



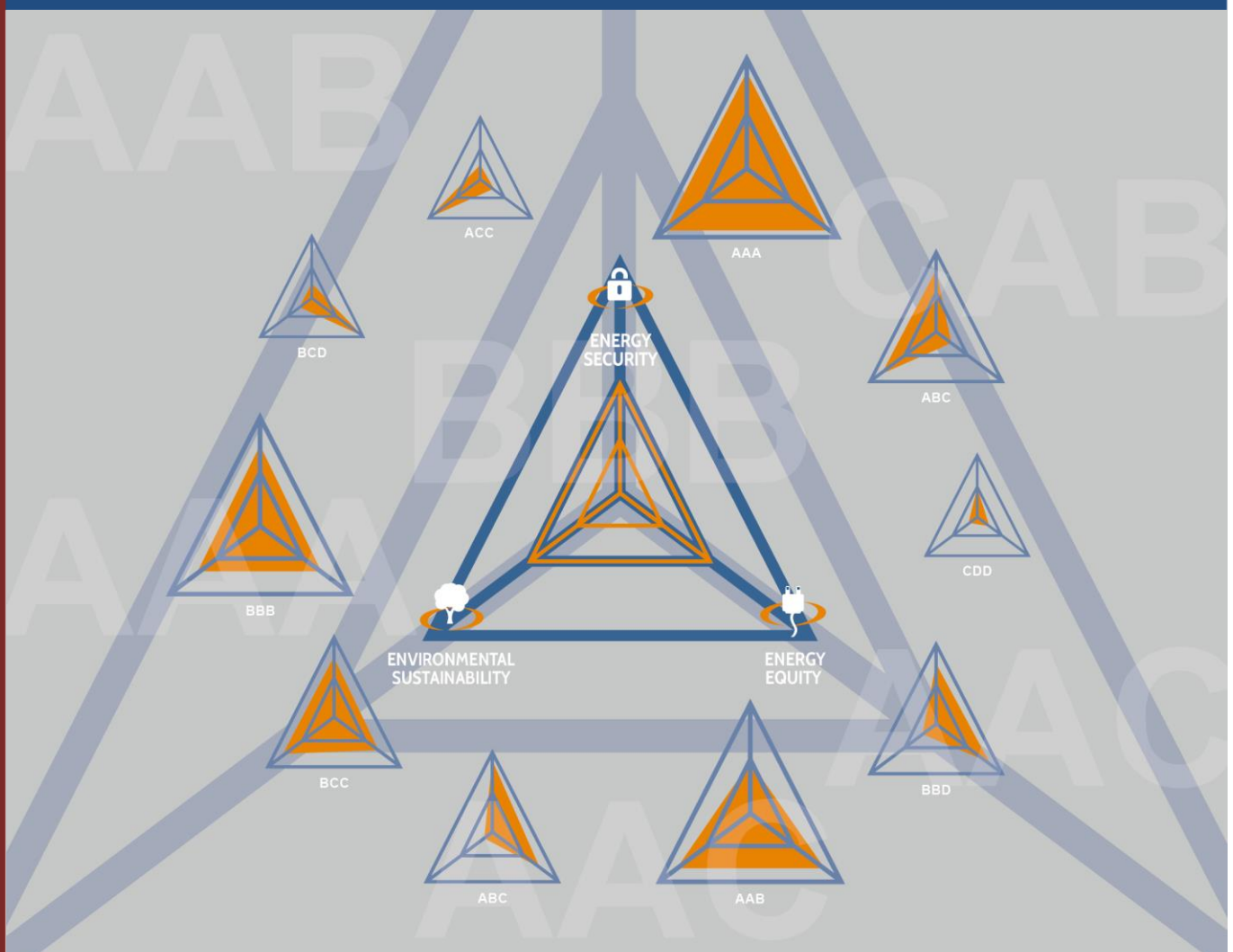
**WORLD ENERGY COUNCIL**  
CONSEIL MONDIAL DE L'ÉNERGIE  
*For sustainable energy.*

# 2014 Energy Trilemma Index

## Benchmarking the sustainability of national energy systems

Project Partner OLIVER WYMAN

**WORLD ENERGY COUNCIL**  
CONSEIL MONDIAL DE L'ÉNERGIE



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## 2014 Energy Trilemma Index

### Benchmarking the sustainability of national energy systems

World Energy Council

Project Partner

OLIVER WYMAN

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# 1. Introduction

This report provides country-level details on the results of the 2014 Trilemma Index prepared by the World Energy Council (WEC) in partnership with global management consulting firm Oliver Wyman, a subsidiary of Marsh & McLennan Companies.

For each WEC member country, a country profile has been prepared to highlight its relative energy performances and contextual attributes. These profiles and the Index provide a comparative assessment tool to evaluate countries' ability to provide a secure, affordable, and environmentally-sensitive energy system and highlight current challenges.

The Index provides a comparative ranking of 129 countries and awards countries with a balance score. The balance score highlights how well countries manage the trade-offs between the three energy sustainability dimensions and identifies top performing countries with an AAA score.

Included in this report are:

- ▶ Executive summary, World Energy Trilemma: Time to get real – the myths and realities of financing energy systems
- ▶ 2014 Trilemma Index rankings and balance score
- ▶ Regional overviews
- ▶ Cross-regional trilemma profiles
- ▶ Country profiles for each of the WEC member countries
- ▶ Index rationale, structure and methodology.

Although the overall Index rankings are important, trends and the balance within the three dimensions provide the most valuable information in helping countries address their energy trilemma. Every country has a chance to improve its energy performance, regardless of whether they are ranked first or last. 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.

The Index discussion highlights countries with common energy trilemma profiles that offer additional benchmarking groups for decision makers to learn from. The cross-regional, illustrative profile groups include the challenges that oil-exporting countries face, the experiences of countries that have developed a high share of renewables or hydropower, or the energy trade-offs that fast growing economies have to manage.

Readers are also directed to the companion document World Energy Trilemma: Time to get real – the myths and realities of financing energy systems, which contains a detailed discussion of the findings of the Trilemma Index in the context of the 2014 discussion with leaders from the financial sector on how to attract investments into the energy sector. The report offers insights on how to unlock the more than US\$48trn of cumulative investment required over the period 2014 to 2035 for the expansion of

energy access, the replacement or renewal of existing infrastructure, the building of new energy infrastructure assets as well as for energy efficiency measures and technologies.

Since 2012, the reports' methodology is based on the guiding premise that energy sustainability involves both the efforts of public and private stakeholders. Together the publications support an evolving dialogue aimed at furthering knowledge of effective strategies and policies to deliver the necessary transformation of the energy system to support sustainable economic and social development.

## Iconography

Graphics displaying results of the Trilemma Index analysis make use of the following iconography.

Energy performance dimensions:



Energy security



Energy equity



Environmental sustainability

Trilemma Index results and country profiles can be found on the WEC website at [www.worldenergy.org/data/sustainability-index](http://www.worldenergy.org/data/sustainability-index).

## 2. Executive summary

In 2013 the World Energy Council (WEC) exposed a number of myths that influence the understanding of important aspects of the global energy landscape. It pointed out that, if not challenged, these misconceptions may lead us down a path of complacency and missed opportunities as current pathways may fall short of delivering on the global aspirations of energy access, energy security, and environmental sustainability – the three dimensions that must be balanced in the energy trilemma.

As energy markets become more complex, driven by accelerated change in energy policy, technological innovation, and consumer expectations, current market designs and business models in some countries may be unable to cope. The pressures of meeting increasing demand and the need to transition and replace existing infrastructure must be met with robust policy and regulatory frameworks that include the right investment conditions for the energy and financial sectors.

The WEC's 2014 Energy Trilemma Index highlights those countries that are able to balance energy demands to deliver more sustainable energy systems for their people and help secure long-term competitive economies. Switzerland, Sweden and Norway take top honours in the 2014 Index overall. The highest ranking country for energy security is once again Canada, with the United States (US) maintaining its position as the most equitable energy system, and Switzerland leading the way on environmental sustainability.

As the world economy and population grows, global energy demand is predicted to increase and even double by 2050. To keep pace with this demand, cumulative investment requirements in electricity generation alone will be between US\$19.3trn<sup>1</sup> and US\$25.7trn between now and 2050.<sup>2</sup> Looking at the broader energy infrastructure, an estimated cumulative investment of US\$40.2trn is required across the energy infrastructure supply chain over the period 2014 to 2035 with an additional US\$8trn investment needed in energy efficiency. This is equal to an annual investment need of US\$1.7trn (rising to US\$2.5trn by 2035) in energy supply infrastructure and to improve energy efficiency. To put this into perspective, this equates to an investment of around US\$240 per capita per year today to US\$285 per capita per year in 2035, considering the current and future world population. A significant figure even for people living in developed countries, and especially high for those in developing and emerging economies. These investment requirements rise by a further 10% to a total of US\$53trn in cumulative investment by 2035 if the goal is set

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<sup>1</sup> This publication uses the short scale version of a trillion, i.e. one trillion means one thousand billion.

<sup>2</sup> World Energy Council (WEC), 2013: World Energy Scenarios: Composing energy futures to 2050; The lower number refers to the WEC's 'Symphony' scenario, which focuses on achieving environmental sustainability through internationally coordinated policies and practices, while the higher number reflects WEC's 'Jazz' scenario, which focuses on energy equity with priority given to achieving individual access and affordability of energy through economic growth.

to a 2°C emissions path (a target to limit the average global temperature increases and the resulting climate change).<sup>3</sup>

The investment needs offer a significant market opportunity if robust and equitable pathways are provided for the investment community. However, capital is extremely sensitive to perceived political and regulatory risks. Moreover, due to the growing pressures on public finances in most countries, there is a limited availability of public funds to substitute or augment the private financing of energy infrastructure. Increasing private sector investment in the energy sectors enables governments to direct their resources to other economic and social needs that may not otherwise be met. It is therefore critical to improve the understanding of the nature of risk and the way to price it. In the absence of such understanding, investment will not flow.

Building on the findings of the recent work with ministers, policymakers and industry leaders, the WEC and global management consultancy, Oliver Wyman, along with the Global Risk Center of its parent Marsh & McLennan Companies, engaged directly with the finance community to explore if it is possible to meet these investment needs, or if the challenge is too great. The interviews provided a clear understanding of the barriers to investment and identified pathways to deliver competitive and sustainable energy systems.

In addressing the investment challenges, three key questions need to be at the centre of attention:

- ▶ Is there enough available capital at the right cost?
- ▶ Will the existing funding instruments be able to channel capital from the investor community to the energy sector?
- ▶ Can the energy sector attract and absorb capital on this scale?

The report found that there is enough money available from the private sector if the right conditions are provided. Policymakers and regulators must clearly signal their future energy strategies, recognising the need for appropriate risk-reward structures, and to put in place lasting policy and regulatory frameworks, free from populist political interference. Alongside this, it is increasingly clear that there needs to be a focus on the development of technical, financial and management skill sets to support energy projects around the world and enable the energy sector to absorb capital.

There is an emerging risk that, under regulatory pressure of Basel III (the global, voluntary regulatory standard on bank capital adequacy), banks may reduce their infrastructure loans. This will put added pressure on other forms of funding which are not yet prepared or incentivised to meet the challenge.

To ensure a robust pipeline of projects that meets the emerging demand dynamics, the energy sector will need to 'get real' about the way it engages with the financial sector, and policymakers will be called on to make some hard choices. The money to catalyse the transition exists – as an example, the International Monetary Fund (IMF) estimates annual global cost of government subsidies for fossil fuels in 2012 was almost US\$2trn (factoring lost tax revenues).<sup>4</sup> It is therefore clear that there is scope to deliver a sustainable energy system that meets the triple challenge of the energy trilemma (to balance energy access, energy security, and environmental

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<sup>3</sup> International Energy Agency (IEA), 2014: World Energy Investment Outlook; The 2°C scenario would require double the investments in low-carbon technologies and energy efficiency.

<sup>4</sup> International Monetary Fund (IMF), 2013: Energy Subsidy Reform: Lessons and implications

sustainability) but, as this report sets out, energy leaders will need to act quickly and adapt the way they engage with the finance community.

## Financial sector recommendations

Countries exhibit a wide diversity of energy policies and strategies but nearly all share a common goal: increasing private sector investment as well as developing skills and expertise. Achieving the necessary investment levels will require that capital can be accessed at the right cost, that there are effective financial instruments to support a flow of investments across the energy sector, and that there is a strong pipeline of energy projects available for investments. Policymakers, the financial sector and the energy sector each have a role to play and must work together to devise and implement approaches that will drive investments.

Research and interviews with financial sector stakeholders have identified three action areas that must be attained to attract greater investment in energy. Unlike complex macroeconomic forces, all of these conditions, while challenging, are still well within the control of governments, investors and energy companies.

### Action area 1

***Policymakers must focus on implementing the regulatory and policy frameworks to encourage investment and reduce political and regulatory risks.***

---

For many developing and emerging economies, this will include a focus on creating the prerequisite strong legal, regulatory and financial frameworks that provide investors in any sector of the economy with confidence that rules will be followed and investments can be recouped. Policymakers and regulators must clearly signal their future energy strategies and put in place lasting policy and regulatory frameworks. Coherent, long-term, accessible, predictable, and transparent energy policies, underpinned by well-implemented regulations and independent regulatory bodies, can significantly increase investors' confidence.

Along with this, policymakers must strive to keep politics out of energy policy and reduce concerns that investing in energy results in unrewarded exposure to political and regulatory risk. The energy sector has been particularly vulnerable to policy intervention and changes, driven in part by the mismatch between political cycles (five years or less) and asset lifetimes (often spanning decades). This results in a risk premium – and higher cost of capital – being applied on a country-by-country basis to investment in the sector and, in some cases, discouraging investment altogether.

Politicking around energy investments has been compounded by the uncertainty created by ongoing climate framework negotiations, as well as technological changes in energy supply, including the expansion of renewables and unconventional oil and gas. As new technologies come to the fore, policymakers face real challenges in developing policies that will drive necessary changes to decarbonise energy and ensure a secure energy supply that is accessible and affordable, while minimising the impact of energy production and use on the environment in order to combat climate change as well as local air and water pollution. It is more important than ever that policymakers maintain a robust engagement with the energy and financial sector on emerging technologies, accompanying financial opportunities, and effective regulatory



frameworks to meet energy goals. This will enable policymakers to shape thriving energy markets and establish competitive risk–return frameworks for investors, while ensuring the needs of their citizens and economies are met.

## Action area 2

***The financial infrastructure must exist for capital to flow easily to the energy sector.***

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Many of the potential financing sources for energy infrastructure are expected to evolve over the coming decades in many countries. Under regulatory pressure of Basel III, banks are expected to reduce their infrastructure loans. At the same time, the regulation opens the space for insurance companies to increase their infrastructure loans. Other investors, for example, pension funds and other long-term investors around the world are also looking to increase their allocations to infrastructure. Over time, more experienced funds may increasingly invest directly and others may invest through dedicated infrastructure funds to bring substantial increases in investments.

Additional developments include the maturing of financial markets in emerging economies, or allowing expanded use of financial mechanisms such as project, infrastructure and green bonds.

As the financial structures evolve, the sector must overcome bias toward conventional energy projects. Currently, approximately 70% of energy investments (not including investments for energy efficiency) are directed to fossil-fuel related projects. Indeed, through to 2035 it is expected that fossil fuels will require 65% of total investments.<sup>5</sup> Nonetheless, increasing the level of comfort and confidence of investors to fund low- and zero-carbon technology projects will be key – especially if a meaningful post-2015 climate change agreement is to be achieved and more investments are to flow in emerging technologies and economies. This will require regulatory stability and new approaches to assess opportunities, aggregate smaller-scale projects, and a greater use of targeted financing mechanisms.

## Action area 3

***The energy sector must bring clearly bankable projects to the market.***

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One of the biggest barriers to increased energy investments, especially in non-OECD countries, is the limited number of projects that can secure financing. A bankable project is one that has all the necessary components aligned, so that investors have confidence in the project success.

In some countries, the lack of bankable projects, or the lack of a steady project pipeline, is resulting in a ‘crowding-out’ of private investors, which compete with public funding institutions such as multilateral development banks to invest in effectively scoped energy projects.

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<sup>5</sup> IEA, 2014: World Energy Investment Outlook

Many factors can limit the availability of bankable projects. In some instances, there are constraints on investments due to restrictions on foreign direct investments. In many other cases, the lack of human capital is a real impediment. Focusing on the development of necessary technical, financial and management skill sets is crucial to support energy projects around the world.

Preparing a project and arranging for funding can account for between 5% and 10% of a project's costs and add several years to the project's development. It is critical to increase the number and the velocity at which projects are developed. The energy sector can establish standard procedures and best practices on the type of information – for example, technical assessments for wind power projects – as well as financial information required to allow investors to effectively and efficiently assess projects. Common practices, such as the EU infrastructure procurement procedures have facilitated investments in Eastern Europe. Emerging economies could look to adapt these best practice models as a means to efficiently build a pipeline of projects and the associated human capital to attract investments.

## Benchmarking the sustainability of national energy systems

A second common energy goal for countries is to balance the three dimensions of the energy trilemma. The evolving challenges facing countries are vividly illustrated by the WEC's 2014 World Energy Trilemma Index. The Index is increasingly being seen as a benchmark for assessing good energy policy at a country level. It points to key areas that countries must give extra attention to in order to further develop a balanced energy profile and minimise the risk and uncertainties investors face due to an unbalanced approach. Comparative rankings highlight how a country is addressing the energy trilemma overall, as well as each of the three dimensions. The balance score provides a snapshot of how well a country manages the trade-offs between the three dimensions (see Figure 1 and Figure 2).<sup>6</sup>

### Box 1: Energy trilemma dimensions

- ▶ **Energy security:** The effective management of primary energy supply from domestic and external sources, the reliability of energy infrastructure, and the ability of energy providers to meet current and future demand.
- ▶ **Energy equity:** The accessibility and affordability of energy supply across the population.
- ▶ **Environmental sustainability:** The achievement of supply- and demand-side energy efficiencies and the development of energy supply from renewable and other low-carbon sources.

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<sup>6</sup> Note, the sequence of the letters in the balance score does not correspond to a specific dimension but rather presents the letter scores in descending alphabetical order.

The results of the 2014 Energy Trilemma Index show that the top 10 countries are developed countries with higher shares of energy coming from low- or zero-carbon energy sources, supported by well-established energy-efficiency programmes. Beyond these commonalities, there are differences in energy resources and supply, such as large discrepancies in the use of nuclear energy. The differences reinforce the conclusion that there is no single solution, but that countries need to take full advantage of available indigenous resources where appropriate and develop policy frameworks that support energy sustainability through the value chain to the end user.

**Figure 1**

**Top 10 Energy Trilemma Index performers overall and per dimension**

Source: WEC/Oliver Wyman, 2014

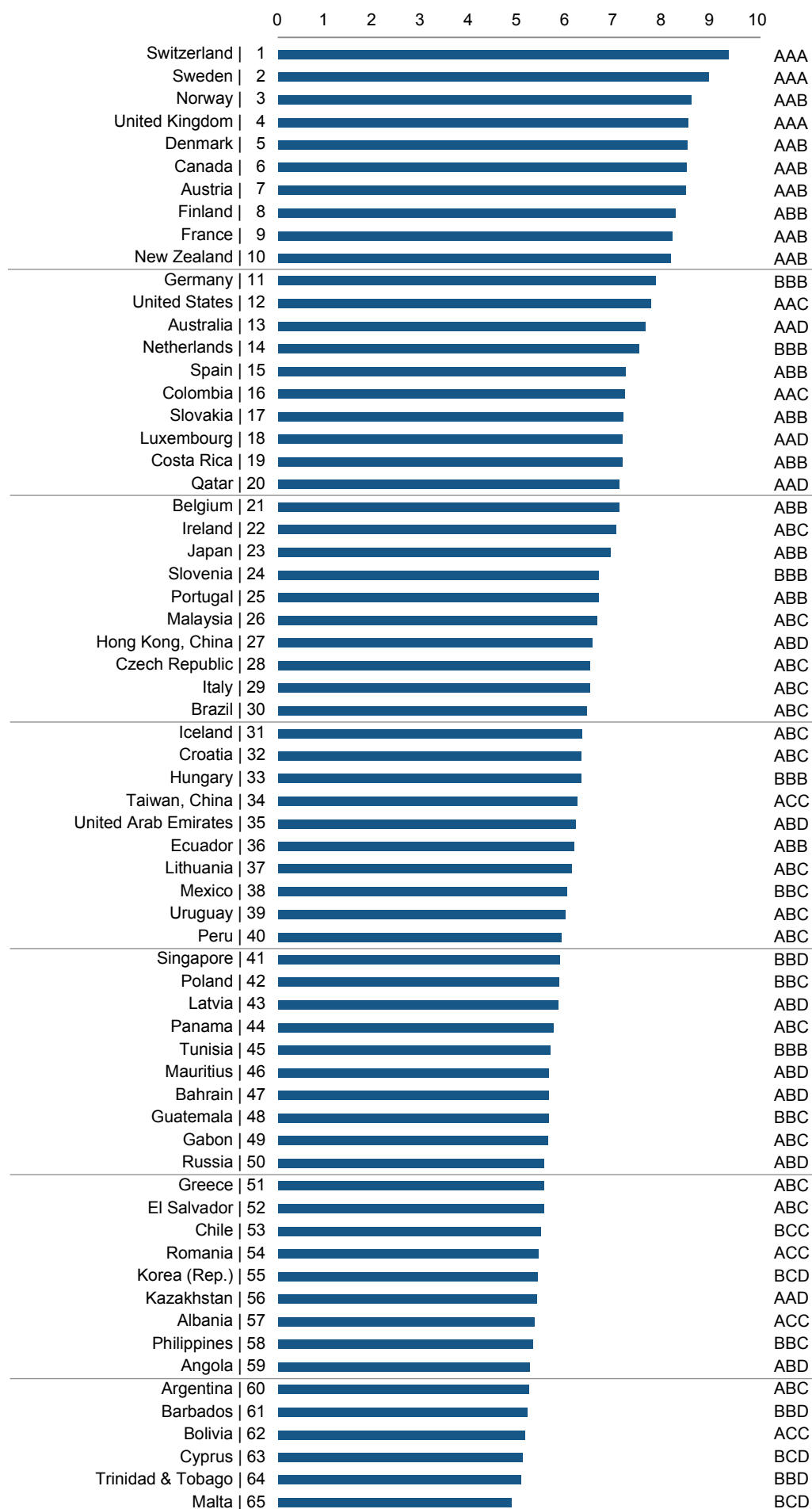


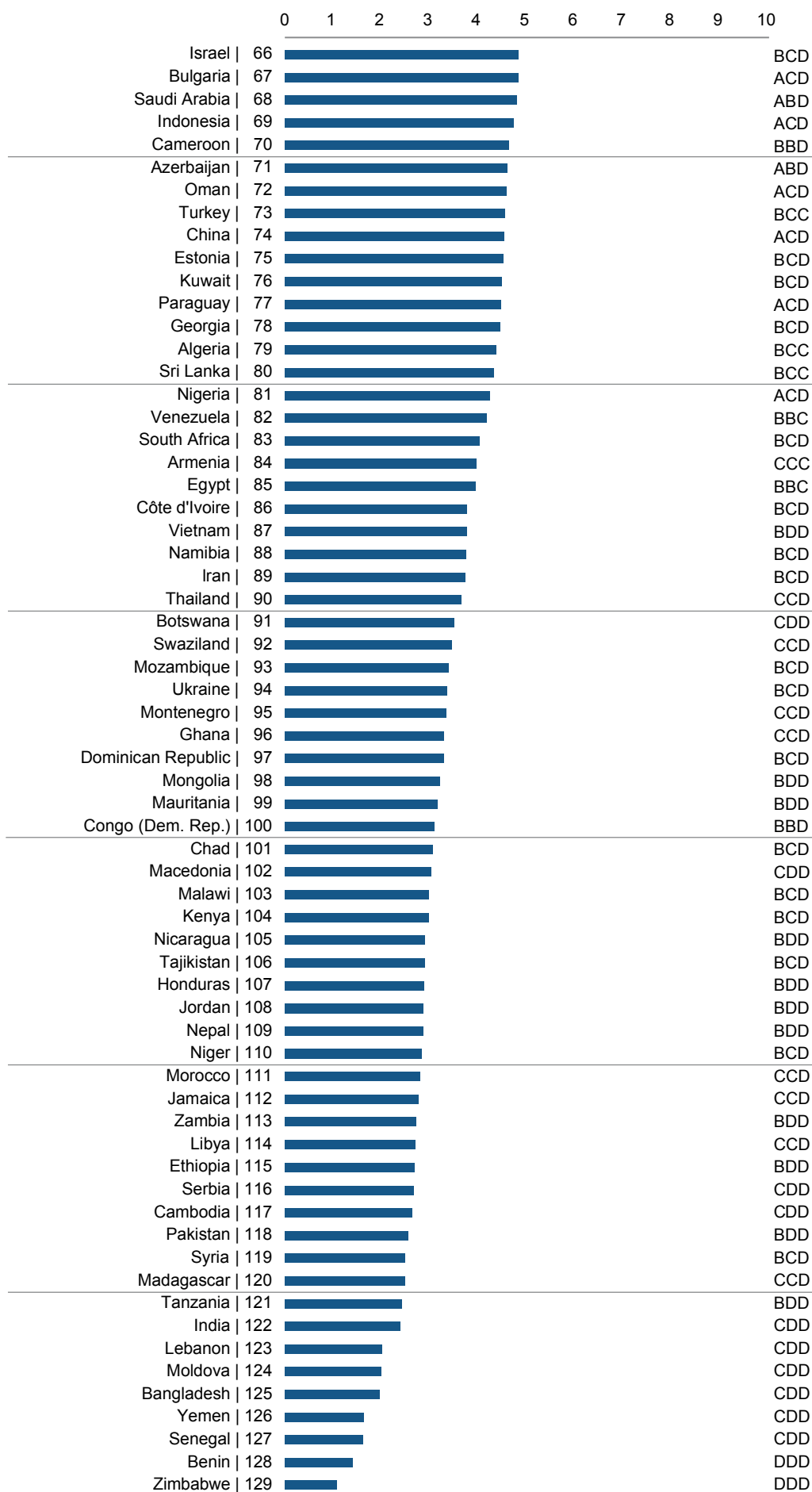
The 2014 Index rankings and balance scores also show changes for a number of countries – including high performers. Both Germany and Spain are showing downward trends since 2012 and have moved out of the top 10 overall ranking. Germany's changes are driven by rising prices for both gasoline and electricity and their impact on energy equity as the country works to transform its energy system. Germany's bold energy transition plans, which include the goals of increasing power generation from renewable sources, a reduction of primary energy usage and CO<sub>2</sub> emissions, and a phase-out of nuclear energy by 2022, require significant and costly changes to Germany's incumbent energy system. It is estimated that close to US\$470bn of investments are needed by 2033. Of this amount, about US\$280bn will be needed as soon as 2023. Renewable power generation will be the highest cost item, followed by investments in expanding distribution and transmission networks, including the introduction of smart meters. This alone will likely require around US\$110bn. Conventional power generation (including gas and new coal-fired power stations) and storage will require investments in the order of US\$60 billion in order to secure supply given the intermittency of renewable power generation.<sup>7</sup>

<sup>7</sup> Oliver Wyman, 2014: Financing Germany's Energy Transition, (Oliver Wyman Energy Journal)

**Figure 2**  
**2014 Energy Trilemma Index rankings and balance scores**

Source: WEC/Oliver Wyman, 2014





Germany's challenges are symbolic of issues facing mature developed economies working to craft and finance a successful transition from an ageing energy system (largely built 50 years ago) to one that serves the needs of economies and societies for the next 50 years and beyond. It must also do so within sharply defined political constraints and changing business models. As further changes in rankings and balance scores may occur during the transitional period, Germany has been included in WEC's watch list. Additional countries on the watch list are the United Kingdom (UK), Japan, Italy, Mexico and the United Arab Emirates (UAE). Here, recent changes or unscheduled events that are not yet reflected in the data may lead to a change in Index performance, both positively in the case of Mexico and the UAE and negatively in the case of the UK, Japan and Italy.

By contrast, other countries have moved up the Index rankings with improvements in different dimensions. For example, the Philippines have continued their upward trend with constant improvements on all dimensions, including an increased diversity of electricity fuel mix. Yet the country continues to struggle with energy equity, as energy prices remain expensive and 17% of Filipinos continue to live without access to modern electricity services.<sup>8</sup> In Latin America, Colombia strengthens its overall Index position and continues to benefit from the energy security and sustainability impacts of hydropower, but its performance is still somewhat unbalanced with a relatively lower performance on energy equity. Overall, however, as an active member of the Rio+20 Summit (the United Nations Conference on Sustainable Development), the country is seeing the benefits of a sustained policy focus on how to address its energy trilemma.

Over the next five years we can expect to see more changes in Index performance as recent investments and policy decisions begin to take effect. These include the effects of industrialised emerging economies' efforts to manage energy demand growth and enhance environmental sustainability, the continued rapid growth in renewable energy in developed and developing countries, the United Nations (UN) Sustainable Energy for All initiative beginning to make inroads, and the tapping of other energy resources. For example, one key area is in Africa, where huge resources remain untapped: it is estimated that only 7% of the continent's hydropower potential and less than 0.7% of its wind potential has been used.<sup>9</sup> Using even a small proportion of these resources could have a transformational impact on the quality of life in Africa, as African countries economically progress and also on its contribution to the global economy.

## Conclusion

There are significant challenges for governments, the energy sector and the financial community over the next 20 years and beyond to meet the projected investment needs to expand energy access, develop new energy technologies, replenish ageing infrastructure assets and associated supply chains, and make energy infrastructure more resilient. Greater engagement is needed from all stakeholder groups to build understanding and trust among policymakers, investors and the energy sector.

Leadership is needed from governments to set targets, develop strategies and create policies and regulations that give the energy and financial sectors certainty that their investments can be recouped and profits made, while meeting the needs of citizens and the economy as a whole.

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<sup>8</sup> Sustainable Energy for All (SE4ALL), 2013: Global Tracking Framework

<sup>9</sup> The Economist, 2013: Lighting up Africa, 18 November, 2013

It is important for the energy sector to ensure that public policy is attractive and business-friendly by engaging in the policymaking process and sharing knowledge and feedback to overcome the information asymmetry. Together, energy leaders from the public and private sectors must actively engage the financial community, highlight the significant opportunities presented by energy sector investments, and find solutions to operate within the challenges.

As the energy system looks to be more market orientated, market dynamics become more important and, with competing demands for capital, external economics will play a more influential role in the success or failure of energy policy goals. The findings and recommendations in this report and the benchmarking the Energy Trilemma Index provides, can help to ensure that countries deliver the conditions to provide for sustainable energy systems.



# How to unlock US\$48trn investment in energy infrastructure

## OBSTACLES AND BARRIERS

### Unlocking capital sources



Roughly US\$48 trillion investment in energy infrastructure is required over the next 20 years to replace ageing assets, build new energy infrastructure, meet climate change targets, and provide access to the 1.2 billion people without energy.

### Managing trade-offs



Balancing the three dimensions of the energy trilemma is hard. And, as time elapses, it will get even harder and more expensive.

### Reducing uncertainty



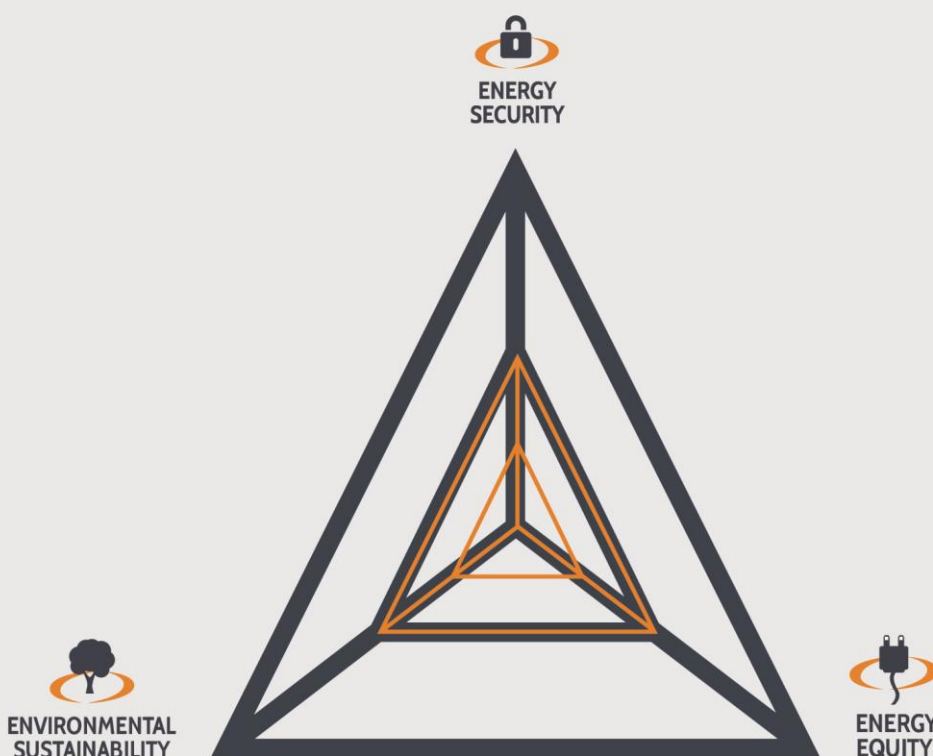
Political and regulatory uncertainty driven by national policy and regulatory changes, lack of an international climate framework, and the speed of technology development drives up the cost of capital and deters investment.

## RECIPE FOR SUCCESS

The World Energy Trilemma report helps governments rise to the challenge the World Energy Council has defined as the energy trilemma.

Balancing the three core dimensions of the energy trilemma – energy security, universal access to affordable energy services, and environmentally-sensitive production and use of energy – is the basis for prosperity and competitiveness of individual countries.

Sustainable energy is not only an opportunity to transform societies and grow economies, but also a necessity – a prerequisite to meet growing energy demand and reduce the carbon footprint.



## WHAT IS AT RISK?

### Meeting energy demands



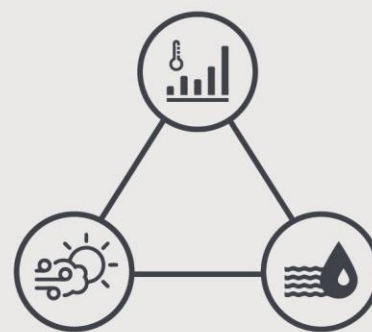
Secure energy is critical to maintaining and driving economic growth. Meeting rising demands for energy enables the expansion of all sectors of the economy including agriculture, transport, manufacturing, construction, health, and social services.

### Delivering social benefits



Energy must be accessible and affordable at all levels of society. The shift from primary energy to electricity is a key feature of modern society and increased energy access is strongly correlated to growth in education, life expectation, and economic development.

### Minimising environmental impacts



The impact of energy production and energy use on the environment must be minimised in order to combat climate change as well as the implications of local air and water pollution.





Collaborative action is required



WHAT GETS MEASURED, GETS DONE

The **Energy Trilemma Index** provides the world's most comparative assessment of how countries perform in delivering sustainable energy systems. The Index enables countries to visualise their energy system and identify areas for action. Further information can be found online at [www.worldenergy.org/data/sustainability-index](http://www.worldenergy.org/data/sustainability-index)

2014 Energy Trilemma Index – Top 20 countries

01	Switzerland	AAA
02	Sweden	AAA
03	Norway	AAB
04	United Kingdom	AAA
05	Denmark	AAB
06	Canada	AAB
07	Austria	AAB
08	Finland	ABB
09	France	AAB
10	New Zealand	AAB
11	Germany	BBB
12	United States	AAC
13	Australia	AAD
14	Netherlands	BBB
15	Spain	ABB
16	Colombia	AAC
17	Slovakia	ABB
18	Luxembourg	AAD
19	Costa Rica	ABB
20	Qatar	AAD

# 3. 2014 World Energy Trilemma Index

Trends and the balance between the three dimensions provide the most valuable information in helping countries address their energy trilemma.

Sustainable energy is not only an opportunity to transform societies and grow economies, but also a necessity - a prerequisite to meet growing energy demand and reduce the carbon footprint. That is why it is so important to balance what the World Energy Council defines as the energy trilemma. Balancing the three core dimensions of the energy trilemma is a strong basis for prosperity and competitiveness of individual countries. Secure energy is critical to fuelling economic growth. Energy must be accessible and affordable at all levels of society, and the impact of energy production and energy use on the environment needs to be minimised in order to combat climate change and maintain good air and water quality.

The 2014 Trilemma Index quantifies the energy trilemma and comparatively ranks countries in terms of their ability to provide a secure, affordable, and environmentally-sustainable energy system. The rankings are based on a range of databases that capture both energy performance and the context of that energy performance. Energy performance indicators consider supply and demand, the affordability of and access to energy, and the environmental impact of a country's energy use. The contextual indicators consider the broader circumstances of energy performance including that country's political, societal and economic strength and stability. Indicators were selected on their high degree of relevance to the research goals.

Each country is also given a balance score that highlights how well a country manages the trade-offs between the three competing dimensions. Figure 2 shows the overall Index performance and balance score of the 129 countries assessed in 2014. This is a unique and unparalleled resource and guide for policymakers seeking to develop solutions for sustainable energy systems.

The Index illustrates the trade-offs that exist with the energy trilemma and points to key areas that countries must give extra attention to in order to develop a balanced energy profile. Trends and the balance between the three dimensions provide the most valuable information in helping countries address their energy trilemma. Rankings from three consecutive years broken down by dimension are covered in the Index. This means that a country can track the results of energy policies not only on a

macro level, but also by dimension. The Index also makes it possible to generate regional, economic or structure-of-the-energy sector peer group comparisons. As countries have unique resource endowments, policy goals and challenges, the absolute rank of a country may be less meaningful than its relative performance versus its peers.

For the deeper Index analysis countries were organised in four economic groups:

- ▶ Group I: GDP per capita greater than US\$33,500
- ▶ Group II: GDP per capita between US\$14,300 and US\$33,500
- ▶ Group III: GDP per capita between US\$6,000 and US\$14,300
- ▶ Group IV: GDP per capita lower than US\$6,000.

Finally, it is important to note that the Index methodology continues to be improved. Further information on Index methodology, 2012 and 2013 rankings, and the balance score can be found in Appendix A.

The 2014 Trilemma Index confirms that trade-offs in the energy trilemma persist for countries at all stages of development. It shows that countries face specific challenges as they pass through the stages of economic and social development. Developed countries currently rank higher in the Index but they must address ageing and carbon-intensive energy systems by increasing low- and zero-carbon emission forms of energy such as renewables, including hydro and nuclear into their energy mix. The Index also shows the opportunity for developing countries. As renewable energy sources become more widely available and cost-effective, countries may be able to leverage environmentally-sensitive and affordable energy sources to support their industrialisation and improve their populations' access to energy. These countries have the highest potential of developing renewable energy sources, but mobilising the necessary investment will be crucial to the success of these future projects.

For a deeper discussion of the Index results, in the context of the 2014 discussion with leaders from the financial sector on how to attract investments into the energy sector and unlock the more than US\$48trn of cumulative investment required over the period 2014 to 2035, refer to World Energy Trilemma: Time to get real – the myths and realities of financing energy systems.

## 4. Regional profiles

The variability seen in performance across the three dimensions of the Trilemma Index shows the degree to which the energy challenges faced by each country are unique. However, the transnational nature of both energy markets and environmental sustainability issues necessitates a view that extends past the country level as highlighted in previous reports and again in World Energy Trilemma: Time to get real – the myths and realities of financing energy systems. Energy leaders emphasised the need to examine opportunities to adopt regionally coordinated approaches to energy resources, infrastructure and regulation.

This section shows the average results for countries in each geographic region represented in the 2014 Index, as well as an overview of regional challenges.

**Table 1**  
**Comparison of key metrics among geographical regions**

Source: World Energy Council / Oliver Wyman

Geographical region		GDP per capita (PPP, US\$)	Industrial sector (% of total GDP)	TPEP/TPEC <sup>1</sup>	Population with access to electricity (%)	Energy affordability (US\$ per kWh) <sup>2</sup>	Energy Intensity (koe per US\$, PPP)	Emission intensity (kCO <sub>2</sub> per US\$, PPP)	CO <sub>2</sub> emissions per capita
Asia	Asia	16,050	28.5	1.12	89.5	0.11	0.19	0.40	5.80
	High-GDP countries	38,450	30.5	0.60	95.5	0.17	0.15	0.36	10.58
	Low-GDP countries	5,510	27.6	1.36	86.6	0.06	0.20	0.41	3.19
Europe	Europe	27,549	26.4	0.60	99.9	0.23	0.16	0.33	6.83
	Western Europe	37,073	27.5	0.60	100.0	0.25	0.14	0.23	7.32
	Eastern Europe	16,438	25.2	0.60	99.9	0.19	0.19	0.44	6.21
Lat. Am. & Caribbean		11,622	31.3	0.94	91.8	0.11	0.16	0.29	5.58
Middle East & North Africa	Middle East & N. Africa	23,303	40.0	2.15	93.9	-	0.21	0.53	10.50
	GCC countries	43,731	55.2	3.31	94.1	-	0.3	0.69	26.38
	Non-GCC countries	11,047	31.7	1.51	93.9	-	0.17	0.44	4.15
North America		36,507	32.7	1.13	99.7	0.11	0.16	0.36	11.47
Sub-Saharan Africa		4,395	28.9	5.21	36.9	-	0.32	0.25	1.03
Global average		17,929	30.1	1.86	83.6	0.18	0.20	0.35	6.30

**Table 2**  
**Comparison of key metrics among GDP groups**

Source: World Energy Council / Oliver Wyman

<b>Economic groups</b> (GDP per capita)	<b>GDP per capita</b> (PPP, US\$)	<b>Industrial sector</b> (% of total GDP)	<b>TPEP/TPEC<sup>1</sup></b>	<b>Population with</b> <b>access to electricity (%)</b>	<b>Energy affordability</b> (US\$ per kWh) <sup>2</sup>	<b>Energy Intensity</b> (koe per US\$, PPP)	<b>Emission intensity</b> (kCO <sub>2</sub> per US\$, PPP)	<b>CO<sub>2</sub> emissions</b> <b>per capita</b>
<b>Group I</b> (33,501+)	45,849	32.2	1.10	95.7	0.22	0.16	0.29	11.53
<b>Group II</b> (14,301–33,500)	22,417	30.3	1.04	95.9	0.18	0.17	0.39	7.83
<b>Group III</b> (6,001–14,300)	9,914	31.4	1.86	91.6	0.09	0.18	0.40	4.16
<b>Group IV</b> (0–6,000)	2,911	27.4	3.05	57.5	–	0.28	0.32	0.99
<b>Global average<sup>3</sup></b>	17,929	30.1	1.86	83.6	0.18	0.20	0.35	6.30

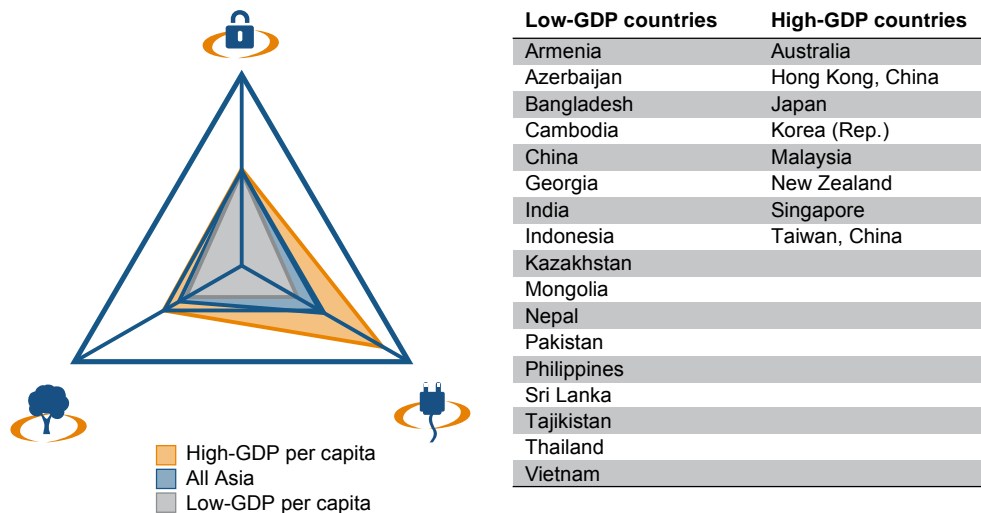
<sup>1</sup> Ratio of total primary energy production to total primary energy consumption, showing the extent to which a country imports or exports energy

<sup>2</sup> “–” indicates lack of available data for this indicator for too many countries in this region

<sup>3</sup> Average of all 129 countries included in the Index

**Figure 3**  
**Trilemma profile: Asia**

Source: World Energy Council / Oliver Wyman



## Asia

Asia is the world's largest and most populated continent. The region contains a diverse array of economies and includes less-developed countries, rapidly-developing economies, and highly-developed nations. In order to fuel economic growth and meet the energy needs of the growing population, investment is needed on an unprecedented scale. Energy demand in the region, in particular in China and India, is predicted to increase by 2050. To keep pace with this demand, cumulative investment requirements in electricity generation alone will be between US\$10trn and US\$12.8trn between now and 2050 (see Figure 4). Looking at the broader energy infrastructure, of the US\$48trn cumulative investment required globally over the next two decades in the energy supply system and energy efficiency, more than 30% is needed in the region, 50% of which is needed in China's energy sector.<sup>10</sup>

Asia has a mix of net energy importers and exporters and the demand for and consumption of energy is set to increase in almost all countries. Primary energy supply is set to increase, potentially by as much as 90%, through to 2050 with South, Central and East Asia at the centre of future growth, in particular China and India.<sup>11</sup> Coal will likely be the dominant fuel, with reserves and infrastructure in place in many countries. Large amounts of oil and natural gas will need to be imported as societies become more motorised. The use of renewable energy sources for electricity generation also continues to grow and is higher in low-GDP countries. In 2013, more than half of global investment in renewable energy was made in Asia, with investment in China amounting to more than US\$56bn and an additional almost US\$50bn spend in other Asian countries.<sup>12</sup>

<sup>10</sup> IEA, 2014: World Energy Investment Outlook (New Policies Scenario)

<sup>11</sup> WEC, 2013: World Energy Scenarios: Composing energy futures to 2050

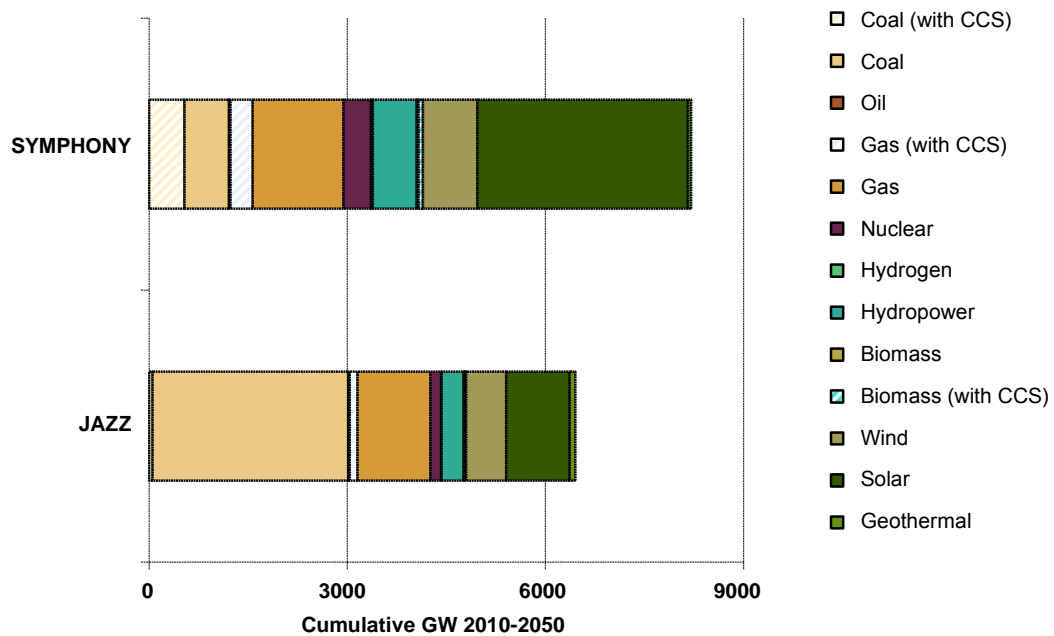
<sup>12</sup> United Nations Environmental Programme / Bloomberg New Energy Finance, 2014: Global trends in renewable energy investment

There is a wide gap in energy equity between high- and low-GDP Asian countries, as many of the low-GDP economies still struggle to provide access to modern energy services to their populations. Of the 1.2 billion people without access to electricity globally, more than 300 million people live in India.<sup>13</sup>

Environmental sustainability performance remains a persistent challenge in low-GDP countries, especially in more industrialised ones such as China, Indonesia, Thailand, India, and Vietnam. It will become increasingly important for these countries to meet rising energy demands through low-carbon methods of electricity generation and a continued focus on improving energy efficiency.

