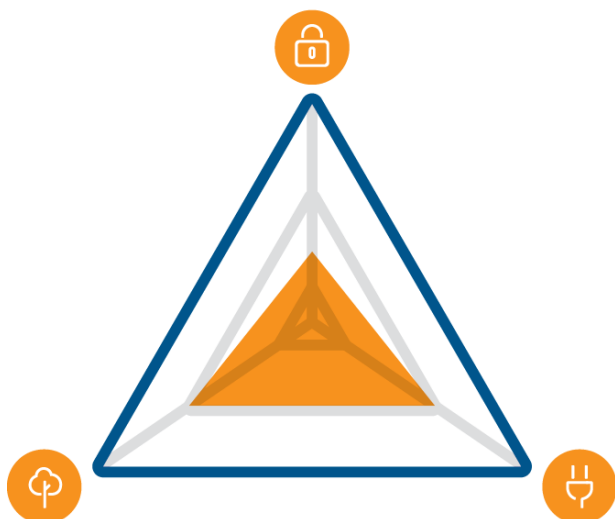
## WORLD ENERGY TRILEMMA INDEX 2018: REGIONAL OVERVIEWS



# Regional Profiles: Key Challenges



# Trilemma Profile: Asia

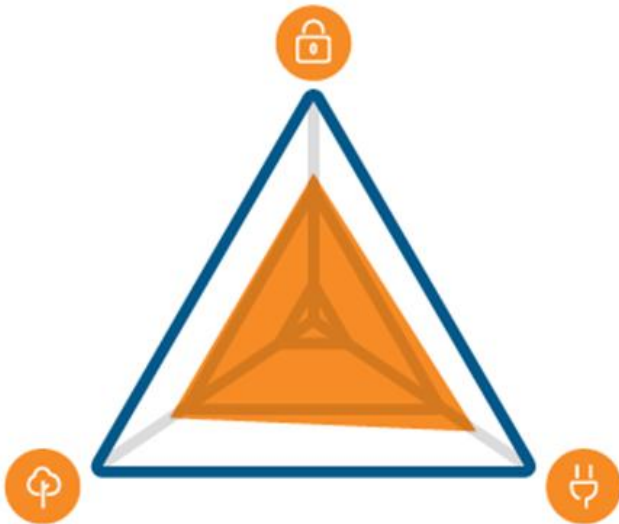


## ASIAN COUNTRIES

New Zealand (8)	Indonesia (71)	Tajikistan (92)
Singapore (19)	Kazakhstan (72)	Pakistan (103)
Azerbaijan (27)	Philippines (74)	Bangladesh (107)
Japan (30)	Thailand (75)	Mongolia (111)
Hong Kong (34)	China (78)	Cambodia (117)
Korea (Rep.) (35)	Vietnam (83)	Nepal (118)
Malaysia (37)	India (88)	
Australia (38)	Sri Lanka (89)	

A large and diverse region for energy resources and physical, and economic contexts, Asia faces 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.

# Trilemma Profile: Europe

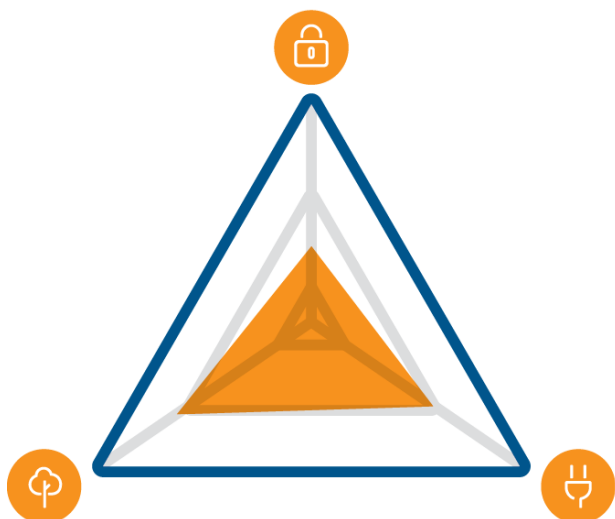


## EUROPEAN COUNTRIES

Denmark (1)	Italy (20)	Turkey (44)
Switzerland (2)	Czech Rep. (21)	Montenegro (49)
Sweden (3)	Portugal (22)	Bulgaria (54)
Netherlands (4)	Romania (23)	Malta (56)
United Kingdom (5)	Belgium (24)	Ukraine (57)
Slovenia (6)	Latvia (25)	Russia (59)
Germany (7)	Slovakia (26)	Macedonia (Rep.) (63)
Norway (9)	Hungary (29)	Cyprus (65)
France (10)	Lithuania (31)	Georgia (69)
Austria (11)	Greece (32)	Luxembourg (70)
Finland (12)	Croatia (33)	Serbia (73)
Spain (16)	Estonia (40)	Albania (79)
Ireland (17)	Poland (41)	Moldova (97)
Iceland (18)	Armenia (43)	

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.