**Figure 4**  
**Cumulative investment needs by 2050 in Asia in GW in electricity generation infrastructure**

Source: WEC, 2013, World Energy Scenarios: Composing energy futures to 2050



Symphony cumulative undiscounted investment: 12.8 trillion US\$2010

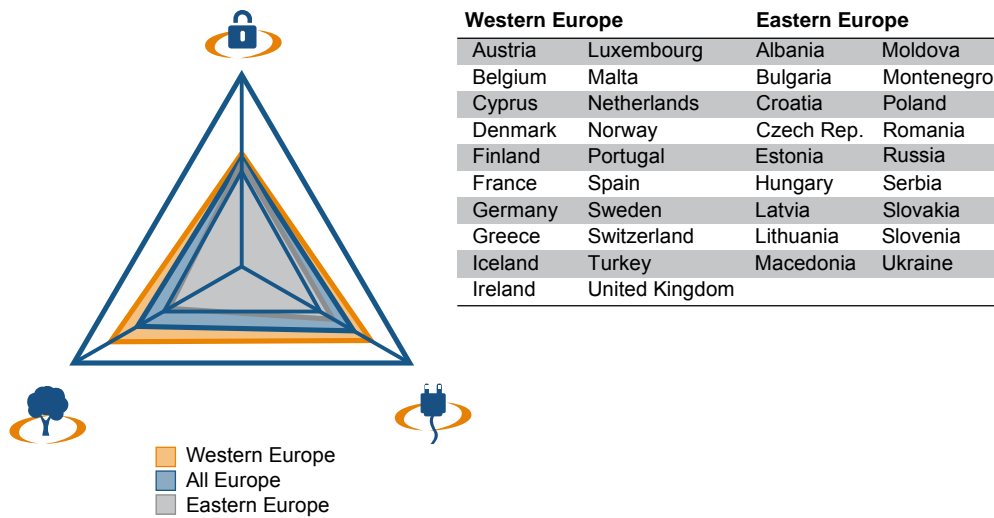
Jazz cumulative undiscounted investment: 10.0 trillion US\$2010

<sup>13</sup> Sustainable Energy for All, 2013: Global tracking framework



**Figure 5**  
**Trilemma profile: Europe**

Source: World Energy Council / Oliver Wyman



## Europe

Following the recent global recession, the GDP decrease in the Euro Zone slowed from -0.7% in 2012 to -0.4% in 2013 and in Central and Eastern Europe GDP growth increased from 1.4% in 2012 to 2.5% in 2013. GDP growth is projected to strengthen throughout 2014 and 2015.<sup>14</sup> In fact, until 2050 GDP in Europe is expected to increase between 75% and 100%. However, the region's energy demand is expected to remain mostly unchanged, mostly due to improved energy efficiency.<sup>15</sup>

The majority of European countries are net energy importers and lack large natural deposits of fossil fuels. Yet, Europe overall manages to still be relatively energy-secure due to contained energy consumption growth and a conscious effort to diversify the electricity generation portfolio. Renewable energy sources including hydro account for an average of 23% of the region's electricity generation already.<sup>16</sup>

Although access to electricity is virtually 100% across the entire region and the quality of the service is perceived as reliable in most countries, rising prices for electricity and gasoline are of concern for many European countries as an increasing number of households face fuel poverty. Many European countries also worry about the impact rising energy prices will have on their economies competitiveness.

Investment needed to sustain and improve performance on the three dimensions of the energy trilemma is high. Cumulative investment requirements in electricity generation alone will be between US\$3.3trn and US\$4.4trn between now and 2050 (see Figure 6). For many European countries the greatest challenge is the need to drive and finance changes in their incumbent energy systems. In the EU alone, more than US\$2trn in power sector investment to 2035 and an estimated 740 GW of gross

<sup>14</sup> International Monetary Fund (IMF), 2014: Is the Tide Rising?

<sup>15</sup> WEC, 2013: World Energy Scenarios: Composing energy futures to 2050

<sup>16</sup> US Energy Information Administration (EIA), 2012: International energy statistics (www.eia.gov)

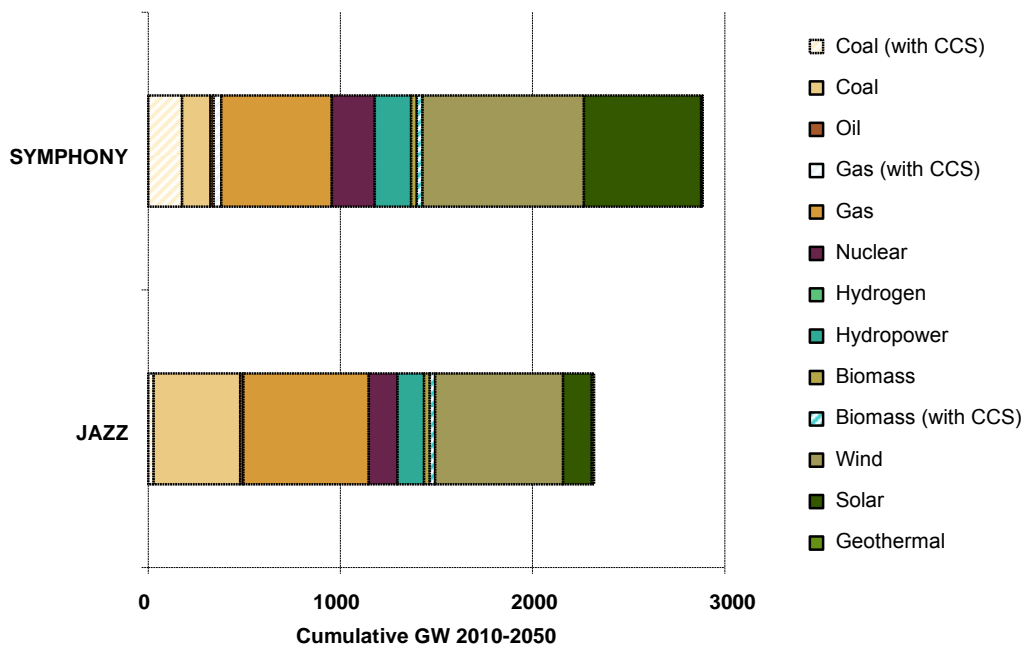


capacity needs to be added by 2035.<sup>17</sup> This includes switching to lower-carbon fuels, improving energy efficiency in transmission and distribution grids, and increasing the use of low-carbon technologies. It is worth noting, that some renewable energy technologies have shorter lifetimes and will need replacing before 2035. Moreover, replacing aging conventional power plants with low- and zero-carbon technologies, in particular renewable energy technologies, requires significant improvements to the transmission and distribution systems to be able to balance the intermittency and disruptiveness of these technologies.

However, low prices in many EU wholesale electricity markets – due to overcapacity and growing share of renewables - have raised concerns about the ability of existing and new power plants to recover their capital investment under current market conditions. Revisions and coordination of the regulatory framework across the region is required to meet current and future energy trilemma goals.

**Figure 6**  
**Cumulative investment needs by 2050 in Europe in GW in electricity generation infrastructure**

Source: WEC, 2013, World Energy Scenarios: Composing energy futures to 2050

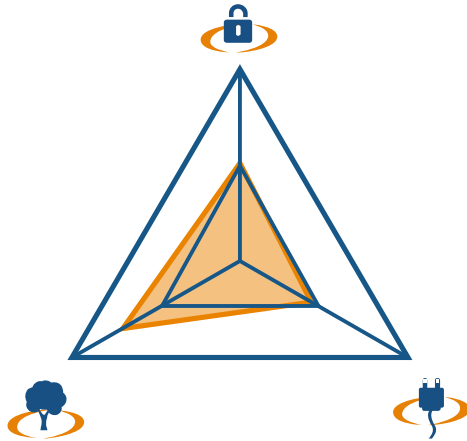


Symphony cumulative undiscounted investment: 4.4 trillion US\$2010  
 Jazz cumulative undiscounted investment: 3.3 trillion US\$2010

<sup>17</sup> IEA, 2014: World Energy Investment Outlook (New Policies Scenario)

**Figure 7****Trilemma profile: Latin America and Caribbean**

Source: World Energy Council / Oliver Wyman

**LAC countries**

Argentina	Guatemala
Barbados	Honduras
Bolivia	Jamaica
Brazil	Nicaragua
Chile	Panama
Colombia	Paraguay
Costa Rica	Peru
Dominican Republic	Uruguay
Ecuador	Venezuela
El Salvador	

## Latin America and Caribbean

The Latin America and Caribbean (LAC) region includes mostly middle and lower-income countries. LAC is expected to see an economic growth rate of 3.0% in 2014.<sup>18</sup> While sound economic policies and a relatively favourable international context in the preceding decade have lifted tens of millions of people out of poverty, the region still suffers from the highest levels of income disparity in the world.

The LAC region includes a mix of both net energy importers and exporters, including OPEC members Ecuador and Venezuela. Overall, LAC is an energy-rich region with large oil and gas deposits and great natural endowments of exploitable renewable energy. Of the total investment needed in the LAC energy system over the next two decades close to 65% is required to sustain and grow the exploration and production of oil and gas resources.<sup>19</sup> Attracting the investment will prove difficult in some countries due to the current political climate of nationalisation and populist policies, but also due to the increasing level of social activism on obtaining of social acceptance as well as environmental licences. With economies expanding, energy consumption continues to rise across the region creating energy security challenges for some countries. Furthermore, weather variability, for example, droughts, puts additional pressure on the system. To address this, LAC countries are continuing to diversify their electricity generation portfolios with renewable energy, solar PV and wind, and complementary thermal power plants.

Energy equity as a whole is fairly low in the region. Access to electricity varies, with nearly a quarter of the population in Nicaragua lacking modern electricity services, while some of the more-developed countries have electrification rates of nearly 100%. Subsidies play an important role in many countries such as Argentina, Venezuela, Bolivia, Ecuador, and Chile, and government attempts to reduce fuel subsidies have for the most part failed due to large protests.

<sup>18</sup> IMF, 2014: Is the Tide Rising?

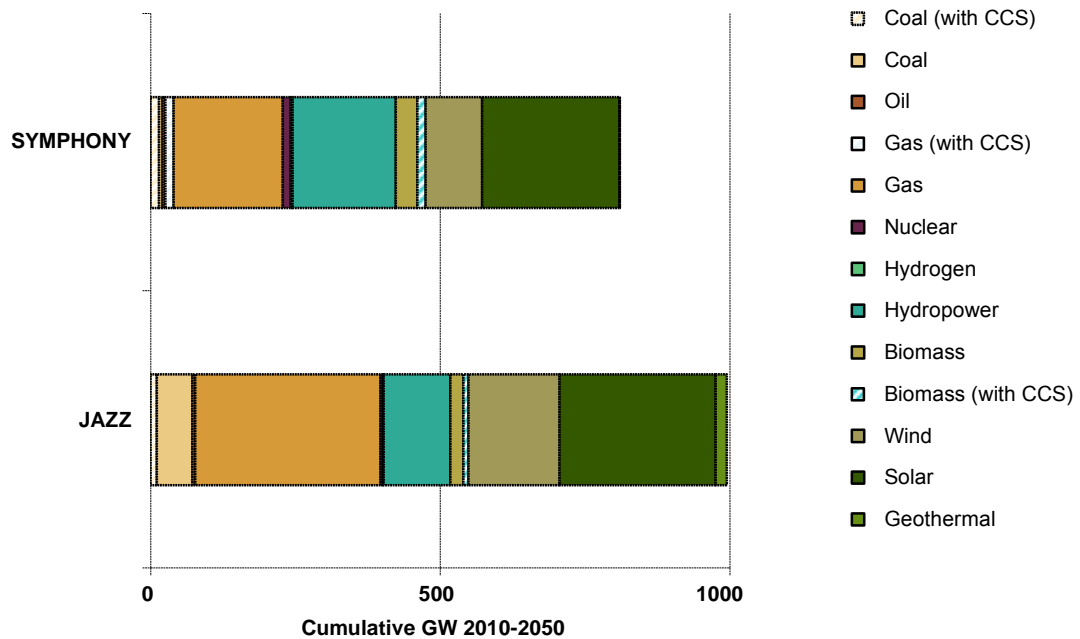
<sup>19</sup> IEA, 2014: World Energy Investment Outlook (New Policies Scenario)

It remains to be seen if this region can maintain its superior environmental performance as its countries address societal and economic inequality and try to extend the benefits of development to the rest of their populations.

Energy demand in the region is predicted to increase and almost double by 2050. To keep pace with this demand, cumulative investment requirements in electricity generation will be US\$1.3trn between now and 2050 (see Figure 8). Looking at the broader energy infrastructure, of the US\$48trn cumulative investment required globally over the next two decades in the energy supply system and energy efficiency, US\$4trn is required over the period 2014 to 2035 in the region.<sup>20</sup>

**Figure 8**  
**Cumulative investment needs by 2050 in Latin America and the Caribbean in GW in electricity generation infrastructure**

Source: WEC, 2013, World Energy Scenarios: Composing energy futures to 2050

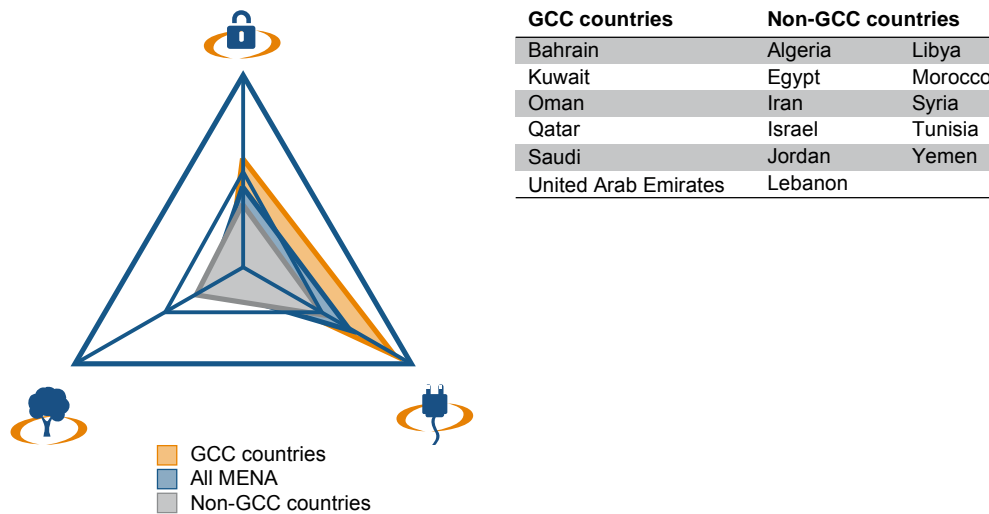


Symphony cumulative undiscounted investment: 1.3 trillion US\$2010  
 Jazz cumulative undiscounted investment: 1.3 trillion US\$2010

<sup>20</sup> IEA, 2014: World Energy Investment Outlook (New Policies Scenario)

**Figure 9**  
**Trilemma profile: Middle East and North Africa**

Source: World Energy Council / Oliver Wyman



## Middle East and North Africa

The Middle East and North Africa (MENA) play a vital role in the global energy industry. These countries have an estimated 66% of the world's oil and 45% of the world's natural gas reserves, most of which is concentrated in the Gulf Cooperation Council (GCC) member countries.<sup>21</sup> While many of these countries have economies tied heavily to oil and gas exports, several have taken steps in recent years to diversify their economies and energy mix.

Despite their vast strategic oil and natural gas reserves, energy security in the region, which includes eight of the 12 OPEC countries, remains average. This can be explained in part by high five-year energy consumption growth rates, a high economic dependence on energy exports especially among the GCC countries, and currently very low amounts of diversity in the sources of electricity production, which is almost exclusively fossil fuelled. However, some of the traditionally oil-reliant Gulf countries, such as Saudi Arabia, the United Arab Emirates, and Bahrain, are addressing the lack of diversity in their electricity fuel mixes by leveraging their fossil fuel wealth to develop the use of renewables and nuclear.

Volatile crude oil prices, shifting global energy demands and supply, massive infrastructure programs, and rising domestic demand are impacting the competitive landscape of National Oil Companies (NOCs) in the Middle East. With strong links between the NOCs and their countries' economies, there are high stakes for these companies to effectively navigate strategic risks. To continue funding their governments' visionary strategies NOCs must develop sound risk governance practices.<sup>22</sup>

<sup>21</sup> WEC, 2013: World Energy Resources

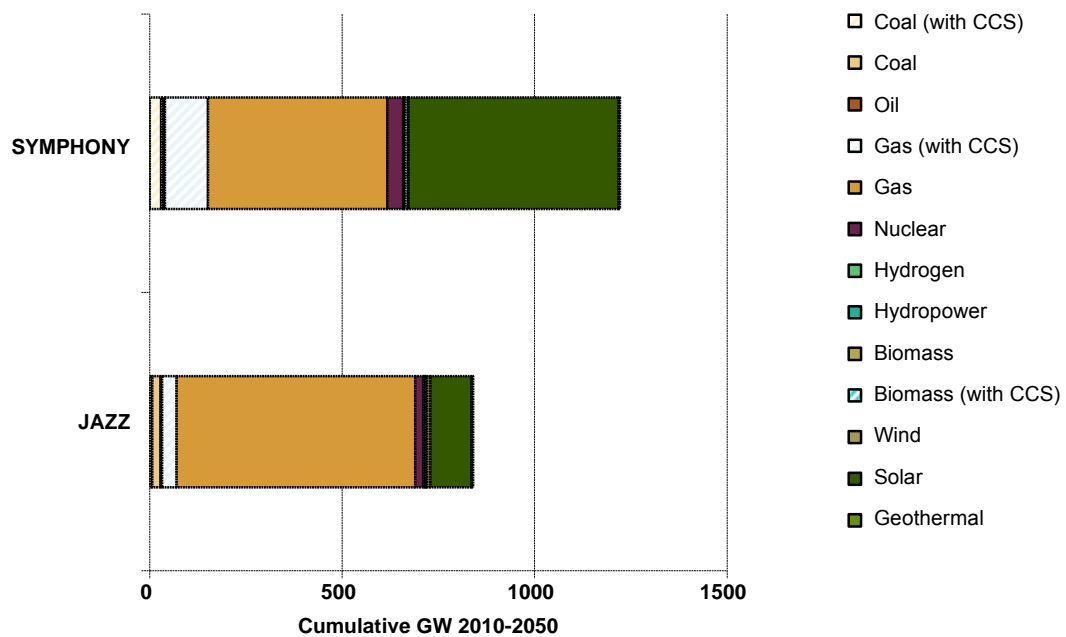
<sup>22</sup> Oliver Wyman, 2012: Creating value under pressure: why national oil companies need risk management in a shifting environment

Energy equity remains the strongest of the three energy dimensions in this region as electricity and gasoline are very affordable, and often subsidised or fixed at artificially low prices by the government. However, low cost energy does little to incentivise energy efficiency or the reduction of energy consumption – and the region’s environmental sustainability performance reflects this. Emission and energy intensity remain the worst in the world. Meanwhile, CO<sub>2</sub> emissions from electricity generation also remain extraordinarily high, with virtually no use of either nuclear power or renewables at the moment.

Energy demand in the region is predicted to increase significantly by 2050. To keep pace with this demand, cumulative investment requirements in electricity generation will be between US\$0.7trn and US\$1.4trn until 2050 (see Figure 10). Looking at the broader energy infrastructure, of the US\$48trn cumulative investment required globally over the next two decades in the energy supply system and energy efficiency, close to US\$4trn is required over the period 2014 to 2035 in the region.<sup>23</sup>

**Figure 10**  
**Cumulative investment needs by 2050 in the Middle East and North Africa in GW in electricity generation infrastructure**

Source: WEC, 2013, World Energy Scenarios: Composing energy futures to 2050

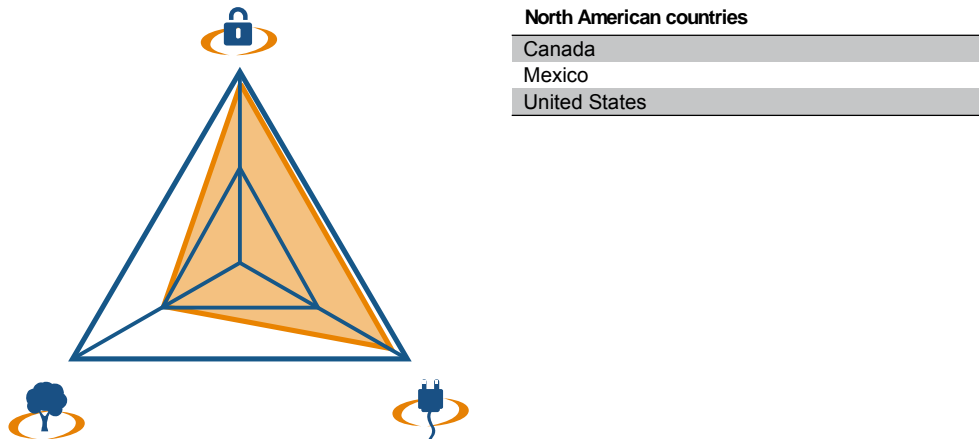


Symphony cumulative undiscounted investment: 1.4 trillion US\$2010  
 Jazz cumulative undiscounted investment: 0.7 trillion US\$2010

<sup>23</sup> IEA, 2014: World Energy Investment Outlook (New Policies Scenario)

**Figure 11**  
**Trilemma profile: North America**

Source: World Energy Council / Oliver Wyman



## North America

The North America region includes Canada, the United States (US), and Mexico. Canada and the United States both have mature, post-industrial economies, while Mexico is a modern, industrial powerhouse. All three countries benefit heavily from the 1994 North American Free Trade Agreement, which eliminated trade tariffs between the three countries. For example, 90% of Mexico's exports now go to either Canada or the US. The entire region was hit particularly hard by the recent global recession, but economic growth has recovered, although not quite to pre-recession levels.

Although the region's energy use is high, North American countries are relatively self-sufficient as all three have large natural endowments of oil, natural gas, coal and hydropower potential. Both Canada and Mexico are net energy exporters and the US is on course to becoming a net energy exporter. The diversity of the electricity generation portfolio improved overall this year, but the use of low-carbon and renewable energy sources for electricity generation remained mixed. Mexico still obtains four-fifths of its electricity from burning fossil fuels, while Canada uses nuclear, hydropower and other renewables to meet 78% of its needs.<sup>24</sup>

Investment requirements over the next two decades are high. More than US\$10trn are needed to replace existing, aging infrastructure, build new energy infrastructure assets and associated supply chains, increase the use of low-carbon technologies, improve energy efficiency, and reduce final energy demand.<sup>25</sup> Investment in renewable energy technologies in 2013 was close to US\$34bn in the United States – representing the highest investment in renewables among developed countries. Yet, investment was down 10% from 2012 due to the continuing shale gas boon and policy uncertainty including questions around the continuation of the Production Tax Credits. Canada saw a growth in investment in renewable energy with US\$6bn invested in 2013.<sup>26</sup>

<sup>24</sup> EIA, 2012: International energy statistics ([www.eia.gov](http://www.eia.gov))

<sup>25</sup> IEA, 2014: World Energy Investment Outlook (New Policies Scenario)

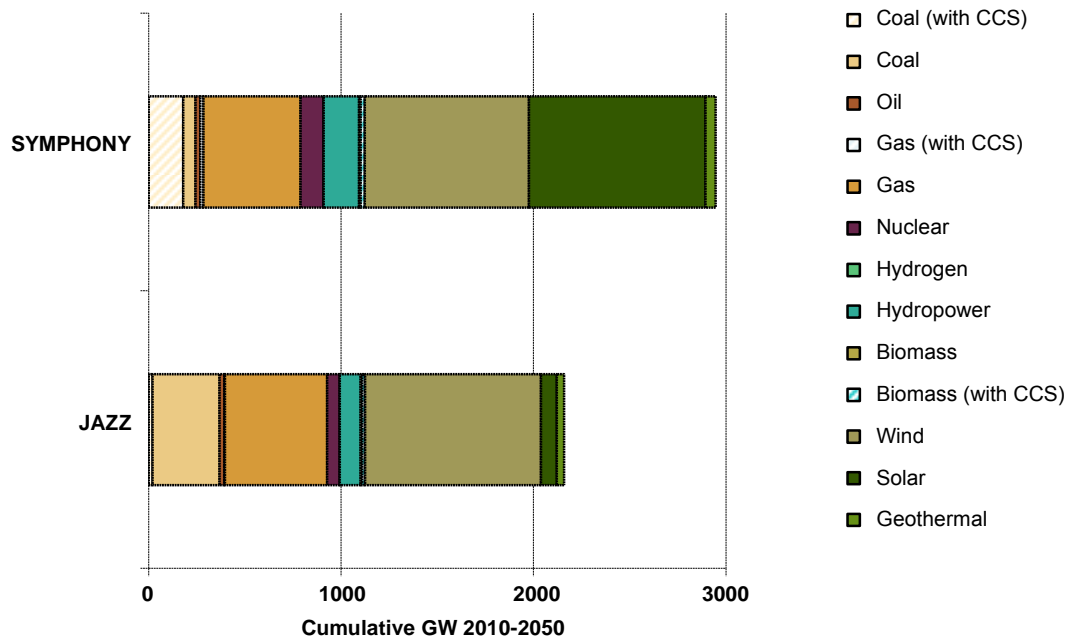
<sup>26</sup> UNEP/BNEF, 2014: Global trends in renewable energy investment

Overall, the environmental sustainability dimension remains the most challenging one for the region. Emission and energy intensity continued to be relatively high in all three countries, although there were slight improvements this year.

Investment needed to sustain and improve performance on the three dimensions of the energy trilemma is high. Cumulative investment requirements in electricity generation alone will be between US\$2.8trn and US\$4.5trn between now and 2050 (see Figure 12). Looking at the broader energy infrastructure, of the US\$48trn cumulative investment required globally over the next two decades in the energy supply system and energy efficiency, more than 20% is required over the period 2014 to 2035 in the region.<sup>27</sup>

**Figure 12**  
**Cumulative investment needs by 2050 in North America in GW in electricity generation infrastructure**

Source: WEC, 2013, World Energy Scenarios: Composing energy futures to 2050

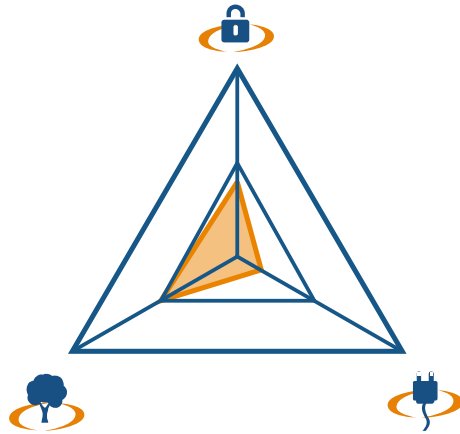


Symphony cumulative undiscounted investment: 4.5 trillion US\$2010  
 Jazz cumulative undiscounted investment: 2.8 trillion US\$2010

<sup>27</sup> IEA, 2014: World Energy Investment Outlook (New Policies Scenario)

**Figure 13****Trilemma profile: Sub-Saharan Africa**

Source: World Energy Council / Oliver Wyman

**Sub-Saharan African countries**

Angola	Ghana
Benin	Kenya
Botswana	Madagascar
Cameroon	Malawi
Chad	Mauritania
Congo (Dem. Rep.)	Mauritius
Côte d'Ivoire	Mozambique
Ethiopia	Namibia
Gabon	Niger

## Sub-Saharan Africa

Sub-Saharan Africa includes some of the world's least developed countries with per capita GDP ranging from the Democratic Republic of Congo's US\$600 to Gabon's US\$18,400.<sup>28</sup> The region's economies rely predominantly on commodities and resource extraction such as oil, gas, coal, uranium, minerals and gemstones, and agriculture. Many sub-Saharan African countries are also working on industrialising and building up a manufacturing base.

While energy security rankings are low (with a few notable exceptions), sub-Saharan African countries fare even worse on energy equity, as about 590 million people lack access to electricity.<sup>29</sup> Environmental sustainability appears to be the strongest trilemma dimension for the region. However this is primarily a reflection of low energy consumption levels, as many of these countries have yet to face the sharp spike in energy demand that accompanies rapid social and economic development.

Sub-Saharan Africa is well-endowed with both fossil fuels and sources of renewable energy, especially hydro and solar power. The region includes a few large oil producers such as OPEC members Angola and Nigeria, as well as several countries that generate all or nearly all of their electricity using renewables, mainly from hydropower. Many of these potential energy resources remain untapped, as countries face institutional and infrastructural barriers to making efficient use of them, and investors stay away due to the perceived political risks and ethical weakness.

However, leading examples such as Gabon show how countries have been able to develop offshore oil with financial support from International Oil Companies and boost their economies with production royalties. Morocco has developed the policies to promote investment in the 20 trillion cubic feet of recoverable shale oil and gas resources which remains largely unexplored.<sup>30</sup> Moreover, Tanzania and Mozambique

<sup>28</sup> IMF, 2013: World Economic Outlook database

<sup>29</sup> SE4All, 2013: Global tracking framework

<sup>30</sup> EIA, 2013: Technically Recoverable Shale Oil and Shale Gas Resources: An Assessment of 137 Shale formations in 41 Countries Outside the United States

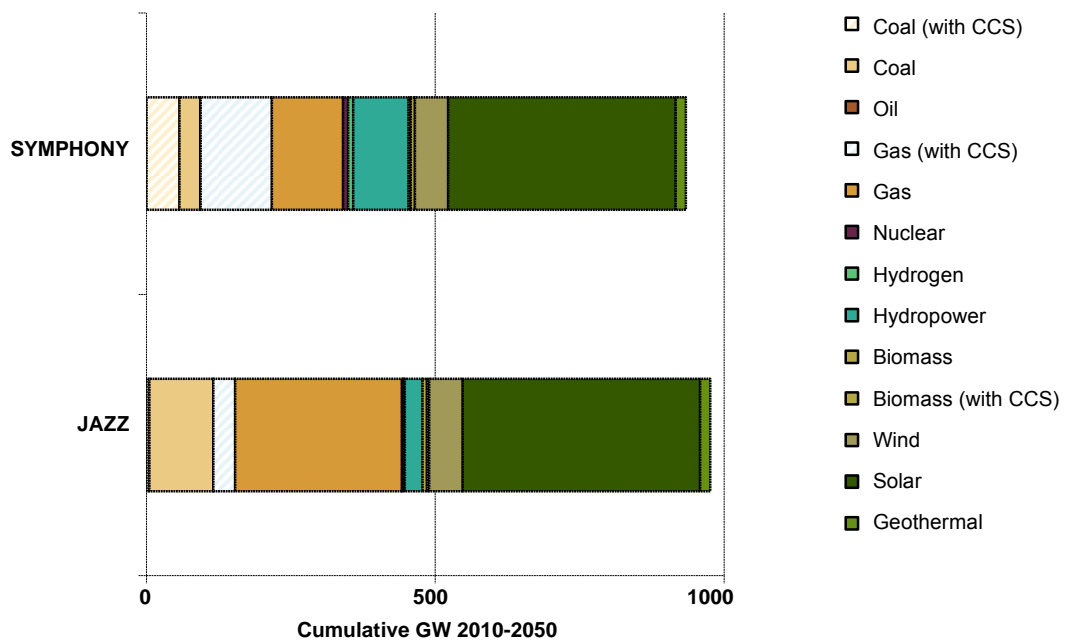


are expected to become LNG exporters after 2020, but Mozambique needs US\$50bn to develop its large hydrocarbon reserves, an estimated 3.5 times the country's GDP.<sup>31</sup> Ethiopia is making great progress in developing available, renewable energy sources and becoming a leading regional power supplier. For example, in 2013, Ethiopia opened Sub-Saharan Africa's largest wind farm.

Energy demand in the region is predicted to increase and more than double by 2050. To keep pace with this demand, cumulative investment requirements in electricity generation alone will be between US\$1.2trn and US\$ 1.4trn between now and 2050 (see Figure 14). Looking at the broader energy infrastructure, of the US\$48trn cumulative investment required globally over the next two decades in the energy supply system and energy efficiency, more than US\$3trn is required over the period 2014 to 2035 in the region.<sup>32</sup>

**Figure 14**  
**Cumulative investment needs by 2050 in North America in GW in electricity generation infrastructure**

Source: WEC, 2013, World Energy Scenarios: Composing energy futures to 2050



Symphony cumulative undiscounted investment: 1.4 trillion US\$2010  
 Jazz cumulative undiscounted investment: 1.2 trillion US\$2010

<sup>31</sup> The Economist, 2014: Africa's Energy Outlook, 31 July 2014

<sup>32</sup> IEA, 2014: World Energy Investment Outlook (New Policies Scenario)

## 5. Cross-regional profiles

Each country will adopt its own path to achieving balance on the energy trilemma considering its developmental stage, resource endowment, policies and regulations, as well as the country's own economic and societal goals and needs. Along with this, each country will have specific investment requirements to meet the goals it has set for its energy sector. However, patterns exist and grouping countries with similar energy trilemma profiles can help policymakers identify existing or emerging successful approaches to common problems.

The challenges facing the energy sector overall can be better understood by examining five distinct profile groups that can be identified from the Index analysis – with countries in each group sharing energy trilemma characteristics and challenges. The illustrative profiles, initially presented in the 2013 Trilemma Index, serve as benchmark guides to other countries with similar preconditions (see Table 3). With the exception of the 'Pack Leaders', the illustrative groupings are not based on a country's absolute performance, but rather on its relative and comparable performance on the three dimensions of energy security, energy equity, and environmental sustainability. Furthermore, each group contains some countries that are further along the path of economic and social development than others, but still face (or once faced) comparable energy challenges.

For a deeper discussion of the trilemma profiles, in the context of the 2014 discussion with leaders from the financial sector on how to attract investments into the energy sector and unlock the more than US\$48trn of cumulative investment required over the period 2014 to 2035, refer to World Energy Trilemma: Time to get real – the myths and realities of financing energy systems.

In addition, a profile has been created for countries that are part of the Clean Energy Ministerial (CEM), a high-level global forum to promote policies and measures focused on three global climate and energy policy goals: improve energy efficiency worldwide, enhance clean energy supply and expand clean energy access. Participating governments account for 80% of global greenhouse gas emissions and 90% of global clean energy investment. They also fund the vast majority of public research and development in clean energy technologies. The trilemma profile of CEM countries varies, and so do their challenges and opportunities. Many of the participating countries are also included in the five trilemma profiles.

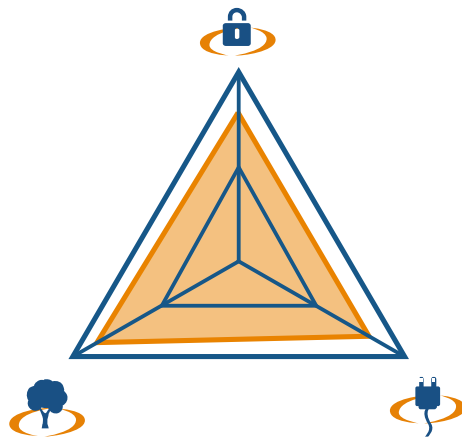
**Table 3**  
**Five profiles of energy investment challenges**

Source: WEC/Oliver Wyman, 2014

	<b>Illustrative members</b>	<b>Key energy trilemma strengths</b>	<b>Core energy investment needs and challenges</b>
<b>Pack Leaders</b>	Switzerland, Sweden, United Kingdom	Overall high performance and balance due to legacy of incumbent system and economic strength: benefit from investment decisions taken decades ago	Transforming incumbent systems and maintenance of high-performing utility sector; managing energy demand and continuing to drive energy efficiency
<b>Fossil-fuelled</b>	United Arab Emirates, Malaysia, Saudi Arabia	Affordability and security of energy due to the availability of exploitable fossil fuels	Stimulating a sustained transition to less intense energy use; managing rising exploration costs and risks for oil and gas; and responding to changing energy markets
<b>Highly-Industrialised</b>	China, Mexico, Russia	Energy security and strong GDP growth	Development of financial markets and a secure investment profile; managing energy demand and increasing energy efficiency; increase investment in energy system to support economic growth
<b>Hydro-powered</b>	Brazil, Colombia, Ethiopia	Strong use of renewables leads to low emissions and higher electrification rates	Development of financial markets and a secure investment profile; developing bankable projects and increasing investors' comfort with new renewables to strengthen the resilience of energy systems
<b>Back of the Pack</b>	Senegal, Nicaragua	Countries are not locked into fossil fuel heavy development path	Country risk ratings may hinder potential investments; developing bankable projects, local financial market capacity and human capacity

**Figure 15****Trilemma profile and illustrative countries: Pack leaders**

Source: World Energy Council / Oliver Wyman



Countries	Index rank	Balance score
Switzerland	1	AAA
Sweden	2	AAA
United Kingdom	4	AAA
Denmark	5	AAB
Austria	7	AAB
France	9	AAB
New Zealand	10	AAB
Germany	11	BBB
Netherlands	14	BBB
Spain	17	ABB

## Pack leaders

The 'Pack leaders' are top performers in terms of both dimensional balance and overall ranking on the Trilemma Index. The majority of the countries rank in the top one-third of all countries on each of the three dimensions.

Pack leaders are all high GDP-per-capita, OECD member countries with mature and strong political, societal and economic conditions that support energy infrastructure investments. They generally have set specific targets for both reducing GHG emissions and increasing the percentage of renewables in their electricity fuel mixes in efforts to reduce their environmental impact and increase their energy security but even these leading countries face significant energy issues and there is no guarantee that they will remain part of this elite group in the future. Policymakers have to craft the right market structures, and support and successfully implement prudent, forward-looking energy policies based on strategies that reflect local resources and capabilities in order to attract the needed investments by 2035 to ensure energy security, preserve affordability of energy services and competitiveness of economies, and meet decarbonisation goals.

One of the greatest challenges facing the pack leaders is the need to drive and finance changes in their incumbent energy systems. In particular, these countries are focused on switching to lower-carbon fuels, improving energy efficiency in transmission and distribution, increasing the use of low-carbon technologies, and reducing final energy demand.

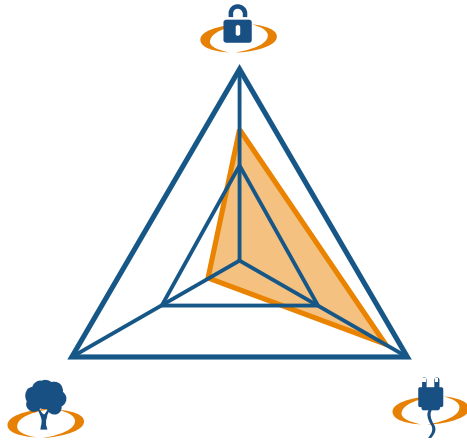
For some of the pack leaders nuclear power production has become of increasing concern to the public. Policymakers are faced with the challenge of replacing nuclear power and further developing new ways of generating low- or zero-carbon energy.

The integration of decentralised and intermittent renewable energy sources such as wind and solar energy poses challenges on the grid as those renewables are characterised by strong daily and seasonal variations, and require accurate forecasting. Increasing the energy system's flexibility while maintaining the reliability and quality of the electricity supply are new requirements for the entire electricity system; making them will require a timely development of the grid infrastructure.

Figure 16

**Trilemma profile and illustrative countries: Fossil-fuelled**

Source: World Energy Council / Oliver Wyman



Countries	Index rank	Balance score
United States	12	AAC
Australia	13	AAD
Qatar	19	AAD
Malaysia	26	ABC
United Arab Emirates	35	ABD
Kazakhstan	57	AAD
Saudi Arabia	68	ABD
Oman	72	ADD
Kuwait	77	BCD
Egypt	85	BBC

**Fossil-fuelled**

'Fossil-fuelled' countries are well endowed with fossil fuel resources and tend to rely heavily on fossil fuels for electricity generation with associated comparatively high CO<sub>2</sub> emissions per kWh generated. While this group's economies benefit from affordable and secure access to energy, high per-capita energy consumption leads to high levels of GHG emissions and a greater environmental impact. Countries that illustrate the fossil-fuelled profile typically show an energy trilemma imbalance that tilts towards energy security and energy equity, while they struggle to minimise their environmental impact.

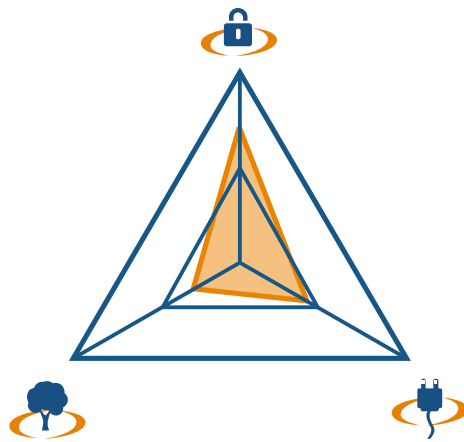
The group is generally made up of energy exporters, notably Saudi Arabia, the United Arab Emirates (UAE) as well as the United States (US), which is on course to becoming an energy exporter. Although fossil fuels are predicted to remain globally dominant in the primary energy mix up to 2050, there are challenges on the horizon for these economies. These include the potential impact of a meaningful post-2015 climate change agreement on global energy demands; the need to diversify energy sources and decarbonise electricity generation; managing demand, and ensuring necessary levels of investments in energy to support economic growth. However, there are also opportunities. A concerted effort on the development of carbon capture, utilisation and storage (CCUS) technologies would allow the mitigation of GHG emissions from large-scale fossil fuel usage in power generation, fuel transformation, but also industry. A breakthrough would have a 'game-changing' impact on these countries' trilemma performance and would enable the long-term, sustainable utilisation of fossil fuels under a post-2015 climate change agreement.

Diversification of energy sources and decarbonising electricity generation is a key next step on the path to balancing the trilemma profile for the countries in this group. The US, but also the UAE have already made steps in this direction. For example, the US has set 2020 emission targets that are as aggressive as those of several of the Pack Leaders and as a result of shale gas and the reduction in coal-fired power generation, it is making progress towards meeting those targets.

Figure 17

**Trilemma profile and illustrative countries: Highly-industrialised**

Source: World Energy Council / Oliver Wyman



Countries	Index rank	Balance score
Mexico	38	BBC
Tunisia	46	BBB
Russia	51	ABD
Philippines	59	BBC
Bolivia	63	ACC
Indonesia	69	ABD
China	74	ACD
Turkey	73	BCC
South Africa	83	BCD
Vietnam	87	BDD
Thailand	90	CCD
India	122	CDD

## Highly-industrialised

'Highly-industrialised' countries are emerging economies with large manufacturing sectors. Countries that illustrate the Highly-industrialised profile have an energy trilemma balance that is tilted heavily towards energy security, with progress needed to ensure energy equity and environmental sustainability.

Economies are based on energy- and emission-intensive activities, which raise their average emissions intensity 28% above the Index countries' average of 0.35 kg CO<sub>2</sub> per US dollar. Similarly, the energy intensity of this profile group is 67% higher than that of the pack leaders.<sup>33</sup> The impact the rapid rate of economic growth and associated energy demand in these countries has had on their citizens' economic status has been significant, yet per capita energy consumption is still low.

The investment challenge for these countries is to meet growing energy demands while maintaining environmental sustainability, improving electrification rates, and keeping energy affordable for all. To meet these goals, some members of the group are making significant investments in renewable energy sources, such as China, which has nearly tripled its renewable energy production from 2001 to 2011. Increasing the share of renewable energy sources in the energy mix will not only help improve the countries' environmental footprint, but also help enhance energy security and lower dependency on imported energy sources.

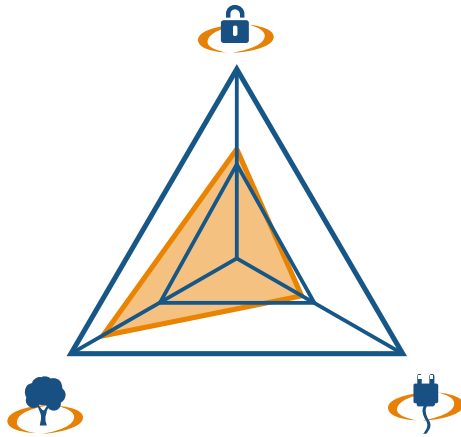
Another key challenge for these emerging economies is to expand energy access, meet the rising energy needs of a growing middle class population and ensure energy remains affordable for all. Increasing generation capacity, securing energy resources, and upgrading existing transmission and distribution lines in order to provide more reliable energy services remains a struggle for all of them.

However, for private sector finance to flow political and regulatory frameworks need to be coherent, transparent and predictable, corruption has to be minimised and a pipeline of bankable projects needs to be developed.

<sup>33</sup> Enerdata / WEC, 2012: Energy efficiency indicator database

**Figure 18****Trilemma profile and illustrative countries: Hydro-powered**

Source: World Energy Council / Oliver Wyman



Countries	Index rank	Balance score
Costa Rica	20	ABB
Colombia	15	AAB
Brazil	30	ABC
Ecuador	36	ABB
Uruguay	39	ABC
Peru	41	ABD
Panama	44	ABC
Cameroon	71	BBD
Paraguay	76	ACD
Sri Lanka	80	BCC
Ethiopia	115	BDD

## Hydro-powered

These emerging economies have an average of 79% of electricity generation from hydropower, the highest share of any profile group.<sup>34</sup> The energy trilemma profile of the 'Hydro-powered' countries is tilted towards the environmental sustainability dimension, although these countries also perform reasonably well on energy security.

The hydro-powered countries are predominantly in Latin America, due to the region's endowments with numerous powerful rivers. Some countries have been impacted by droughts and resulting energy shortfalls highlight concerns about energy security. To mitigate the risks associated with hydro-electric power generation, many countries are looking to increase the share of non-hydropower renewable, but also complementary thermal power generation to maintain energy security and affordable energy.

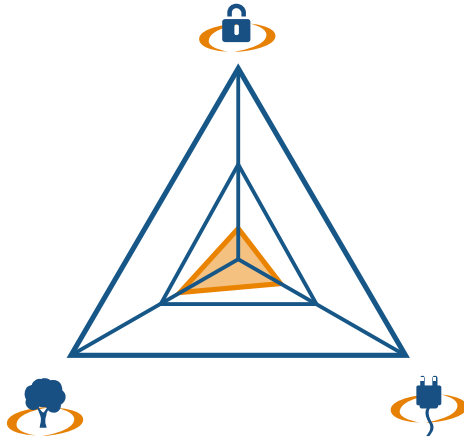
To reach national diversification targets, hydro-powered countries are adopting a number of strategies. Along with policy and regulatory frameworks, it is important for policymakers to work with the financial sector to ensure renewable projects can secure credit ratings to increase investor confidence. Project viability is a major barrier preventing much needed private sector investment. Financial institutions can be wary of investing in projects that lack a guaranteed cash flow, such as a Purchasing Power Agreement. If governments can offer rate or off-take guarantees before additional capacity is developed, investments will become more appealing. It is critical that governments abide by these commitments to ensure they remain trustworthy.

While most of these economies are still developing, the heavy use of hydropower has allowed these countries to meet a growing demand for electricity while maintaining a low environmental footprint. Historically, industrialising countries have substantially increased their impact on the environment as they strive to boost economic growth and access to energy. However, Hydro-powered countries like Brazil, Panama, and Uruguay are proving that industrialisation and environmental sustainability are not mutually exclusive.

<sup>34</sup> EIA, 2012: International energy statistics

**Figure 19****Trilemma profile and illustrative countries: Back of the pack**

Source: World Energy Council / Oliver Wyman



Countries	Index rank	Balance score
Dominican Republic	97	BCD
Nicaragua	105	BDD
Honduras	107	BDD
Jordan	108	BDD
Nepal	109	BDD
Jamaica	111	CCD
Morocco	112	CCD
Libya	114	CCD
Lebanon	123	CDD
Moldova	124	CDD
Senegal	126	DDD
Yemen	127	CDD
Benin	128	DDD

## Back of the Pack

The energy trilemma profile of the 'Back of the pack' is tightly clustered and countries struggle to make progress on all three dimensions. The profile is represented by less developed and developing countries from all over the world.

In the absence of a sufficient energy infrastructure, oil and oil product stocks, and investments, countries are typically not yet locked into high-carbon or fossil fuel energy infrastructures and have the potential to take a more sustainable approach to energy and economic development. However, countries in this profile need both financial and human capital to meet their energy investment needs.

To attract capital and exploit resources, the countries must develop the institutional frameworks to support investment. Political instability, low regulatory quality, lack of control of corruption, and compliance with rule of law, continue to lead to speculative debt grades and sovereign credit ratings and hinder both domestic and foreign investment.

Moreover, financial investments and energy projects must be managed by people and human capital constraints are key barriers to increasing the velocity and volume of bankable projects in many countries. The lack of managerial, scientific and engineering capital in these countries is a key focus for many development efforts. In this regard, the role of multinational development banks is crucial in working with governments to develop institutional strength and domestic financial markets, provide financial guarantees and support, and help build local human capacity. If the right investment conditions can be created, the development opportunities are significant.

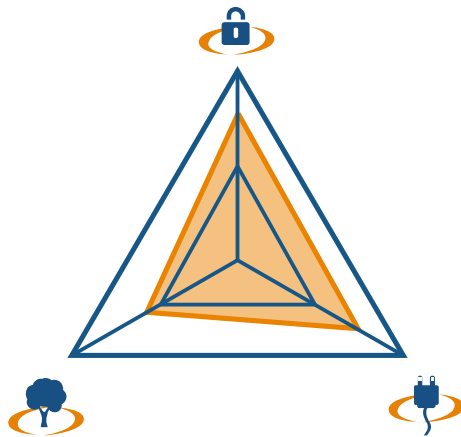
The challenge facing the back of the pack countries is monumental, but the development of domestic energy sectors could help these countries begin the journey to economic growth, social development, and sustainability.



Figure 20

**Trilemma profile: Clean Energy Ministerial (CEM) countries**

Source: World Energy Council / Oliver Wyman

**Countries participating in CEM**

Sweden	Japan
United Kingdom	Italy
Norway	Brazil
Denmark	United Arab Emirates
Canada	Mexico
Finland	Russia
France	Korea (Rep.)
Germany	Indonesia
United States	China
Australia	South Africa
Spain	India

**CEM participants**

The Clean Energy Ministerial (CEM) is a high-level forum that brings together countries to increase international collaboration on promoting policies and best practices in advancing to a low-carbon economy. Participating governments account for 80% of global greenhouse gas emissions and 90% of global clean energy investment. They also fund the vast majority of public research and development in clean energy technologies. The trilemma profile of CEM countries varies, and so do their challenges and opportunities. Many of the participating countries are also included in the five trilemma profiles.

A number of the CEM countries are close to having a good trilemma balance, yet they recognise that more needs to be done to primarily improve the environmental sustainability of their energy systems. The commitment to advance clean energy technologies through this mechanism shows a level of leadership in addressing the triple challenge of the energy trilemma. By making the options more attractive to all affected stakeholders it is likely that the energy equity of nations will be affected, and increasing affordability and accessibility to cleaner energy options are featured across several of the CEM initiatives. The CEM works through 13 main initiatives that are divided into four categories: integration, human capacity, clean energy supply, and energy efficiency. Overall, participation within the Clean Energy Ministerial seeks to increase global collaboration on enhancing energy efficiency, expanding clean energy supplies, and increasing clean energy access. Progress in these areas can help nations overcome the energy trilemma challenge and it will be important to watch the trends for these countries in future years.

While the US is in the lead for more than half of the CEM initiatives, Western European countries continue to perform in their leadership role in clean energies, and are further enhanced by the cooperation of the European Commission, which provides a supranational enhancement to further back already strong existing national profiles.

## 6. Country profiles

This section shows the Index rankings overall and per dimension for each WEC member country represented in the 2014 Trilemma Index as well as their balance score. The trilemma graph on each country profile (upper left corner) illustrates the balance score, which highlights the trade-offs between the three competing dimensions: energy security, energy equity, and environmental sustainability. The table on the right hand side shows the Index rankings from three consecutive years broken down by dimension and trends in performance over the years. Furthermore, the country profile provides a commentary on performance, an indication of trends and future developments, an overview of the country's energy endowment, and contributions of energy sources to total electricity generation as well as relevant key metrics to provide more context.

TRILEMMA BALANCE

Balance score



Index scores for energy security, energy equity, and environmental sustainability highlight the degree of balance among the three dimensions

INDEX RANKINGS AND BALANCE

Overall rank

	2012	2013	2014	Trend	Score
Energy performance	23	31	26	→	
Energy security	39	46	43	↓	B
Energy equity	42	54	44	↓	B
Environmental sustainability	44	35	41	↑	B
Overall rank and balance score	33	33	33	→	BBB

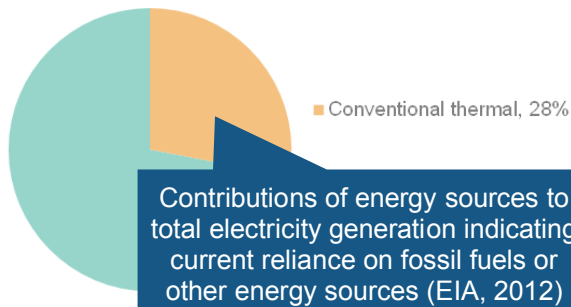
2012-2014 rank for each Index component as well as overall rank

2012-2014 trend for each Index component, +/- 3 positions is considered stable

INDEX COMMENTARY

Overview of current Index ranking and country's energy trilemma, highlighting indicator changes from 2013 to 2014

DIVERSITY OF ELECTRICITY GENERATION



Contributions of energy sources to total electricity generation indicating current reliance on fossil fuels or other energy sources (EIA, 2012)

FOSSIL FUEL RESERVES (IN MTOE)



Resource endowment (WEC, 2013: World Energy Resources). For additional energy sources, for example, unconventional or renewable energy sources visit [www.worldenergy.org/data/resources](http://www.worldenergy.org/data/resources)

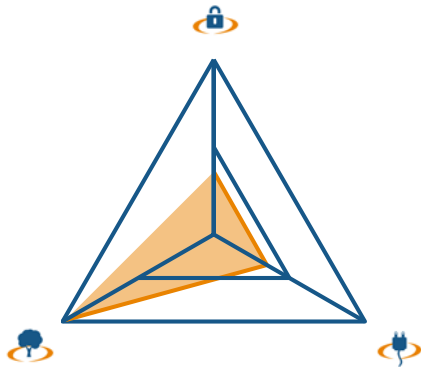
KEY METRICS

Industrial sector (% of GDP)	29.6	GDP per capita (PPP, USD); GDP Group	19,445 (II)
Percent of total GDP that is in the industrial sector (CIA World Factbook, 2013)		GDP (IMF, 2012) and GDP group assignment as defined in this report	
TPEP / TPEC (net energy importer)	0.39	Energy intensity (koe per USD)	0.14
Ratio of total primary energy production to total primary energy consumption, showing the extent to which a country imports or exports energy (EIA, 2010)		Measure of how much energy is required to produce one dollar GDP at purchasing power parity (Enerdata / WEC, 2012)	
Emission intensity (kCO <sub>2</sub> per USD)	0.25	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	4.29
Measures CO <sub>2</sub> emissions from fuel combustion created by the production of one dollar of GDP at purchasing power parity (Enerdata / WEC, 2012)		CO <sub>2</sub> emissions from fuel combustion per person (Enerdata / WEC, 2012)	
Energy affordability (USD per kWh, 2013)	0.18	Population with access to electricity (%)	100.0
Average cost of electricity (IEA, 2011-2013)		Access to electricity (SE4All, 2010)	







TRENDS AND OUTLOOK

Commentary explaining recent energy policy developments, future trends for country's sustainability balance and issues of importance for future policy making as provided by the country's WEC member committee

## TRILEMMA BALANCE



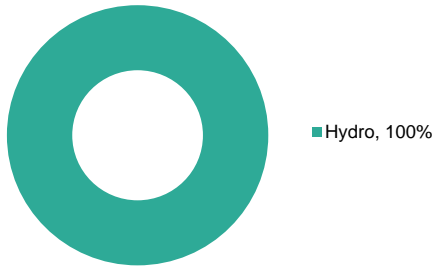
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	34	49	53	↓	
 Energy security	63	87	83	↓	<b>C</b>
 Energy equity	71	76	84	↓	<b>C</b>
 Environmental sustainability	3	3	3	→	<b>A</b>
Contextual performance	85	84	67	↑	
 Political strength	71	68	70	→	
 Societal strength	74	74	71	→	
 Economic strength	105	106	69	↑	
<b>Overall rank and balance score</b>	<b>47</b>	<b>60</b>	<b>57</b>	<b>↓</b>	<b>ACC</b>

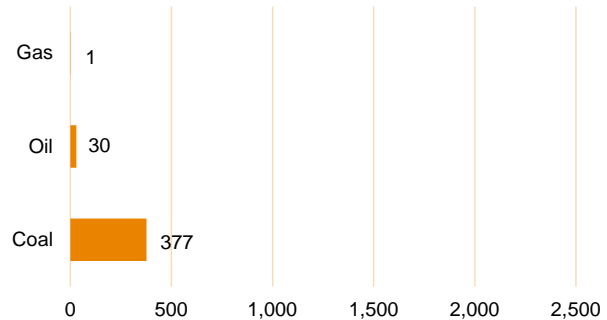
## INDEX COMMENTARY

Albania moves up three places in this year's Index. Albania continues to exhibit outstanding performance on the environmental sustainability dimension, offset by weaker results on the other two dimensions of the energy trilemma. In terms of energy security, Albania continues to increase its oil stocks, and further decreases its dependence on fuel imports. However, transmission and distribution losses have increased again and the overall perceived quality of electricity supply has suffered. There is a slight drop in energy equity as gasoline prices increase and household expenditure on electricity becomes comparatively more expensive, while an electricity generation portfolio that employs mostly hydropower enables the country to remain among the top three nations in the world with the lowest environmental impact. The majority of the contextual indicators remain stable, and there is a significant improvement in the country's economic strength caused by an update of the data points underlying the indicator for cost of living expenditure.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

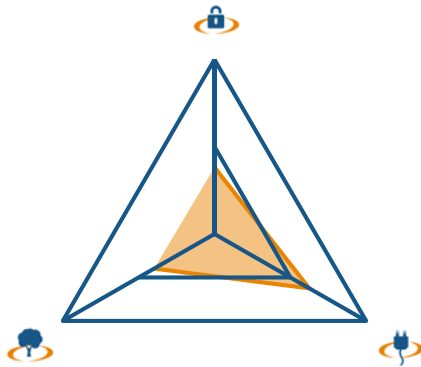


## KEY METRICS

Industrial sector (% of GDP)	12.0	GDP per capita (PPP, USD); GDP Group	9,207 (III)
TPEP / TPEC (net energy importer)	0.79	Energy intensity (koe per USD)	0.08
Emission intensity (kCO <sub>2</sub> per USD)	0.14	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	1.11
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

TRILEMMA BALANCE



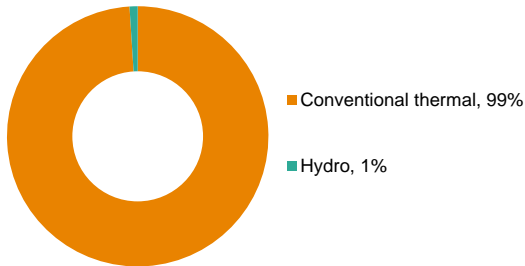
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	78	81	69	↑	
Energy security	80	86	80	→	<b>C</b>
Energy equity	63	68	49	↑	<b>B</b>
Environmental sustainability	77	74	78	→	<b>C</b>
Contextual performance	96	99	77	↑	
Political strength	116	120	116	→	
Societal strength	97	97	94	→	
Economic strength	66	75	36	↑	
<b>Overall rank and balance score</b>	<b>85</b>	<b>88</b>	<b>79</b>	<b>↑</b>	<b>BCC</b>

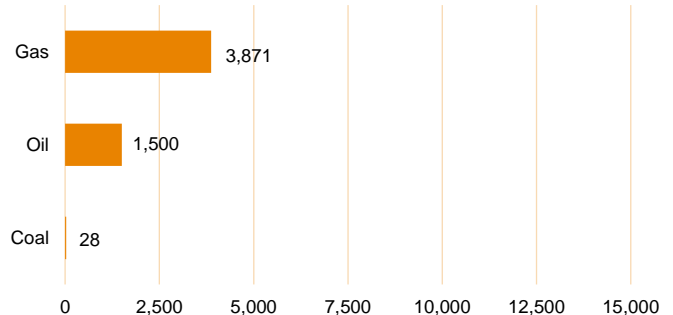
INDEX COMMENTARY

Algeria has gone up by nine places in this year's Index. The energy trilemma appears less balanced in 2014 because the country's performance on the energy equity dimension has improved. Although the perceived quality of the electricity supply continues to worsen, gasoline has become more affordable. Performance on energy security improves, mostly because of a decreased economic dependence on fuel exports. The environmental sustainability dimension sees a slight decline driven by higher energy and emission intensity and an increase in CO<sub>2</sub> emissions from electricity generation. Algeria's contextual performance for political and societal strength remains weak, while the country's comparative economic strength improves significantly, caused by the availability of data points underlying the indicator for cost of living expenditure.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)



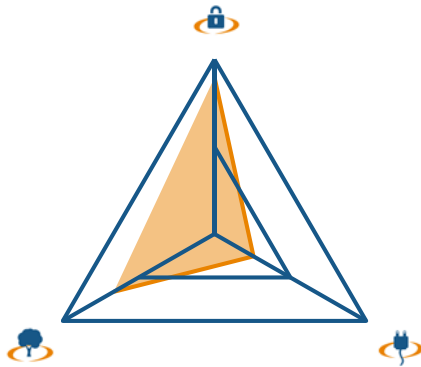
KEY METRICS

Industrial sector (% of GDP)	62.6	GDP per capita (PPP, USD); GDP Group	7,305 (III)
TPEP / TPEC (net energy exporter)	3.96	Energy intensity (koe per USD)	0.17
Emission intensity (kCO <sub>2</sub> per USD)	0.40	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	3.08
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	99.3

TRENDS AND OUTLOOK

- In recent years, Algeria has continuously developed its economy and improved its energy system. Energy policies have been implemented to intensify oil and gas exploration efforts to increase reserves, to promote renewable energy and energy efficiency and increase the share of renewables in electricity generation to 40% by 2030.
- Policymakers should continue to focus on: 1) increasing the proportion of renewable energy in electricity generation; 2) the development of energy efficiency because there is great potential for improvement; 3) the development of a renewable energy industry that is economically sustainable; and 4) the development and support of R&D and training to increase the transfer of knowledge and technology.

## TRILEMMA BALANCE



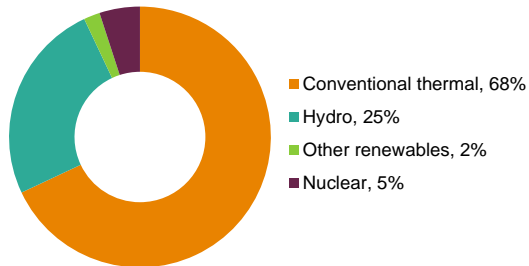
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	10	12	45	↓	
Energy security	11	14	14	→	<b>A</b>
Energy equity	23	33	96	↓	<b>C</b>
Environmental sustainability	38	38	44	↓	<b>B</b>
Contextual performance	78	83	98	↓	
Political strength	88	80	89	→	
Societal strength	67	67	64	→	
Economic strength	77	100	122	↓	
<b>Overall rank and balance score</b>	<b>19</b>	<b>26</b>	<b>60</b>	<b>↓</b>	<b>ABC</b>

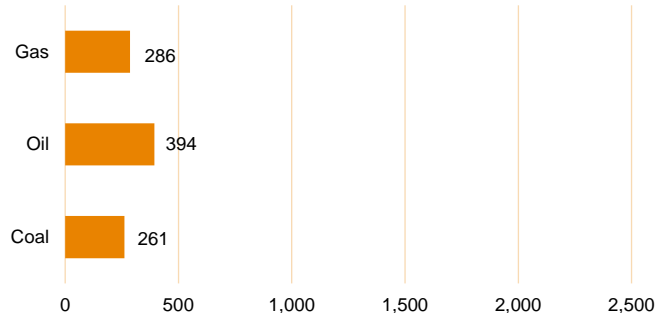
## INDEX COMMENTARY

Argentina drops 34 places in the 2014 Index. While energy security indicators remain mostly stable, Argentina's environmental sustainability performance has deteriorated slightly due to higher CO<sub>2</sub> emissions from electricity generation. The energy equity dimension sees a major drop in 2014 as gasoline prices spike and the perceived quality of the electricity supply continues to decrease. Contextually, Argentina continues to struggle with indicators of political, social and economic strength. The significant change in economic strength is caused by the absence of data points underlying the indicator for cost of living expenditure.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



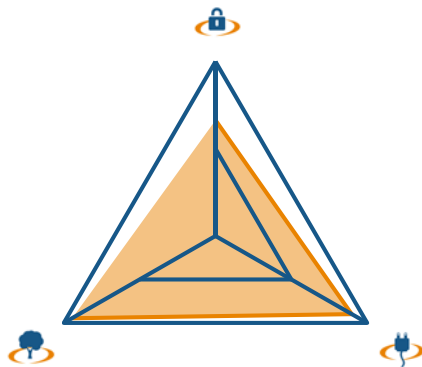
## KEY METRICS

Industrial sector (% of GDP)	29.7	GDP per capita (PPP, USD); GDP Group	17,917 (II)
TPEP / TPEC (net energy exporter)	1.02	Energy intensity (koe per USD)	0.13
Emission intensity (kCO <sub>2</sub> per USD)	0.29	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	4.56
Energy affordability (USD per kWh, 2011)	0.02	Population with access to electricity (%)	88.2

## TRENDS AND OUTLOOK

- Argentina, although positioned relatively high in the Index, still faces major challenges and is expected to drop further in the rankings.
- With the current energy policy of low prices for producers and high subsidies to consumers continues, there is little chance to reverse the decline production. Oil production declined by 30% since 1998, while natural gas production declined by 8% since 2006. As a consequence, Argentina, previously a net energy exporter in 2006 with a surplus of US\$6 billion, became a net energy importer in 2011 with a deficit of US\$3 billion.
- The lack of investment in all energy sectors has become a major challenge, further intensified by the nationalisation of the oil company YPF (by expropriation of Repsol shares in Argentina's biggest oil company). The new management is struggling to attract new investors, which are necessary to exploit the large reserves of unconventional oil and natural gas in Argentina.
- Policymakers urgently need to focus on restoring the energy markets and attracting a great deal of investment by implementing clear and stable rules and regulations.

## TRILEMMA BALANCE



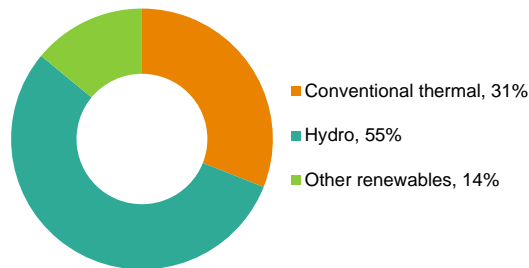
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	3	5	5	→	
Energy security	30	33	44	↓	<b>B</b>
Energy equity	7	7	10	→	<b>A</b>
Environmental sustainability	7	7	8	→	<b>A</b>
Contextual performance	12	12	13	→	
Political strength	9	12	12	→	
Societal strength	16	16	13	→	
Economic strength	28	27	19	↑	
<b>Overall rank and balance score</b>	<b>4</b>	<b>4</b>	<b>7</b>	<b>→</b>	<b>AAB</b>

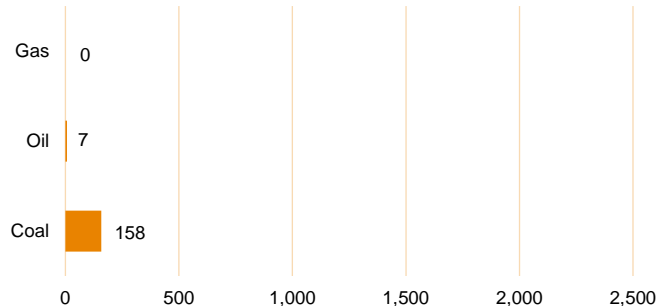
## INDEX COMMENTARY

Austria continues to balance the three dimensions of the trilemma fairly well, but has fallen three places down the Index. Even though the country has a well-diversified generation portfolio, energy security remains the country's weakest dimension, with comparatively low oil and oil product stocks, and reliance on fuel imports. For the most part, energy equity and environmental sustainability indicators remain stable, although CO<sub>2</sub> emissions from electricity generation continue to increase. Performance on contextual indicators is very good.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



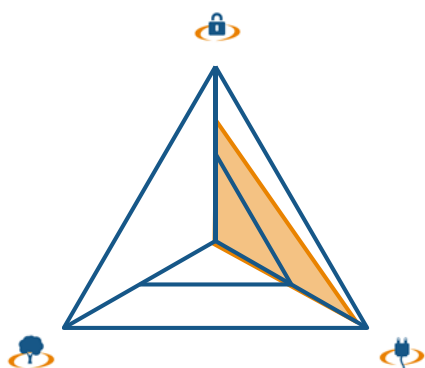
## KEY METRICS

Industrial sector (% of GDP)	28.6	GDP per capita (PPP, USD); GDP Group	41,908 (I)
TPEP / TPEC (net energy importer)	0.36	Energy intensity (koe per USD)	0.11
Emission intensity (kCO <sub>2</sub> per USD)	0.21	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	7.58
Energy affordability (USD per kWh, 2013)	0.27	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- The Energy Trilemma Index reflects Austria's situation very well. Energy security, however, does not yet reflect the accomplishments achieved by the country. For example: Austria's increasing energy self-sufficiency, which is also one of the country's main long goals; or the progress since 1980 in the renewable energy sector, where Austria has more than doubled the production of renewable 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 EU Emissions Trading Scheme (EU ETS) and 21% from 2005 levels for sectors included in EU ETS; and a 20% improvement in energy efficiency. In addition, Austria set the goal of achieving 100% energy self-sufficiency with renewables by 2050. Lastly, Austria's Sustainability Strategy lists 20 goals to: increase quality of life overall; strengthen economic growth; support sustainable goods and services; and optimise the transport system.
- Key issues policymakers need to focus on are: 1) reduce dependence on energy imports; 2) increase efforts around energy efficiency and energy savings; 3) decrease energy intensity; and 4) increase the use of renewable energy.

## TRILEMMA BALANCE



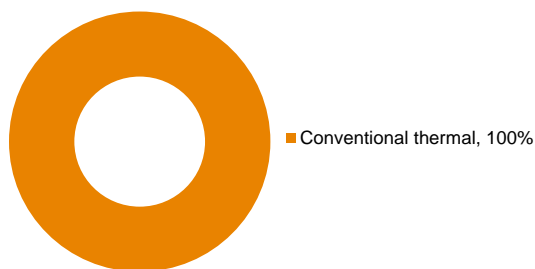
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	59	52	58	→	
Energy security	40	23	40	→	<b>B</b>
Energy equity	19	19	13	↑	<b>A</b>
Environmental sustainability	126	125	126	→	<b>D</b>
Contextual performance	35	31	43	↓	
Political strength	51	54	60	↓	
Societal strength	41	41	45	↓	
Economic strength	14	8	31	↓	
<b>Overall rank and balance score</b>	<b>48</b>	<b>38</b>	<b>47</b>	<b>→</b>	<b>ABD</b>

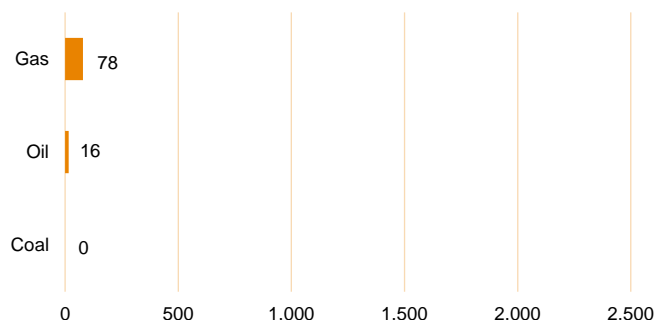
## INDEX COMMENTARY

Bahrain drops nine places in the Index. The small island country continues to struggle with balancing the energy trilemma. The high levels of energy security and equity are offset by its underperformance in environmental sustainability. Although Bahrain's electricity generation portfolio is not diversified and indigenous resources slowly diminish, the country performs relatively well on the energy security dimension. Bahrain's high ranking on the energy equity dimension is driven by low gasoline prices and the availability of affordable and reliable electricity. However, the country's impact on the environment remains large, with comparatively poor air and water quality, and very high energy and emission intensity. Contextually, Bahrain's indicators of political and societal strength are average and stable, while, economically, high macroeconomic stability is partly offset by comparatively higher living costs.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



## KEY METRICS

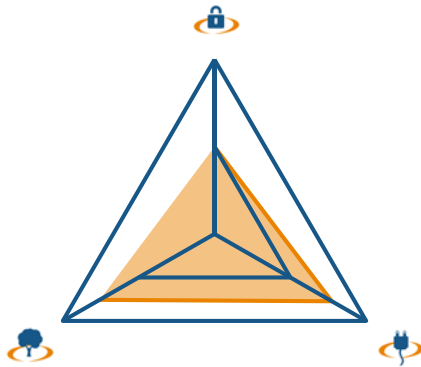
Industrial sector (% of GDP)	46.7	GDP per capita (PPP, USD); GDP Group	33,136 (II)
TPEP / TPEC (net energy importer)	0.99	Energy intensity (koe per USD)	0.37
Emission intensity (kCO <sub>2</sub> per USD)	0.85	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	94.1

## TRENDS AND OUTLOOK

- Bahrain holds comparatively small reserves, and, at its current production rate, its recoverable natural gas reserves will be depleted in less than 8 years. At the same time Bahrain experiences a continuously increasing demand for energy due to growth in population and of the economy. Energy infrastructure to import gas as well as augment oil production and refinery capacity is under development.
- Bahrain's latest National Economic Strategy (2009-2014) identifies energy efficiency and renewable energy technologies as key instruments to sustain energy security for economic growth and improve environmental sustainability. Both areas are also identified as important in the strategy document Economic Vision 2030. Bahrain has ratified the Kyoto protocol and CO<sub>2</sub> emissions have been decreasing since 2000.
- Even though a comprehensive energy and climate policy framework is not yet in place, Bahrain has initiated a number of initiatives focusing on energy security, energy efficiency and the development of renewable energy sources. Initiatives include: an Energy Efficiency Implementation Programme in collaboration with the World Bank to tackle energy inefficiencies in buildings; solar and wind "pilot" projects initiated by the Electricity and Water Authority to assess the potential of alternative energy sources; efforts by the National Oil and Gas Authority aiming to double oil production by 2018 and increase the country's refinery capacity by 50%, a strong asset for the Kingdom due to the abundance of oil in neighbouring countries.



TRILEMMA BALANCE



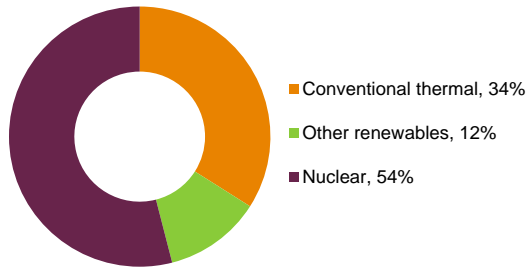
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	24	20	23	→	
Energy security	69	63	65	↑	<b>B</b>
Energy equity	15	13	29	↓	<b>A</b>
Environmental sustainability	41	34	32	↑	<b>B</b>
Contextual performance	20	17	18	→	
Political strength	18	16	17	→	
Societal strength	14	14	17	→	
Economic strength	43	45	34	↑	
<b>Overall rank and balance score</b>	<b>20</b>	<b>17</b>	<b>21</b>	<b>→</b>	<b>ABB</b>

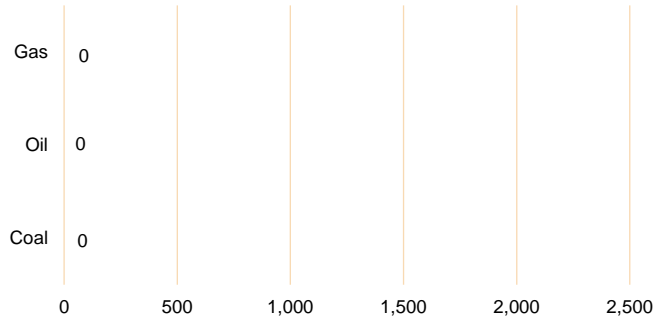
INDEX COMMENTARY

Belgium drops four places in this year's Index with only few overall changes in either energy or contextual performance. Energy security continues to be the weakest of the three dimensions because the country has comparatively low strategic oil reserves and a high reliance on energy imports. Energy equity deteriorates due to higher, but still affordable gasoline and electricity prices as well as a lower perceived quality of the electricity supply. Environmental sustainability remains above average. Belgium's contextual performance stays strong overall.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)

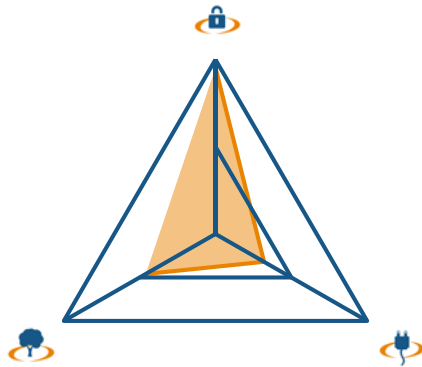


KEY METRICS

Industrial sector (% of GDP)	22.6	GDP per capita (PPP, USD); GDP Group	37,448 (I)
TPEP / TPEC (net energy importer)	0.20	Energy intensity (koe per USD)	0.16
Emission intensity (kCO <sub>2</sub> per USD)	0.26	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	8.55
Energy affordability (USD per kWh, 2013)	0.26	Population with access to electricity (%)	100.0

TRENDS AND OUTLOOK

## TRILEMMA BALANCE



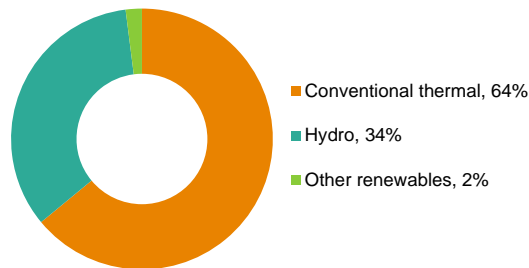
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	53	44	50	→	
Energy security	21	4	7	↑	<b>A</b>
Energy equity	80	84	88	↓	<b>C</b>
Environmental sustainability	65	71	70	↓	<b>C</b>
Contextual performance	83	86	86	→	
Political strength	103	100	101	→	
Societal strength	99	99	107	↓	
Economic strength	44	53	46	→	
<b>Overall rank and balance score</b>	<b>60</b>	<b>55</b>	<b>62</b>	<b>→</b>	<b>ACC</b>

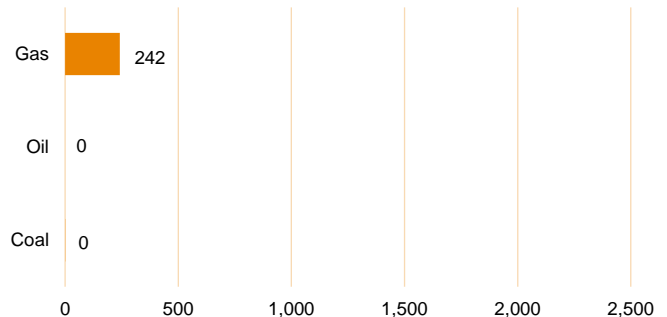
## INDEX COMMENTARY

Bolivia drops seven places in the Index maintaining strong energy security indicators and comparatively weaker energy equity and environmental sustainability dimensions. Reliance on energy exports is moderate, and the country's electricity fuel mix of thermal and hydropower is further diversified. However, attention still needs to be paid to the reliability of the electricity transmission and distribution network. Twenty percent of the Bolivian population is without electricity, and for those with access, electricity remains relatively expensive. The country's environmental sustainability is stable, with no reductions in energy or emission intensity and a further increase in CO<sub>2</sub> emissions from electricity generation. Bolivia's political and societal indicators' performance remains weak overall, while the comparatively stronger indicators of economic strength improve slightly.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



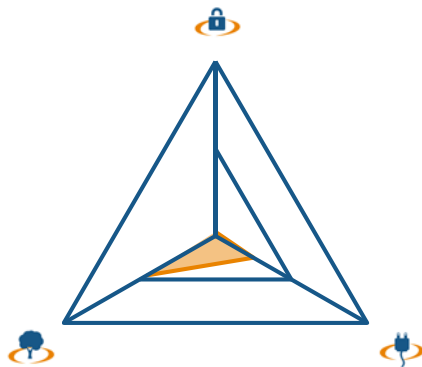
## KEY METRICS

Industrial sector (% of GDP)	38.5	GDP per capita (PPP, USD); GDP Group	5,041 (IV)
TPEP / TPEC (net energy exporter)	2.75	Energy intensity (koe per USD)	0.18
Emission intensity (kCO <sub>2</sub> per USD)	0.34	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	1.58
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	80.2

## TRENDS AND OUTLOOK

- The energy sector is of political and economic significance to Bolivia, which is a meaningful contributor to regional natural gas supplies. Bolivia exports natural gas to Brazil and Argentina, and its proven natural gas reserves rank as the fifth largest reserves in South America. Bolivia has a fairly small amount of proven oil reserves, and in recent years has been a net oil importer because production has failed to keep pace with consumption. There is good potential for renewable energy derived from by-products of sugar cane and wood industries, and the vast hydroelectric potential has not been fully exploited.
- Recent developments include: an intensive campaign in oil exploration to replenish reserves and maintain the domestic market and export contracts of natural gas to Brazil and Argentina; and a recently approved Investment Act, which will be complemented by a Law of Incentives for the oil sector, a new hydrocarbons law and a law on prior consultation.
- Key issues for policymakers to focus on: 1) creation of an attractive, enabling environment for investment to flow into transport of hydrocarbons in both the internal network and future export markets; 2) continuous assessment of exploration and production potential of domestic natural gas resources; 3) engagement with the general public in order to increase public acceptance, shorten the time of pre-consultation with indigenous peoples and allow for a speedier approval of contracts; and 4) further development of renewables including hydropower.

## TRILEMMA BALANCE



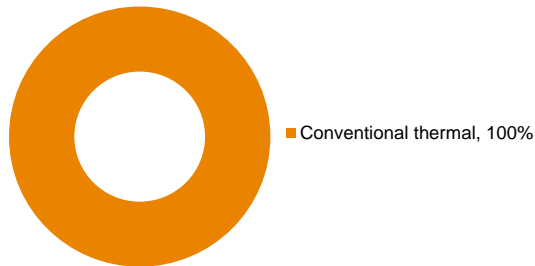
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	109	109	121	↓	
Energy security	121	126	126	↓	<b>D</b>
Energy equity	96	97	98	→	<b>D</b>
Environmental sustainability	69	62	71	→	<b>C</b>
Contextual performance	59	63	33	↑	
Political strength	40	38	35	↑	
Societal strength	56	56	66	↓	
Economic strength	83	82	15	↑	
<b>Overall rank and balance score</b>	<b>98</b>	<b>99</b>	<b>91</b>	<b>↑</b>	<b>CDD</b>

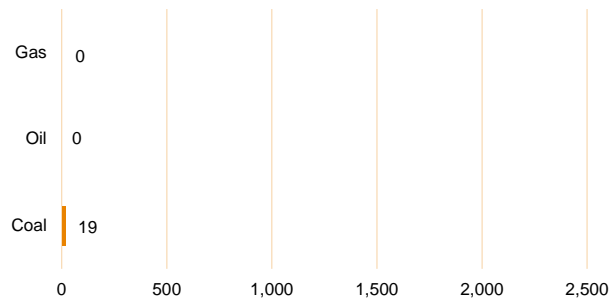
## INDEX COMMENTARY

Botswana has improved its position in this year's Index by eight places. The country continues to struggle with balancing the three facets of the energy trilemma, and each dimension's ranking is quite different from the other two. Energy security is very weak as the country relies exclusively on conventional thermal power for electricity generation, and electricity transmission and distribution losses remain high. Energy equity performance is unchanged. However, only 43% of the population has access to modern electricity services, which is a big hurdle that the country must overcome. An increase in emission intensity causes the country to slip on environmental sustainability performance. Performance on indicators of political and societal strength remains mostly stable, while indicators of economic strength have improved substantially because of the up-to-date data points underlying the indicator for cost of living expenditure, and an improved macroeconomic stability.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

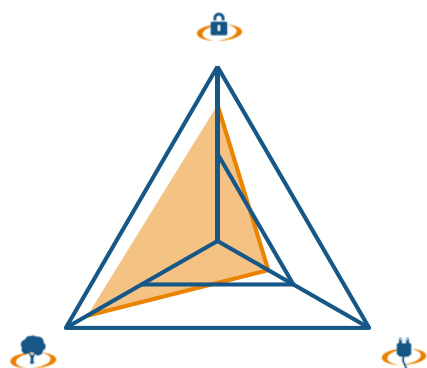


## KEY METRICS

Industrial sector (% of GDP)	35.7	GDP per capita (PPP, USD); GDP Group	15,706 (II)
TPEP / TPEC (net energy importer)	0.34	Energy intensity (koe per USD)	0.09
Emission intensity (kCO <sub>2</sub> per USD)	0.21	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	2.74
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	43.1

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



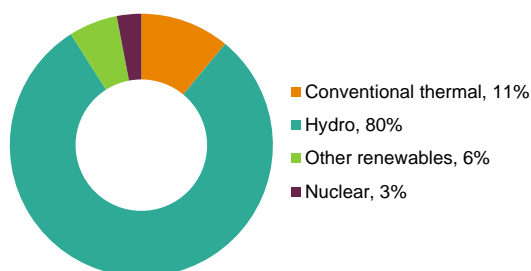
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	39	30	29	↑	
Energy security	43	27	29	↑	<b>B</b>
Energy equity	89	86	86	→	<b>C</b>
Environmental sustainability	12	17	19	↓	<b>A</b>
Contextual performance	65	58	45	↑	
Political strength	62	63	65	→	
Societal strength	66	66	59	↑	
Economic strength	64	37	25	↑	
<b>Overall rank and balance score</b>	<b>44</b>	<b>34</b>	<b>30</b>	<b>↑</b>	<b>ABC</b>

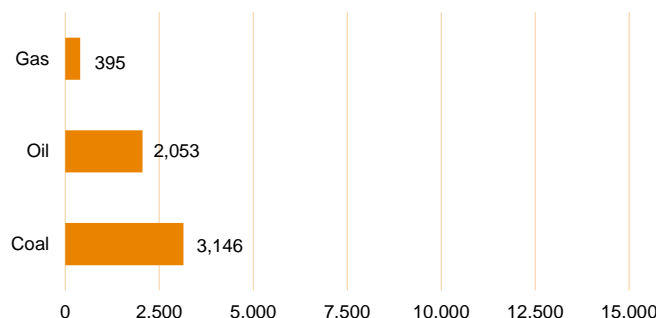
## INDEX COMMENTARY

Brazil improves by four places in this year's Index. Brazil's balancing of the energy trilemma is lopsided, with high rankings in energy security and environmental sustainability, but low levels of energy equity. Although the affordability of gasoline improves while electricity prices remain stable, Brazil's energy equity score still lags behind the country's performance on the other energy dimensions as the perceived quality of the electricity supply continues to worsen. With electricity being generated mostly with hydropower, Brazil's environmental impact is relatively low and earns a very good ranking. However, attention must be paid to slightly rising energy and emission intensity. While the majority of the contextual indicators remain mostly stable, there is a significant improvement in the country's economic strength caused by an update of the data points underlying the indicator for cost of living expenditure.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



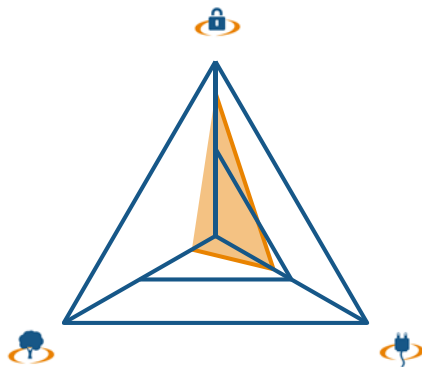
## KEY METRICS

Industrial sector (% of GDP)	26.4	GDP per capita (PPP, USD); GDP Group	11,876 (III)
TPEP / TPEC (net energy importer)	0.84	Energy intensity (koe per USD)	0.14
Emission intensity (kCO <sub>2</sub> per USD)	0.21	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	2.14
Energy affordability (USD per kWh, 2011)	0.19	Population with access to electricity (%)	98.9

## TRENDS AND OUTLOOK

- The country's recent energy policy developments were directed to: the development of large offshore oil and gas reserves found under a layer of salt in 2007 (pre-salt oil); the development of renewable energy sources including wind and solar power, and biomass derived energies, including ethanol, bagasse, biodiesel; and implementation of energy prices that encourage energy efficiency and saving. The transportation sector is expected to contribute to energy efficiency measures, including electrical vehicles, road improvements, as well as increased rail and waterways transportation. These developments are expected to have a strong impact on, and lead to improvements in, all three dimensions of the energy policy trilemma.
- Policymakers should focus on: 1) the possibilities presented by biomass, including sugar cane, planted wood and other crops; and 2) the opportunities arising from the successful exploitation of the pre-salt oil and gas deposits. Both will impact positively on the country's energy security and change Brazil's role in the global energy market, but the effects on the environment need to be considered. Lastly, the development, financing and implementation of energy efficiency programmes, involving thousands of processes and appliances and millions of consumers on which the success of such measures depend, should advance more quickly.

## TRILEMMA BALANCE



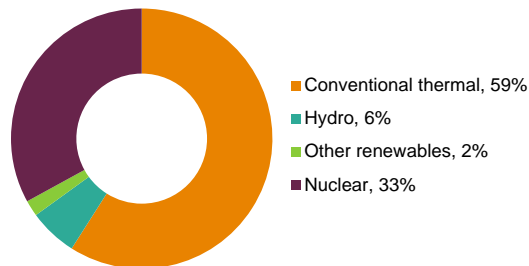
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	74	71	78	↓	
Energy security	28	26	24	↑	<b>A</b>
Energy equity	74	77	80	↓	<b>C</b>
Environmental sustainability	107	108	109	→	<b>D</b>
Contextual performance	54	54	48	↑	
Political strength	48	49	50	→	
Societal strength	52	52	58	↓	
Economic strength	67	61	50	↑	
<b>Overall rank and balance score</b>	<b>66</b>	<b>70</b>	<b>67</b>	→	<b>ACD</b>

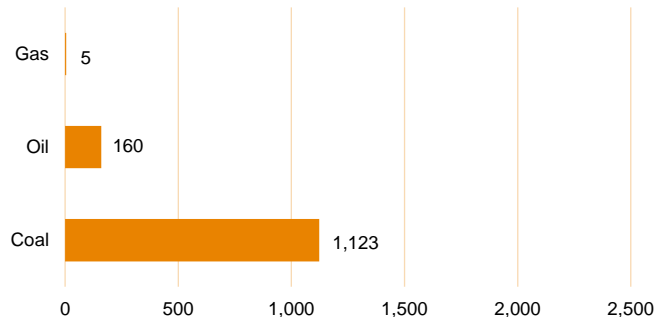
## INDEX COMMENTARY

Bulgaria's overall Index ranking is stable, although it sees minimal negative change across both energy and contextual indicators. The competing dimensions of the energy trilemma continue to be heavily unbalanced, as Bulgaria has a high level of energy security, performs moderately on energy equity, and does a poor job in mitigating its environmental impact. Energy security, the strongest of all dimensions, improves further as the country increases its reserve oil stocks and transmission and distribution losses decrease, but is expected to worsen due to lack of investment. Energy equity performance remains lackluster, with comparatively high levels of household spending on electricity services driven by a questionable pricing policy. Environmental sustainability remains Bulgaria's weakest dimension, with energy and emission intensity being high and above European average, comparatively poor air and water quality, and high CO<sub>2</sub> emissions from electricity generation. Overall contextual performance is stable, as improvements in economic strength are offset by risky declines in political stability, control of corruption and rule of law.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



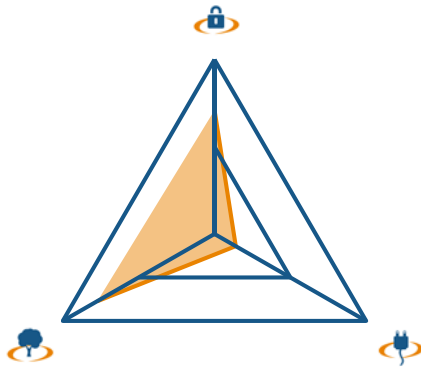
## KEY METRICS

Industrial sector (% of GDP)	30.3	GDP per capita (PPP, USD); GDP Group	14,076 (III)
TPEP / TPEC (net energy importer)	0.55	Energy intensity (koe per USD)	0.21
Emission intensity (kCO <sub>2</sub> per USD)	0.52	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	6.30
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- In July 2012 the Bulgarian Parliament amended the existing Energy Act to: guarantee equal access to electricity and gas grids; strengthen the power of national energy regulators; improve market transparency; promote trans-border trade; and enhance end-user rights. The new legal framework was expected to improve the sustainable use of renewable energy sources, market liberalisation and social equity. The amendments have not yet resulted in the expected improvements.
- Key issues policymakers need to focus on are: 1) improved energy security by building a reliable energy infrastructure, further diversifying sources and routes of energy supply, and optimizing the use of indigenous energy resources; 2) increased energy efficiency; 3) the promotion of clean development mechanisms; 4) social protection; 5) pursuing the ambitious targets of giving 30% of households access to natural gas by 2020 as set out in the national energy strategy; and 6) respect for the rule of law.

## TRILEMMA BALANCE



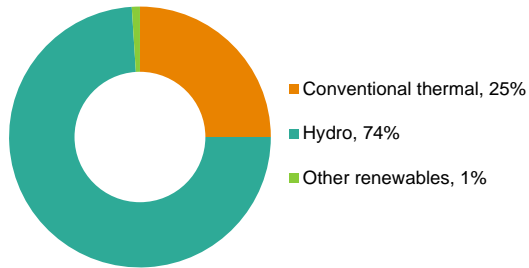
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	58	70	59	→	
Energy security	32	62	38	↓	<b>B</b>
Energy equity	108	107	111	→	<b>D</b>
Environmental sustainability	42	39	30	↑	<b>B</b>
Contextual performance	113	104	109	↑	
Political strength	110	111	111	→	
Societal strength	115	115	121	↓	
Economic strength	84	74	56	↑	
<b>Overall rank and balance score</b>	<b>75</b>	<b>82</b>	<b>70</b>	<b>↑</b>	<b>BBD</b>

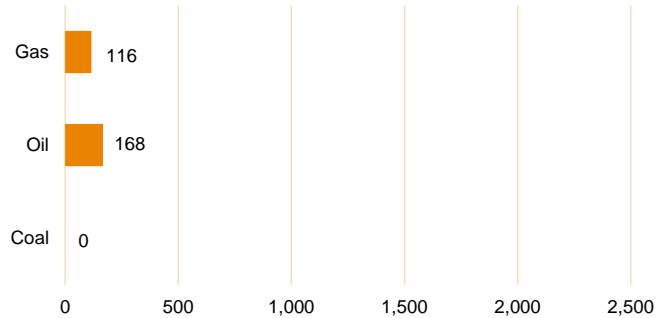
## INDEX COMMENTARY

Cameroon improves its position by 12 places in this year's Index, mainly due to a relative improvement in energy security, which is better measurable in 2014 because of the availability of additional data points. As more people gain access to electricity, meeting the growth in energy consumption needs to be at the centre of attention as well as the reliability of the electricity transmission and distribution network. Energy equity, Cameroon's weakest energy performance dimension, does not improve as access to electricity remains at a low 49% of the population and both gasoline and electricity are to a large extent unaffordable. Cameroon's high share of hydropower in its electricity fuel mix enables the country to maintain a comparatively small environmental footprint. Declines in energy intensity and CO<sub>2</sub> emissions from electricity generation allow the country to move its environmental sustainability ranking up nine places. Contextually, performance is stable, but low. Economic strength remains Cameroon's strongest contextual dimension. Further improvements are caused by an update of the data points underlying the indicator for cost of living expenditure.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

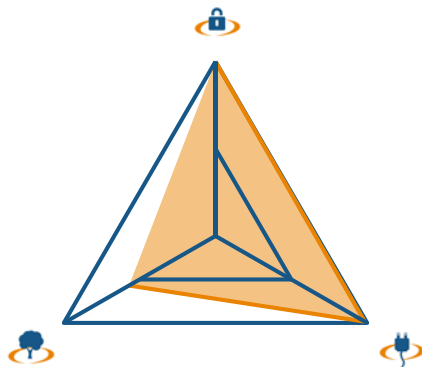


## KEY METRICS

Industrial sector (% of GDP)	27.3	GDP per capita (PPP, USD); GDP Group	2,338 (IV)
TPEP / TPEC (net energy exporter)	1.53	Energy intensity (koe per USD)	0.16
Emission intensity (kCO <sub>2</sub> per USD)	0.11	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.24
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	49.0

## TRENDS AND OUTLOOK

TRILEMMA BALANCE



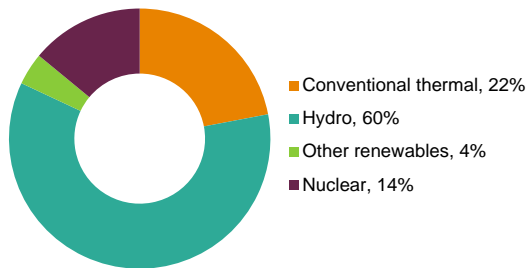
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	9	8	4	↑	
Energy security	2	1	1	→	<b>A</b>
Energy equity	2	2	2	→	<b>A</b>
Environmental sustainability	66	60	56	↑	<b>B</b>
Contextual performance	17	14	14	→	
Political strength	11	10	10	→	
Societal strength	10	10	14	↓	
Economic strength	48	46	27	↑	
<b>Overall rank and balance score</b>	<b>10</b>	<b>6</b>	<b>6</b>	<b>↑</b>	<b>AAB</b>

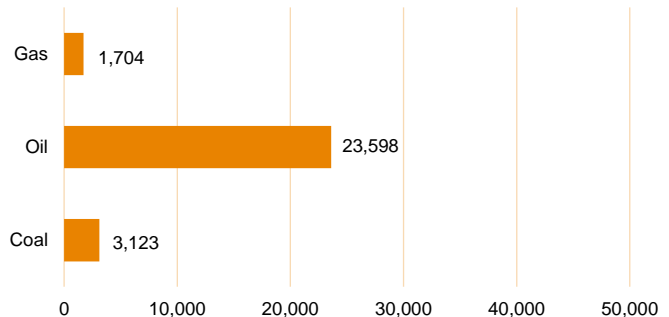
INDEX COMMENTARY

Canada maintains its sixth place in the overall Index ranking. Although one of the top Index performers overall, Canada’s weaker environmental sustainability ranking continues to undermine its otherwise excellent performance. Canada, one of the largest energy exporters in the world, ranks exceptionally well on the energy security dimension with a favourable energy export-to-import ratio, a significantly diversified electricity generation portfolio away from fossil fuels and a low economic dependency on fuel exports. Energy equity is also high with plentiful, relatively affordable energy. Environmental sustainability remains Canada’s weakest energy dimension with comparatively high, although decreasing levels of, energy and emission intensity due to long distances and a higher reliance on energy-intensive resource development industries than most industrialised countries. Emissions per kWh generated stay at relatively low levels because of the hydro-heavy electricity fuel mix. Contextual performance is stable and strong.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)



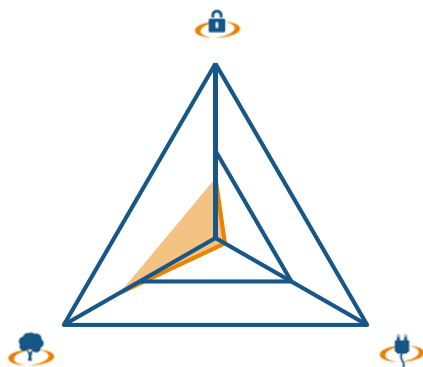
KEY METRICS

Industrial sector (% of GDP)	28.4	GDP per capita (PPP, USD); GDP Group	42,469 (I)
TPEP / TPEC (net energy exporter)	1.41	Energy intensity (koe per USD)	0.20
Emission intensity (kCO <sub>2</sub> per USD)	0.41	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	14.76
Energy affordability (USD per kWh, 2012)	0.10	Population with access to electricity (%)	100.0

TRENDS AND OUTLOOK

- Canada’s high and improving position in the Index reflects the country’s extensive and diverse energy resource base and public and private commitment to develop those resources. The two main challenges Canada faces are: balancing resource development with environmental protection; and developing diverse markets for Canada’s energy resources.
- The most recent energy policy developments include: strong focus on developing markets for oil and gas beyond North America; a faster energy infrastructure approvals process; more stringent environmental standards for fossil-fuelled power generation, both federally and provincially. These three developments should support continuing improvement in Canada’s energy balance.
- The three key issues policymakers need to focus on are: 1) managing the environmental/climate impacts of energy resource development; 2) market diversification; and 3) ensuring an appropriate sharing of the benefits from resource development, most notably with Canada’s aboriginal population in whose traditional territory most resource development and delivery projects are being developed.