# Trilemma Profile: Latin America and Caribbean

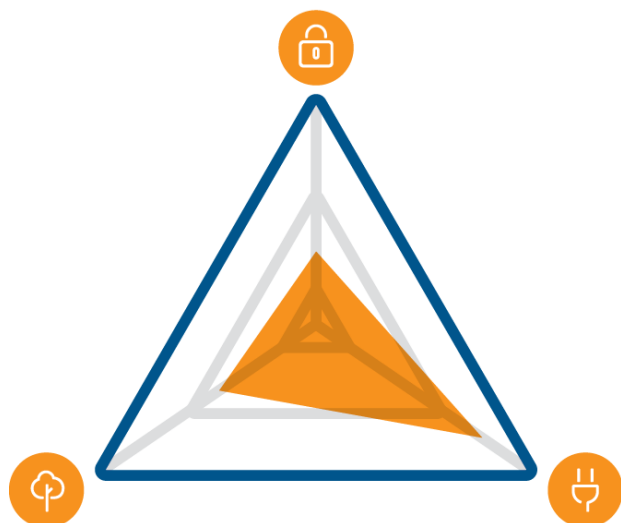


## LAC COUNTRIES

Uruguay (28)	Panama (61)	Jamaica (93)
Chile (42)	Ecuador (62)	Bolivia (99)
Colombia (48)	Venezuela (76)	Guatemala (100)
Peru (51)	El Salvador (80)	Nicaragua (104)
Costa Rica (52)	Dominican Republic (82)	Honduras (109)
Brazil (53)	Paraguay (87)	
Argentina (60)	Trinidad & Tobago (90)	

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.

# Trilemma Profile: Middle East, Gulf States and North Africa countries

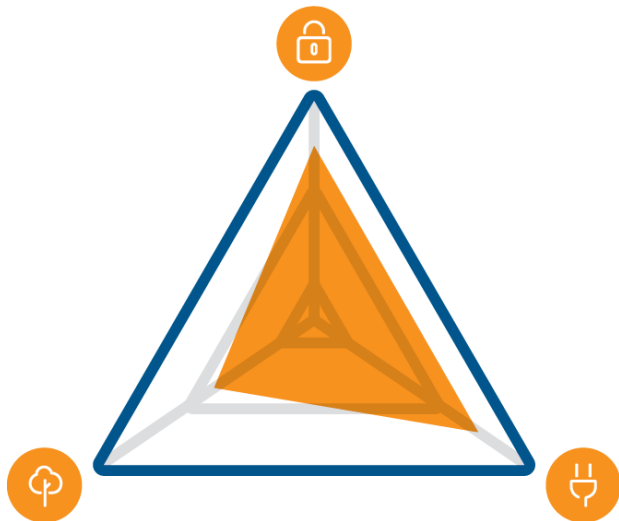


## MEGS & NA COUNTRIES

Israel (15)	Bahrain (50)	Morocco (68)
United Arab Emirates (36)	Egypt (55)	Iraq (77)
Qatar (39)	Algeria (64)	Iran (Islamic Rep.) (81)
Kuwait (45)	Tunisia (66)	Jordan (86)
Saudi Arabia (47)	Oman (67)	Lebanon (101)

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 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.

# Trilemma Profile: North America



## NORTH AMERICAN COUNTRIES

Canada (13)

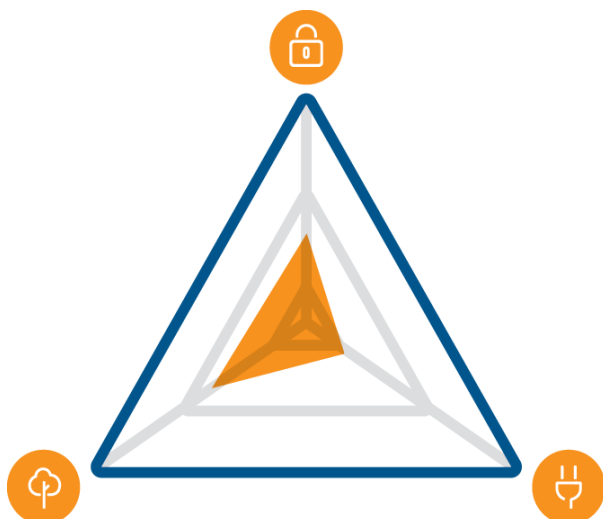
United States (14)

Mexico (58)

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.



# Trilemma Profile: Sub-Saharan Africa



## SUB-SAHARAN AFRICAN COUNTRIES

Mauritius (46)	Cote d'Ivoire (105)	Zimbabwe (119)
Swaziland (84)	Nigeria (106)	Malawi (120)
South Africa (85)	Cameroon (108)	Tanzania (121)
Ghana (91)	Ethiopia (110)	Congo (Dem. Rep.) (122)
Kenya (94)	Zambia (112)	Benin (123)
Botswana (95)	Senegal (113)	Chad (124)
Gabon (96)	Mauritania (114)	Niger (125)
Namibia (98)	Madagascar (115)	
Angola (102)	Mozambique (116)	

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.



# Thank you

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