## TRILEMMA BALANCE



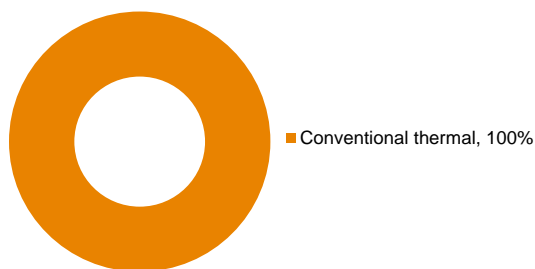
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	120	96	94	↑	
Energy security	124	83	85	↑	<b>C</b>
Energy equity	126	123	121	↑	<b>D</b>
Environmental sustainability	52	50	48	↑	<b>B</b>
Contextual performance	124	113	115	↑	
Political strength	128	124	125	→	
Societal strength	128	128	127	→	
Economic strength	103	58	56	↑	
<b>Overall rank and balance score</b>	<b>124</b>	<b>104</b>	<b>101</b>	<b>↑</b>	<b>BCD</b>

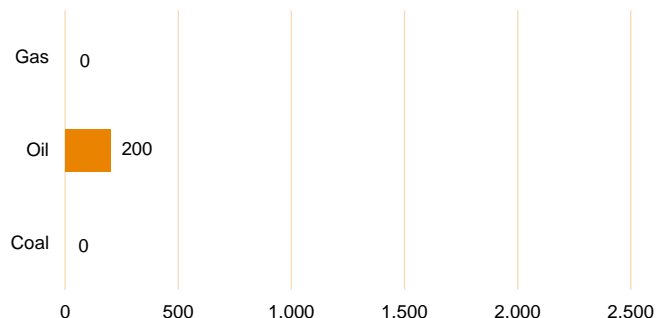
## INDEX COMMENTARY

Chad improves its overall ranking by three positions, and remains in the lowest quartile of the Index. The three sides of the country's energy trilemma are rather unbalanced, with a small degree of energy security being balanced on both sides by very low levels of energy equity and an above-average performance on environmental sustainability. Chad has a very strong ratio of total energy production to total energy consumption because of the very low energy consumption related to low energy access rates. However, performance on other indicators of energy security, for example, diversity of electricity generation or transmission and distribution losses, continues to be very low. Energy equity remains the country's weakest dimension, with 96.5% of the population without access to electricity. The country's environmental sustainability is moderate, with mostly unchanged energy and emission intensity and rather poor air and water quality. Contextually, political and societal strength remain very poor, while economic strength is comparatively stronger.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



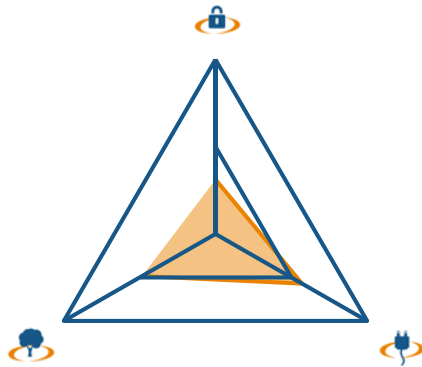
## KEY METRICS

Industrial sector (% of GDP)	9.9	GDP per capita (PPP, USD); GDP Group	2,474 (IV)
TPEP / TPEC (net energy exporter)	78.95	Energy intensity (koe per USD)	0.12
Emission intensity (kCO <sub>2</sub> per USD)	0.02	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.03
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	3.5

## TRENDS AND OUTLOOK



TRILEMMA BALANCE



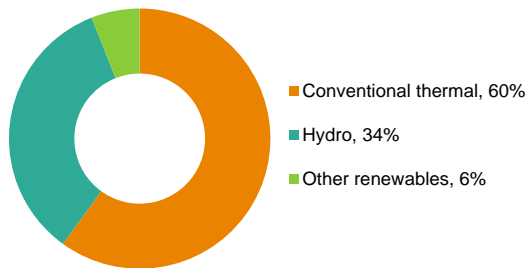
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	56	78	77	↓	
Energy security	61	90	89	↓	<b>C</b>
Energy equity	50	56	55	↓	<b>B</b>
Environmental sustainability	64	72	67	→	<b>C</b>
Contextual performance	25	20	17	↑	
Political strength	27	25	28	→	
Societal strength	36	36	27	↑	
Economic strength	21	19	9	↑	
<b>Overall rank and balance score</b>	<b>43</b>	<b>57</b>	<b>53</b>	<b>↓</b>	<b>BCC</b>

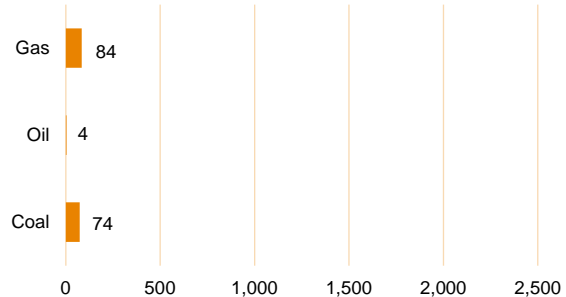
INDEX COMMENTARY

Chile's overall Index ranking is mostly stable. While well-positioned in energy equity and environmental sustainability, Chile lags behind in energy security. The well-diversified electricity generation portfolio and continuously improving reliability of the electricity transmission and distribution network is offset by a high energy consumption growth relative to GDP growth, low oil and oil products stocks, and a fairly high dependence on energy imports. The perceived quality of the electricity supply continues to worsen and may lead to further deterioration in the energy equity dimension in the near future. While the majority of the contextual indicators remain mostly stable, there is a significant improvement in the country's economic strength caused by an update of the data points underlying the indicator for cost of living expenditure.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)

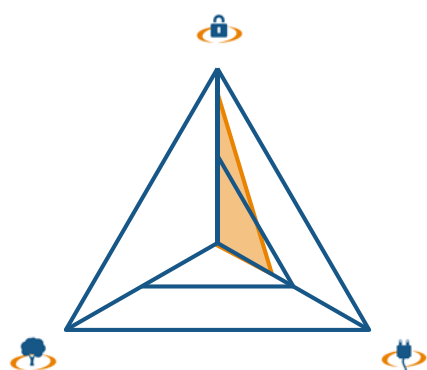


KEY METRICS

Industrial sector (% of GDP)	35.4	GDP per capita (PPP, USD); GDP Group	18,182 (II)
TPEP / TPEC (net energy importer)	0.26	Energy intensity (koe per USD)	0.13
Emission intensity (kCO <sub>2</sub> per USD)	0.28	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	99.6

TRENDS AND OUTLOOK

## TRILEMMA BALANCE



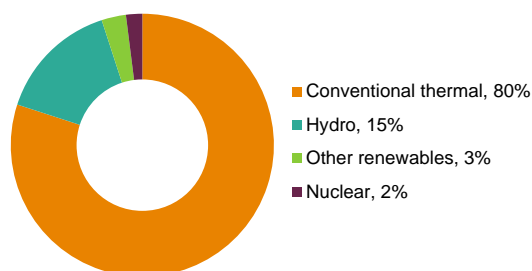
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	85	90	82	→	
Energy security	12	18	19	↓	<b>A</b>
Energy equity	100	101	82	↑	<b>C</b>
Environmental sustainability	125	126	127	→	<b>D</b>
Contextual performance	44	44	47	→	
Political strength	79	76	79	→	
Societal strength	61	61	69	↓	
Economic strength	9	7	8	→	
<b>Overall rank and balance score</b>	<b>76</b>	<b>78</b>	<b>74</b>	<b>→</b>	<b>ACD</b>

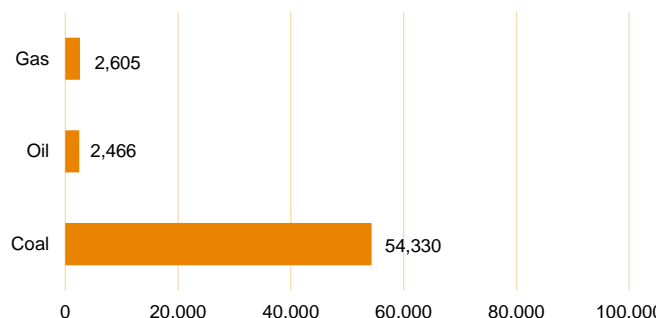
## INDEX COMMENTARY

China moves up four places in the Index, maintaining a rather unbalanced energy trilemma. Energy security remains by far the strongest of this 'Highly-industrialised' country's three dimensions as it struggles to replicate its success in this dimension with equally strong performances in the other two dimensions of the energy trilemma. The energy equity dimension sees a major improvement in 2014 as electricity prices and the perceived quality of the electricity supply remain mostly stable compared to other countries. China fails to improve its ranking on the environmental sustainability dimension, as energy and emissions intensity remain high compared to peer countries. Contextual performance is mostly stable, with mediocre scores for indicators of political and societal strength, and a strong economic performance.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



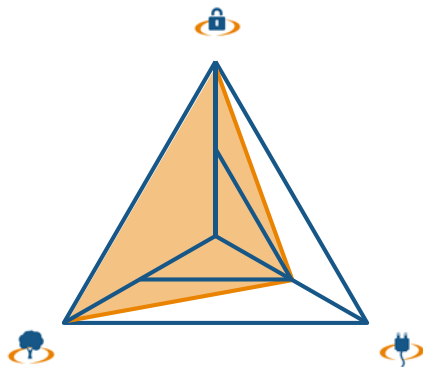
## KEY METRICS

Industrial sector (% of GDP)	43.9	GDP per capita (PPP, USD); GDP Group	9,051 (III)
TPEP / TPEC (net energy importer)	0.90	Energy intensity (koe per USD)	0.27
Emission intensity (kCO <sub>2</sub> per USD)	0.75	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	5.94
Energy affordability (USD per kWh, 2011)	0.05	Population with access to electricity (%)	99.7

## TRENDS AND OUTLOOK

- China is the largest global energy consumer, and emitter of CO<sub>2</sub> emissions. Given its fast growing economy, energy security is crucial to the country's development. To limit its dependence on oil and gas imports, China is set to develop the oil and gas shale industry, and a great number of nuclear power plants are either under construction or in planning, most of them located in coastal areas where the economy is expanding rapidly.
- The 12th Five year plan (2011-2015) prioritises sustainable growth, industrial upgrading, energy efficiency, an increase of the share of renewables and reduction of GHG emissions. The 12<sup>th</sup> Energy Development plan addresses additional issues such as: improvement of safety in coal mines; further exploration of petroleum and natural gas resources; development of unconventional oil and gas resources; and halting foreign oil dependence at 61%.
- To enable continued economic growth, meet the growing demand and manage the environmental impact China needs to continue investing in the diversification of its energy mix, the deployment of clean energy technologies, and energy efficiency and conservation. Strategies such as the 'Top 10,000 programme', which targets 15,000 industrial enterprises, around 160 large transportation enterprises and public buildings (consuming about two-thirds of China's energy) for energy efficiency improvements; the development of a pricing mechanism for natural resources that reflects market forces; resource scarcity and the cost of environmental damage; or the implementation of plans to expand the transmission and distribution are crucial.

## TRILEMMA BALANCE



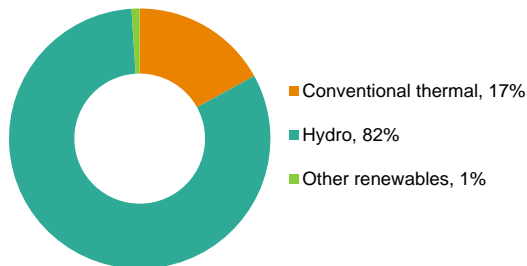
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	15	13	9	↑	
Energy security	6	5	5	→	<b>A</b>
Energy equity	86	85	63	↑	<b>C</b>
Environmental sustainability	4	4	4	→	<b>A</b>
Contextual performance	68	67	68	→	
Political strength	77	72	81	↓	
Societal strength	73	73	67	↑	
Economic strength	59	56	63	↓	
<b>Overall rank and balance score</b>	<b>26</b>	<b>24</b>	<b>16</b>	<b>↑</b>	<b>AAC</b>

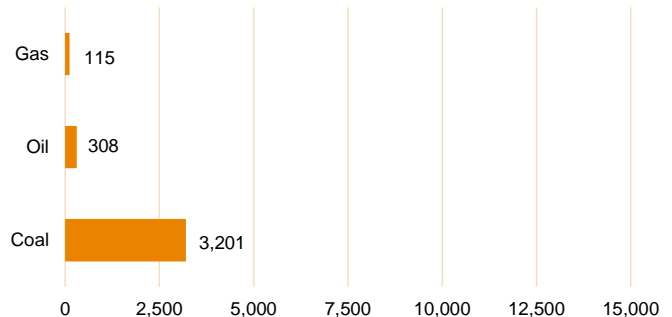
## INDEX COMMENTARY

Colombia strengthens its overall Index position and moves up eight places. A member of the 'Hydro-powered' group of countries, Colombia exhibits extremely strong performance on the energy security and environmental sustainability dimensions of the energy trilemma, but, like many of its peers, is still struggling with a lagging energy equity ranking. Continued strong performance on the energy security dimension is largely driven by the energy exporter's favourable total energy production to consumption ratio and its large strategic oil reserves. Energy equity, Colombia's weakest dimension, sees a significant improvement driven by lower gasoline prices, mostly stable electricity prices and an improved perceived quality of the electricity supply. Environmental sustainability performance is among the best in the world. Contextually, indicators of political and economic strength see some declines, while societal strength sees some improvements.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



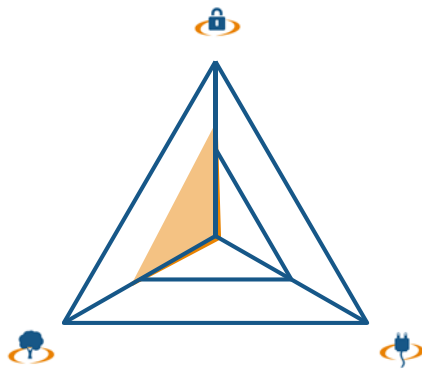
## KEY METRICS

Industrial sector (% of GDP)	37.8	GDP per capita (PPP, USD); GDP Group	10,697 (III)
TPEP / TPEC (net energy exporter)	3.30	Energy intensity (koe per USD)	0.08
Emission intensity (kCO <sub>2</sub> per USD)	0.15	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	1.36
Energy affordability (USD per kWh, 2011)	0.11	Population with access to electricity (%)	96.8

## TRENDS AND OUTLOOK

- Colombia, although in a relatively high position in the Index, still faces major challenges such as: expanding coverage of energy services, and finding solutions based on non-conventional energies; improving quality and reliability of energy services; diversification of the energy mix; and sustaining the positive economic development without increasing CO<sub>2</sub> emissions.
- Main areas policymakers are focusing on are: 1) ensuring the continued development of the mining and energy sector as one of the main drivers of economic growth and social development; 2) promoting of energy efficiency on energy demand and supply side, and consolidating a culture for sustainable use of natural resources; 3) strengthening the participation of different stakeholders in the development phases of the industry; 4) increasing exploration of natural gas; 5) developing and implementing efficient mass transportation systems; 6) ensuring the expansion of electricity generation capacity; and 7) strengthening guarantees and investment opportunities in the country, and boosting investment in science and technology in the energy sector.
- Furthermore, Colombia was an active participant at the Rio+20 summit, and is committed to continue this effort in: setting the objectives of sustainable development; seeking food security; protecting water sources; promoting the use of renewable energy; sustainable city development; protecting the oceans; and increasing employment to reduce poverty.

## TRILEMMA BALANCE



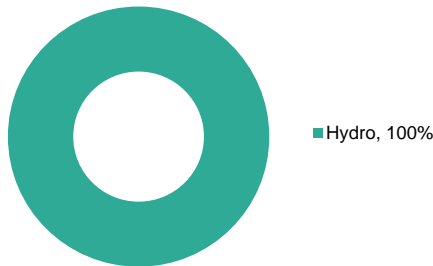
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	63	56	83	↓	
Energy security	47	30	46	→	<b>B</b>
Energy equity	124	121	126	→	<b>D</b>
Environmental sustainability	24	27	58	↓	<b>B</b>
Contextual performance	129	129	129	→	
Political strength	129	129	128	→	
Societal strength	129	129	129	→	
Economic strength	113	115	120	↓	
<b>Overall rank and balance score</b>	<b>88</b>	<b>80</b>	<b>100</b>	<b>↓</b>	<b>BBD</b>

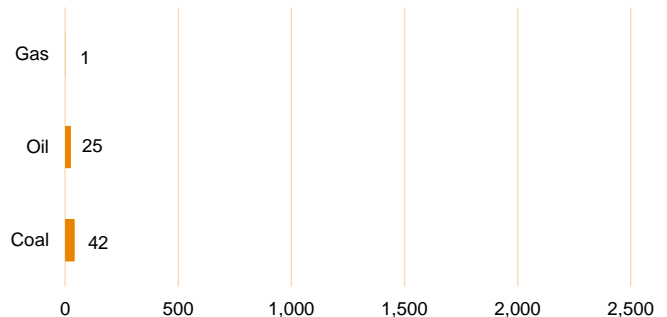
## INDEX COMMENTARY

Congo (DR) drops 20 places in this year's Index. Energy security and environmental sustainable performance continue to be quite good, but the country still struggles with providing affordable, high-quality energy to all its citizens. Higher transmission and distribution losses impact on the country's performance on energy security, while environmental sustainability sees a decline due comparatively high energy intensity (a data point available for the first time). Energy equity performance is very poor as only about 15% of the population has access to electricity. Once the country develops economically, and is able to provide a larger share of its population with access to modern energy services, it will face the challenge of meeting the growing demand while sustaining the current levels of energy security and environmental sustainability. Contextual performance remains very poor across all indicators, especially on indicators of societal and political strength, with marginally better scores on indicators of economic strength. No improvements were made on these contextual indicators during the past year.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

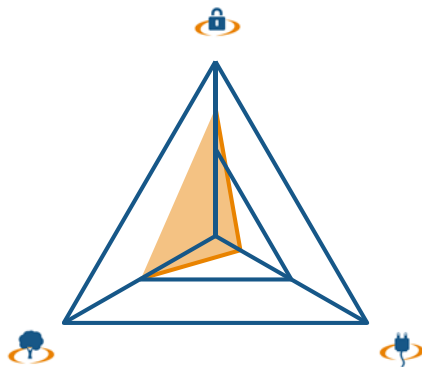


## KEY METRICS

Industrial sector (% of GDP)	21.7	GDP per capita (PPP, USD); GDP Group	606 (IV)
TPEP / TPEC (net energy exporter)	1.10	Energy intensity (koe per USD)	1.05
Emission intensity (kCO <sub>2</sub> per USD)	0.12	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.04
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	15.2

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



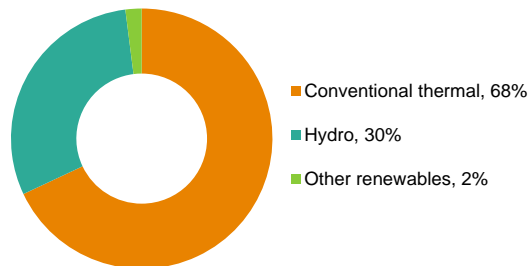
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	73	72	76	→	
Energy security	36	36	35	→	<b>B</b>
Energy equity	111	108	110	→	<b>D</b>
Environmental sustainability	61	68	66	↓	<b>C</b>
Contextual performance	122	128	121	→	
Political strength	126	124	119	↑	
Societal strength	126	126	120	↑	
Economic strength	106	116	89	↑	
<b>Overall rank and balance score</b>	<b>91</b>	<b>93</b>	<b>86</b>	<b>↑</b>	<b>BCD</b>

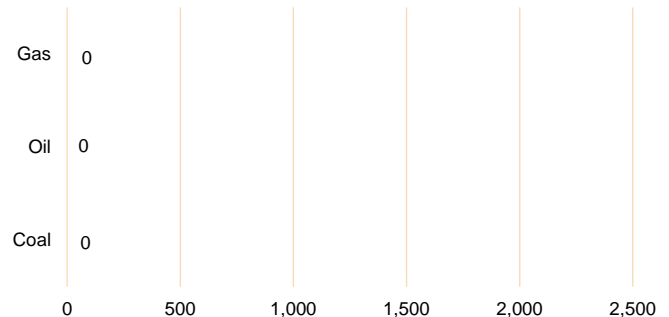
## INDEX COMMENTARY

Côte d'Ivoire improves by seven places in the 2014 Index. The country struggles to balance the energy trilemma, with a fairly good performance on the energy security dimension offset by a mediocre environmental sustainability ranking and low levels of energy equity. At the current level of economic and social development the country's energy security is strong enough, but improvements to the electricity infrastructure will soon be needed, as 23% of generated electricity is lost in transmission and distribution. Energy equity remains poor as over 40% of the population still does not have access to electricity, and energy services are not affordable. Once the country further develops economically and is able to provide an even larger share of its population with access to modern energy services it will be challenging for the country to meet the growing demand, sustain the current level of energy security and maintain the relatively low impact on the environment. Contextual performance overall remains poor, with visible improvements in economic performance, caused by an update of the data points underlying the indicator for cost of living expenditure.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

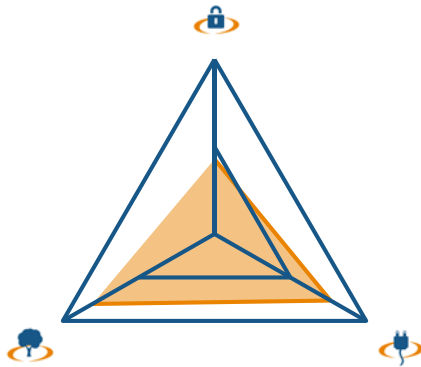


## KEY METRICS

Industrial sector (% of GDP)	21.3	GDP per capita (PPP, USD); GDP Group	1,707 (IV)
TPEP / TPEC (net energy exporter)	1.33	Energy intensity (koe per USD)	0.32
Emission intensity (kCO <sub>2</sub> per USD)	0.16	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.28
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	58.9

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



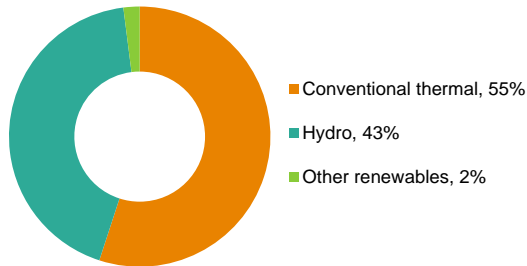
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	22	24	24	→	
Energy security	59	66	74	↓	<b>C</b>
Energy equity	38	31	31	↑	<b>B</b>
Environmental sustainability	21	21	26	↓	<b>A</b>
Contextual performance	61	61	56	↑	
Political strength	43	45	43	→	
Societal strength	48	48	47	→	
Economic strength	89	81	85	↑	
<b>Overall rank and balance score</b>	<b>30</b>	<b>30</b>	<b>32</b>	<b>→</b>	<b>ABC</b>

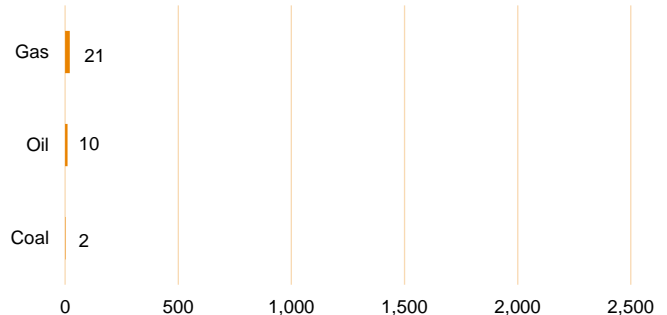
## INDEX COMMENTARY

Croatia's overall Index ranking remains mostly unchanged and it continues to balance the three sides of the energy trilemma relatively well, although energy security lags slightly behind. The country's energy security ranking declines further, despite small improvements in further diversifying its electricity fuel mix. Performance in the energy equity dimension is stable as an improvement in the perceived quality of the electricity supply is offset by gradually increasing prices for gasoline. Environmental sustainability sees some deterioration due to higher CO<sub>2</sub> emissions from electricity generation. Contextual performance remains largely unchanged. Economic strength is Croatia's weakest contextual dimension.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

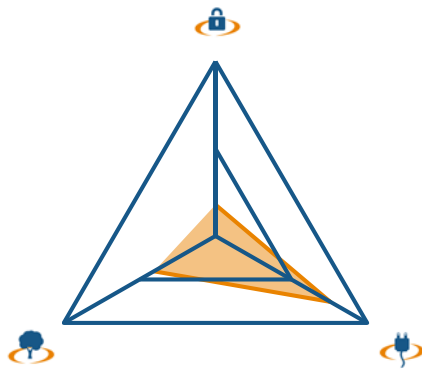


## KEY METRICS

Industrial sector (% of GDP)	25.8	GDP per capita (PPP, USD); GDP Group	18,102 (II)
TPEP / TPEC (net energy importer)	0.48	Energy intensity (koe per USD)	0.12
Emission intensity (kCO <sub>2</sub> per USD)	0.27	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	4.22
Energy affordability (USD per kWh, 2011)	0.10	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



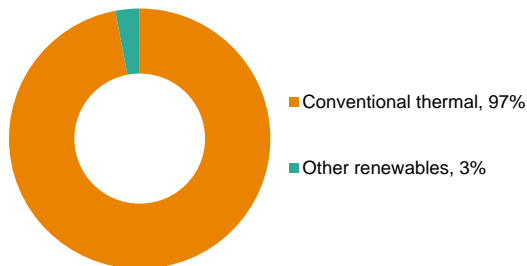
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	79	79	79	→	
Energy security	109	104	106	→	<b>D</b>
Energy equity	27	36	32	↓	<b>B</b>
Environmental sustainability	84	80	77	↑	<b>C</b>
Contextual performance	22	34	31	↓	
Political strength	28	27	23	↑	
Societal strength	20	20	25	↓	
Economic strength	32	60	64	↓	
<b>Overall rank and balance score</b>	<b>59</b>	<b>63</b>	<b>63</b>	<b>↓</b>	<b>BCD</b>

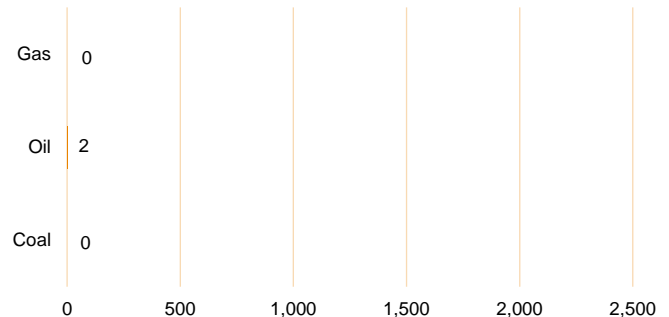
## INDEX COMMENTARY

Cyprus' overall Index ranking remains mostly unchanged as it continues to struggle with balancing the energy trilemma. Cyprus' continually-strong energy equity ranking is offset by weaker performances on the energy security and environmental sustainability dimensions. Energy security is the weakest of the three energy dimensions as the country is highly reliant on fuel imports and struggles to diversify its electricity generation portfolio away from fossil fuels. Energy equity is Cyprus's strongest energy dimension, and slightly improves due to comparatively lower household expenditure on electricity. The lower emissions intensity leads to a better environmental sustainability performance in the 2014 Trilemma Index. Indicators of contextual societal and political strength continue to be good.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

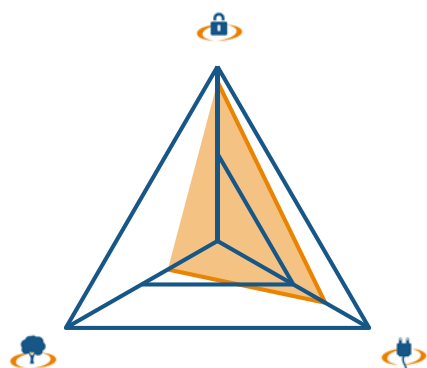


## KEY METRICS

Industrial sector (% of GDP)	15.9	GDP per capita (PPP, USD); GDP Group	26,773 (II)
TPEP / TPEC (net energy importer)	0.01	Energy intensity (koe per USD)	0.11
Emission intensity (kCO <sub>2</sub> per USD)	0.32	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	7.49
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



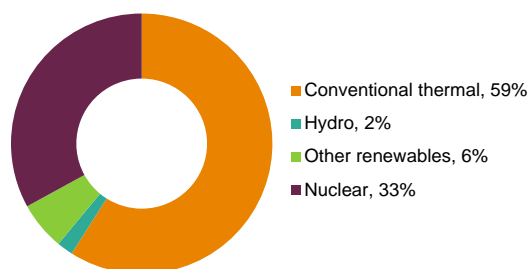
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	38	32	31	↑	
Energy security	16	16	12	↑	<b>A</b>
Energy equity	37	32	38	→	<b>B</b>
Environmental sustainability	90	90	87	→	<b>C</b>
Contextual performance	39	38	38	→	
Political strength	21	18	25	↓	
Societal strength	40	40	35	↑	
Economic strength	70	72	68	→	
<b>Overall rank and balance score</b>	<b>35</b>	<b>32</b>	<b>28</b>	<b>↑</b>	<b>ABC</b>

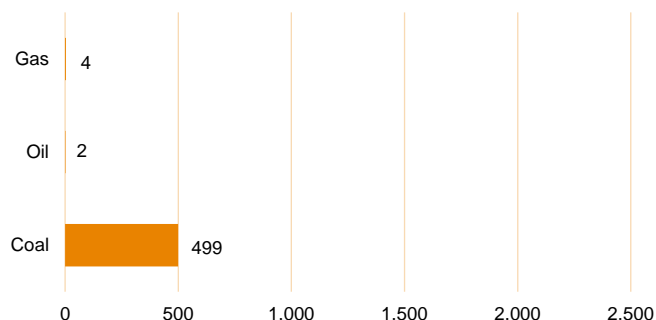
## INDEX COMMENTARY

The Czech Republic moves up four places in the overall Index ranking. While the country addresses the energy security and equity dimensions of the energy trilemma very well, the mitigation of its environmental impact fails to keep up. Performance on the energy security dimension sees continued diversification of the electricity generation portfolio and a lower dependency on fuel imports. There is a slight drop in energy equity as gasoline prices increase and household expenditure on electricity become more expensive. Performance on the environmental sustainability dimension remains relatively poor with comparatively high, but improving energy and emission intensity. Contextual performance is stable with economic strength remaining to be the weakest dimension due to a high cost of living.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



## KEY METRICS

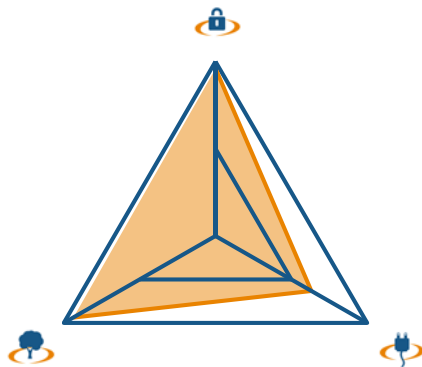
Industrial sector (% of GDP)	37.3	GDP per capita (PPP, USD); GDP Group	27,059 (II)
TPEP / TPEC (net energy importer)	0.64	Energy intensity (koe per USD)	0.17
Emission intensity (kCO <sub>2</sub> per USD)	0.42	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	9.87
Energy affordability (USD per kWh, 2013)	0.21	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- The most recent policy development is the completion of the update of the national energy policy State Energy Concept of the Czech Republic (SEK), which is expected to undergo public review by technical experts and professionals and subsequently considered by the government. The policy is based on the following: construction of new nuclear power generation units in the existing sites of nuclear power plants; gradual transition from largely extracted lignite deposits towards natural gas and renewable energy sources as the main sources for electricity and heat production because domestic coal remains a stable segment of the country's energy mix (decreasing from 45% today to less than 20% in the coming decades); medium-term stabilising of combined heat and power (CHP), provision of coal / fuels for central heating; significant efficiency increase in the energy production sector and reaching considerable economies in use of all kinds of energy; and reconstruction and development of network infrastructure (electricity, gas) to ensure system integration of decentralised production, operational reliability, as well as ancillary and transit services.
- Key issues to be considered by policymakers are: 1) diversification of imported fuels (oil, gas) and enlargement of transport routes and capacities; 2) acceleration and simplification of project administrative approval and permitting procedures for modernising and new constructions of energy infrastructure; and 3) strengthening international cooperation in the process implementing EU Internal Energy Markets and, creating common regional markets, especially for electricity and gas.



## TRILEMMA BALANCE



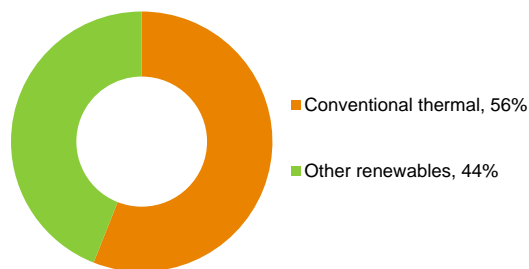
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	5	2	7	→	
Energy security	5	3	6	→	<b>A</b>
Energy equity	34	25	47	↓	<b>B</b>
Environmental sustainability	19	10	9	↑	<b>A</b>
Contextual performance	9	9	11	→	
Political strength	3	3	11	↓	
Societal strength	15	15	10	↑	
Economic strength	25	21	18	↑	
<b>Overall rank and balance score</b>	<b>5</b>	<b>2</b>	<b>5</b>	<b>→</b>	<b>AAB</b>

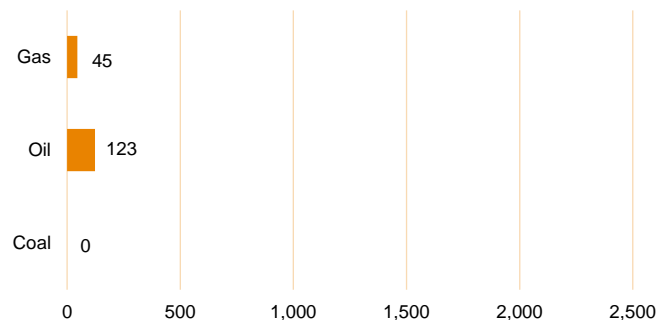
## INDEX COMMENTARY

Denmark's overall Index ranking remains mostly unchanged in 2014 and the country remains a top performer and a 'Pack leader'. Denmark continues to balance all three sides of the energy trilemma well, providing its population with secure, affordable and environmentally-sensitive energy. Energy security remains the country's strongest energy dimension with a well-diversified electricity generation portfolio, low dependency on fuel exports, and a high quality distribution and transmission network. Indicators of energy equity, which are the least-strong of the three Danish energy dimensions, decline as energy becomes gradually more expensive for the Danish people. Continued efforts to minimise the country's impact on the environment pay off as energy and emission intensity improve. Contextual performance is strong overall and mostly stable, with only minor changes.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



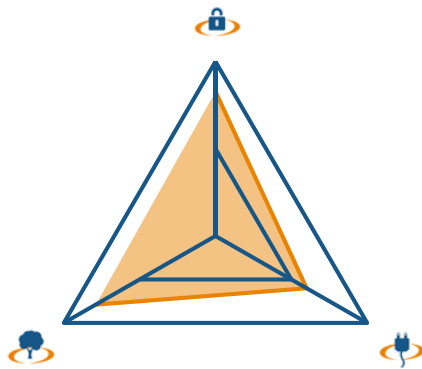
## KEY METRICS

Industrial sector (% of GDP)	21.7	GDP per capita (PPP, USD); GDP Group	37,249 (I)
TPEP / TPEC (net energy exporter)	1.16	Energy intensity (koe per USD)	0.10
Emission intensity (kCO <sub>2</sub> per USD)	0.20	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	6.31
Energy affordability (USD per kWh, 2013)	0.39	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- In March 2012 a new Energy Agreement was reached in Denmark. The Agreement contains a wide range of ambitious initiatives. This should bring Denmark closer to reaching the target of 100% renewable energy in the energy and transport sectors by 2050 by committing to large investments up to 2020 in energy efficiency, renewable energy and the overall energy system. Targets to reach by 2020 include approximately 50% of electricity consumption supplied by wind power, and more than 35% of final energy consumption supplied from renewable energy sources.
- To overcome the challenges and reach its ambitious targets of becoming independent of fossil fuels and reducing CO<sub>2</sub> emissions, Danish policymakers are focusing on the implications of: being fossil fuel free for the transport sector; the future role of the Danish natural gas grid; and the introduction of huge amounts of fluctuating renewable energy in the electricity grid.

## TRILEMMA BALANCE



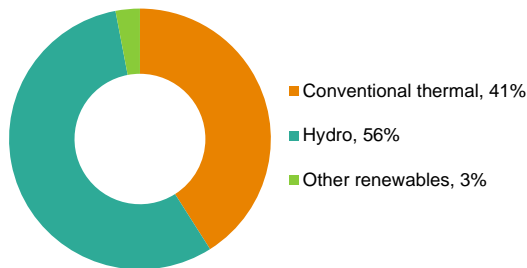
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	20	23	15	↑	
Energy security	23	25	23	→	<b>A</b>
Energy equity	65	62	52	↑	<b>B</b>
Environmental sustainability	27	28	28	→	<b>B</b>
Contextual performance	79	78	101	↓	
Political strength	112	109	107	↑	
Societal strength	89	89	93	↓	
Economic strength	36	30	81	↓	
<b>Overall rank and balance score</b>	<b>40</b>	<b>35</b>	<b>36</b>	<b>↑</b>	<b>ABB</b>

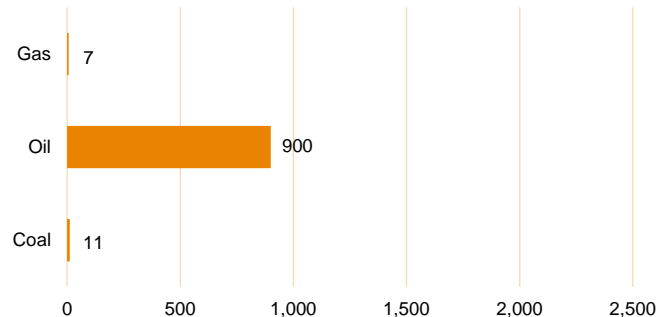
## INDEX COMMENTARY

Ecuador's overall Index ranking remains mostly unchanged in 2014, with strong energy security and environmental sustainability performance and an average ranking on energy equity. Considering the highly diversified electricity generation portfolio and virtually no dependence on fuel exports, energy security is the country's strongest dimension. Attention, however, ought to be paid to the overall quality of the transmission and distribution network that sees continued high losses. Similar to its 'Hydro-powered' peer countries, Ecuador lags behind on energy equity, but performs strongly on environmental sustainability. The energy equity dimension sees an improvement in 2014 as the perceived quality of the electricity supply continues to improve and prices for gasoline and electricity increase slower than in other parts of the world. Contextual performance is weak, especially political and societal indicators. Economic performance deteriorates across the board, with lower macroeconomic stability, a drop in the availability of credit to the private sector, but also due to comparatively higher cost of living (caused by an update to the data point).

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



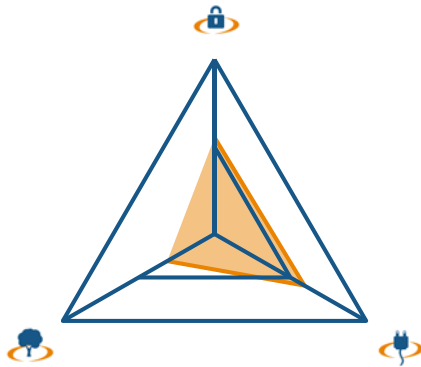
## KEY METRICS

Industrial sector (% of GDP)	35.1	GDP per capita (PPP, USD); GDP Group	9,682 (III)
TPEP / TPEC (net energy exporter)	2.07	Energy intensity (koe per USD)	0.12
Emission intensity (kCO <sub>2</sub> per USD)	0.27	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	97.5

## TRENDS AND OUTLOOK

- The Ecuadorian government has been pushing several initiatives to create a more sustainable energy sector. The Ecuadorian National Strategic Planning (National Plan for Good Living), sets the following goals: increase of the share of renewable energy in the electricity generation mix; reduce oil-derived imports; change the current profile of oil exports to higher value-added products; increase of effectiveness and efficiency of the transportation sector; reduce losses of generation and distribution; and an overall increase in energy efficiency.
- For this purpose, the government is currently developing several projects, which include: 1) the construction of eight high-capacity hydroelectric power plants; 2) the promotion of installing non-conventional renewable power plants; 3) the change from gas-based cooking to efficient induction-based cooker appliances; and 4) the construction of a big oil refinery.
- The ambitious policies developed by the government will ensure the sustainability of the Ecuadorian energy sector by promoting improvement on each of the three energy trilemma dimensions.

TRILEMMA BALANCE



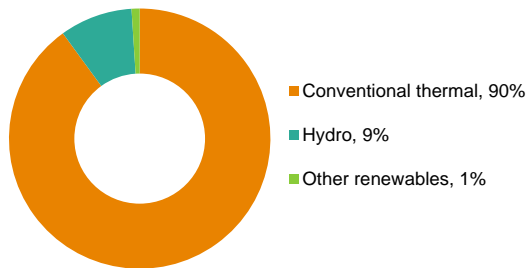
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	61	63	68	↓	
Energy security	52	47	58	↓	<b>B</b>
Energy equity	56	59	54	→	<b>B</b>
Environmental sustainability	81	84	89	↓	<b>C</b>
Contextual performance	90	102	122	↓	
Political strength	91	107	112	↓	
Societal strength	90	90	92	→	
Economic strength	88	98	125	↓	
<b>Overall rank and balance score</b>	<b>73</b>	<b>76</b>	<b>85</b>	<b>↓</b>	<b>BBC</b>

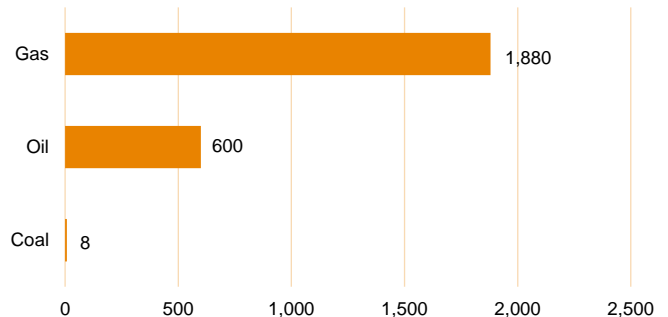
INDEX COMMENTARY

Egypt drops nine places in the Index, down to rank 85. The mediocre performance in energy security and energy equity is offset by a weaker environmental sustainability performance. Energy security sees a setback due to the perceived lower quality of the electricity transmission and distribution network. Environmental sustainability performance worsens due to a slight decline of all underlying indicators. Contextual indicators remain weak and slip even further, reflecting the country's more recent political events.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)



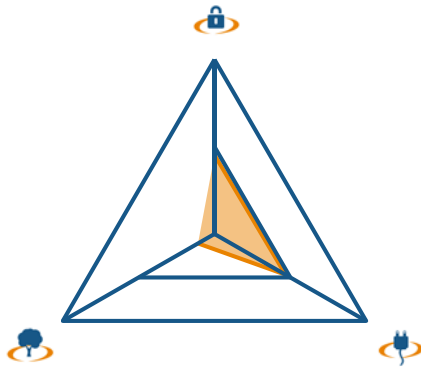
KEY METRICS

Industrial sector (% of GDP)	37.5	GDP per capita (PPP, USD); GDP Group	6,474 (III)
TPEP / TPEC (net energy exporter)	1.17	Energy intensity (koe per USD)	0.17
Emission intensity (kCO <sub>2</sub> per USD)	0.41	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	2.31
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	99.6

TRENDS AND OUTLOOK

- As the most populous country in North Africa, Egypt is keen to improve its energy sustainability. Therefore, energy has become one of the most important topics in recent years. Due to the political transition the country is going through, challenges related to energy security need to be overcome. These challenges include an insufficient electricity capacity to meet the demand and no reserve capacities, low energy efficiency especially in the industrial sector, or the slow progress new and renewable energy projects make due to the incremental cost gap between fossil fuel and renewable technologies.
- Policymakers are addressing the following energy developments: 1) expansion of new power capacities at the least cost location; 2) diversification of power generation by expanding wind farms, and introducing solar PV and solar thermal generation to benefit from one of the best solar belt locations in the world; 3) improvement of the energy tariff structure to encourage energy saving measures; 4) encouragement of the private sector to invest in the development of energy infrastructure including renewable energy projects using build, own, operate (BOO) schemes; and 5) extension of the regional interconnection power grid capacity between Egypt and Arab, African and European countries.

## TRILEMMA BALANCE



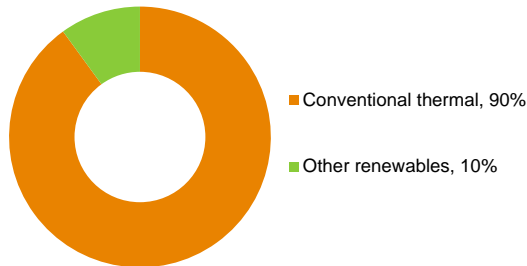
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	81	82	93	↓	
Energy security	64	65	71	↓	<b>C</b>
Energy equity	51	51	68	↓	<b>B</b>
Environmental sustainability	117	117	115	→	<b>D</b>
Contextual performance	26	25	21	↑	
Political strength	24	26	30	↓	
Societal strength	30	30	30	→	
Economic strength	34	35	22	↑	
<b>Overall rank and balance score</b>	<b>65</b>	<b>68</b>	<b>75</b>	<b>↓</b>	<b>BCD</b>

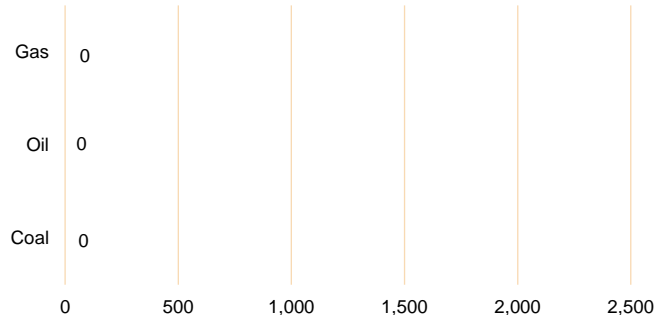
## INDEX COMMENTARY

Estonia drops seven places in this year's Index, driven by deteriorations in energy security and equity. Overall, Estonia continues to struggle with balancing the energy trilemma, as the country's poor performance in mitigating its environmental impact lags far behind its energy security and energy equity rankings. Despite efforts to diversify the electricity generation portfolio further, energy security performance declines due to a higher dependence on fuel imports. Meanwhile, both gasoline and electricity become more expensive for Estonians, causing the country's energy equity ranking to slip. Estonia's environmental sustainability performance continues to be poor but improving as energy and emission intensity decrease compared to last year. Estonia's contextual performance remains solid.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



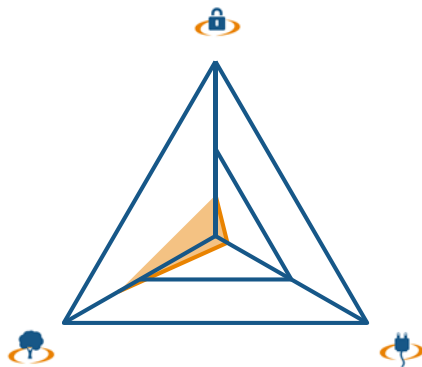
## KEY METRICS

Industrial sector (% of GDP)	30.0	GDP per capita (PPP, USD); GDP Group	22,472 (II)
TPEP / TPEC (net energy importer)	0.72	Energy intensity (koe per USD)	0.22
Emission intensity (kCO <sub>2</sub> per USD)	0.67	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	12.71
Energy affordability (USD per kWh, 2013)	0.17	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- Estonia has over the last couple of years successfully worked on improving its security of energy supply by diversifying its energy imports, increasing the domestic electricity production capacity to exceed domestic demand and the share of domestically-produced liquid fuels, and thereby increasing its export capability. Estonia still struggles with environmental sustainability, mainly due to CO<sub>2</sub> emissions from electricity production. However, the future looks promising, as there is a strong drive to switch from using oil shale in electricity generation to instead use the oil shale to produce oil and a by-product gas. This gas, similar to natural gas, will then be used to generate electricity. This will significantly reduce CO<sub>2</sub> emission from power generation.
- Recently, Estonia has had several excellent developments: the share of renewable electricity in total electricity consumption in 2013 increased to 12.6%; new shale oil production units are being built, leading to less dependence on imports of petroleum products; and liberalised electricity markets delivered lower prices for all market participants.
- The key trends, which are expected to support Estonia's moving up in the Index rankings, are: 1) the continued increase of the share of renewable energy in the electricity generation mix; 2) the building of new interconnection power grid capacity with neighbouring countries; and 3) the ability to satisfy most of its need for diesel fuel from refining shale oil. However, Estonian policymakers also need to continue their focus on the other two aspects of the energy trilemma, environmental sustainability and energy equity, while keeping energy security levels high.

TRILEMMA BALANCE



INDEX RANKINGS AND BALANCE SCORE

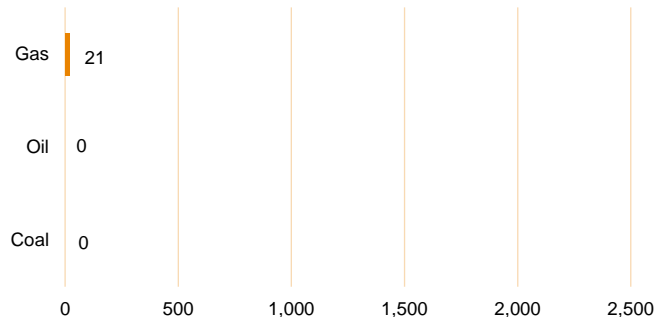
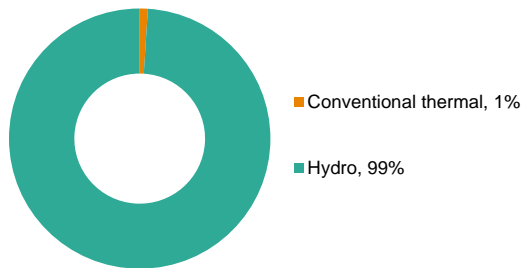
	2012	2013	2014	Trend	Score
Energy performance	102	99	104	→	
Energy security	102	97	99	→	<b>D</b>
Energy equity	118	119	119	→	<b>D</b>
Environmental sustainability	51	47	47	↑	<b>B</b>
Contextual performance	117	122	123	↓	
Political strength	115	113	114	→	
Societal strength	116	116	108	↑	
Economic strength	95	124	112	↓	
<b>Overall rank and balance score</b>	<b>110</b>	<b>112</b>	<b>115</b>	<b>↓</b>	<b>BDD</b>

INDEX COMMENTARY

Although Ethiopia’s overall energy performance remains relatively stable this year, the country slips three places down the Index driven by changes in the contextual dimensions. As one of the ‘Hydro-powered’ countries, Ethiopia exhibits many of the same challenges in balancing the energy trilemma that are faced by the countries in that group. A strong environmental sustainability performance is unfortunately overshadowed by poorer performances on the energy security and equity dimensions. Ethiopia’s energy security sees no notable changes as the country continues to struggle with high transmission and distribution losses and a homogenous electricity mix because as it is almost solely reliant on hydropower. The recent addition of wind to the generation mix (roughly 13% of total generation) is not yet reflected in the 2014 Index. Energy equity performance remains poor as only 23% of the population has access to electricity. Environmental sustainability, Ethiopia’s strongest dimension, sees further reductions in energy intensity. Contextual performance across the board is weak, with marginal improvements in social and economic strength.

DIVERSITY OF ELECTRICITY GENERATION

FOSSIL FUEL RESERVES (IN MTOE)



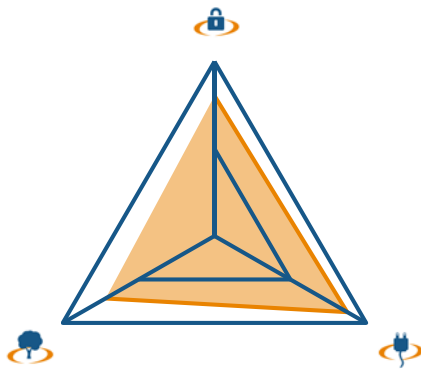
KEY METRICS

Industrial sector (% of GDP)	10.8	GDP per capita (PPP, USD); GDP Group	1,256 (IV)
TPEP / TPEC (net energy importer)	0.35	Energy intensity (koe per USD)	0.39
Emission intensity (kCO <sub>2</sub> per USD)	0.07	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.07
Energy affordability (USD per kW)	-	Population with access to electricity (%)	23.0

TRENDS AND OUTLOOK

- Ethiopia has undergone substantial changes over the last 18 years. GDP has been growing by about 11% for the last eight consecutive years and population growth continued at an average rate of 2.5% annually, both contributing to the substantial level of energy demand created over the corresponding period. The Government Growth and Transformation Plan aims at becoming a middle income country by 2025. The Climate-Resilient Green Economy (CRGE) strategy focuses on enhancing development with minimum carbon emission. The vision for the Ethiopian energy sector is to ensure access to affordable, clean and modern energy for all citizens by 2025 and to become a renewable energy hub in the Eastern Africa Region.
- With regard to energy supply, electricity generation capacity has more than doubled while far more generation capacity is within reach. To meet the demand, petroleum fuel imports have increased over the past decade. Also, the demand for biomass energy has increased exerting pressure on existing forest and woodlands. Projections indicate that unless action is taken to change the traditional development path annual petroleum and fuel wood consumption will rise significantly.
- Policymakers need to address: 1) high levels of energy poverty; 2) low private sector participation and competition; 3) the lack of human and institutional capacity; 4) high dependence on and unsustainable use of biomass; 5) high dependence on imported petroleum fuels; 6) wasteful and inefficient energy production, transportation, and use; and 7) development of renewable energy technologies, energy conservation and sustainable forest and woodland management practices.

## TRILEMMA BALANCE



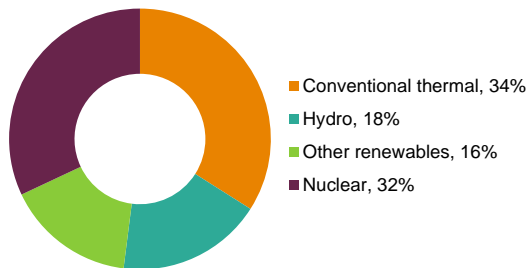
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	14	17	10	↑	
Energy security	25	37	26	→	<b>B</b>
Energy equity	20	21	16	↑	<b>A</b>
Environmental sustainability	49	45	37	↑	<b>B</b>
Contextual performance	7	6	7	→	
Political strength	1	2	2	→	
Societal strength	1	1	3	→	
Economic strength	35	34	20	↑	
<b>Overall rank and balance score</b>	<b>11</b>	<b>13</b>	<b>8</b>	<b>→</b>	<b>ABB</b>

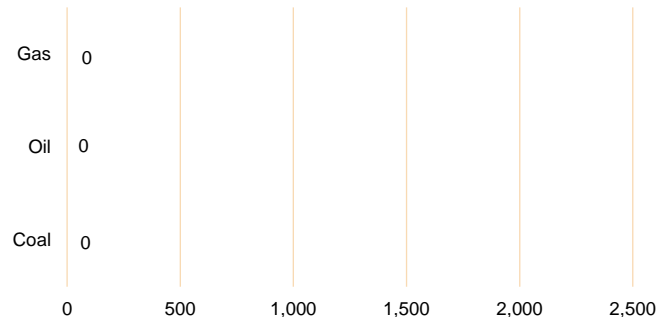
## INDEX COMMENTARY

Finland moves up five places this year entering the top 10 of the Index. Finland continues to balance the three sides of the energy trilemma well with improvements across all energy dimensions. The rise in energy security is mostly driven by a decreased reliance on fuel imports. Energy equity performance continues to be strong as gasoline and electricity prices increase only gradually and the perceived quality of the electricity supply improves. Environmental sustainability, Finland's weakest energy dimension, improves due to lower CO<sub>2</sub> emissions from electricity generation and a decrease in emissions intensity. Performance on contextual indicators remains excellent, although economic strength stays lower than societal and political strength due to the relatively high cost of living.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



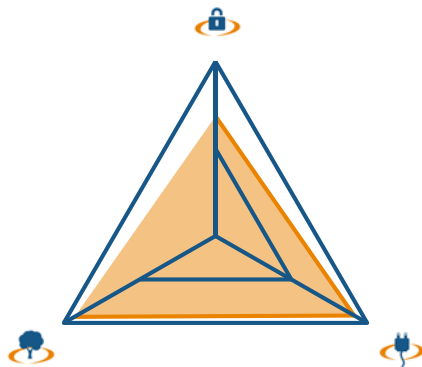
## KEY METRICS

Industrial sector (% of GDP)	25.1	GDP per capita (PPP, USD); GDP Group	35,740 (I)
TPEP / TPEC (net energy importer)	0.35	Energy intensity (koe per USD)	0.20
Emission intensity (kCO <sub>2</sub> per USD)	0.29	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	9.03
Energy affordability (USD per kWh, 2013)	0.20	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- Even though Finland's electricity fuel mix still shows a large share of conventional thermal power generation, it has to be noted that three-quarters of that figure is combined heat and power production. This should not be viewed as conventional because it reaches efficiency ratios up to two times compared to conventional thermal generation.
- Recent energy policy developments in Finland include: 1) streamlining the approval of wind farms; 2) tax hikes on fossil fuels in heat generation that will mainly affect light fuel oil in domestic heating and other fossil fuels in district heating and industrial cogeneration, and which will increase costs but also 'clean' the fuel mix; and 3) nuclear, biomass and waste (CHP), and wind power are high on the agenda, and their share in the electricity generation mix is expected to grow significantly.

## TRILEMMA BALANCE



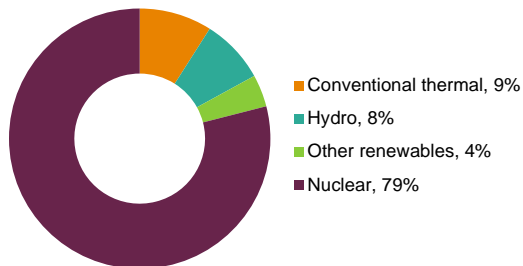
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	5	6	6	→	
Energy security	41	44	41	→	<b>B</b>
Energy equity	8	5	11	↓	<b>A</b>
Environmental sustainability	9	9	10	→	<b>A</b>
Contextual performance	29	28	23	↑	
Political strength	20	27	30	↓	
Societal strength	19	19	20	→	
Economic strength	57	52	38	↑	
<b>Overall rank and balance score</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>→</b>	<b>AAB</b>

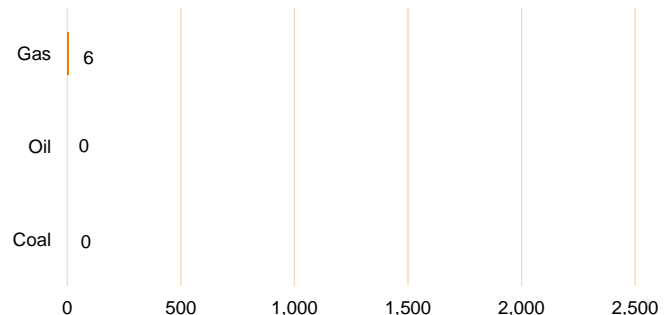
## INDEX COMMENTARY

France's overall Index ranking remains mostly unchanged. The three sides of the energy trilemma are relatively well-balanced, although energy security lags slightly behind. Overall energy security performance continues to be stable. Energy equity dips as decreasing costs for gasoline are offset by the gradually increasing cost of electricity and the perceived quality of the electricity supply decreases. Environmental sustainability performance remains unchanged and excellent – not unexpected as France uses fossil fuels to generate only 9% of its electricity. Contextual performance is good.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



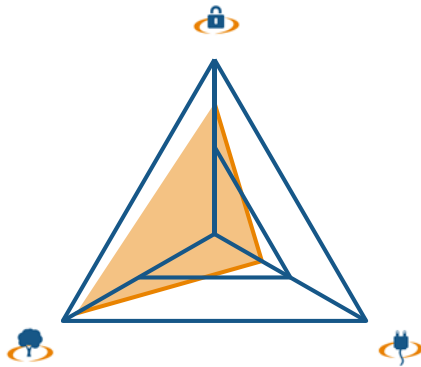
## KEY METRICS

Industrial sector (% of GDP)	18.7	GDP per capita (PPP, USD); GDP Group	35,312 (I)
TPEP / TPEC (net energy importer)	0.46	Energy intensity (koe per USD)	0.13
Emission intensity (kCO <sub>2</sub> per USD)	0.17	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	4.90
Energy affordability (USD per kWh, 2013)	0.19	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- France has very little domestic oil and natural gas production and relies heavily on imports. To reduce import dependency, France has pursued a vigorous policy of nuclear power development since the mid-1970s and now has by far the largest nuclear generating capacity of any country in Europe, and is second only to the United States in the world. Nuclear power constitutes about 79% of total electricity generation.
- Recent energy policies include measures and targets to improve energy efficiency, boost renewable power and tackle climate change. The government has also revised social tariffs for electricity and gas to counteract the increase in energy prices.
- Key challenges for France come with the implementation phase of its policies and efforts must go towards meeting the targets set. The coexistence of regulated tariffs and market prices for electricity could also cause friction for producers.

## TRILEMMA BALANCE



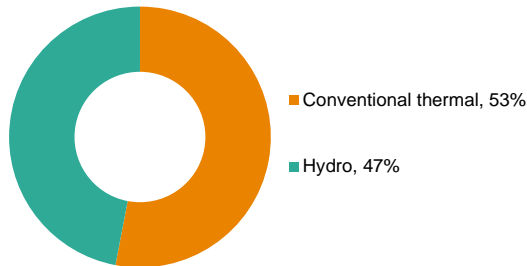
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	45	33	28	↑	
Energy security	46	35	33	↑	<b>B</b>
Energy equity	97	92	89	↑	<b>C</b>
Environmental sustainability	10	12	12	→	<b>A</b>
Contextual performance	116	116	96	↑	
Political strength	95	92	90	↑	
Societal strength	95	95	79	↑	
Economic strength	124	127	105	↑	
<b>Overall rank and balance score</b>	<b>62</b>	<b>56</b>	<b>49</b>	<b>↑</b>	<b>ABC</b>

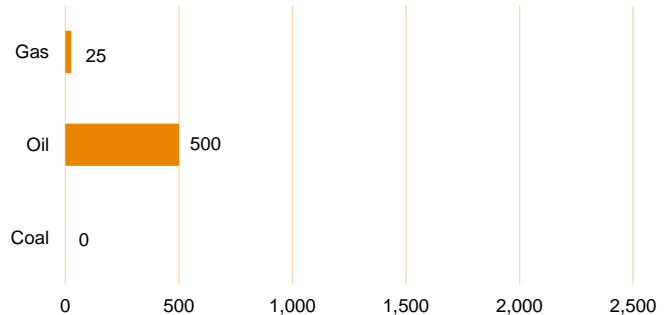
## INDEX COMMENTARY

Gabon continues to improve and moves up seven places in this year's Index. The country struggles with balancing the energy trilemma, as strong performances in energy security and environmental sustainability are outweighed by a poor energy equity ranking. Gabon's energy security and environmental sustainability performance remain largely stable. Energy equity sees a slight improvement driven by comparatively lower household expenditure on electricity. As the country further develops economically and is able to provide a larger share of its population with access to modern energy services it will be challenging for the country to meet the growing demand, sustain the current level of energy security and maintain the relatively low environmental impact. Contextual performance is still poor but improving across the board, with indicators of economic strength being weaker than those of political and societal strength.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



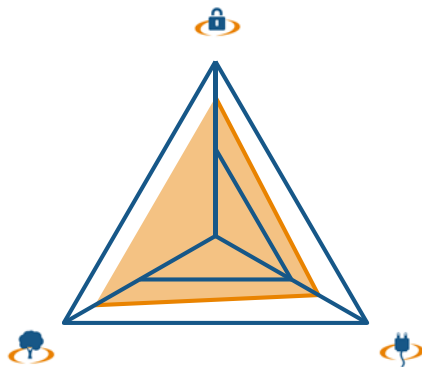
## KEY METRICS

Industrial sector (% of GDP)	63.9	GDP per capita (PPP, USD); GDP Group	18,386 (II)
TPEP / TPEC (net energy exporter)	11.87	Energy intensity (koe per USD)	0.10
Emission intensity (kCO <sub>2</sub> per USD)	0.11	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	1.61
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	81.6

## TRENDS AND OUTLOOK



TRILEMMA BALANCE



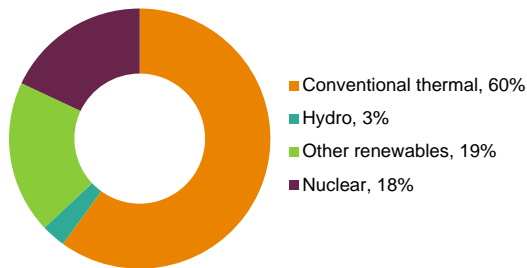
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	8	10	14	↓	
Energy security	24	31	27	→	<b>B</b>
Energy equity	13	11	42	↓	<b>B</b>
Environmental sustainability	31	30	27	↑	<b>B</b>
Contextual performance	13	13	12	→	
Political strength	16	16	16	→	
Societal strength	18	18	11	↑	
Economic strength	26	24	14	↑	
<b>Overall rank and balance score</b>	<b>8</b>	<b>11</b>	<b>11</b>	<b>→</b>	<b>BBB</b>

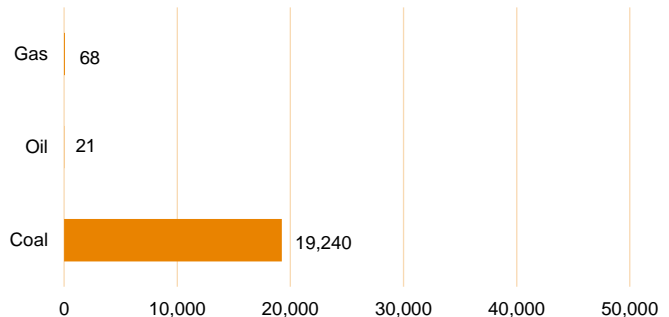
INDEX COMMENTARY

Germany maintains its position in this year's Index and continues to balance the three sides of the energy trilemma very well. While performance on energy security and environmental sustainability see a slight upward trend, energy equity drops. With prices for both gasoline and electricity continuously increasing and the perceived quality of the electricity supply gradually worsening, Germany sees a significant decline in the energy equity dimension. Germany's performance on contextual indicators is strong, with further improvements on societal and economic indicators.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)



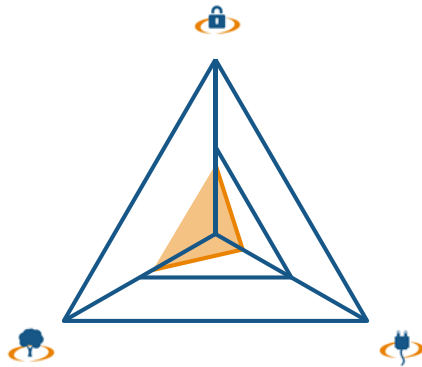
KEY METRICS

Industrial sector (% of GDP)	30.1	GDP per capita (PPP, USD); GDP Group	39,335 (I)
TPEP / TPEC (net energy importer)	0.34	Energy intensity (koe per USD)	0.11
Emission intensity (kCO <sub>2</sub> per USD)	0.26	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	8.96
Energy affordability (USD per kWh, 2013)	0.39	Population with access to electricity (%)	100.0

TRENDS AND OUTLOOK

- The most recent policy development in Germany, initiated before 2010, is the German Energy Transition. The goal of the policy is a strong increase in power generation from renewable sources, a reduction of primary energy usage and CO<sub>2</sub> emissions. The 2011 decision to phase out nuclear by 2022 constitutes a challenge to Germany's energy mix. Eight out of 17 facilities were closed immediately, while the remaining nine nuclear power plants will be phased out gradually to ensure system stability.
- To achieve the increase in power generation from renewable sources, the Renewable Energy Law (EEG) guarantees a fixed price independent of demand and supply for renewable power plants. The law first came into effect in 2000 with revisions in 2006, 2008, and 2012. Even though there are visible successes, the law is disabling free market mechanisms because it allows the sector to rely on subsidies rather than encouraging competition for innovative, efficient and inexpensive technologies. Investors are reluctant to invest in new conventional power plants, which will still be needed to secure future energy demand.
- Subsidies for renewable energy and investments in grid infrastructure to integrate the increasing amounts of volatile renewable energy into the system have led and will continue to lead to higher electricity prices. Policymakers must set the right framework towards a free and efficient European electricity market to limit the burden.

## TRILEMMA BALANCE



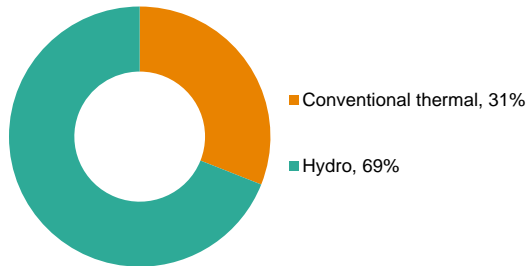
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	102	103	98	↑	
Energy security	90	85	78	↑	<b>C</b>
Energy equity	106	105	106	→	<b>D</b>
Environmental sustainability	75	77	76	→	<b>C</b>
Contextual performance	88	87	84	↑	
Political strength	64	62	62	→	
Societal strength	75	75	78	→	
Economic strength	121	120	114	↑	
<b>Overall rank and balance score</b>	<b>104</b>	<b>102</b>	<b>96</b>	<b>↑</b>	<b>CCD</b>

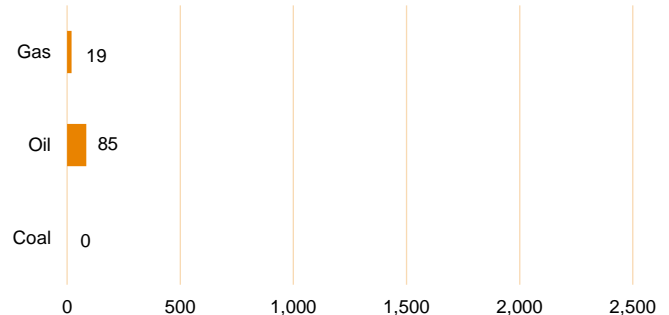
## INDEX COMMENTARY

Ghana improves its overall Index ranking by six places this year to finish at rank 96. Ghana's three energy dimensions remain unbalanced, as its energy equity ranking continues to fall behind performance on the other two dimensions. Energy security performance further improves this year, with a more diversified electricity fuel mix and increased strategic oil reserves. Transmission and distribution losses of electricity also improve, albeit remaining among the highest in the world. Providing its people with access to modern energy services continues to be a challenge for Ghana, which has a 61% electrification rate that poses an obstacle that must be overcome if the country seeks to develop further economically. The environmental sustainability dimension is Ghana's strongest, and overall performance is mediocre and largely flat. Contextual performance stays weak, with political and societal strength being more robust than economic strength.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



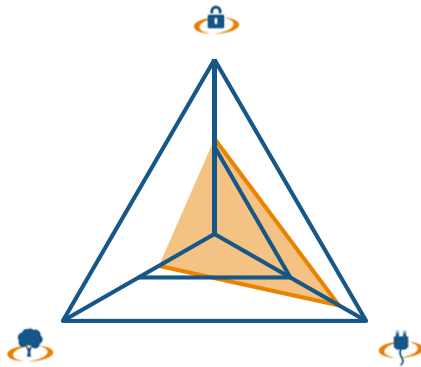
## KEY METRICS

Industrial sector (% of GDP)	28.7	GDP per capita (PPP, USD); GDP Group	3,316 (IV)
TPEP / TPEC (net energy importer)	0.43	Energy intensity (koe per USD)	0.26
Emission intensity (kCO <sub>2</sub> per USD)	0.27	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.47
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	60.5

## TRENDS AND OUTLOOK

- In order to improve energy security, energy equity and environmental sustainability Ghana needs to address a number of related challenges, such as: 1) the lack of credible, sustained and focused energy policy; 2) the inability to execute policies; 3) governmental interference; and 4) ineffective regulatory authorities.
- Recent policy developments include: the enactment of Electricity Regulations, 2008 (L.I 1937), which is intended to provide for the planning, expansion, safety criteria, reliability and cost effectiveness of the Interconnected Transmission System, and to regulate the wholesale electricity market; the enactment of the Renewable Energy Act, 2011 (Act 832) to improve the development, management and utilisation of renewable energy sources for production of heat and power in an efficient and environmentally sustainable manner; and the incorporation of Ghana Gas Company in July 2011 with the responsibility to build, own, and operate infrastructure required for gathering, processing, transporting and marketing of natural gas in Ghana.

TRILEMMA BALANCE



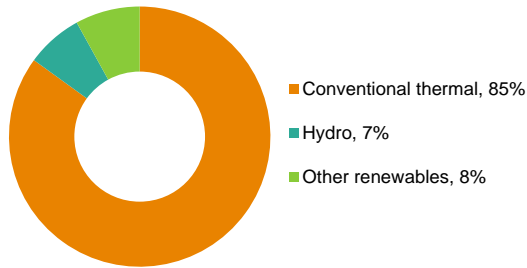
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	62	42	49	↑	
Energy security	88	54	59	↑	<b>B</b>
Energy equity	26	18	23	→	<b>A</b>
Environmental sustainability	76	81	82	↓	<b>C</b>
Contextual performance	46	48	62	↓	
Political strength	50	51	55	↓	
Societal strength	37	37	41	↓	
Economic strength	62	64	100	↓	
<b>Overall rank and balance score</b>	<b>55</b>	<b>39</b>	<b>51</b>	<b>↑</b>	<b>ABC</b>

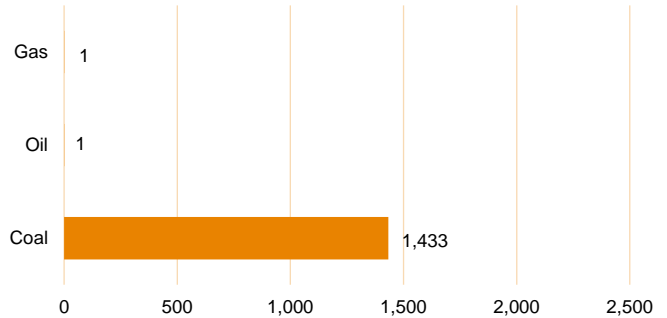
INDEX COMMENTARY

Greece drops by 12 places in this year's Index, driven by on average small declines in both energy and contextual performance. Greece continues to struggle balancing the three sides of the energy trilemma, with a very good energy equity ranking, decent energy security and weaker environmental sustainability performances. Greece's energy security sees a slight drop this year due to a less diverse electricity generation mix, which sees renewable sources losing part of their share to fossil fuels. Energy equity is very high, with Greece continuing to offer its citizens affordable energy and electricity. Environmental sustainability remains Greece's weakest dimension, with the main drivers of this lower score being a high level of emissions intensity and CO<sub>2</sub> emissions from electricity generation, which rely very heavily on burning fossil fuels. Contextual performance slightly deteriorates with economic strength plunging caused by an update of data points underlying the indicator for cost of living expenditure.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)

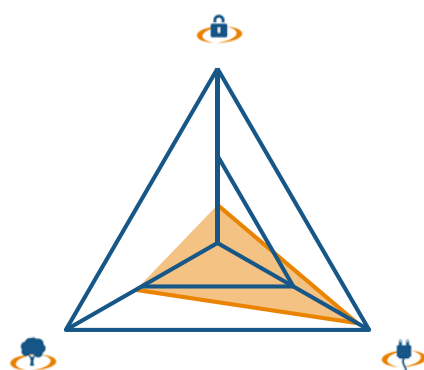


KEY METRICS

Industrial sector (% of GDP)	16.0	GDP per capita (PPP, USD); GDP Group	24,469 (II)
TPEP / TPEC (net energy importer)	0.29	Energy intensity (koe per USD)	0.11
Emission intensity (kCO <sub>2</sub> per USD)	0.34	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	7.04
Energy affordability (USD per kWh, 2012)	0.18	Population with access to electricity (%)	100.0

TRENDS AND OUTLOOK

## TRILEMMA BALANCE



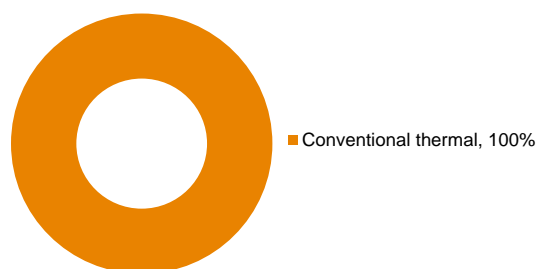
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	54	58	52	→	
Energy security	84	99	101	↓	<b>D</b>
Energy equity	25	24	9	↑	<b>A</b>
Environmental sustainability	60	58	60	→	<b>B</b>
Contextual performance	14	18	6	↑	
Political strength	10	11	9	→	
Societal strength	50	50	12	↑	
Economic strength	1	15	2	→	
<b>Overall rank and balance score</b>	<b>38</b>	<b>40</b>	<b>27</b>	<b>↑</b>	<b>ABD</b>

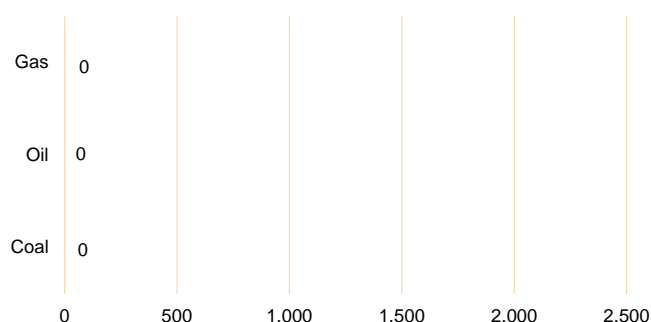
## INDEX COMMENTARY

Hong Kong improves its position in the 2014 Index by 13 places, largely due to a rise in energy equity and contextual indicators. Hong Kong ranks very well on the energy equity dimension and has maintained a stable performance on the environmental sustainability dimensions. Although 77% of the electricity needs are met by local generation, Hong Kong's relatively low energy security ranking is driven primarily by a lack of energy resources and reliance on the import of energy and fuel for local power generation. Energy equity is high and improving with relatively affordable energy and full access rate to quality electricity. Environmentally, Hong Kong, like China, faces challenges from issues on air and water quality. Contextual performance remains strong, with this year's changes almost all due to a correction of indicators on education, health and macroeconomic stability.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

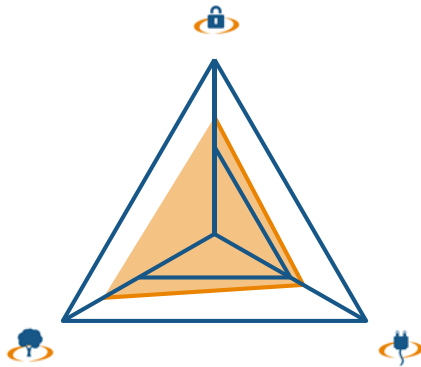


## KEY METRICS

Industrial sector (% of GDP)	6.9	GDP per capita (PPP, USD); GDP Group	50,917 (I)
TPEP / TPEC (net energy importer)	0.00	Energy intensity (koe per USD)	0.05
Emission intensity (kCO <sub>2</sub> per USD)	0.14	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	6.17
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

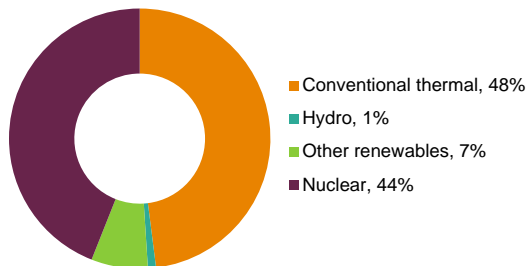
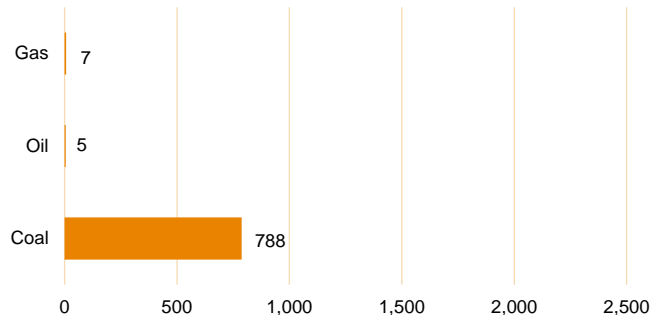
- As Hong Kong, China, does not have much indigenous energy resources and 23% of the economy's electricity is imported, active steps have been taken to ensure safe and stable energy supply at reasonable prices, while minimising the environmental impact. To secure clean and reliable electricity supply, Hong Kong signed a Memorandum of Understanding (MOU) on energy cooperation with Mainland China in August 2008, which provided assurance to the continual supply of nuclear energy and enhanced supply of natural gas from Mainland China to Hong Kong. The recent completion and commissioning of the Hong Kong Branch Line of the Second West-East Natural Gas Pipeline has helped ensure a stable and secure supply of natural gas from the mainland for power generation. The Government has put in place a contingency plan for oil supply, that co-ordinates the allocation and consumption of essential oil products in the event of an oil supply disruption. A code of practice has also been put in place that requires major oil companies to maintain a minimum of 30 days' supply of gas oil and naphtha.
- To increase energy diversity natural gas has been introduced as feedstock for electricity generation since the 1990s. Moreover, with the introduction of LPG vehicles around 2000, LPG is used as a fuel for more than 20,000 taxis and light buses. The increased uses of natural gas and LPG reduce Hong Kong's dependence on conventional oil products.
- A wide range of measures to protect the environment and improve air quality have been implemented with positive results. The Clean Air Plan for Hong Kong, released in March 2013, outlines relevant policies, measures and plans to tackle the issue.

**TRILEMMA BALANCE**

**INDEX RANKINGS AND BALANCE SCORE**

	2012	2013	2014	Trend	Score
Energy performance	23	31	25	→	
Energy security	39	46	43	↓	<b>B</b>
Energy equity	41	42	53	↓	<b>B</b>
Environmental sustainability	44	44	35	↑	<b>B</b>
Contextual performance	44	41	57	↓	
Political strength	33	32	38	↓	
Societal strength	43	43	42	→	
Economic strength	73	68	96	↓	
<b>Overall rank and balance score</b>	<b>28</b>	<b>31</b>	<b>33</b>	<b>↓</b>	<b>BBB</b>

**INDEX COMMENTARY**

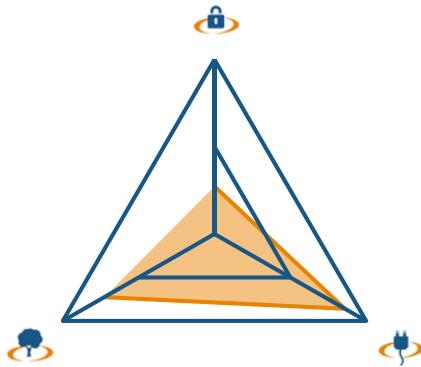
Hungary slips two places this year to finish 33 in the 2014 Index. The three competing sides of the energy trilemma remain well balanced, with mostly good scores on all dimensions. Energy security improves a little this year due to a further diversified electricity fuel mix. With regard to energy equity, the cost of energy for Hungarian citizens increases slightly, while the perceived quality of the electricity supply drops, causing a slide in the ranks. Lower energy and emissions intensity lead to an improvement of environmental sustainability performance. Contextual performance remains mostly unchanged, except for a deterioration of macroeconomic stability.

**DIVERSITY OF ELECTRICITY GENERATION**

**FOSSIL FUEL RESERVES (IN MTOE)**

**KEY METRICS**

Industrial sector (% of GDP)	28.0	GDP per capita (PPP, USD); GDP Group	19,445 (II)
TPEP / TPEC (net energy importer)	0.39	Energy intensity (koe per USD)	0.14
Emission intensity (kCO <sub>2</sub> per USD)	0.25	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	4.29
Energy affordability (USD per kWh, 2013)	0.18	Population with access to electricity (%)	100.0

**TRENDS AND OUTLOOK**

## TRILEMMA BALANCE



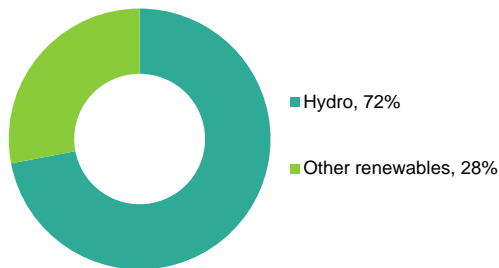
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	43	40	39	↑	
Energy security	98	96	94	↑	<b>C</b>
Energy equity	12	15	18	↓	<b>A</b>
Environmental sustainability	40	41	36	↑	<b>B</b>
Contextual performance	28	26	35	↓	
Political strength	17	15	15	→	
Societal strength	7	7	8	→	
Economic strength	71	70	99	↓	
<b>Overall rank and balance score</b>	<b>32</b>	<b>33</b>	<b>31</b>	<b>→</b>	<b>ABC</b>

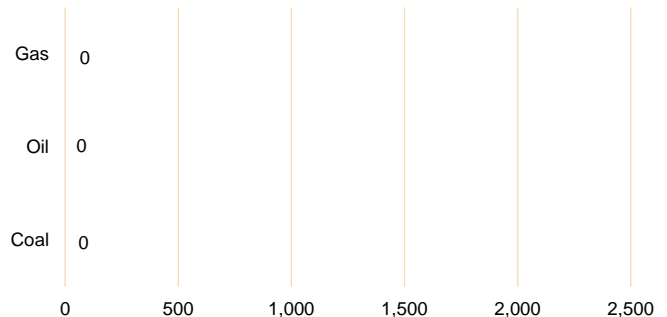
## INDEX COMMENTARY

Overall, Iceland maintains a stable position in the Index throughout the years. Iceland, which performs well on the energy equity dimension and mitigates its environmental impact fairly well, struggles with providing energy security. The country's energy consumption growth rate, in particular, has historically been quite high, although the country has made some successful efforts to slow this growth recently. Furthermore, Iceland is heavily reliant on hydropower and has no strategic oil stocks, two things that also contribute to its low energy security rank. Iceland's energy equity is among the best in the world, as it provides its citizens with affordable, high-quality access to energy. Environmental sustainability performance is also fairly good, especially as Iceland's electricity fuel mix is virtually emission-free. The big flaw here is the country's high level of energy intensity. Contextual performance remains mostly stable across the board, although macroeconomic stability continues to be very low (but improving) in the wake of the recent collapse of the country's banks.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

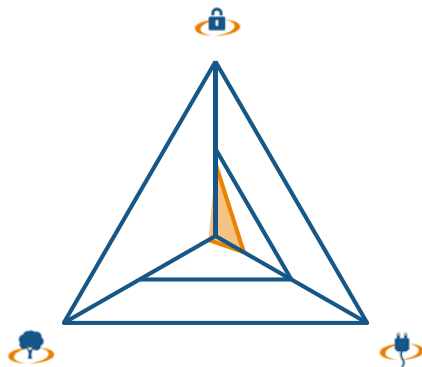


## KEY METRICS

Industrial sector (% of GDP)	22.9	GDP per capita (PPP, USD); GDP Group	39,544 (I)
TPEP / TPEC (net energy importer)	0.80	Energy intensity (koe per USD)	0.65
Emission intensity (kCO <sub>2</sub> per USD)	0.20	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	6.65
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



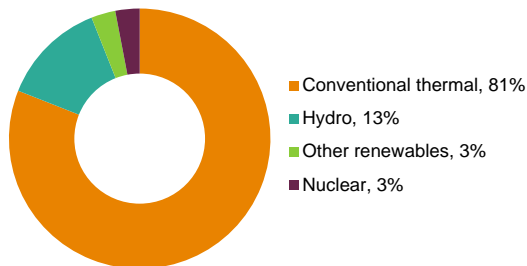
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	124	124	122	→	
Energy security	86	76	76	↑	<b>C</b>
Energy equity	110	110	105	↑	<b>D</b>
Environmental sustainability	123	121	123	→	<b>D</b>
Contextual performance	77	76	90	↓	
Political strength	97	93	103	↓	
Societal strength	80	80	84	↓	
Economic strength	54	54	77	↓	
<b>Overall rank and balance score</b>	<b>117</b>	<b>115</b>	<b>122</b>	<b>↓</b>	<b>CDD</b>

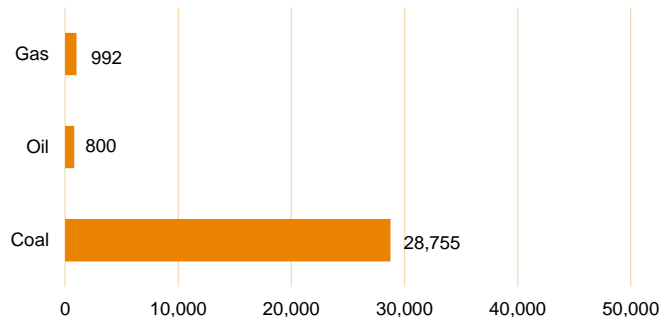
## INDEX COMMENTARY

India drops seven places in the overall Index rankings. India has a stronger energy security performance, followed by a weaker energy equity result and a very poor performance on the environmental sustainability dimension. From an energy security standpoint, there are no notable changes except for further efforts to diversify the electricity generation mix. Energy infrastructure remains unstable with transmission and distribution losses - technical and non-technical - equal to 23% of electricity generated. Energy equity performance is still low. High gasoline prices and expensive electricity means that only 75% of the population has access to electricity. India's environmental sustainability ranking continues to be its weakest, with air and water quality and CO<sub>2</sub> emissions from electricity generation remaining large challenges for the rapidly-developing country. Contextual performance slightly deteriorates across the board, with economic strength still ranking as India's best contextual dimension.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



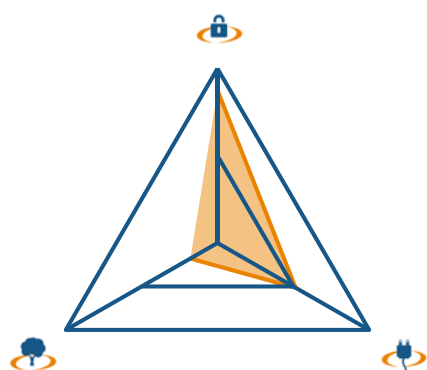
## KEY METRICS

Industrial sector (% of GDP)	25.8	GDP per capita (PPP, USD); GDP Group	3,900 (IV)
TPEP / TPEC (net energy importer)	0.70	Energy intensity (koe per USD)	0.19
Emission intensity (kCO <sub>2</sub> per USD)	0.46	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	1.54
Energy affordability (USD per kWh, 2011)	0.05	Population with access to electricity (%)	75.0

## TRENDS AND OUTLOOK

- India faces the twin challenges of fuelling the energy needs of an economy that needs to grow to eradicate poverty, while at the same time also remaining aware of the need to mitigate the impact on the environment.
- Following the Integrated Energy Policy developed by the Planning Commission in 2006, India committed itself to ensure the sustainability of its energy system. A number of programmes are in place to implement the targets. For example: the Renewable Purchase Obligations ensures that utilities procure a certain quantity of electricity from renewable resources; the National solar mission aims to add 25,000 MW of utility-scale solar capacity by 2020; the Perform, Achieve and Trade scheme is a domestic cap and trade mechanism that aims at energy conservation in energy-intensive industries which account for 90% of all energy consumption in the country; the Accelerated Power Development and Reform program that focuses on the reduction of technical and commercial losses by electricity utilities.
- The challenges policymakers need to focus on are: 1) ensuring cost recovery in hydrocarbon sector to phase out subsidies; 2) pushing for reforms in the coal sector to increase investment to keep pace with the impressive growth in the power generation sector; 3) continuing investments in the development of renewable energy sources; 4) developing a culture of professionalism and efficiency in the electricity distribution utilities so as to ensure that the efficiency gains made are not negated by continued technical and commercial losses; and 5) tackling the distorted retail level electricity tariffs.

## TRILEMMA BALANCE



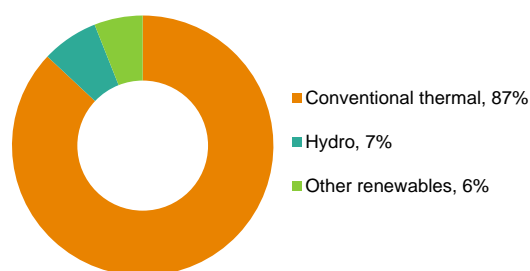
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	87	68	61	↑	
Energy security	37	17	17	↑	<b>A</b>
Energy equity	94	83	64	↑	<b>C</b>
Environmental sustainability	109	104	106	→	<b>D</b>
Contextual performance	71	72	81	↓	
Political strength	92	95	88	↑	
Societal strength	82	82	87	↓	
Economic strength	41	42	76	↓	
<b>Overall rank and balance score</b>	<b>85</b>	<b>73</b>	<b>69</b>	<b>↑</b>	<b>ACD</b>

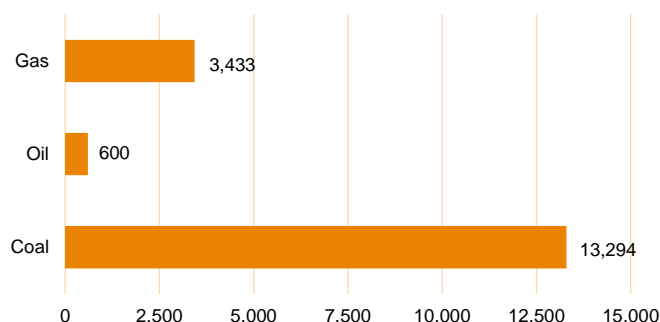
## INDEX COMMENTARY

Indonesia moves up four places in this year's Index. However, Indonesia faces the same challenges in balancing the competing sides of the energy trilemma, as its peers in the 'Highly-industrialised' group of countries do, with the very strong energy security ranking offset by weaker energy equity and environmental sustainability performance. Energy security is robust, with a very favourable total energy production to consumption ratio, and a slowing energy consumption growth rate. Energy equity improves as prices for gasoline and electricity remain at the same level and the perceived quality of the electricity supply improves. Performance on the environmental sustainability dimension also lags behind quite a bit, with an improving energy and emissions intensity offset by rising CO<sub>2</sub> emissions from electricity generation. Contextually, political strength and societal strength remain mostly stable, while there is a significant drop in the country's economic strength caused by an update of the data points underlying the indicator for cost of living expenditure.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



## KEY METRICS

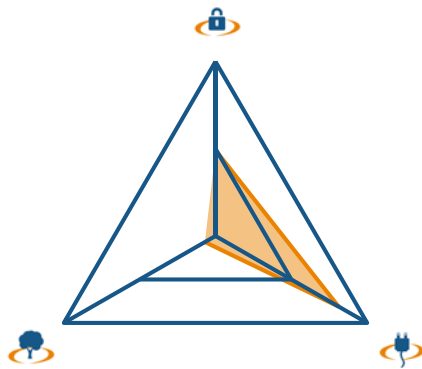
Industrial sector (% of GDP)	46.6	GDP per capita (PPP, USD); GDP Group	4,925 (IV)
TPEP / TPEC (net energy exporter)	2.28	Energy intensity (koe per USD)	0.20
Emission intensity (kCO <sub>2</sub> per USD)	0.40	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	1.74
Energy affordability (USD per kWh, 2011)	0.06	Population with access to electricity (%)	94.2

## TRENDS AND OUTLOOK

- Fossil fuels remain the main energy source. Levels of development and deployment of efficient and low-carbon and carbon-free energy technologies are slower than expected to fulfil sustained energy demand growth, which remains positive under significant energy subsidies to support social and economic development.
- Recent energy policy developments include the energy policy targets of the Presidential Decree No. 5, 2006 on National Energy Policy and its Blueprint of National Energy Management 2005-2025. The policy targets are: reducing energy elasticity to less than one, aligned with the target of economic growth; enhancing the national energy mix with oil below 20%, natural gas more than 30%, coal to more than 33%, and the remaining 17% from new and renewable energy. The Ministerial Decree on feed-in-tariffs for renewable energy gives more opportunity for development of small renewable energy with private participations. This will give remote islands the opportunity to accelerate access to electricity. The government is also preparing to issue a new national energy policy as the implementation of Energy Law No. 30, 2007.
- Key issues policymakers need to continue to focus on include: 1) removing energy subsidies; 2) intensifying the efforts to increase the use of new and renewable energy through research and development, pilot projects, providing incentives, capacity building; 3) embed low-carbon and carbon-free technologies in the long-term energy plan; 4) increase energy efficiency on supply and demand sides; and 5) attract more investments to the energy sector.



## TRILEMMA BALANCE



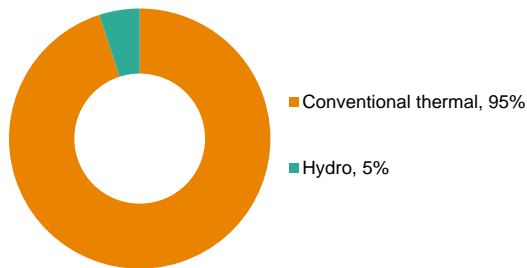
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	66	87	75	↓	
Energy security	50	75	66	↓	<b>C</b>
Energy equity	31	44	24	↑	<b>B</b>
Environmental sustainability	118	119	120	→	<b>D</b>
Contextual performance	93	95	124	↓	
Political strength	120	115	115	↑	
Societal strength	81	81	96	↓	
Economic strength	69	89	126	↓	
<b>Overall rank and balance score</b>	<b>77</b>	<b>91</b>	<b>89</b>	<b>↓</b>	<b>BCD</b>

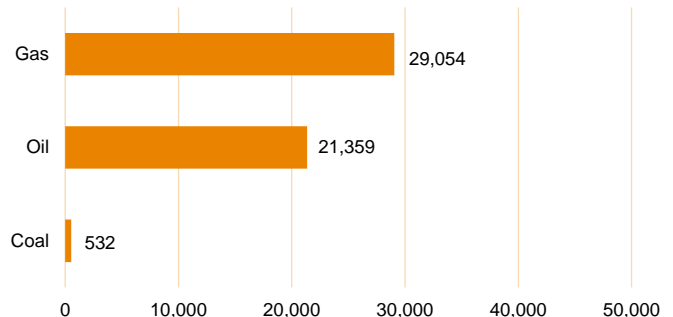
## INDEX COMMENTARY

Iran's overall Index ranking remains mostly unchanged. Iran's balancing of the various dimensions of the energy trilemma is rather lopsided, with a respectable energy equity ranking and slightly poorer performance in energy security being counterbalanced by the country's lack of mitigation of its environmental impact. A high energy consumption growth rate, high distribution losses of electricity (an amount equal to 15% of total electricity generated), and low, but improving diversity of the electricity generation portfolio result in a lower energy security rank than might be expected from an OPEC country. Energy equity is Iran's strongest energy dimension, as both gasoline and electricity remain affordable. Performance on the environmental sustainability dimension is a serious challenge for Iran, with high energy and emission intensity, levels of pollution, and amounts of CO<sub>2</sub> emitted from electricity generation. Contextually, indicators of political and societal strength are stable but low. Economic strength continues to fall this year due to increasing macroeconomic instability and a drop in the availability of credit to the private sector.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

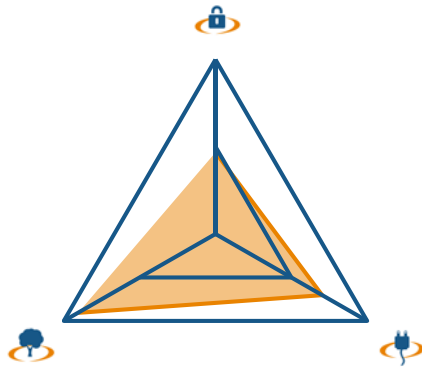


## KEY METRICS

Industrial sector (% of GDP)	44.9	GDP per capita (PPP, USD); GDP Group	12,444 (III)
TPEP / TPEC (net energy exporter)	1.60	Energy intensity (koe per USD)	0.27
Emission intensity (kCO <sub>2</sub> per USD)	0.65	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	7.03
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	98.4

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



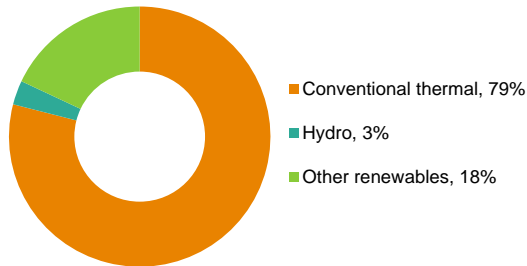
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	27	25	21	↑	
Energy security	85	82	69	↑	<b>C</b>
Energy equity	28	30	39	↓	<b>B</b>
Environmental sustainability	15	15	13	→	<b>A</b>
Contextual performance	18	18	25	↓	
Political strength	14	14	14	→	
Societal strength	11	11	18	↓	
Economic strength	46	51	61	↓	
<b>Overall rank and balance score</b>	<b>21</b>	<b>20</b>	<b>22</b>	<b>→</b>	<b>ABC</b>

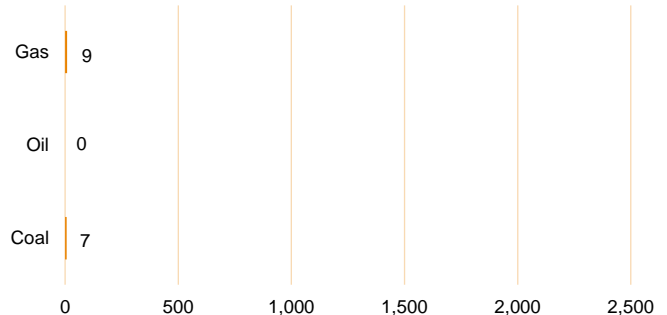
## INDEX COMMENTARY

Overall, Ireland maintains a stable position in the Trilemma Index throughout the years. While Ireland performs quite well on indicators of environmental sustainability and energy equity, it struggles to replicate this success on the energy security dimension. Performance improves on some indicators of energy security, including an improved diversity of the electricity generation portfolio and a reduced dependence on fuel imports. However, Ireland continues to struggle with low rates of energy production (only 8% of the total energy it consumes). Gasoline prices and household expenditure on electricity are gradually increasing, but energy equity performance remains good. Despite its heavy reliance on burning fossil fuels to generate electricity (and the attendant CO<sub>2</sub> emissions), Ireland does very well on the environmental sustainability dimension, due to an extremely high air and water quality and a low energy intensity. Contextually, Ireland continues to do well on almost all indicators, with the notable exception of macroeconomic stability.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

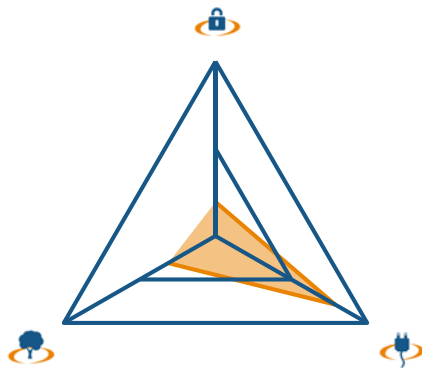


## KEY METRICS

Industrial sector (% of GDP)	28.0	GDP per capita (PPP, USD); GDP Group	40,716 (I)
TPEP / TPEC (net energy importer)	0.08	Energy intensity (koe per USD)	0.08
Emission intensity (kCO <sub>2</sub> per USD)	0.22	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	7.56
Energy affordability (USD per kWh, 2013)	0.29	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



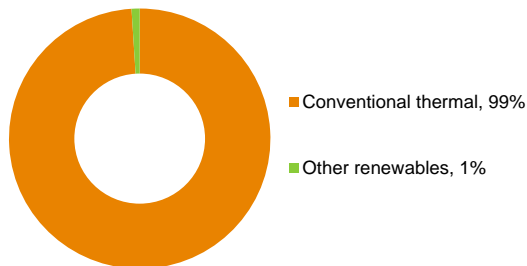
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	75	73	80	↓	
Energy security	100	102	104	↓	<b>D</b>
Energy equity	30	29	27	→	<b>B</b>
Environmental sustainability	83	83	88	↓	<b>C</b>
Contextual performance	41	45	41	→	
Political strength	52	50	49	→	
Societal strength	31	31	26	↑	
Economic strength	56	66	60	↓	
<b>Overall rank and balance score</b>	<b>63</b>	<b>67</b>	<b>66</b>	<b>→</b>	<b>BCD</b>

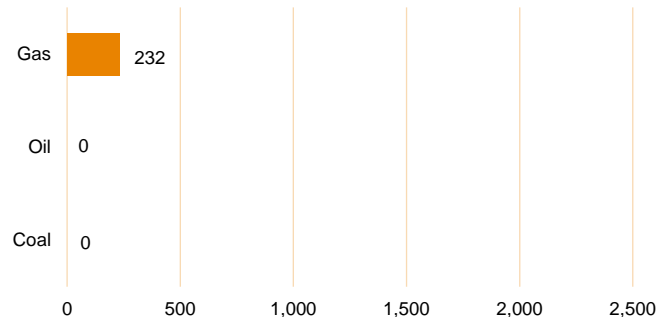
## INDEX COMMENTARY

With overall energy and contextual performance roughly the same, Israel's overall Index ranking remains mostly unchanged. The three sides of Israel's energy trilemma are unbalanced, with weaker energy security and environmental sustainability performance, and a high degree of energy equity. Energy security continues to be Israel's weakest dimension due to the small country's heavy reliance on energy imports (it produces only 6% of the total energy it consumes), low oil and oil product stocks, and a homogenous electricity fuel mix that uses mostly conventional thermal energy. Energy equity remains Israel's strongest energy dimension. Environmental sustainability performance remains fairly stable, with higher emission intensity, and CO<sub>2</sub> emissions from electricity generation. Contextually, Israel has a high degree of societal strength, decent political and economic strength.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



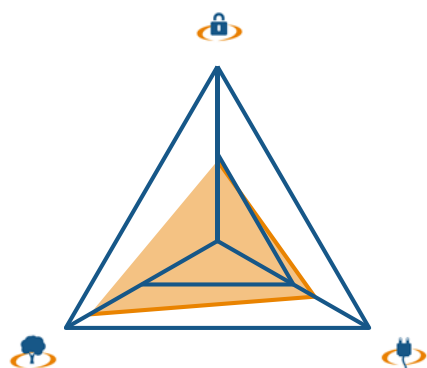
## KEY METRICS

Industrial sector (% of GDP)	31.2	GDP per capita (PPP, USD); GDP Group	33,878 (I)
TPEP / TPEC (net energy importer)	0.06	Energy intensity (koe per USD)	0.11
Emission intensity (kCO <sub>2</sub> per USD)	0.36	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	9.70
Energy affordability (USD per kWh, 2012)	0.15	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- The discovery of off-shore natural gas reserves and underground oil shale and subsequent beginning exploration will change the country's energy landscape, as Israel relies heavily on fossil fuel imports to meet its growing energy needs. As a country that has been largely dependent on imports to meet its needs, these reserves are critical to the country's energy security.
- Recent policy developments include: the National Energy Efficiency Programme; and a target for renewable electricity generations set at 10% by 2020 to help counteract increasing energy demand and reduce GHG emissions.
- The greatest challenges for policymakers are to: 1) ensure that production of new resources is carried out efficiently; 2) set a binding target for reducing GHG emissions; and 3) closely monitor the implementation of the energy efficiency programme.

## TRILEMMA BALANCE



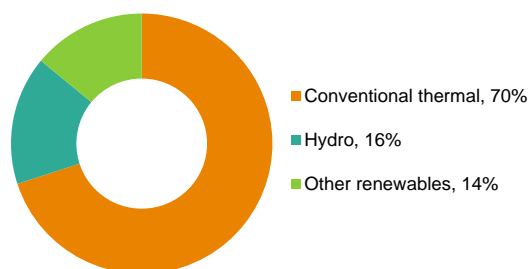
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	26	25	34	↓	
Energy security	76	69	70	↑	<b>C</b>
Energy equity	29	34	48	↓	<b>B</b>
Environmental sustainability	22	24	21	→	<b>A</b>
Contextual performance	38	39	36	→	
Political strength	44	43	42	→	
Societal strength	32	32	38	↓	
Economic strength	50	59	44	↑	
<b>Overall rank and balance score</b>	<b>27</b>	<b>28</b>	<b>29</b>	→	<b>ABC</b>

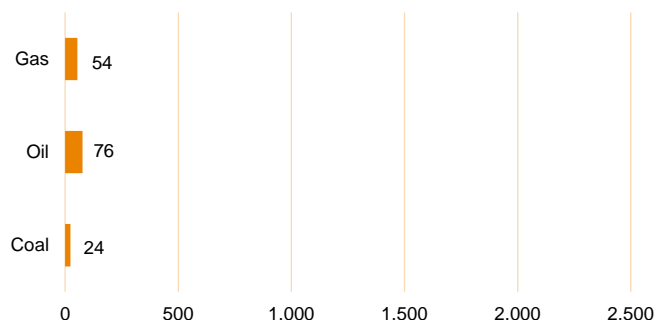
## INDEX COMMENTARY

Overall, Italy maintains a stable position in the Trilemma Index throughout the years, but the three sides of the energy trilemma are not balanced. Hampered by an unfavourable total energy production to consumption ratio (the country produces only 17% of the energy it consumes), Italy is increasing both its energy production and the diversity of its electricity fuel mix to improve its long-term energy security. The energy equity dimension sees higher fuel and electricity prices, but, on the whole, Italy continues to provide its citizens with relatively affordable, high-quality energy. Environmental sustainability performance remains relatively stable, with slight declines in CO<sub>2</sub> emissions from electricity generation and improved emissions intensity. Contextual performance is also largely unchanged, with macroeconomic stability being by far the worst indicator.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



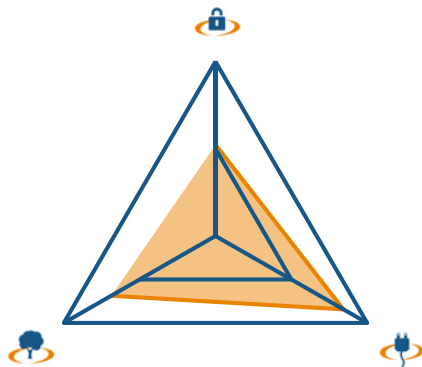
## KEY METRICS

Industrial sector (% of GDP)	24.4	GDP per capita (PPP, USD); GDP Group	30,551 (II)
TPEP / TPEC (net energy importer)	0.17	Energy intensity (koe per USD)	0.10
Emission intensity (kCO <sub>2</sub> per USD)	0.23	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	5.96
Energy affordability (USD per kWh, 2013)	0.31	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- Italy has reached important mitigation policy objectives by transforming its thermoelectric fleet into one of the most efficient in Europe and by changing the energy mix for power generation from oil to cleaner natural gas and renewable energy. Furthermore, several measures were adopted for improving energy efficiency in the residential, commercial and transport sectors. These policies have led to impressive achievements in the reduction of GHG emissions and water pollution between 2005 and 2013.
- Recent policy developments include: a review of the incentive scheme for PV installations, extending the timeframe during which the incentive will be provided; producers of renewable energy (RE) are asked to contribute to balancing and transmission/ distribution costs (RE associated with on-site consumption is partially exempted); the introduction of the Conto Energia, a mechanism supporting cooling/ thermal efficiency and the production of thermal energy from RE in buildings and businesses; and the development of the PAEE National Action Plan on Energy Efficiency that sets efficiency goals to 2020 and policies for achieving them. These measures are expected to have a positive impact on both energy affordability and environmental sustainability by lowering the burden of incentives on energy bills, increasing the share of renewables in thermal uses and improving efficiency.
- Finally, the increasing interconnection of the Italian natural gas market with EU markets is expected to lower natural gas prices in the wholesale market, and hence for households and industry. The new government is also working on the legal framework for offshore upstream activities to encourage the domestic production of oil and natural gas.

TRILEMMA BALANCE



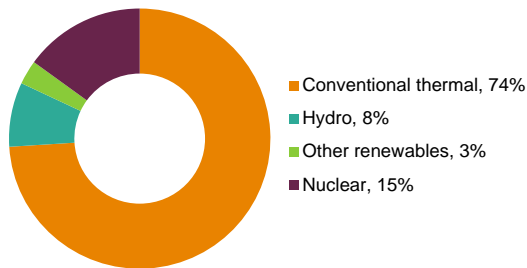
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	13	14	22	↓	
Energy security	49	48	62	↓	<b>B</b>
Energy equity	9	17	20	↓	<b>A</b>
Environmental sustainability	29	33	41	↓	<b>B</b>
Contextual performance	30	32	28	→	
Political strength	22	22	19	→	
Societal strength	12	12	15	→	
Economic strength	65	71	71	↓	
<b>Overall rank and balance score</b>	<b>14</b>	<b>16</b>	<b>23</b>	<b>↓</b>	<b>ABB</b>

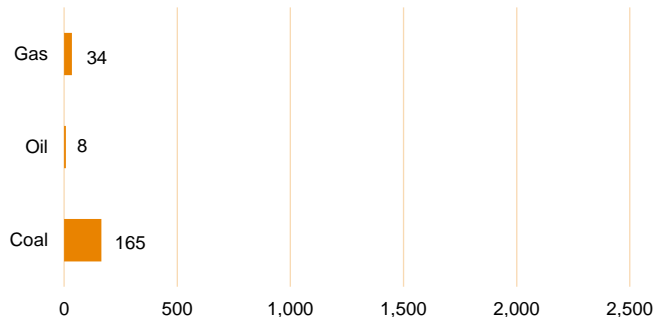
INDEX COMMENTARY

Japan's overall Index ranking slips seven places this year, a reflection of weaker energy performance. Japan, a resource-poor country, continues to struggle with unfavourable total energy production to consumption and therefore import-to-export ratios. After the 2011 Fukushima nuclear accident the electricity fuel mix becomes notably less diverse. Since September 2013 all of the country's nuclear reactors remain closed and the future of nuclear power in Japan remains uncertain. Japan's rank on the energy equity dimension slips this year as decreasing electricity prices (due to the depreciation of the Yen) and an again improving quality of the electricity supply are offset as gasoline becomes more expensive. Environmental sustainability performance also drops given the increased amount of fossil fuels burned for power generation. Contextual indicators of political and societal strength repeat their outstanding performance for yet another year.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)



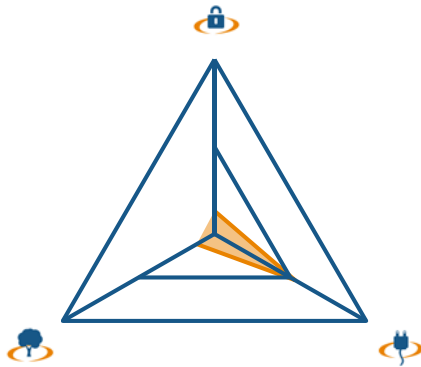
KEY METRICS

Industrial sector (% of GDP)	25.6	GDP per capita (PPP, USD); GDP Group	35,724 (I)
TPEP / TPEC (net energy importer)	0.19	Energy intensity (koe per USD)	0.11
Emission intensity (kCO <sub>2</sub> per USD)	0.30	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	9.38
Energy affordability (USD per kWh, 2013)	0.24	Population with access to electricity (%)	100.0

TRENDS AND OUTLOOK

- Most recent energy policy developments include the implementation of a feed-in tariff (FIT) system on July 1, 2012, which is expected to increase the penetration of renewable energies, such as solar PV and wind. However, the FIT system is viewed with some criticism because purchasing prices are set high based on the estimated cost of individual renewable energies to guarantee the investors' profit. A heavy burden on consumers' (including households on welfare) electricity bill is expected. Also there are concerns that the domestic PV will not be able to compete against lower-cost imports in the national market.
- In December 2012 Japan's government changed. The new government approved the Basic Energy Plan in April 2014 and positioned nuclear power as an important base-load power source, reversing the previous government's policy of abolishing nuclear power by 2030. Under a new nuclear safety standard, Japan plans to restart nuclear plants where safety has been confirmed. In July 2013 a newly established independent organisation, the Nuclear Regulation Authority (NRA), started to accept applications from nuclear operators (electric power companies) to undergo safety examinations based on the new standard, which added severe accident management and measures against risks such as terrorism attacks or a volcano eruption. In September 2014, the NRA announced that the first two PWR nuclear units passed the safety examinations.
- However, the future composition of Japan's energy sector, especially the future of nuclear power, is still unclear as a serious question remains: can agreements on the restart from neighbouring municipalities and prefectural governors be obtained easily?

## TRILEMMA BALANCE



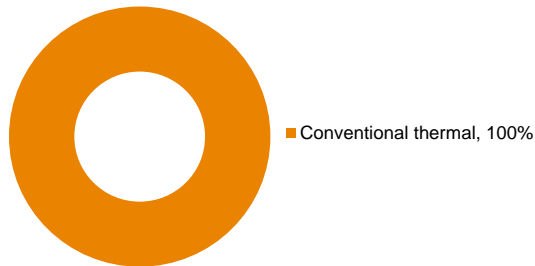
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	105	113	114	↓	
Energy security	108	119	112	↓	<b>D</b>
Energy equity	62	63	61	→	<b>B</b>
Environmental sustainability	110	107	114	↓	<b>D</b>
Contextual performance	47	49	75	↓	
Political strength	66	67	69	→	
Societal strength	49	49	53	↓	
Economic strength	37	38	118	↓	
<b>Overall rank and balance score</b>	<b>93</b>	<b>96</b>	<b>108</b>	<b>↓</b>	<b>BDD</b>

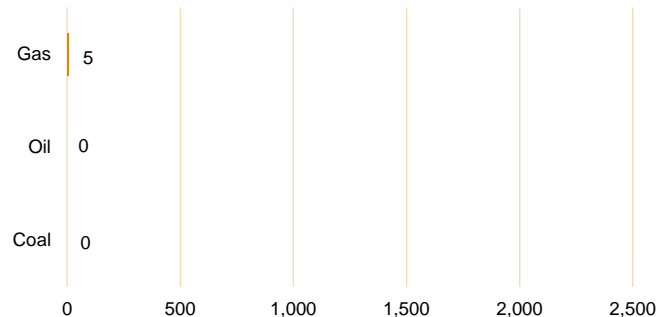
## INDEX COMMENTARY

Jordan drops 12 places in this year's Index. One of the 'Back of the Pack' countries, Jordan has its weaker performances on the energy security and environmental sustainability dimensions balanced out by a decent energy equity ranking. The country's low energy security, the weakest of the three dimensions, is driven by a combination of its unfavourable total energy production to consumption and import to export ratios, its homogenous fossil-fuelled electricity fuel mix, and the high proportion of electricity lost in transmission and distribution. This year's improvement comes largely as the result of lower transmission and distribution losses. Energy equity is Jordan's strongest energy dimension, with relatively affordable, mostly high-quality energy. Environmental sustainability performance slips as emission intensity and CO<sub>2</sub> emissions from electricity generation increase. Contextually, Jordan ranks above-average for political and societal strength, with political indicators worsening across the board as societal ones improve or remain flat. Economic strength plunges due to a deteriorating macroeconomic stability and an update of the data points.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

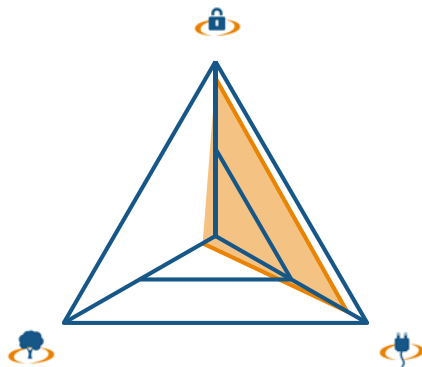


## KEY METRICS

Industrial sector (% of GDP)	29.9	GDP per capita (PPP, USD); GDP Group	5,968 (IV)
TPEP / TPEC (net energy importer)	0.03	Energy intensity (koe per USD)	0.23
Emission intensity (kCO <sub>2</sub> per USD)	0.66	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	3.49
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	99.4

## TRENDS AND OUTLOOK

TRILEMMA BALANCE



INDEX RANKINGS AND BALANCE SCORE

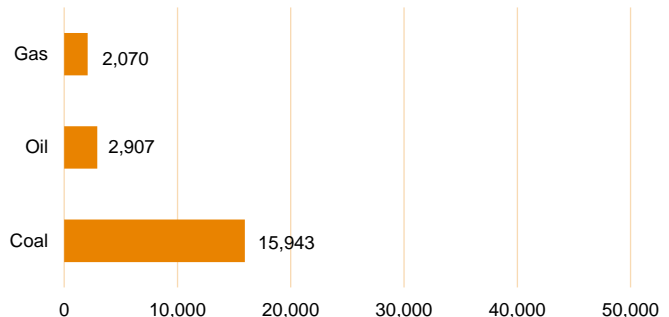
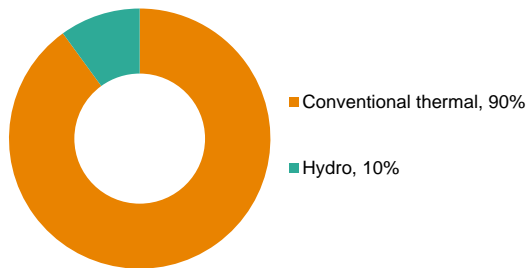
	2012	2013	2014	Trend	Score
Energy performance	51	43	38	↑	
Energy security	8	6	13	↓	<b>A</b>
Energy equity	35	35	17	↑	<b>A</b>
Environmental sustainability	119	116	118	→	<b>D</b>
Contextual performance	84	90	93	↓	
Political strength	69	83	91	↓	
Societal strength	102	102	89	↑	
Economic strength	76	79	88	↓	
<b>Overall rank and balance score</b>	<b>57</b>	<b>58</b>	<b>56</b>	→	<b>AAD</b>

INDEX COMMENTARY

Overall, Kazakhstan maintains a stable position in the Index throughout the years. Kazakhstan, a 'Fossil-fuelled' country, has strong energy security and energy equity rankings, and a poor environmental sustainability performance. The country's robust energy security performance worsens slightly this year as the country's dependence on fuel exports are taken into account for the first time (additional data points are available). Attention must still be paid to further diversifying the electricity generation portfolio away from fossil fuels to include renewable energy source and potentially more hydropower. Energy equity improves as the perceived quality of the country's very affordable gasoline and electricity increases. Environmental sustainability still lags very far behind with no notable changes this year, except for an increase in CO<sub>2</sub> emissions from electricity generation. Contextual indicators of political, societal, and economic strength so far all remain on the lower end of the spectrum, with the notable exception of the country's robust macroeconomic stability. Political stability did not strengthen this year, while societal indicators show some improvements.

DIVERSITY OF ELECTRICITY GENERATION

FOSSIL FUEL RESERVES (IN MTOE)



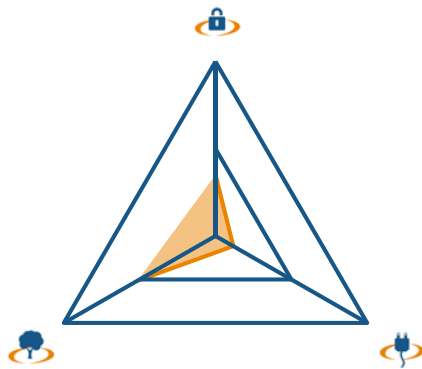
KEY METRICS

Industrial sector (% of GDP)	37.9	GDP per capita (PPP, USD); GDP Group	13,574 (III)
TPEP / TPEC (net energy exporter)	2.58	Energy intensity (koe per USD)	0.40
Emission intensity (kCO <sub>2</sub> per USD)	1.21	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	14.46
Energy affordability (USD per kWh, 2011)	0.04	Population with access to electricity (%)	100.0

TRENDS AND OUTLOOK

- The government together with business, energy industry and industrial associations, has developed and implemented a clear energy strategy and well-defined energy policy to support the development of a sustainable energy system.
- Recent policy developments in Kazakhstan include: strengthening state institutions responsible for energy efficiency in production, extraction and consumption of energy; clear and comprehensive energy saving programmes to reduce energy intensity of industry (reduce 10% by 2015 and 25% by 2020 compared to 2008); the adoption of policies to support the development and inclusion of available renewable energy sources (RES) into the energy mix (electricity generated from RES should reach 1 billion kWh per year by 2014, almost three times the 2009 level); and plans and programmes to facilitate the modernisation of existing power generation, power grids and oil refining installations. Together, these changes are expected to improve the country's environmental sustainability noticeably. Moreover, the diversification of the generation portfolio is envisaged by the concept of Kazakhstan's Transition to a Green Economy approved by the Order of the President of Kazakhstan in 2013.
- Policymakers will continue existing successful practices to maintain a favourable investment climate, which allows improvements to the country's trilemma balance, and attracts investment into the exploration and production of energy resources for export to world markets. There is a need to further develop power generating facilities by introducing cutting-edge technologies that will not only ensure domestic supply, but also enable the country to offer significant amounts of electricity to markets in neighbouring countries.

## TRILEMMA BALANCE



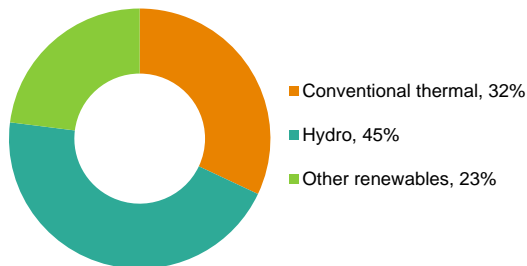
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	107	100	101	↑	
Energy security	93	88	84	↑	<b>C</b>
Energy equity	114	114	114	→	<b>D</b>
Environmental sustainability	74	63	63	↑	<b>B</b>
Contextual performance	115	118	112	→	
Political strength	101	102	104	→	
Societal strength	122	122	114	↑	
Economic strength	90	99	82	↑	
<b>Overall rank and balance score</b>	<b>113</b>	<b>108</b>	<b>104</b>	<b>↑</b>	<b>BCD</b>

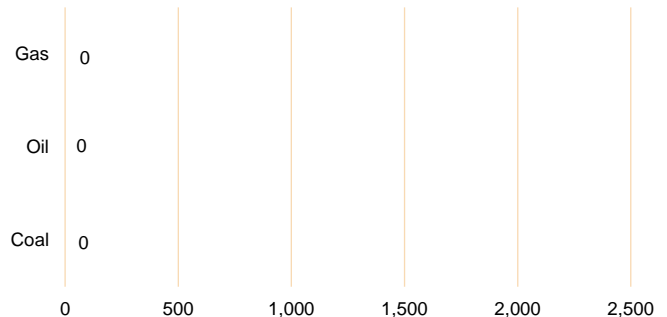
## INDEX COMMENTARY

Kenya increases four places in the 2014 Index, although its overall energy performance remains mostly stable with no noteworthy changes. Kenya struggles with balancing the energy trilemma, as energy equity lags behind its performances on the energy security and environmental sustainability dimensions. With Kenya producing less than a quarter of the total energy it consumes, overall energy security remains fairly low. However, the country continues to keep its economy growing faster than energy consumption rates, which bodes well for the future. Energy equity is Kenya's weakest energy dimension, with high gasoline prices and only 23% of its citizens having access to rather expensive electricity services. Environmental sustainability is Kenya's strongest dimension. However, the country will face the challenge of keeping these emissions low (fossil fuels currently make up less than a third of Kenya's electricity fuel mix) as it works to strengthen its economy and increase energy equity. Contextual performance continues to be low.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



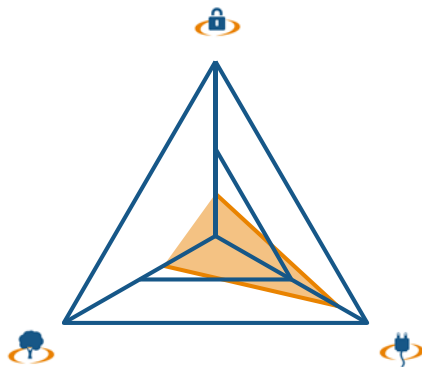
## KEY METRICS

Industrial sector (% of GDP)	17.4	GDP per capita (PPP, USD); GDP Group	1,737 (IV)
TPEP / TPEC (net energy importer)	0.23	Energy intensity (koe per USD)	0.32
Emission intensity (kCO <sub>2</sub> per USD)	0.18	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.28
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	23.0

## TRENDS AND OUTLOOK



## TRILEMMA BALANCE



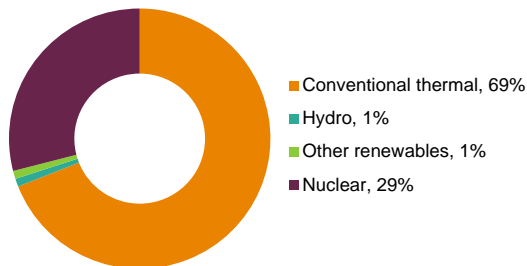
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	72	85	70	→	
Energy security	89	103	98	↓	<b>D</b>
Energy equity	32	49	25	↑	<b>B</b>
Environmental sustainability	86	85	85	→	<b>C</b>
Contextual performance	21	16	22	→	
Political strength	41	37	40	→	
Societal strength	26	26	31	↓	
Economic strength	11	9	13	→	
<b>Overall rank and balance score</b>	<b>54</b>	<b>64</b>	<b>55</b>	<b>→</b>	<b>BCD</b>

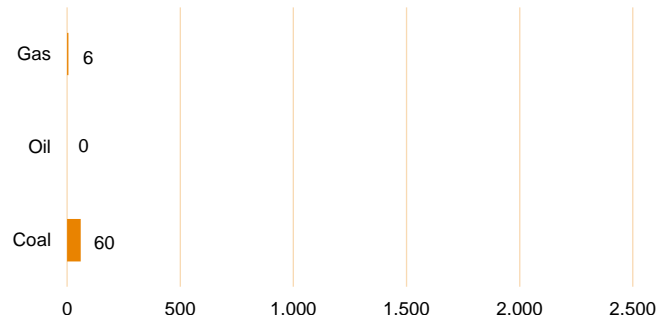
## INDEX COMMENTARY

Korea moves up nine places in the 2014 Trilemma Index, mostly due to improvements in energy security and energy equity. Korea has a low level of energy security and struggles with mitigating its environmental impact, but performs rather well on the energy equity dimension. Korea continues to be heavily reliant on fuel imports with an unfavourable energy import to export ratio. As gasoline prices creep upwards, but remain within means, the perceived quality of the country's very affordable electricity services improves, helping to lift Korea's energy equity ranking. Indicators measuring environmental sustainability are all constant, with the exception of a minor increase in CO<sub>2</sub> emissions from electricity generation. Contextual performance is good, but this year sees a slight worsening across the board. Economic strength, the strongest of Korea's contextual dimensions, declines despite improvements in the availability of domestic credit to the private sector, due to an update of data points underlying the indicator for cost of living expenditure.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



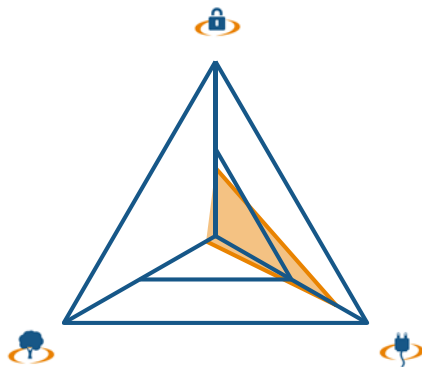
## KEY METRICS

Industrial sector (% of GDP)	39.2	GDP per capita (PPP, USD); GDP Group	31,950 (II)
TPEP / TPEC (net energy importer)	0.14	Energy intensity (koe per USD)	0.19
Emission intensity (kCO <sub>2</sub> per USD)	0.43	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	11.90
Energy affordability (USD per kWh, 2013)	0.10	Population with access to electricity (%)	93.3

## TRENDS AND OUTLOOK

- Energy security remains a major challenge with a very low stability of resource supplies and an energy import dependency of around 97%. As a counter measure Korea (Republic) has invested in overseas resource development, but this brings new challenges such as low production capacity, lack of human resources, technical skills and so on. There are environmental sustainability calls for action given high energy intensity levels, growing energy consumption and increasing GHG emissions.
- Recent policy measures to enhance energy security include: expanding cooperation with resource-rich countries; strengthening the competitiveness of energy developing companies; and establishing the Overseas Resource Development Fund to fund energy development projects in addition to giving government loans and guarantees. Environmental sustainability policy measures include: the expansion of renewable energy with targets until 2030; the shift from government-financed feed-in-tariffs to a renewable portfolio standard in 2012 to create new demand for renewable energy; and the strong support of RD&D. Nuclear energy plays an essential role in the countries energy system in terms of energy security, economics, climate change and load demand.
- Policymakers need to continue focusing on: 1) the enhancement of overseas energy development; 2) the development of renewable energy; and 3) the expansion of the nuclear power sector considering safety issues, waste disposal, and increasing public acceptance by providing objective information and being transparent.

## TRILEMMA BALANCE



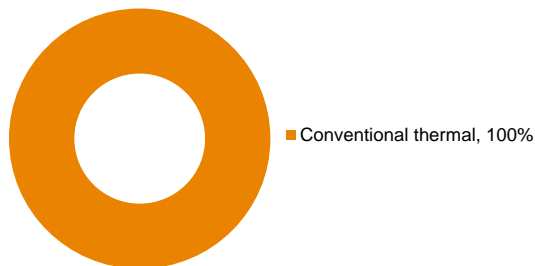
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	77	80	81	↓	
Energy security	62	73	79	↓	<b>C</b>
Energy equity	33	28	26	↑	<b>B</b>
Environmental sustainability	122	122	121	→	<b>D</b>
Contextual performance	36	36	51	↓	
Political strength	56	60	64	↓	
Societal strength	53	53	54	→	
Economic strength	6	4	54	↓	
<b>Overall rank and balance score</b>	<b>61</b>	<b>66</b>	<b>76</b>	<b>↓</b>	<b>BCD</b>

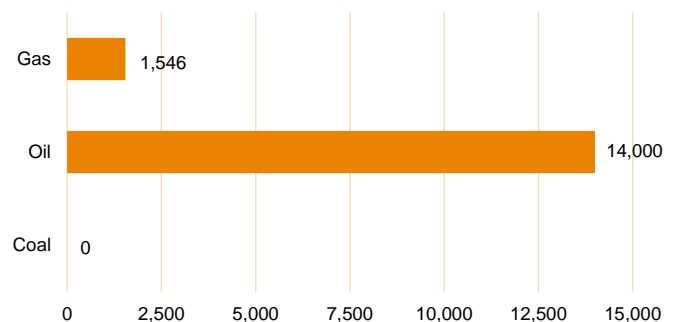
## INDEX COMMENTARY

Kuwait drops 10 places in the overall Index ranking, largely because of a decline in economic strength. A member of the 'Fossil-fuelled' grouping, Kuwait has a very low score on the environmental sustainability dimension, especially when compared with its better performances on energy security and energy equity. Kuwait's energy security ranking is lower than expected for an OPEC country, as the energy consumption growth rate outpaces economic growth and its electricity fuel mix remains homogenous and entirely reliant on burning fossil fuels. Both gasoline and electricity are affordable to Kuwaitis, making energy equity Kuwait's strongest energy dimension by far. The country's environmental sustainability ranking is still among the worst in the world, with high levels of energy and emission intensity and large amounts of CO<sub>2</sub> emissions resulting from electricity generation, although all indicators see some improvements this year. Contextually, political and societal strength remain mostly stable, whereas Kuwait's economic strength plunges mainly due to an update of data points underlying the indicator for cost of living expenditure.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

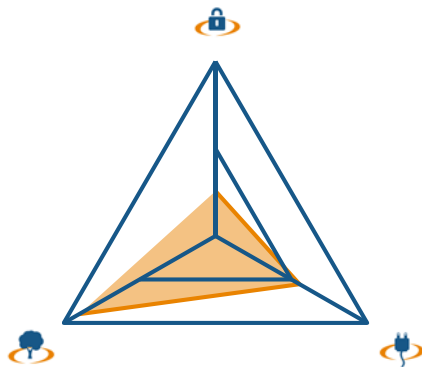


## KEY METRICS

Industrial sector (% of GDP)	50.6	GDP per capita (PPP, USD); GDP Group	39,877 (I)
TPEP / TPEC (net energy exporter)	4.38	Energy intensity (koe per USD)	0.24
Emission intensity (kCO <sub>2</sub> per USD)	0.60	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	29.62
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	94.1

## TRENDS AND OUTLOOK

TRILEMMA BALANCE



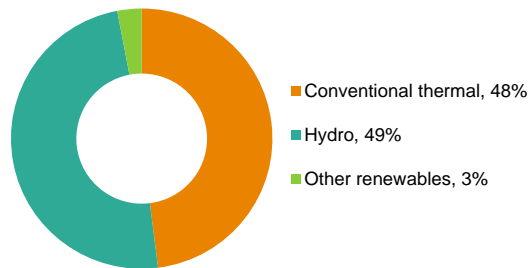
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	44	51	51	↓	
Energy security	78	98	96	↓	<b>D</b>
Energy equity	54	54	59	↓	<b>B</b>
Environmental sustainability	18	14	14	↑	<b>A</b>
Contextual performance	51	43	40	↑	
Political strength	37	41	39	→	
Societal strength	42	42	43	→	
Economic strength	78	62	52	↑	
<b>Overall rank and balance score</b>	<b>42</b>	<b>43</b>	<b>43</b>	→	<b>ABD</b>

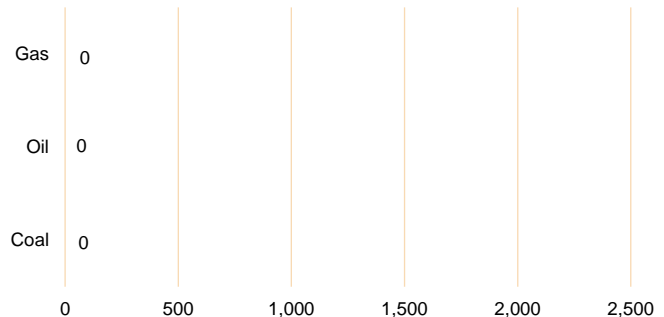
INDEX COMMENTARY

Overall, Latvia maintains a stable position in the Index throughout the years. The country faces challenges similar to those that are faced by the 'Hydro-powered' grouping of countries, with lower levels of energy security and energy equity being counterpoints to a strong environmental sustainability performance. Latvia, which imports over three-quarters of the energy it consumes, struggles with its energy security ranking the most. Performance on this dimension slightly improves this year as the country lowers its transmission and distribution losses and renewable energy sources are added to the electricity generation profile. Latvia performs much better on the energy equity dimension, with affordable (although not quite cheap) prices of gasoline and electricity. Latvia's environmental sustainability performance is its best, and among the top worldwide, with further decreasing energy and emissions intensity and comparatively low CO<sub>2</sub> emissions from electricity generation. Contextually, political and societal indicators remain stable, while economic strength increases as macroeconomic stability improves.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)



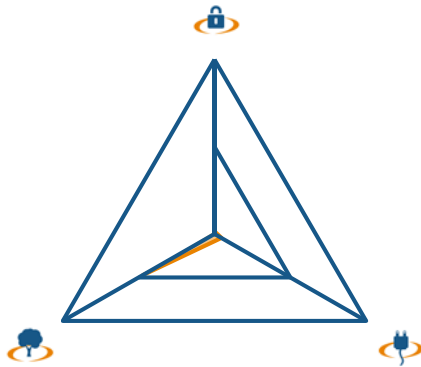
KEY METRICS

Industrial sector (% of GDP)	25.7	GDP per capita (PPP, USD); GDP Group	18,037 (II)
TPEP / TPEC (net energy importer)	0.22	Energy intensity (koe per USD)	0.13
Emission intensity (kCO <sub>2</sub> per USD)	0.21	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	3.38
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	100.0







TRENDS AND OUTLOOK

- Latvia's current power generation capacity, which consists of hydropower plants (HPP) and combined heat-electric generation plants (CHP), is insufficient to meet the electricity demand. To address this issue and other challenges the Cabinet of Ministers in Latvia issued the Guidelines for Energy Sector Development for 2007-2016 and defined main principles, goals and directions for the next 10 years including the goal to achieve energy self-sufficiency by 2016.
- Furthermore, in 2012 the Latvian government agreed on the Latvian Energy Long Term Strategy 2030 – Competitive Energy for Society. The main goals include: reduce electricity and natural gas imports from third countries by 50%; increase energy production from renewable resources up to 50% of gross energy consumption; provide alternatives for natural gas deliveries; open electricity market in Latvia and to integrate it into the Baltic electricity markets; and increase interconnection power grid capacity to increase the effectiveness of the electricity market and to reduce electricity prices.
- The main challenges in Latvia will be to incentivise investments to develop new power plants and to balance the goals of increasing renewable energy generation (mainly wind) and keeping energy prices at an acceptable level to avoid negative impacts on the economy.

## TRILEMMA BALANCE



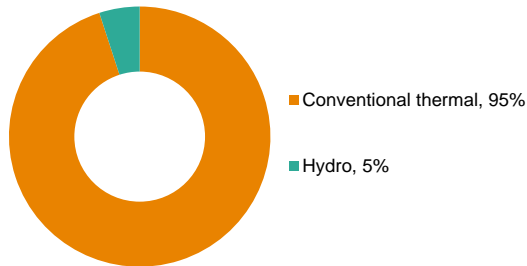
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	113	121	125	↓	
 Energy security	122	127	127	↓	<b>D</b>
 Energy equity	84	87	123	↓	<b>D</b>
 Environmental sustainability	87	89	68	↑	<b>C</b>
Contextual performance	69	70	102	↓	
 Political strength	95	96	102	↓	
 Societal strength	69	69	75	↓	
 Economic strength	49	48	104	↓	
<b>Overall rank and balance score</b>	<b>105</b>	<b>109</b>	<b>123</b>	<b>↓</b>	<b>CDD</b>

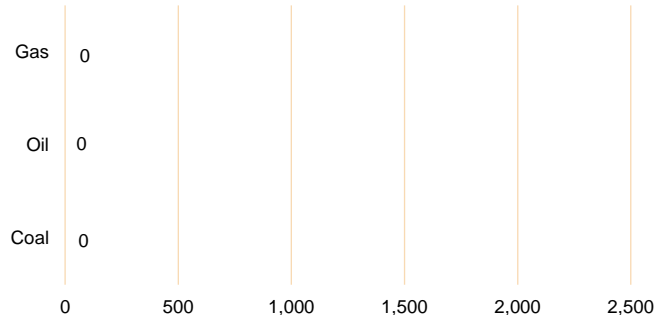
## INDEX COMMENTARY

Lebanon drops an additional 14 places in the 2014 Index. The country's rankings on the three energy dimensions are all low. Producing a mere 3% of the energy it consumes and having no oil stocks of its own, Lebanon is heavily reliant on fuel imports and is ill-equipped to handle any potential disruptions to its energy supply. The lack of diversity of its electricity fuel mix does not help either, as the country relies on burning fossil fuels to generate 95% of its electricity. Lebanon's environmental sustainability performance is comparatively better and improving, with decreasing energy and emissions intensity. However, Lebanon's energy equity dimension sees a major drop in 2014 as the country's performance becomes less measurable (a necessary data point is not available anymore). Similarly for economic strength for which the drop from 48 to 104 is caused by the absence of data points underlying the indicator for cost of living expenditure. Moreover, Lebanon continues to be plagued by low levels of political stability, control of corruption, and rule of law, and sees a further deterioration of its already weak macroeconomic stability.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



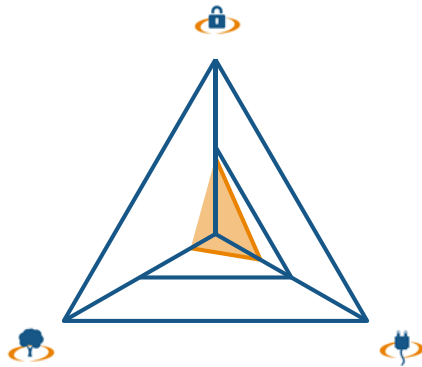
## KEY METRICS

Industrial sector (% of GDP)	20.0	GDP per capita (PPP, USD); GDP Group	14,618 (II)
TPEP / TPEC (net energy importer)	0.03	Energy intensity (koe per USD)	0.10
Emission intensity (kCO <sub>2</sub> per USD)	0.28	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	3.63
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	99.9

## TRENDS AND OUTLOOK

- Lebanon has a chronic electricity supply problem. However, in 2010, the government approved a promising strategy for the rehabilitation of the power sector, including the development of energy efficiency and renewable energy. The national target is to reach 12% of renewable energy out of the total electricity production in 2020. The energy efficiency target is to minimise demand by 5% in 2015. Challenges include mainly updating the legislative framework of the power sector.
- In addition to the policy paper, Lebanon is the first country in the Arab world to develop its National Energy Efficiency Action Plan (NEEAP) in 2011. Currently, the Renewable Energy Strategy is under preparation. Furthermore, Lebanon is embarking on a promising oil and gas exploration programme.
- Policymakers should focus on creating an enabling legislative framework for the development of renewable energy and energy efficiency, in addition to setting clear environmental regulations for the upcoming oil and gas industry.

TRILEMMA BALANCE



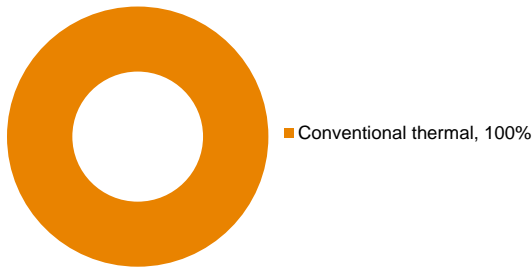
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	96	101	106	↓	
Energy security	53	70	73	↓	<b>C</b>
Energy equity	90	72	91	→	<b>C</b>
Environmental sustainability	113	123	108	↑	<b>D</b>
Contextual performance	123	124	116	↑	
Political strength	113	126	127	↓	
Societal strength	117	117	106	↑	
Economic strength	129	117	78	↑	
<b>Overall rank and balance score</b>	<b>109</b>	<b>117</b>	<b>114</b>	<b>↓</b>	<b>CCD</b>

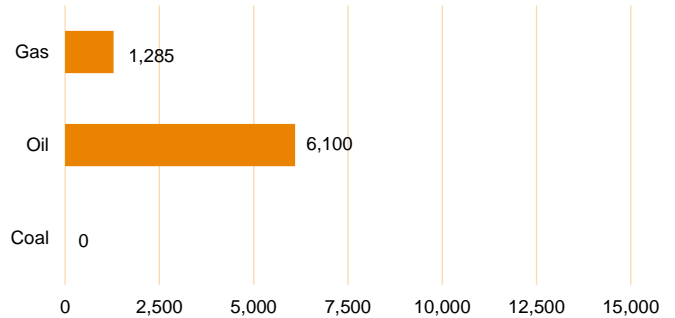
INDEX COMMENTARY

Libya's overall Index ranking remains mostly unchanged. The energy trilemma is unbalanced, with equally mediocre performances in energy security and energy equity being dragged down by a very poor environmental sustainability ranking. Energy security is mostly stable this year with no noteworthy changes, while energy equity drops given a comparative worsening of the price and quality of electricity services. Performance on the environmental sustainability dimension remains Libya's worst, but improves as energy and emissions intensity return to 2011 levels and CO<sub>2</sub> emissions from electricity generation decrease. Performance on contextual indicators is quite varied, with some indicators improving and others deteriorating. Indicators of political strength, control of corruption, and rule of law continue to fall. At the same time, though improving macroeconomic stability causes economic indicators to surge mid-way up the Index.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)

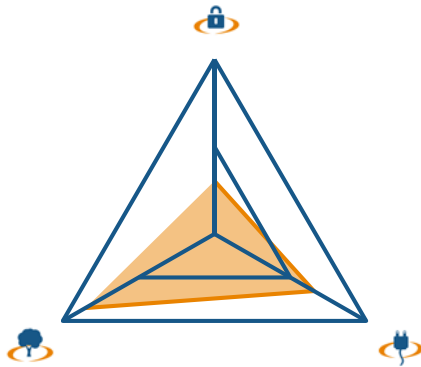


KEY METRICS

Industrial sector (% of GDP)	58.3	GDP per capita (PPP, USD); GDP Group	12,686 (III)
TPEP / TPEC (net energy exporter)	5.13	Energy intensity (koe per USD)	0.21
Emission intensity (kCO <sub>2</sub> per USD)	0.53	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	6.37
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	100.0

TRENDS AND OUTLOOK

## TRILEMMA BALANCE



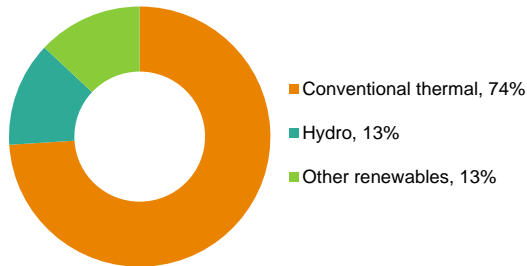
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	37	48	46	↓	
Energy security	80	93	90	↓	<b>C</b>
Energy equity	46	46	45	→	<b>B</b>
Environmental sustainability	16	26	20	↓	<b>A</b>
Contextual performance	40	42	39	→	
Political strength	35	36	33	→	
Societal strength	39	39	39	→	
Economic strength	63	69	62	→	
<b>Overall rank and balance score</b>	<b>36</b>	<b>42</b>	<b>37</b>	<b>→</b>	<b>ABC</b>

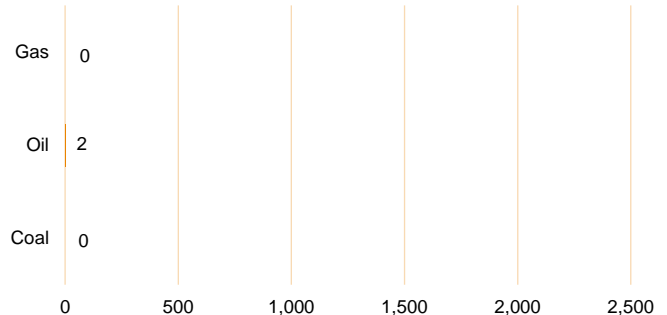
## INDEX COMMENTARY

Lithuania moves up five places in the overall rankings as performance improves across the majority of the Index dimensions. The three sides of the energy trilemma are not very well-balanced. Energy security continues to be the most challenging dimension for Lithuania, which produces a mere 5% of the total energy it consumes. Despite declining energy consumption, the country's total energy production to consumption and energy import to export ratios remain unfavourable as domestic energy production struggles in the wake of the closure of Lithuania's last nuclear power plant at the end of 2009, while at the same time transmission and distribution losses continue to increase. Even though prices for gasoline increase, energy equity does not see significant changes. Performance on the environmental sustainability dimension improves given a decrease in CO<sub>2</sub> emissions from electricity generation. Indicators of contextual performance remain stable across the board. The biggest change is an increase in macroeconomic stability.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

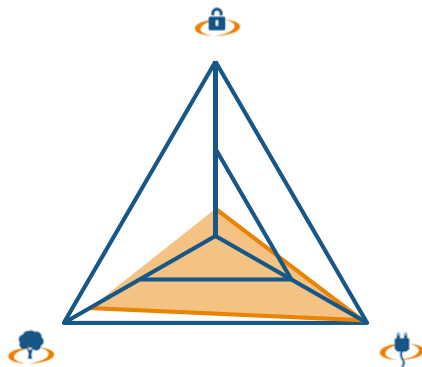


## KEY METRICS







Industrial sector (% of GDP)	28.3	GDP per capita (PPP, USD); GDP Group	21,588 (II)
TPEP / TPEC (net energy importer)	0.05	Energy intensity (koe per USD)	0.13
Emission intensity (kCO <sub>2</sub> per USD)	0.24	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	4.54
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



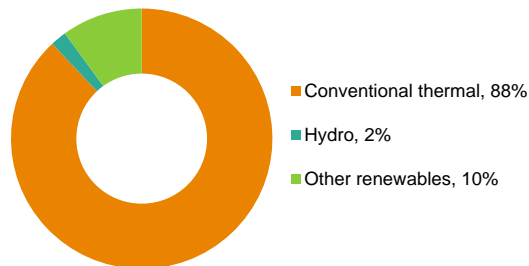
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	30	34	30	→	
 Energy security	96	107	109	↓	<b>D</b>
 Energy equity	6	4	4	→	<b>A</b>
 Environmental sustainability	28	29	23	↑	<b>A</b>
Contextual performance	3	2	9	↓	
 Political strength	7	5	6	→	
 Societal strength	13	13	16	→	
 Economic strength	2	1	5	→	
<b>Overall rank and balance score</b>	<b>18</b>	<b>19</b>	<b>18</b>	<b>→</b>	<b>AAD</b>

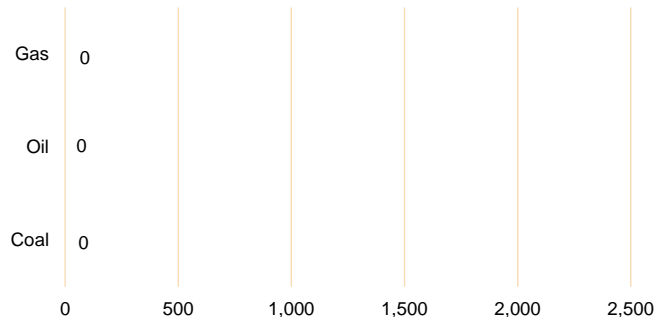
## INDEX COMMENTARY

Overall, Luxembourg maintains a stable position in the Index throughout the years. Its balance of the energy trilemma remains unbalanced, with excellent performances on the energy equity and environmental sustainability dimensions, but a low degree of energy security. This poor performance on the energy security dimension is driven by a heavy reliance on fuel imports (totalling 98% of energy consumed), minimal oil stocks, and the low diversity of the electricity fuel mix. These are all persisting challenges for Luxembourg, given the country's small geographical size and resource-poor natural endowments, but high level of economic development. Energy equity remains among the highest in the world, as the country continues to provide its citizens with (relatively) affordable gasoline and electricity. Luxembourg's environmental sustainability ranking improves, as CO<sub>2</sub> emissions from electricity generation and emissions intensity see a decrease. Contextually, Luxembourg ranks ninth in the world overall and continues to receive top marks on all indicators of political, societal, and economic strength.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

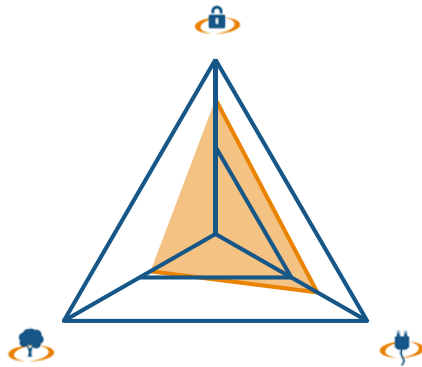


## KEY METRICS

Industrial sector (% of GDP)	13.3	GDP per capita (PPP, USD); GDP Group	77,499 (I)
TPEP / TPEC (net energy importer)	0.02	Energy intensity (koe per USD)	0.12
Emission intensity (kCO <sub>2</sub> per USD)	0.28	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	19.08
Energy affordability (USD per kWh, 2012)	0.21	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



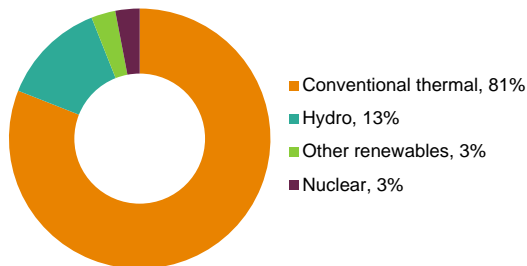
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	49	38	37	↑	
Energy security	35	29	30	↑	<b>B</b>
Energy equity	52	47	43	↑	<b>B</b>
Environmental sustainability	73	75	74	→	<b>C</b>
Contextual performance	58	61	52	↑	
Political strength	68	65	63	↑	
Societal strength	68	68	68	→	
Economic strength	40	40	42	→	
<b>Overall rank and balance score</b>	<b>46</b>	<b>41</b>	<b>38</b>	<b>↑</b>	<b>BBC</b>

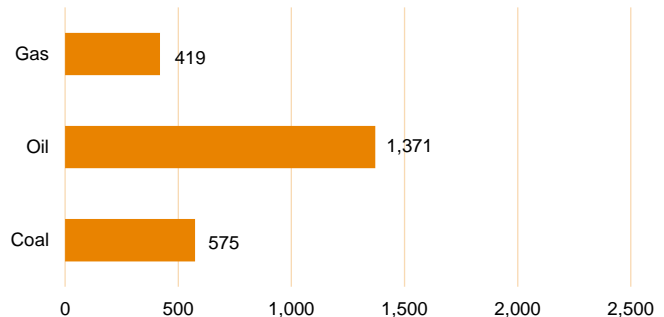
## INDEX COMMENTARY

Mexico continues the positive trend of previous years and moves up three places in the Index rankings. Like the other 'Highly-industrialised' countries, Mexico shows a strong performance in energy security, decent levels of energy equity, and an environmental sustainability ranking that lags behind. The net energy exporter's energy security remains stable with no noteworthy changes. Energy equity improves this year as prices for electricity and gasoline are mostly stable, compared to sharp increases in other countries, and the perceived quality of electricity supply goes up. Mexico, which has a highly-industrialised economy and still generates 81% of its electricity by burning fossil fuels, struggles the most with mitigating its impact on the environment. Mexico's biggest challenges in this dimension remain air and water pollution. Contextually, Mexico's performance is overall stable, with moderate levels of political and societal strength and a comparatively stronger economy.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



## KEY METRICS

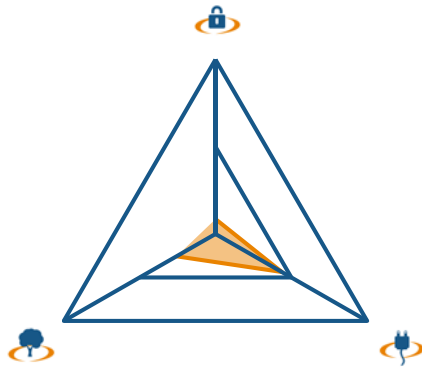
Industrial sector (% of GDP)	36.6	GDP per capita (PPP, USD); GDP Group	15,344 (II)
TPEP / TPEC (net energy exporter)	1.21	Energy intensity (koe per USD)	0.13
Emission intensity (kCO <sub>2</sub> per USD)	0.29	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	3.77
Energy affordability (USD per kWh, 2013)	0.09	Population with access to electricity (%)	99.2

## TRENDS AND OUTLOOK

- The most recent policy development is the reform of the energy sector: the government approved: The Government approved the constitutional changes and respective legislation allowing the full participation of the private sector through competitive markets in most of the activities involved. Thus, the Mexican energy sector will have the challenge to manage two transitions simultaneously: the transition from a monopolistic structure to a competitive market scheme and from a high carbon to a low carbon economy.
- One of the new laws establishes a cap-and-trade scheme for the energy sector bringing it in line with the 2012 General Law on Climate Change. Mexico is the second country, after the UK, which has enacted a law that frames the actions to be taken as far as climate change is concerned, both from an emission mitigation point of view as well as measures of adaptation. The three explicit goals are: 1) by 2020, there should be a 30% reduction in GHG emissions with respect to a business as usual (BAU) projection; 2) by 2024, 35% of the electricity generation has to come from clean energies (non- GHG emitting technologies); and 3) by 2050, an aspirational goal of a 50% reduction in GHG emissions with respect to a BAU projection.
- The greatest challenges policymakers need to focus on to meet the above mentioned targets are: 1) the continuation of a renewable energy program and the re-initiation of a nuclear programme; 2) continued increase of production of both oil and natural gas on and off-shore as well as the development of shale gas resources; and 3) improved energy efficiency and energy conservation including decreasing energy intensity.



TRILEMMA BALANCE



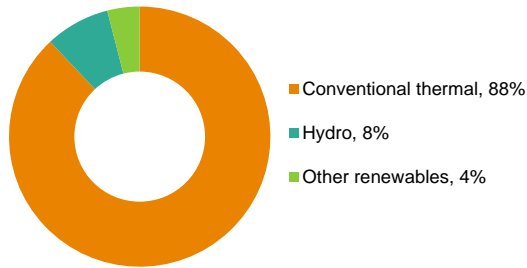
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	111	111	113	→	
Energy security	112	110	118	↓	<b>D</b>
Energy equity	79	79	72	↑	<b>C</b>
Environmental sustainability	95	96	96	→	<b>C</b>
Contextual performance	67	79	85	↓	
Political strength	81	80	75	↑	
Societal strength	71	71	81	↓	
Economic strength	52	78	98	↓	
<b>Overall rank and balance score</b>	<b>102</b>	<b>105</b>	<b>111</b>	<b>↓</b>	<b>CCD</b>

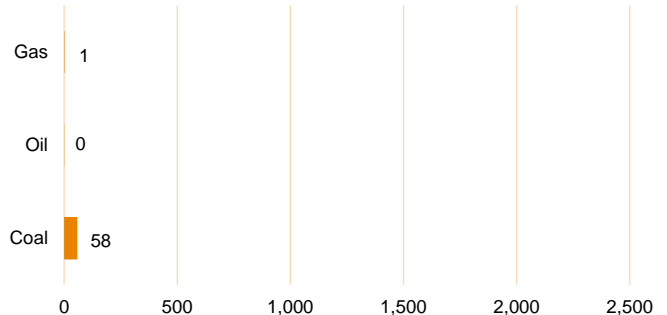
INDEX COMMENTARY

Morocco, a member of the ‘Back of the Pack’ country grouping, falls six places in the overall Index to rank 112, a drop caused largely by a decline in energy security. Energy security is Morocco’s weakest dimension mainly because of its unfavourable total energy consumption to production ratio ( the country only produces 6% of the energy it consumes) and an increasing energy consumption growth rate that is outpacing economic growth. Declines this year are driven by increasing transmission and distribution losses and a less favourable diversity of the country’s electricity generation profile. On the energy equity dimension, comparatively more affordable, better quality electricity services are offset by gasoline prices that become even more expensive to Moroccans. Mitigating its impact on the environment also remains a challenge for Morocco, as it continues to see high levels of pollution and rising CO<sub>2</sub> emissions levels from the generation of electricity. Contextually, indicators of political and societal strength remain constant and on the lower side. Economic strength falls further as macroeconomic stability declines.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)

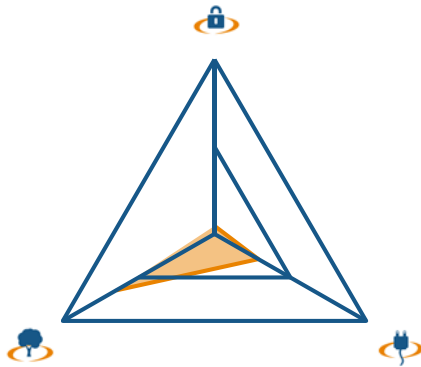


KEY METRICS

Industrial sector (% of GDP)	31.7	GDP per capita (PPP, USD); GDP Group	5,193 (IV)
TPEP / TPEC (net energy importer)	0.06	Energy intensity (koe per USD)	0.12
Emission intensity (kCO <sub>2</sub> per USD)	0.34	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	1.56
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	98.9

TRENDS AND OUTLOOK

## TRILEMMA BALANCE



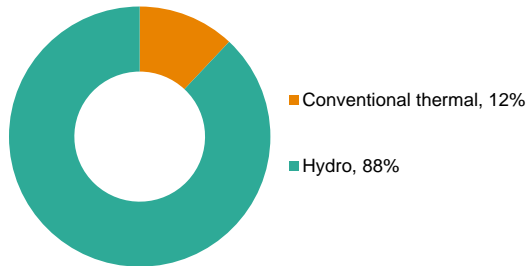
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	98	102	101	→	
Energy security	125	123	123	→	<b>D</b>
Energy equity	93	94	92	→	<b>C</b>
Environmental sustainability	50	49	46	↑	<b>B</b>
Contextual performance	60	65	58	→	
Political strength	49	48	48	→	
Societal strength	76	76	74	→	
Economic strength	55	67	59	↓	
<b>Overall rank and balance score</b>	<b>92</b>	<b>90</b>	<b>88</b>	<b>↑</b>	<b>BCD</b>

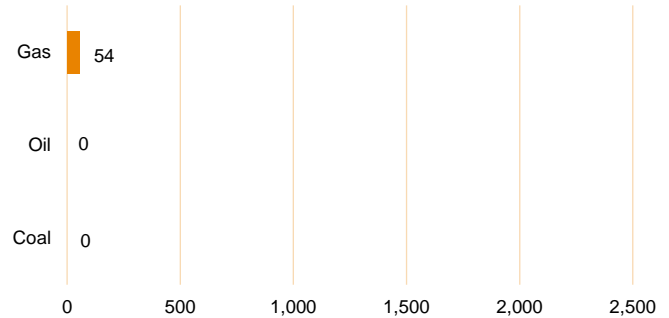
## INDEX COMMENTARY

Namibia continues the positive trend of previous years and moves up two more places in the Index to rank 88. Although not in the 'Hydro-powered' grouping of countries, Namibia does rely heavily on hydropower for electricity generation and exhibits an energy trilemma balance that is similar to some of those countries. Energy security remains a big challenge for Namibia. Transmission and distribution losses are stabilising while the perceived quality of electricity supply further improves. Improvements are offset by a reduced diversity in the electricity fuel mix. Performance on the energy equity dimension remains stable. The country does well at mitigating its environmental impact with low energy and emission intensity and declining CO<sub>2</sub> emissions from electricity generation as hydro keeps increasing in the electricity fuel mix compared to fossil fuels. However, it will take effort for Namibia to maintain this level of performance as the country continues to develop. Contextual indicators are mediocre, and see marginal improvements across the board.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

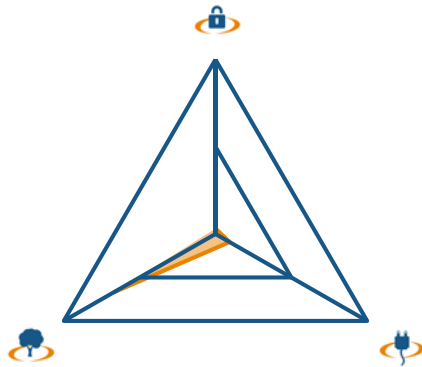


## KEY METRICS

Industrial sector (% of GDP)	29.6	GDP per capita (PPP, USD); GDP Group	7,800 (III)
TPEP / TPEC (net energy importer)	0.18	Energy intensity (koe per USD)	0.12
Emission intensity (kCO <sub>2</sub> per USD)	0.23	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	1.41
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	43.7

## TRENDS AND OUTLOOK

TRILEMMA BALANCE



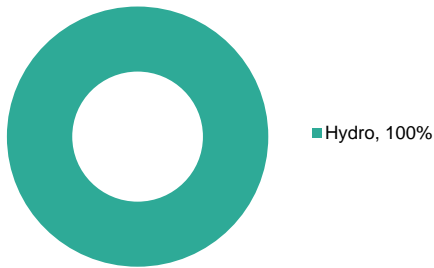
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	111	116	112	→	
Energy security	118	125	125	↓	<b>D</b>
Energy equity	122	122	117	↑	<b>D</b>
Environmental sustainability	47	46	43	↑	<b>B</b>
Contextual performance	89	88	79	↑	
Political strength	119	117	121	→	
Societal strength	121	121	110	↑	
Economic strength	24	22	17	↑	
<b>Overall rank and balance score</b>	<b>108</b>	<b>111</b>	<b>109</b>	<b>→</b>	<b>BDD</b>

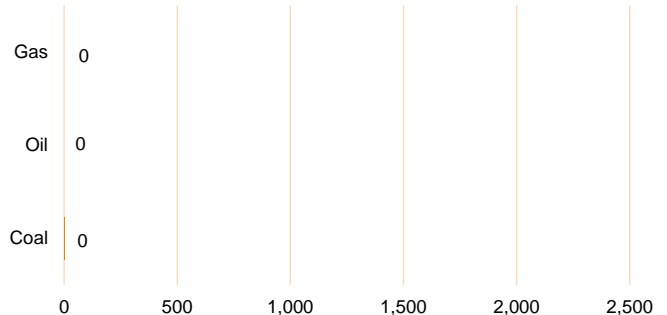
INDEX COMMENTARY

Nepal, a 'Back of the Pack' country, maintains a stable position in the Trilemma Index throughout the years. The country's energy security ranking doesn't see improvements as the root causes of its low ranking continue to be no oil stocks, its homogenous electricity fuel mix (100% hydropower), and the high transmission and distribution losses (35% of total electricity generated). Energy equity also remains extremely low in Nepal, though improving, with high gasoline prices and expensive electricity that is both inaccessible (Nepal has a 76% electrification rate) and perceived to be of low quality. Despite poor performances on the energy security and energy equity dimensions, Nepal does comparatively well at mitigating its impact on the environment. Energy intensity remains high, but the country's reliance on hydropower for electricity results in almost no carbon emissions from electricity generation. Contextual performance sees minor shifts, with political strength and societal strength continuing to be among the lowest globally, and economic strength high and improving.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)

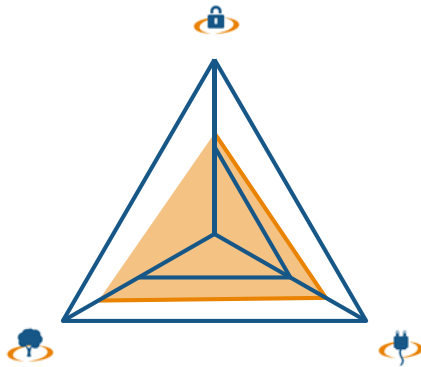


KEY METRICS

Industrial sector (% of GDP)	14.5	GDP per capita (PPP, USD); GDP Group	1,457 (IV)
TPEP / TPEC (net energy importer)	0.37	Energy intensity (koe per USD)	0.29
Emission intensity (kCO <sub>2</sub> per USD)	0.11	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.12
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	76.3

TRENDS AND OUTLOOK

## TRILEMMA BALANCE



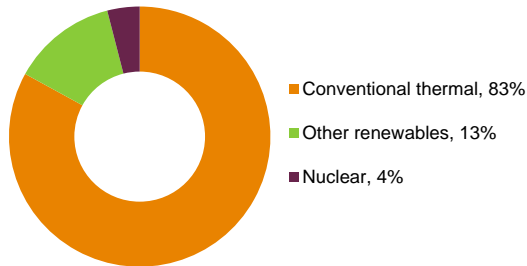
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	18	16	20	→	
Energy security	48	42	55	↓	<b>B</b>
Energy equity	22	23	33	↓	<b>B</b>
Environmental sustainability	39	35	31	↑	<b>B</b>
Contextual performance	4	4	7	→	
Political strength	12	8	7	↑	
Societal strength	5	4	7	→	
Economic strength	16	16	11	↑	
<b>Overall rank and balance score</b>	<b>13</b>	<b>12</b>	<b>14</b>	<b>→</b>	<b>BBB</b>

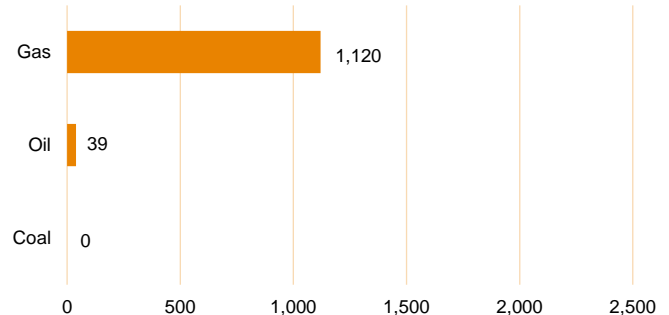
## INDEX COMMENTARY

The Netherlands' overall Index ranking remains mostly unchanged throughout the years. As a 'Pack Leader', the country balances the energy trilemma well, and although absolute values show minor changes across all three dimensions, outperformance of peer countries causes the rankings to drop. Indicators for energy security are mostly stable, with a slight improvement of the diversification of the electricity generation portfolio offset by a fairly high dependence on fuel imports. Energy equity, drops due to increases in the prices of gasoline and electricity. The Netherlands continues to make progress in reducing its environmental footprint, as CO<sub>2</sub> emissions from electricity generation drop slightly. Though showing signs of improvement, the Netherlands still relies on burning fossil fuels to generate a higher proportion of its electricity (83%) than the other 'Pack Leaders', indicating that low and no-carbon sources of electricity need to be further developed if it wishes to remain in this premier country grouping position. Contextually, the Netherlands is one of the world's top performers.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



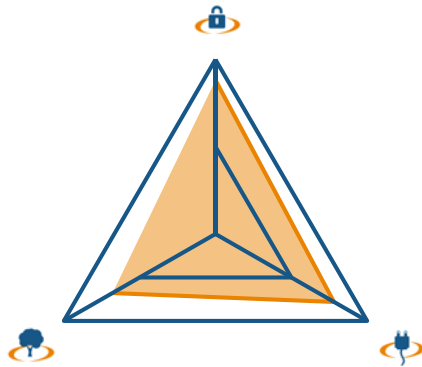
## KEY METRICS

Industrial sector (% of GDP)	25.4	GDP per capita (PPP, USD); GDP Group	41,527 (I)
TPEP / TPEC (net energy importer)	0.71	Energy intensity (koe per USD)	0.13
Emission intensity (kCO <sub>2</sub> per USD)	0.27	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	9.75
Energy affordability (USD per kWh, 2013)	0.26	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- The Netherlands is well-positioned in the Index but still faces a number of challenges. These include: the public debate around installation of additional onshore wind capacity; high expectations of biomass and green gas in the face of challenging markets; ensuring solar surges and geothermal meet promises given the low starting base; and a FIT scheme that is not sufficient to reach targets. Furthermore, energy efficiency progress is fairly slow.
- Key energy policy developments are: the green deals – specific arrangements between the national government and individual sustainability initiatives such as energy, water, resources, waste to remove red tape, adjust policies where appropriate, make knowledge available and so on; energy innovation top sector approach designed to strengthen market steering, market involvement and market resources for energy innovation in seven key areas that include gas, solar, offshore wind, industrial efficiency and biomass/bio-based economy; and the SDE+ (stimulation of sustainable/renewable energy) feed in scheme that is fully operational, has significant funding (>1,5 bill. Euro/annum) and strong competition among options.
- Key trends include a strong de-centralisation of power generation such as solar, wind, small CHP, and to some degree also of gas production (green gas). Policymakers have to create the framework to stimulate or facilitate this development including the upgrade of the existing network such as smart grids. Finally, the Netherlands is expected to strengthen its position as a gas country, with an increased focus on the role of gas as a balancing fuel in a system that moves towards sustainability.

TRILEMMA BALANCE



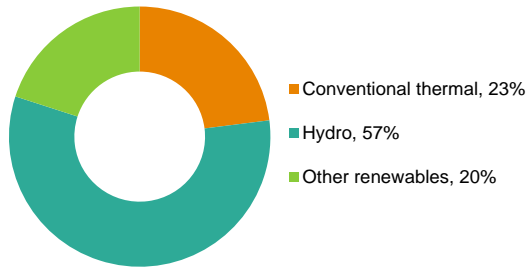
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	11	11	11	→	
Energy security	19	15	16	→	<b>A</b>
Energy equity	18	26	28	↓	<b>A</b>
Environmental sustainability	36	37	42	↓	<b>B</b>
Contextual performance	5	6	4	→	
Political strength	4	1	3	→	
Societal strength	4	3	6	→	
Economic strength	27	33	12	↑	
<b>Overall rank and balance score</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>→</b>	<b>AAB</b>

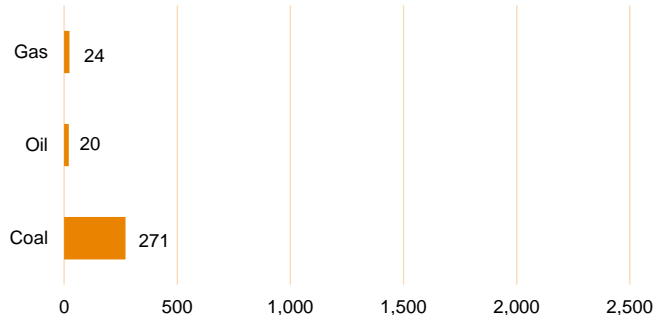
INDEX COMMENTARY

Overall, New Zealand maintains its position among the top 10 countries worldwide in the 2014 Index. One of the 'Pack Leaders', New Zealand exhibits strong, well-balanced performance on all three sides of the energy trilemma. Energy security is the country's strongest dimension. The country produces 88% of its own energy and continues its focus on diversifying the electricity fuel mix, which consists of a healthy and robust combination of fossil fuels, hydropower, wind and geothermal. The quality of the electricity services provided further improves, but increasing gasoline and electricity prices cause New Zealand's energy equity ranking to drop slightly. New Zealand's environmental footprint remains fairly low. There is a small reduction in the already low CO<sub>2</sub> emissions released in generating electricity, but higher energy and emissions intensity result in a lower rank. Contextual performance stays extremely strong, with a high degree of political and societal strength. Economic strength strongly improves this year, catching up with the other two contextual dimensions.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)



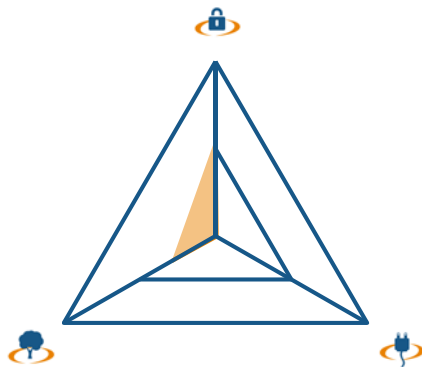
KEY METRICS

Industrial sector (% of GDP)	25.5	GDP per capita (PPP, USD); GDP Group	29,609 (II)
TPEP / TPEC (net energy importer)	0.88	Energy intensity (koe per USD)	0.18
Emission intensity (kCO <sub>2</sub> per USD)	0.30	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	7.35
Energy affordability (USD per kWh, 2012)	0.22	Population with access to electricity (%)	100.0

TRENDS AND OUTLOOK

- New Zealand is well-positioned in the Index. It could yet see further improvements due to its progressively improving macroeconomic position, and its strong potential to increase renewable energy sources in electricity and heat generation, thereby lowering CO<sub>2</sub> emissions and improving environmental sustainability performance without the need for subsidies. The aggressive pursuit of upstream exploration opportunities could further enhance energy security.
- The New Zealand Energy Strategy (NZES) and Energy Efficiency and Conservation Strategy set the government's overarching energy policy framework. Its four priorities (diverse resource development, environmental responsibility, efficient use of energy, and secure and affordable energy) should contribute to improvements in New Zealand's performance across all three energy dimensions. The NZES contains the aspirational goals to increase the amount of renewable electricity from 70% to 90% by 2025, facilitated by the only country-wide emissions trading scheme outside of the EU, competitive market signals and grid investment, while not compromising security of supply or competitiveness.
- Trends to watch are: 1) the implications of flat energy demand on future competition, investment and energy intensity; 2) a growing political debate about increase price transparency and energy poverty; 3) the integration of intermittent renewables such as solar, smart grid technologies and their implications for lines company investment; and 4) the growing involvement of the demand-side via participation in the electricity market and the more aggressive promotion of demand-side measures including energy efficiency.

## TRILEMMA BALANCE



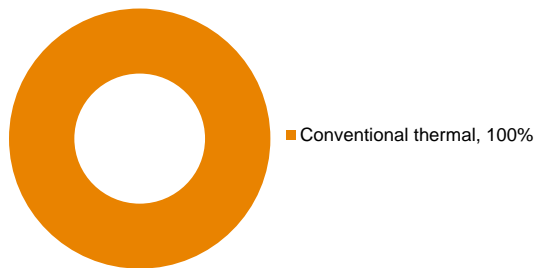
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	127	118	108	↑	
Energy security	115	80	57	↑	<b>B</b>
Energy equity	128	127	127	→	<b>D</b>
Environmental sustainability	96	91	92	↑	<b>C</b>
Contextual performance	106	105	99	↑	
Political strength	108	108	110	→	
Societal strength	91	91	101	↓	
Economic strength	99	103	66	↑	
<b>Overall rank and balance score</b>	<b>127</b>	<b>122</b>	<b>110</b>	<b>↑</b>	<b>BCD</b>

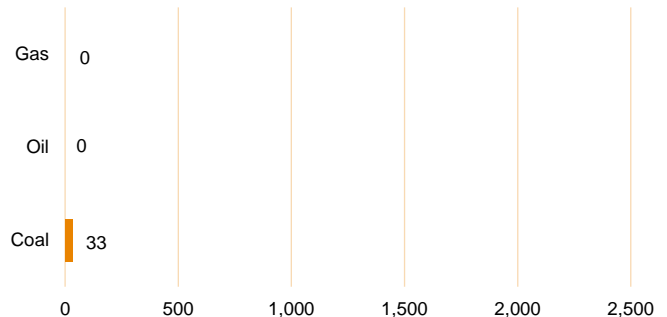
## INDEX COMMENTARY

Niger moves up 12 places in the Index rankings, driven by a stronger energy security performance. While energy security is average and environmental sustainability performance mediocre, Niger struggles greatly with the energy equity portion of the energy trilemma. Providing energy equity is Niger's biggest challenge, as gasoline prices increase and become even less affordable, and over 90% of the population continues to live without access to modern electricity services. One of Niger's biggest improvements this year is on the energy security dimension as reliance on fuel imports decreases and strategic oil stocks increase. Indicators of the environmental sustainability dimension see some improvement, but energy intensity remains very high, and air and water quality very low. Performance in the contextual dimensions is low for indicators of political and societal strength, but improves for economic strength. Changes here are caused by an update of the data points underlying the indicator for cost of living expenditure.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

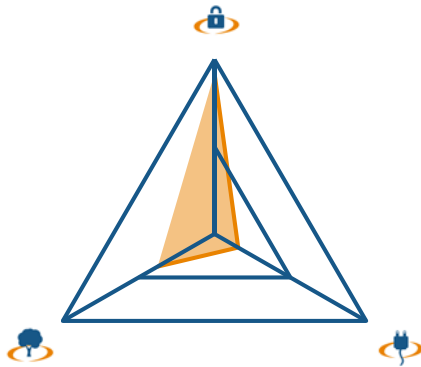


## KEY METRICS

Industrial sector (% of GDP)	14.2	GDP per capita (PPP, USD); GDP Group	813 (IV)
TPEP / TPEC (net energy importer)	0.31	Energy intensity (koe per USD)	0.24
Emission intensity (kCO <sub>2</sub> per USD)	0.16	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.11
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	9.3

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



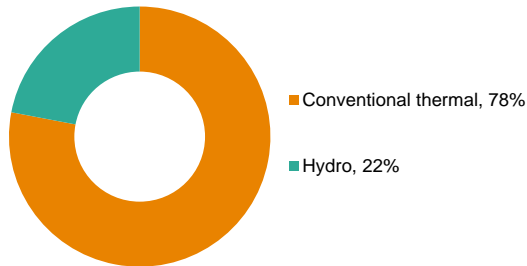
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	71	67	65	↑	
Energy security	13	13	11	→	<b>A</b>
Energy equity	109	111	108	→	<b>D</b>
Environmental sustainability	82	79	81	→	<b>C</b>
Contextual performance	128	121	108	↑	
Political strength	125	122	124	→	
Societal strength	127	127	124	→	
Economic strength	117	97	41	↑	
<b>Overall rank and balance score</b>	<b>90</b>	<b>84</b>	<b>81</b>	<b>↑</b>	<b>ACD</b>

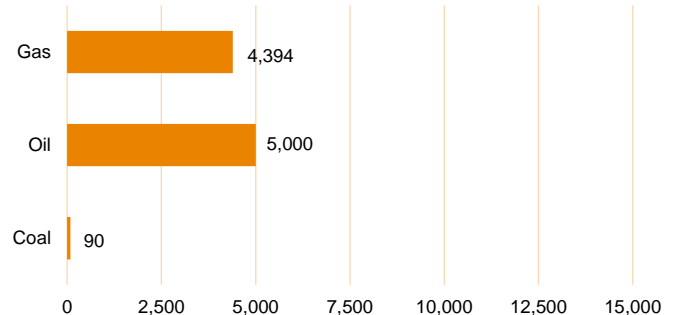
## INDEX COMMENTARY

Nigeria climbs three places to rank 81 in the overall Index. Nigeria has difficulty balancing the three sides of the energy trilemma. This year sees a slight improvement in energy security as electricity transmission and distribution losses decline, from 18% to 10% of the total amount of electricity generated. Energy equity remains by far Nigeria's weakest energy dimension. As prices for gasoline and electricity slowly increase, the overall perception of the quality of the electricity supply improves gradually. However, less than half of Nigerians have access to modern electricity services. To sustain and continue economic growth and become par with South Africa, Nigeria needs to solve its issues with power generation urgently. Environmental sustainability performance also remains low, as lower levels of energy intensity are offset by higher CO<sub>2</sub> emissions from electricity generation. Contextual performance overall is very weak for indicators of political and societal strength, but improves for economic strength. Changes here are caused by an update of the data points underlying the indicator for cost of living expenditure.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

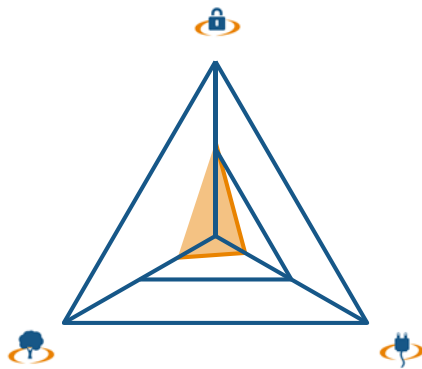


## KEY METRICS

Industrial sector (% of GDP)	43.0	GDP per capita (PPP, USD); GDP Group	2,697 (IV)
TPEP / TPEC (net energy exporter)	8.74	Energy intensity (koe per USD)	0.31
Emission intensity (kCO <sub>2</sub> per USD)	0.13	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.30
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	48.0

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



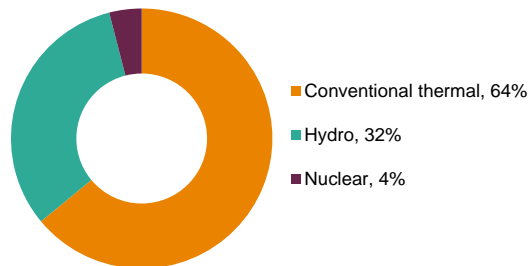
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	108	98	100	↑	
Energy security	73	56	60	↑	<b>B</b>
Energy equity	103	103	104	→	<b>D</b>
Environmental sustainability	108	100	97	↑	<b>D</b>
Contextual performance	125	126	125	→	
Political strength	117	119	120	→	
Societal strength	124	124	119	↑	
Economic strength	119	123	128	↓	
<b>Overall rank and balance score</b>	<b>121</b>	<b>114</b>	<b>118</b>	→	<b>BDD</b>

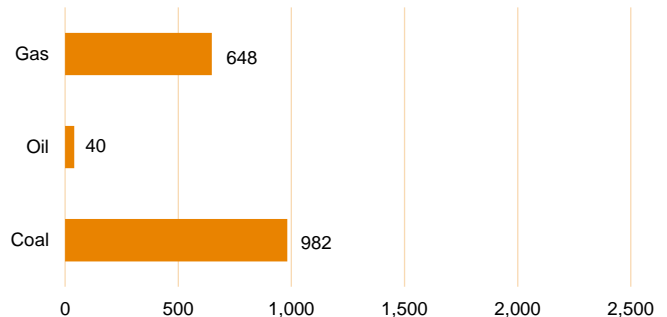
## INDEX COMMENTARY

Pakistan drops four places in the overall Index rankings. One of the 'Highly-industrialised' countries, Pakistan faces many of the same challenges as the other members of that group when it comes to balancing the energy trilemma, resulting in a stronger energy security ranking being offset by two equally weak performances on the energy equity and environmental sustainability dimensions. Performance on all energy dimensions is mostly stable this year. The well-diversified electricity generation portfolio, a mix of conventional thermal power, hydropower, and a small amount of nuclear power, helps boost the energy importer's energy security ranking, while transmission and distribution losses remain a big challenge. Meanwhile, energy equity continues to be low, as energy prices increase. Some improvements are made in reducing energy intensity and CO<sub>2</sub> emissions from electricity generation, but Pakistan still struggles with its environmental footprint. Performances on all indicators of political, societal, and economic strength are stable, but very poor.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



## KEY METRICS

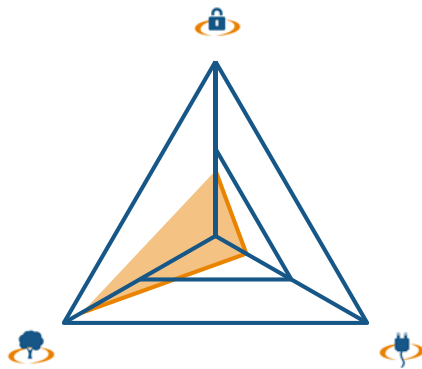
Industrial sector (% of GDP)	21.6	GDP per capita (PPP, USD); GDP Group	3,056 (IV)
TPEP / TPEC (net energy importer)	0.68	Energy intensity (koe per USD)	0.19
Emission intensity (kCO <sub>2</sub> per USD)	0.30	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.74
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	91.4

## TRENDS AND OUTLOOK

- Key trends, which are expected to support Pakistan's moving up in the Index rankings are: 1) the continued increase of the share of renewable energy in the electricity production mix; 2) stringent energy conservation rules and regulations; and 3) synergy in all energy related departments / ministries through development of a single ministry of energy.



## TRILEMMA BALANCE



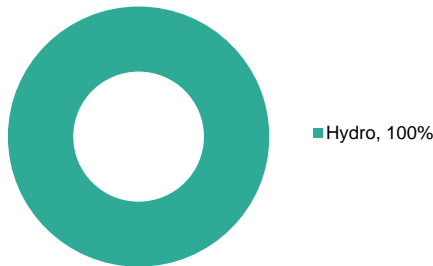
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	70	66	65	↑	
Energy security	95	84	81	↑	<b>C</b>
Energy equity	96	99	103	↓	<b>D</b>
Environmental sustainability	13	13	16	→	<b>A</b>
Contextual performance	108	89	83	↑	
Political strength	107	106	106	→	
Societal strength	108	108	104	↑	
Economic strength	87	50	43	↑	
<b>Overall rank and balance score</b>	<b>81</b>	<b>74</b>	<b>77</b>	<b>↑</b>	<b>ACD</b>

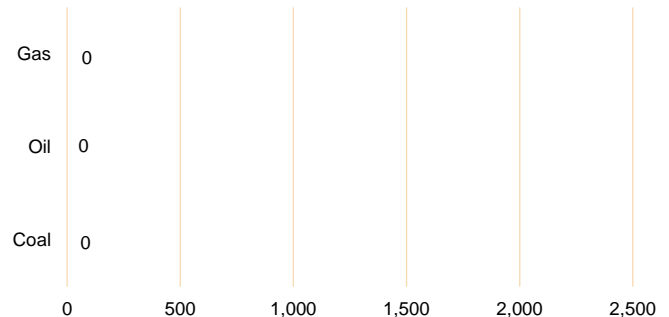
## INDEX COMMENTARY

Paraguay moves down three places in the Index, a minor shift reflecting the mostly stable performance across the board. Paraguay, a 'Hydro-powered' country, has an energy trilemma balance that is typical of that country grouping, with average-to-low energy security and equity scores balanced out by excellent marks on the environmental sustainability dimension. Paraguay's total energy consumption growth rate is relatively flat considering its strong economic growth, allowing it to strengthen its favourable energy consumption to production ratio and free up more energy (most of it excess electricity generated through hydropower) for export. Energy equity continues to be the most challenging of the three dimensions for Paraguay, as gasoline prices increase and continue to be very expensive. Environmental sustainability performance slightly dips but remains exceptional, and the country's CO<sub>2</sub> emissions-free electricity generation is of note. Indicators of contextual political and societal strength are on the lower side with no notable changes.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

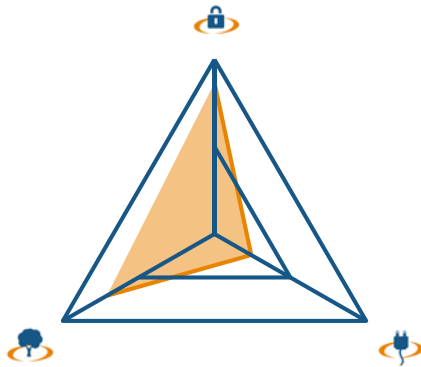


## KEY METRICS

Industrial sector (% of GDP)	17.7	GDP per capita (PPP, USD); GDP Group	6,053 (III)
TPEP / TPEC (net energy exporter)	1.19	Energy intensity (koe per USD)	0.16
Emission intensity (kCO <sub>2</sub> per USD)	0.16	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.74
Energy affordability (USD per kWh, 2011)	0.06	Population with access to electricity (%)	97.4

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



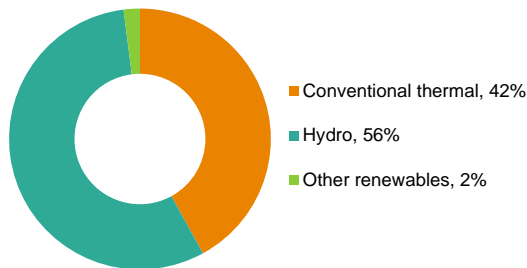
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	33	45	43	↓	
Energy security	9	21	18	↓	<b>A</b>
Energy equity	91	96	97	↓	<b>C</b>
Environmental sustainability	34	43	38	↓	<b>B</b>
Contextual performance	66	60	53	↑	
Political strength	76	69	74	→	
Societal strength	79	79	77	→	
Economic strength	47	23	23	↑	
<b>Overall rank and balance score</b>	<b>41</b>	<b>45</b>	<b>40</b>	→	<b>ABC</b>

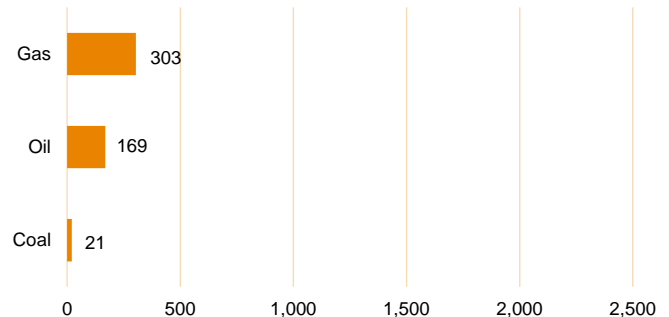
## INDEX COMMENTARY

Peru moves up five places in the Index rankings as performance in energy security and environmental sustainability improves. Although Peru is a member of the 'Hydro-powered' grouping of countries, unlike in most of those countries, energy security outperforms the environmental sustainability dimension. Energy equity still lags quite a bit behind. Peru is able to meet 95% of its energy needs through domestic production. The 2014 rise in the country's strong energy security ranking is driven by a noticeable decline in electricity transmission and distribution losses. On the energy equity dimension, the price of gasoline is up, but the overall quality and affordability of energy services Peruvians receive remains comparatively stable. With hydropower making up 60% of Peru's electricity fuel mix, the country continues to perform decently on most of the environmental sustainability indicators and sees improvements this year due to lower emissions intensity. Contextually, Peru sees a solid economic performance driven by low cost of living and high macroeconomic stability. Political indicators deteriorate slightly, while societal indicators are mostly stable.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



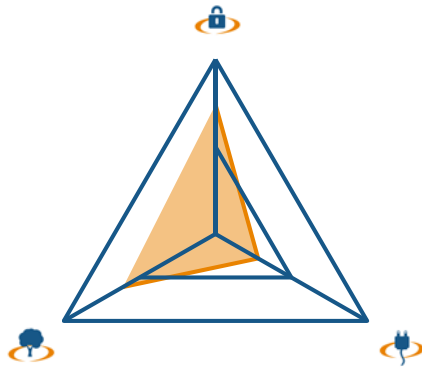
## KEY METRICS

Industrial sector (% of GDP)	37.5	GDP per capita (PPP, USD); GDP Group	10,596 (III)
TPEP / TPEC (net energy importer)	0.95	Energy intensity (koe per USD)	0.08
Emission intensity (kCO <sub>2</sub> per USD)	0.16	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	1.50
Energy affordability (USD per kWh, 2011)	0.13	Population with access to electricity (%)	85.1

## TRENDS AND OUTLOOK

- Peru's National Energy Policy 2010-2040 was approved at the end of 2010 with the goal to encourage and protect private investment in the sector; and to minimise the social and environmental impacts by promoting the development of energy markets, encouraging efficiency and the development of renewable energies at the local, regional, and national level.
- Schemes to support these goals are already in place and include: a law, passed in April 2012, to promote energy security in hydrocarbons; a scheme to promote the modernisation of oil refineries; a universal energy access plan for the 2013-2022 period, implemented in May 2013, with clearly defined targets for different subcomponents; and auctions and call for tenders to secure the implementation of hydro projects. Additional fiscal incentives are in place for small scale hydro, solar, wind, biomass, and geothermal.

TRILEMMA BALANCE



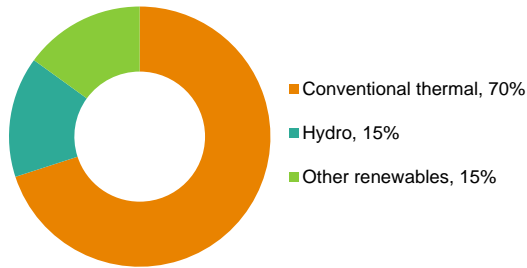
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	64	61	57	↑	
Energy security	42	39	34	↑	<b>B</b>
Energy equity	99	93	93	↑	<b>C</b>
Environmental sustainability	55	54	51	↑	<b>B</b>
Contextual performance	82	75	60	↑	
Political strength	98	94	84	↑	
Societal strength	100	100	82	↑	
Economic strength	45	32	26	↑	
<b>Overall rank and balance score</b>	<b>71</b>	<b>65</b>	<b>58</b>	<b>↑</b>	<b>BBC</b>

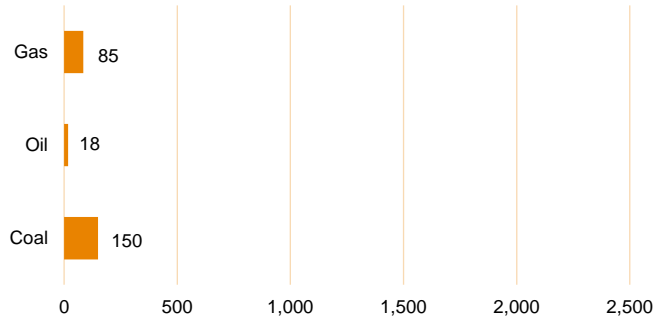
INDEX COMMENTARY

The Philippines moves its Index ranking up by seven places, again riding on the strength of small across-the-board improvements on all energy and contextual dimensions. The Philippines’ decent performances on the energy security and environmental sustainability dimensions are offset by its comparatively worse performance in energy equity. Energy security continues to be the Philippines’ strongest energy dimension, as the country further diversifies its electricity fuel mix. Energy equity is low, as energy prices remain expensive and 17% of Filipinos continue to live without access to modern electricity services. Environmental sustainability performance still is slightly above average, helped along by an electricity fuel mix that is almost one third hydropower and other renewables. Contextually, the country makes marginal improvements across the board, further improving its already very respectable economic ranking.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)

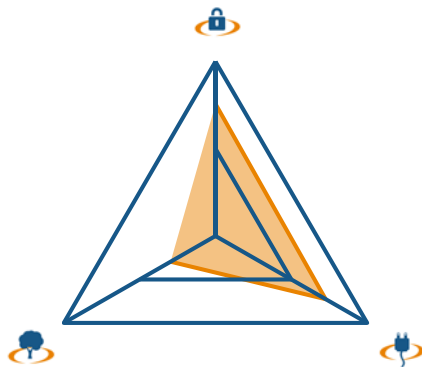


KEY METRICS

Industrial sector (% of GDP)	31.6	GDP per capita (PPP, USD); GDP Group	4,380 (IV)
TPEP / TPEC (net energy importer)	0.40	Energy intensity (koe per USD)	0.12
Emission intensity (kCO <sub>2</sub> per USD)	0.22	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.85
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	83.3

TRENDS AND OUTLOOK

## TRILEMMA BALANCE



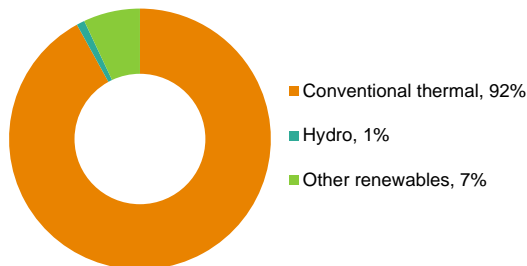
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	55	54	48	↑	
Energy security	34	38	32	→	<b>B</b>
Energy equity	44	39	36	↑	<b>B</b>
Environmental sustainability	93	94	91	→	<b>C</b>
Contextual performance	49	52	49	→	
Political strength	29	30	32	→	
Societal strength	34	34	37	→	
Economic strength	93	96	94	→	
<b>Overall rank and balance score</b>	<b>50</b>	<b>48</b>	<b>42</b>	<b>↑</b>	<b>BBC</b>

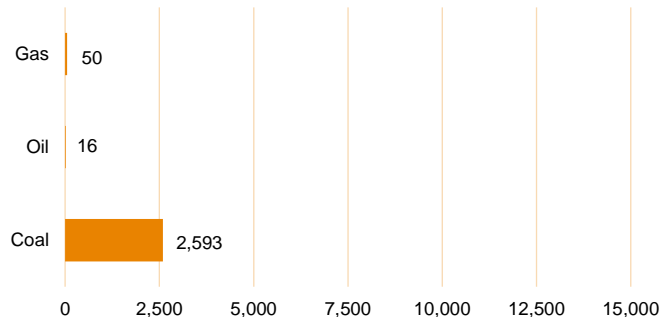
## INDEX COMMENTARY

Poland moves up six places in the overall Index rankings but continues to struggle with balancing the three sides of the energy trilemma, with good performances on the energy security and energy equity dimensions, and a poor environmental sustainability ranking. The country's improved ranking on energy security is driven by further reductions in electricity transmission and distribution losses and an increase of strategic oil stock. The cost of energy slightly increases for the Polish people and remains relatively affordable. The environmental sustainability dimension continues to be the most challenging for Poland, with the problematic indicators being the high level of emission intensity and CO<sub>2</sub> emissions from electricity generation. Contextual performance is mostly constant, with decent levels of political and societal strength, but a comparatively weaker economic strength.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



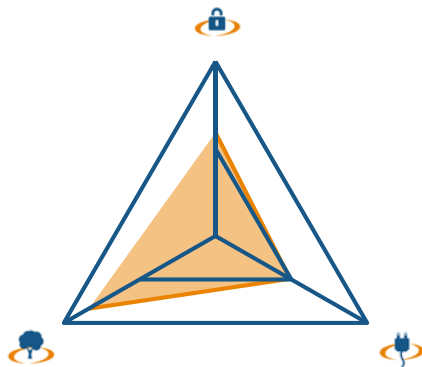
## KEY METRICS

Industrial sector (% of GDP)	33.3	GDP per capita (PPP, USD); GDP Group	20,577 (II)
TPEP / TPEC (net energy importer)	0.62	Energy intensity (koe per USD)	0.14
Emission intensity (kCO <sub>2</sub> per USD)	0.42	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	7.65
Energy affordability (USD per kWh, 2013)	0.20	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- Recent energy policy developments are expected to affect energy efficiency, energy security and environmental sustainability positively: 1) diversification of electricity generation portfolio by the decision to build nuclear plants; reducing energy consumption per GDP, increasing energy efficiency and reducing energy losses in manufacturing and distribution; incentives that foster the development of renewable energy; diversification of gas supplies; increase of the competitiveness of fuels and energy by liberalisation of the markets; improving the legal framework for exploration works for domestic primary energy fuels; and limiting the energy sector impact on environment by the development of clean coal technologies.
- Expected future trends effecting Poland's sustainability balance and issues for policymakers to focus on are: 1) development of the country's energy network infrastructure; 2) further diversification of energy sources; 3) modernisation of the electricity generation sector; 4) increase security of primary fuel supply through investments in more efficient coal mining exploitation and exploration for conventional and unconventional gas; 5) increase transport biofuels production and use; 6) continued efforts to improve energy efficiency and energy savings (end-user energy efficiency measures); 7) further development and deployment of clean coal technologies; and 8) transition to a low-carbon economy, while enabling an evolution of lifestyles and economic development, by deploying low-emission technologies to achieve zero-emission growth.

TRILEMMA BALANCE



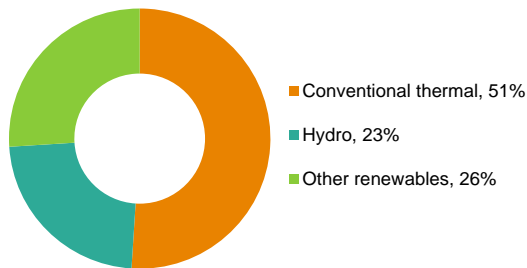
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	32	27	35	→	
Energy security	58	55	53	↑	<b>B</b>
Energy equity	48	53	65	↓	<b>B</b>
Environmental sustainability	26	20	22	↑	<b>A</b>
Contextual performance	33	28	24	↑	
Political strength	34	35	34	→	
Societal strength	28	28	28	→	
Economic strength	38	36	30	↑	
<b>Overall rank and balance score</b>	<b>25</b>	<b>23</b>	<b>25</b>	<b>→</b>	<b>ABB</b>

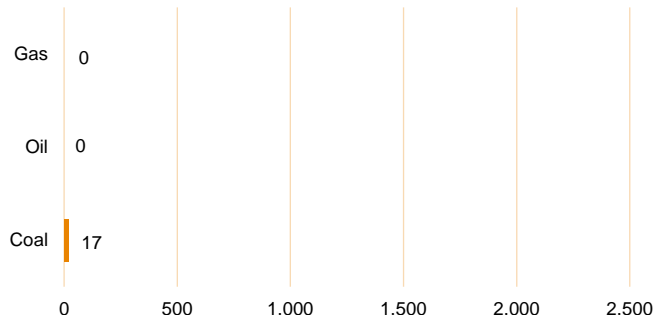
INDEX COMMENTARY

Overall, Portugal maintains a stable position in the Index throughout the years. Portugal's energy trilemma balance consists of two fair performances on the energy security and equity dimensions, and a very good performance in mitigating its impact on the environment. Regarding its energy security, Portugal has one of the most well-rounded electricity generation portfolios in the world (a balance between fossil fuels, hydropower, and other renewables). The 2014 improvement is driven by an increase in strategic oil stocks. Energy equity sees a decline as both gasoline and electricity become more expensive. Portugal's performance on the environmental sustainability dimension slightly worsens, due to higher CO<sub>2</sub> emissions from electricity generation. Contextually, Portugal once again exhibits solid, well-rounded scores, although still struggling to improve its macroeconomic stability.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)



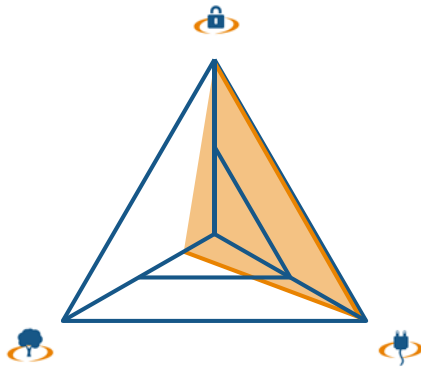
KEY METRICS

Industrial sector (% of GDP)	22.2	GDP per capita (PPP, USD); GDP Group	23,059 (II)
TPEP / TPEC (net energy importer)	0.25	Energy intensity (koe per USD)	0.10
Emission intensity (kCO <sub>2</sub> per USD)	0.21	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	4.40
Energy affordability (USD per kWh, 2012)	0.26	Population with access to electricity (%)	100.0

TRENDS AND OUTLOOK

- The Portuguese energy model is based on economic rationality and sustainability, including the promotion of energy efficiency, use of renewable energy from indigenous sources and the reduction of energy costs.
- Portugal promoted, at the EU level, the reinforcement of electricity interconnection capacity, particularly between the Iberian Peninsula and Central Europe, as a means to increase the value of the Portuguese renewable generation potential and to contribute to EU security of supply and CO<sub>2</sub> reduction targets. As a result, the most recent proposal from the Commission on the strategy to 2030 included an interconnection capacity of 15% as a fourth target.
- Reduction of energy costs to the consumer is being sought, namely by improving competition and market transparency and revising certain payments to the electricity generation sector. Energy equity in the access to energy services is being reinforced, by broadening eligibility criteria.
- Security of domestic natural gas supply will improve through the construction of a third gas interconnection with Spain, which will also allow further development of the gas storage site at Carríço. Complemented by the gas interconnection between Spain and France (project MidCat), this will bring the Iberian market closer to central Europe and foster gas market competition as well as market integration. In the oil sector, a new entity (Entidade Nacional para o Mercados de Combustíveis) has been created, and is responsible for monitoring fuels market transparency, biofuels and for the management of strategic oil stocks.

## TRILEMMA BALANCE



## INDEX RANKINGS AND BALANCE SCORE

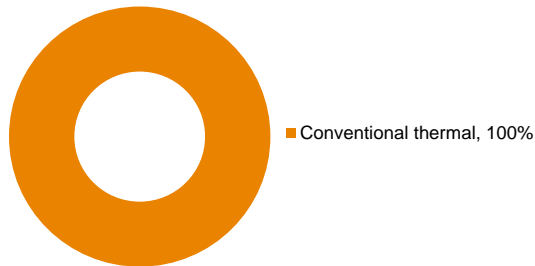
	2012	2013	2014	Trend	Score
Energy performance	19	22	19	→	
Energy security	7	8	3	↑	<b>A</b>
Energy equity	11	9	6	↑	<b>A</b>
Environmental sustainability	94	95	103	↓	<b>D</b>
Contextual performance	15	15	29	↓	
Political strength	31	31	23	↑	
Societal strength	29	29	32	→	
Economic strength	7	10	53	↓	
<b>Overall rank and balance score</b>	<b>17</b>	<b>18</b>	<b>20</b>	<b>→</b>	<b>AAD</b>

## INDEX COMMENTARY

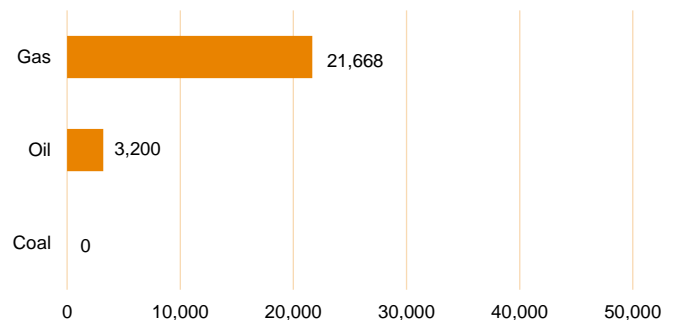
Overall, Qatar maintains a stable position in the Index throughout the years. A member of the 'Fossil-fuelled' country grouping, Qatar displays extremely strong energy security and equity rankings and a poor performance on the environmental sustainability dimension. Regarding its very robust energy security, Qatar performs very well on all available underlying indicators with the exception of its diversity of electricity generation portfolio. Decreasing distribution and transmission losses help to lift Qatar's energy security ranking into the top five worldwide. Gasoline prices creep upwards, but remain very cheap, and the perceived quality of electricity services is very high, helping to lift Qatar's energy equity ranking. The country's already poor environmental sustainability performance worsens as energy and emissions intensity increase. Contextually, performance on all indicators of political and societal strength remains mostly constant. The drop in economic strength is caused by an update of the data points underlying the indicator for living cost expenditure, and the availability of domestic credit to the private sector, which decreases.

## DIVERSITY OF ELECTRICITY GENERATION

## FOSSIL FUEL RESERVES (IN MTOE)



■ Conventional thermal, 100%



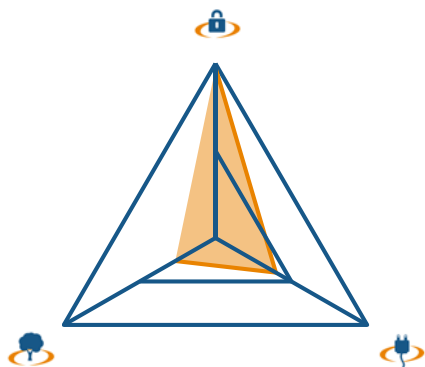
## KEY METRICS

Industrial sector (% of GDP)	72.2	GDP per capita (PPP, USD); GDP Group	100,889 (I)
TPEP / TPEC (net energy exporter)	5.93	Energy intensity (koe per USD)	0.27
Emission intensity (kCO <sub>2</sub> per USD)	0.52	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	39.07
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	94.1

## TRENDS AND OUTLOOK

- Qatar controls 14% of the total world natural-gas reserves, which makes it the third country in the world in terms of the proved gas reserves, and is the world's largest supplier of LNG.
- The Qatar National Vision 2030 defines the long-term outcomes for the country and provides a framework within which national strategies and implementation plans can be developed. Expanding competitive industries derived from hydrocarbon industries, building a knowledge-based economy characterised by relying on research, development and innovation, and excellence in entrepreneurship are three key elements identified to achieve the set goals.
- Recent energy policy developments include the objectives to: reduce electricity usage by 20% and water consumption by 35% within five years; and enhance the management of economic, environmental and social impacts within the energy and industry sector. Multi-national companies in Qatar are encouraged to put forward their five-year sustainable development strategies with well-defined performance targets higher levels of innovation.
- Policymakers need to continue developing an integrated set of measures to attract domestic, regional and foreign investment to establish and support the government's goal to open the economy, focusing on industries with new technologies and high added value.

## TRILEMMA BALANCE



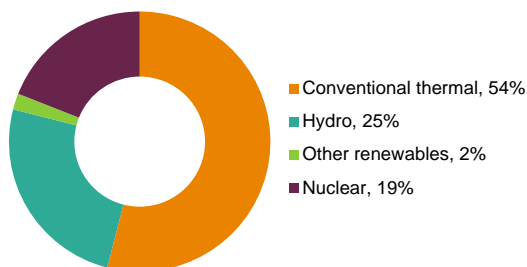
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	46	53	55	↓	
Energy security	4	9	4	→	<b>A</b>
Energy equity	59	70	78	↓	<b>C</b>
Environmental sustainability	92	88	95	→	<b>C</b>
Contextual performance	72	69	55	↑	
Political strength	53	56	61	↓	
Societal strength	65	65	56	↑	
Economic strength	98	90	58	↑	
<b>Overall rank and balance score</b>	<b>52</b>	<b>52</b>	<b>54</b>	<b>→</b>	<b>ACC</b>

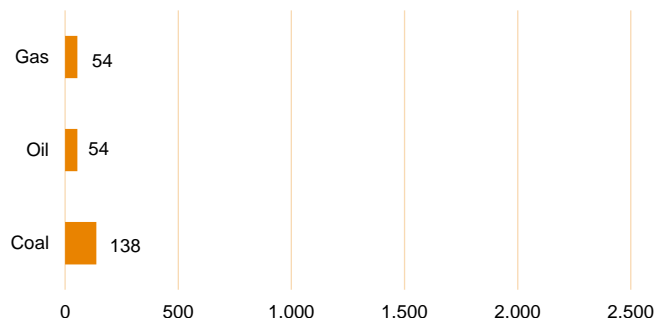
## INDEX COMMENTARY

Romania maintains a stable position in the Index throughout the years. Romania's balance of the energy trilemma is unbalanced, with an extremely strong energy security ranking and much weaker performances on the energy equity and environmental sustainability dimensions. The country has a healthy energy production to consumption ratio, meeting 80% of its energy needs itself and hence a lower dependency on fuel imports. Romania's energy equity ranking drops as gasoline becomes more expensive. Still the worst of Romania's three energy dimensions, the country's environmental sustainability performance deteriorates, as emissions intensity as well as carbon emissions from electricity generation rise. Contextual performance sees some changes for indicators of societal and political indicators and deteriorations in political ones. Economic strength improves driven by an update of the data points underlying the indicator for living cost expenditure, and due to an increase in macroeconomic stability.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



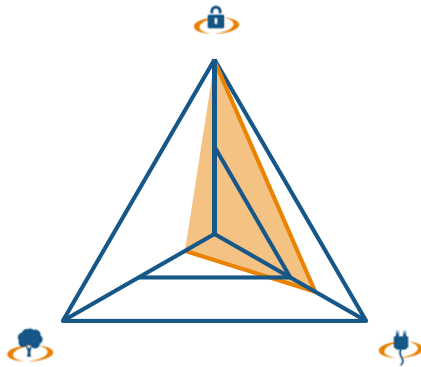
## KEY METRICS

Industrial sector (% of GDP)	34.2	GDP per capita (PPP, USD); GDP Group	12,722 (III)
TPEP / TPEC (net energy importer)	0.80	Energy intensity (koe per USD)	0.15
Emission intensity (kCO <sub>2</sub> per USD)	0.33	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	3.65
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- The most recent energy policy development that is expected to have a positive influence on the country's energy sustainability balance is the revision of Romania's renewable energy law, which will offer differentiated, and potentially lucrative, green certificate packages across all renewable technologies. However, the implementation of the law has been postponed since 2008 and the delay has resulted in uncertainty of returns for investors already implementing projects and has discouraged potential new investors from entering the market. Despite the uncertainty, the installed renewable energy capacity continues to increase slowly.
- Progress has also been made with: building insulation to improve energy efficiency; the share of coal in the energy mix continues to decline; and the integration of the power markets of Czech Republic, Slovakia, Hungary and Romania as of November 2014.
- Key issues for policymakers to focus on include: 1) integration of renewable energy sources; 2) energy infrastructure development, especially in the electricity transmission and distribution grid; 3) market integration at regional and European level; 4) increasing environmental impact mitigation efforts; and 5) increasing awareness for energy efficiency measures.

## TRILEMMA BALANCE



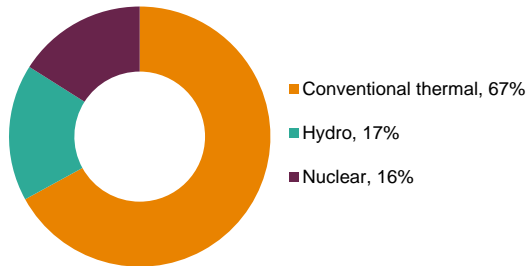
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	48	46	40	↑	
Energy security	1	2	2	→	<b>A</b>
Energy equity	57	61	44	↑	<b>B</b>
Environmental sustainability	102	99	104	→	<b>D</b>
Contextual performance	86	80	74	↑	
Political strength	102	97	97	↑	
Societal strength	92	92	90	→	
Economic strength	61	47	51	↑	
<b>Overall rank and balance score</b>	<b>58</b>	<b>54</b>	<b>50</b>	<b>↑</b>	<b>ABD</b>

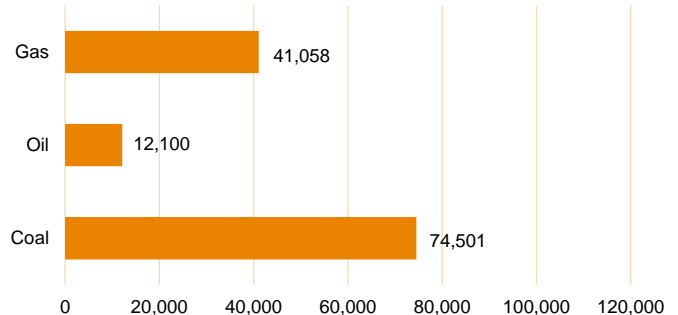
## INDEX COMMENTARY

Russia improves its overall Index ranking by four places, continuing the upward trend. One of the 'Highly-industrialised' countries, Russia's balance of the energy trilemma consists of an exceptional level of energy security, an average performance on energy equity, and a poor environmental sustainability ranking. Russia's energy security is solid with no noticeable changes. As gasoline prices move slowly upwards, but remain very cheap, the perceived quality of electricity services improves, helping to lift Russia's energy equity ranking. The environmental sustainability dimension, by far the country's weakest, worsens as emissions intensity and CO<sub>2</sub> emissions from electricity generation increase. Contextual performance is mostly stable and similar to last year.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



## KEY METRICS

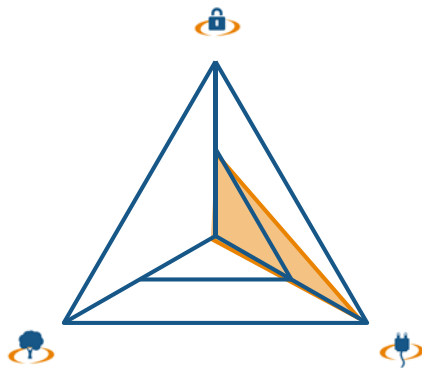
Industrial sector (% of GDP)	37.5	GDP per capita (PPP, USD); GDP Group	17,386 (II)
TPEP / TPEC (net energy exporter)	1.82	Energy intensity (koe per USD)	0.34
Emission intensity (kCO <sub>2</sub> per USD)	0.76	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	11.51
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- Russia is endowed with natural resources, and exports natural gas and oil to countries in Eastern and Western Europe, Turkey, Japan as well as other Asian countries. The high dependence of the economy on energy exports and the vulnerability to the fluctuations in the energy prices, the development of shale gas in other regions of the world, but also Europe's efforts to decrease dependence on Russian gas imports following disputes with key transit countries such as Ukraine, led to the development of diversification strategies for the economy, transportation routes, but also the country's own energy and electricity generation mix.
- The Energy Strategy to 2030 emphasises action on improving energy efficiency, increasing the use of clean energy technologies such as renewable energy, hydro and nuclear, and reducing GHG emissions. With the accession of Russia to the World Trade Organisation in August 2012, the country agreed to increase its domestic natural gas prices, with the target of setting domestic prices in Russia equal to European 'net of transport prices' by 2014.
- Some targets as well as policies and measures are in place already. For example, in May 2013 Russia issued Resolution No. 449 on a Mechanism for the Support of Renewable Energy Sources on the Wholesale Electric Power and Capacity Market, which incentivises the use of renewables in power generation, legislations does not yet match the ambitious target to reduce GHG emissions by 2030 of up to 100 to 105% compared to 1990 levels.



TRILEMMA BALANCE



INDEX RANKINGS AND BALANCE SCORE

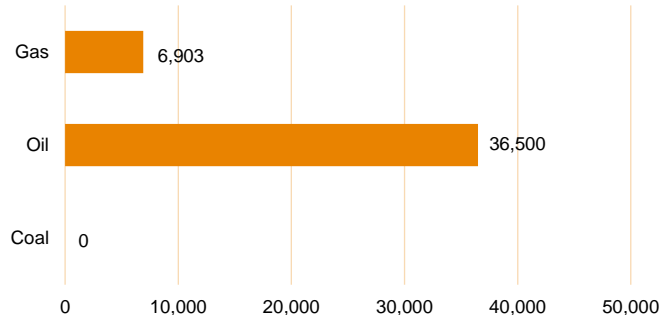
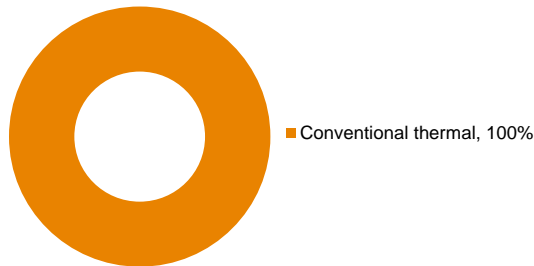
	2012	2013	2014	Trend	Score
Energy performance	57	57	67	↓	
Energy security	38	45	68	↓	<b>B</b>
Energy equity	14	12	7	↑	<b>A</b>
Environmental sustainability	124	124	125	→	<b>D</b>
Contextual performance	42	47	64	↓	
Political strength	70	79	67	→	
Societal strength	55	55	51	↑	
Economic strength	15	14	84	↓	
<b>Overall rank and balance score</b>	<b>49</b>	<b>51</b>	<b>68</b>	<b>↓</b>	<b>ABD</b>

INDEX COMMENTARY

Saudi Arabia's ranking drops 17 places in this year's Index. As one of the 'Fossil-Fuelled' countries, Saudi Arabia's energy trilemma is balanced in a fashion that is typical of that country grouping, with good performance on energy security and high levels of energy equity, and a poor environmental sustainability performance. Energy security drops by several ranks this year, mainly due to the great dependence on fuel exports, which make up a large part of the Kingdom's GDP (additional data points are included). While the country's plentiful oil resources make it the world's largest oil producer, it relies exclusively on fossil fuels for electricity. Performance on energy equity remains high, helped largely by cheap gasoline and plentiful, high-quality electricity. Environmental sustainability still lags behind severely since Saudi Arabia's energy mix relies entirely on fossil fuels. Contextually, political and social conditions see improvements in effectiveness of government, control of corruption and rule of law, while economic strength drops significantly caused by an update of the data points underlying the indicator for cost of living expenditure.

DIVERSITY OF ELECTRICITY GENERATION

FOSSIL FUEL RESERVES (IN MTOE)



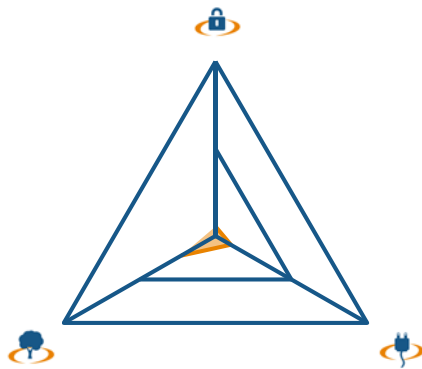
KEY METRICS

Industrial sector (% of GDP)	62.5	GDP per capita (PPP, USD); GDP Group	30,465 (II)
TPEP / TPEC (net energy exporter)	3.15	Energy intensity (koe per USD)	0.32
Emission intensity (kCO <sub>2</sub> per USD)	0.77	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	17.01
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	94.1

TRENDS AND OUTLOOK

- The Saudi energy sector, totally dependent on oil and gas for electricity generation and transportation, faces the dual challenge of coping with rising internal energy demand and reducing carbon emissions.
- In order to tackle the challenge Saudi Arabia is looking to diversify its national energy mix to include renewable energy and nuclear and recently announced plans to invest US\$109 billion over the next 20 years in solar energy. Energy efficiency has been identified as a key national priority. The Kingdom is also investing in the exploration of shale gas to meet its domestic energy demand. Carbon capture, utilisation and storage (CCUS) gained a strategic priority on the Saudi energy policy agenda to promote clean use of fossil fuels.
- To achieve the above mentioned goals, policymakers should focus on: 1) maintaining the Kingdom's spare capacity and global position as a secure supplier of energy; 2) diversifying the economy which currently depends mainly on hydrocarbons; 3) educating the public about the importance of energy, managing national demand, and increasing efficiency.

## TRILEMMA BALANCE



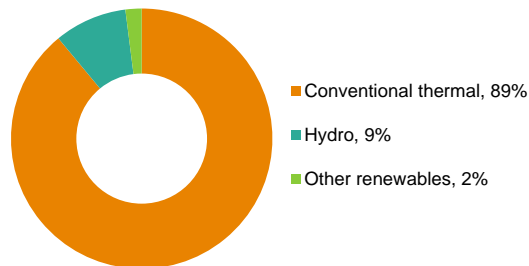
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	126	127	127	→	
Energy security	120	120	122	→	<b>D</b>
Energy equity	117	118	116	→	<b>D</b>
Environmental sustainability	91	93	100	↓	<b>C</b>
Contextual performance	99	96	103	↓	
Political strength	89	88	79	↑	
Societal strength	105	105	91	↑	
Economic strength	92	94	110	↓	
<b>Overall rank and balance score</b>	<b>125</b>	<b>126</b>	<b>127</b>	<b>→</b>	<b>CDD</b>

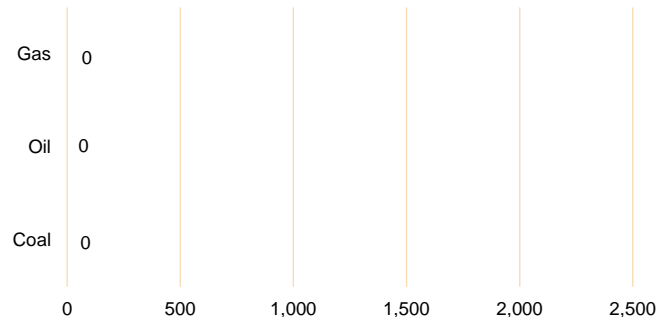
## INDEX COMMENTARY

Senegal's overall Index ranking remains mostly unchanged. One of the 'Back of the Pack' countries, Senegal's rankings on all three dimensions of the energy trilemma are low. Energy security lags behind the most, with low marks being driven by an extremely low ratio of total energy production to consumption and a high percentage of electricity lost in transmission and distribution. Energy equity sees a marginal improvement. As gasoline prices creep upwards, the perceived quality of electricity services improves slowly for the 57% of the population that has access to electricity services. Senegal's environmental sustainability ranking, while its strongest, is still rather poor. Burning fossil fuels to generate electricity results in high CO<sub>2</sub> emissions, and high energy and emissions intensity remain a serious problem. The country's energy mix does contain a small amount (11%) of hydropower and renewables, which represents a potentially promising start for the contribution of renewables. Contextual performance is low, but political and societal indicators show signs of improvement.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

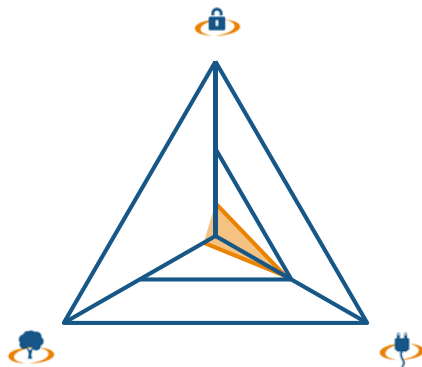


## KEY METRICS

Industrial sector (% of GDP)	22.7	GDP per capita (PPP, USD); GDP Group	1,908 (IV)
TPEP / TPEC (net energy importer)	0.04	Energy intensity (koe per USD)	0.17
Emission intensity (kCO <sub>2</sub> per USD)	0.28	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.49
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	56.5

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



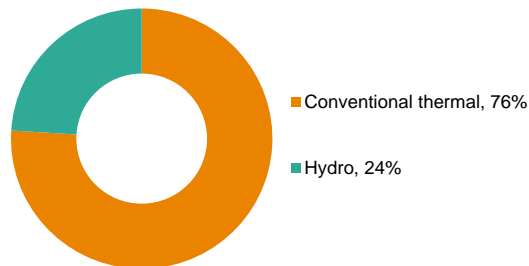
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	100	110	120	↓	
Energy security	81	101	105	↓	<b>D</b>
Energy equity	68	65	70	→	<b>C</b>
Environmental sustainability	120	118	119	→	<b>D</b>
Contextual performance	81	85	81	→	
Political strength	74	74	71	→	
Societal strength	59	59	61	→	
Economic strength	107	118	119	↓	
<b>Overall rank and balance score</b>	<b>100</b>	<b>106</b>	<b>116</b>	<b>↓</b>	<b>CDD</b>

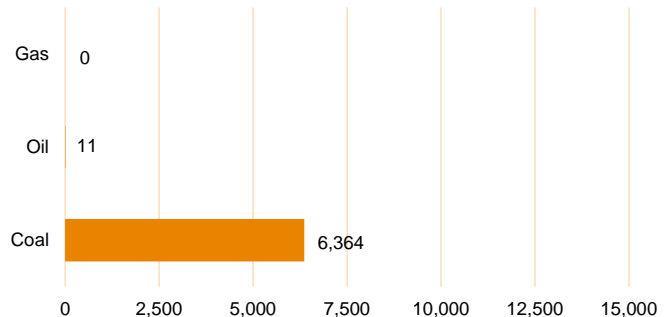
## INDEX COMMENTARY

In 2014, Serbia falls 10 places in the Index, down to rank 116. As Serbia has developed economically, its efforts to maximise energy equity and provide its people with affordable, good-quality energy has come at the cost of environmental sustainability, resulting in an imbalance between the various sides of the energy trilemma. Apart from slightly reduced oil reserves and an electricity generation portfolio that shows a larger share of fossil fuels, Serbia's absolute performance on the indicators of energy security remains largely unchanged (although across-the-board low). Serbia's performance on the energy equity dimension decreases, but continues to be the country's strongest. Serbia's large environmental footprint is a serious challenge. Improvements in energy and emissions intensity are offset by higher levels of CO<sub>2</sub> from electricity generation. Regarding its contextual performance, Serbia's performance remains mostly stable, with the most notable changes being improvements in political stability and a decline in macroeconomic stability.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



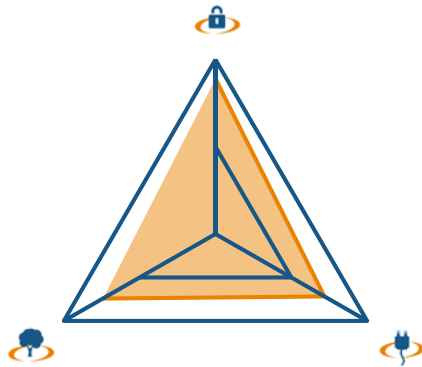
## KEY METRICS

Industrial sector (% of GDP)	31.8	GDP per capita (PPP, USD); GDP Group	10,835 (III)
TPEP / TPEC (net energy importer)	0.72	Energy intensity (koe per USD)	0.20
Emission intensity (kCO <sub>2</sub> per USD)	0.63	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	6.14
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- In the last few years considerable investments have been made in the energy sector, transportation system, and waste management. For example, in electrostatic precipitators, and new slug and ash removal systems.
- The recent energy policy developments include: implementation of new energy policy, which opens the energy market further and meets the requirements of the South Eastern Europe Energy Treaty; new standards for energy efficiency, including the building sector, are in force meeting EU regulations; and implementation of a feed-in-tariff scheme two years ago. These developments are expected to have a positive impact especially on the energy security and environmental sustainability dimension.
- Key issues policymakers need to focus on are: 1) adopt the new energy sector development strategy until 2030 with a clear vision for how the sector and the energy mix should develop until 2050; 2) meet the obligation from the South Eastern Europe Energy Treaty to open the energy market fully by 2015; 3) implement flue gas desulphurisation in all power plants by 2017; 4) meet EU biofuel targets for the transportation sector; and 5) establish a fund under the new law on rational use of energy, which will support energy efficiency and renewable energy projects, complementing the existing fund under the environmental policy.

## TRILEMMA BALANCE



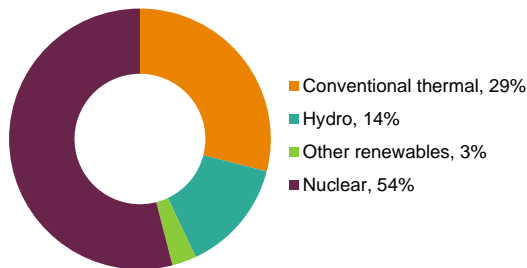
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	17	19	11	↑	
Energy security	20	20	15	↑	<b>A</b>
Energy equity	40	38	37	→	<b>B</b>
Environmental sustainability	46	48	34	↑	<b>B</b>
Contextual performance	51	55	54	→	
Political strength	23	29	27	↓	
Societal strength	38	38	46	↓	
Economic strength	95	95	101	↓	
<b>Overall rank and balance score</b>	<b>22</b>	<b>22</b>	<b>17</b>	<b>↑</b>	<b>ABB</b>

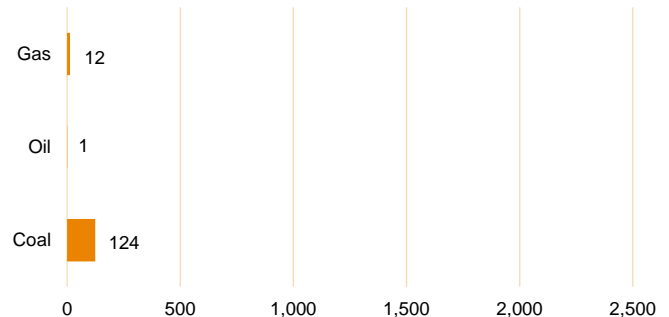
## INDEX COMMENTARY

Slovakia moves up five places in the Index ranking this year, with improvements in both energy security and environmental sustainability. Slovakia does an excellent job at balancing the various competing demands of the energy trilemma, with good rankings on all three energy dimensions. Although Slovakia imports the majority of its energy, it still performs well on energy security due to the diversity of energy sources of the electricity it does produce, and low rates of electricity distribution losses. Despite the rising price of gasoline, Slovakia also performs well on the energy equity dimension with its citizens having widespread access to quality electricity. The country improves its environmental sustainability ranking, particularly due to its diverse electricity and heat generation portfolio, which is 71% from low-carbon or renewable sources and only 29% fossil-fuel based as well as lower energy and emissions intensity. Contextually, Slovakia performs well on political and societal indicators, although control of corruption and rule of law fell a little this year, but macroeconomic stability continues to lag behind.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



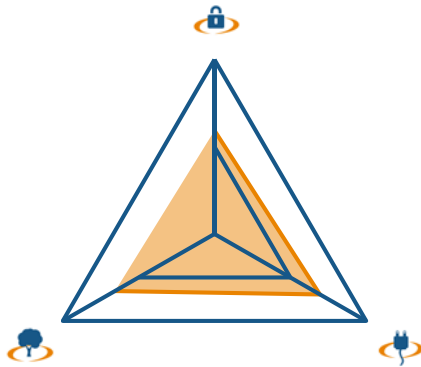
## KEY METRICS

Industrial sector (% of GDP)	30.8	GDP per capita (PPP, USD); GDP Group	24,042 (II)
TPEP / TPEC (net energy importer)	0.33	Energy intensity (koe per USD)	0.15
Emission intensity (kCO <sub>2</sub> per USD)	0.28	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	6.06
Energy affordability (USD per kWh, 2013)	0.24	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- Improvements made to the Slovak energy sector over the past years are driven by energy saving efforts in all sectors of the economy, by using more efficient and clear heat and power technologies. The dependence on energy imports remains high and not diversified, however, the use of domestic renewable energy sources and processing of waste is increasing.
- Recent policy developments are mainly driven by EU energy and climate targets and implementation of EU policy and regulation continues including market liberalisation and promotion of environmentally-friendly energy technologies. The removal of cross subsidies is challenging as it conflicts with the support of the availability of cheap energy for low-income households and for the manufacturing sector.
- Policymakers need to focus on dealing with the challenge for the distribution system as a result of decentralised production and electric mobility. Increasing energy efficiency in all sectors of the economy remains a challenge and requires structural changes in the economy to diverge from heavy industry to a sophisticated production, but also measures to reduce energy consumption of buildings. The role of nuclear energy needs to be discussed because the technology allows an increase of electricity generation without increasing carbon emissions. Furthermore, policymakers need to focus on decreasing the dependence on natural gas and oil imports.

## TRILEMMA BALANCE



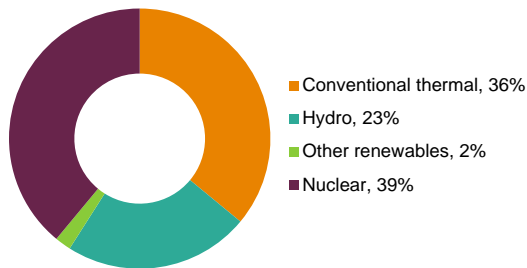
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	31	28	32	→	
Energy security	57	60	52	↑	<b>B</b>
Energy equity	36	27	40	↓	<b>B</b>
Environmental sustainability	37	42	45	↓	<b>B</b>
Contextual performance	31	35	26	↑	
Political strength	32	34	37	↓	
Societal strength	25	25	29	↓	
Economic strength	42	48	32	↑	
<b>Overall rank and balance score</b>	<b>23</b>	<b>25</b>	<b>24</b>	<b>→</b>	<b>BBB</b>

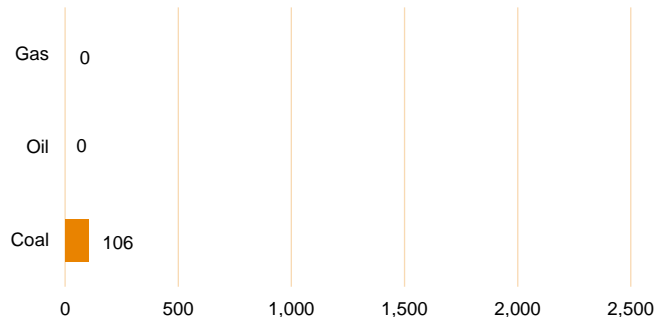
## INDEX COMMENTARY

Overall, Slovenia maintains a stable position in the Index throughout the years and exhibits strong, well-rounded performance on all three dimensions. Energy security improves as the country reduces its transmission and distribution losses and increases its strategic oil stocks. Energy equity deteriorates as gasoline and electricity become more expensive. Performance on the environmental sustainability dimension also falls slightly, but is still fair, as energy and emissions intensity slightly increase. Contextual political and societal indicators remain stable and very good.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



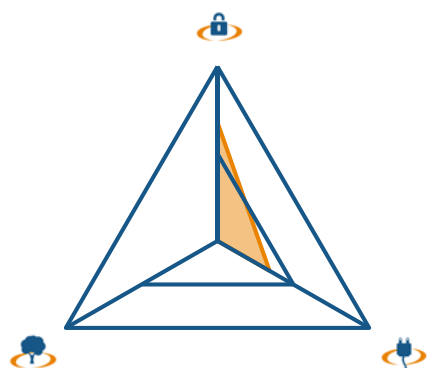
## KEY METRICS

Industrial sector (% of GDP)	28.9	GDP per capita (PPP, USD); GDP Group	27,837 (II)
TPEP / TPEC (net energy importer)	0.49	Energy intensity (koe per USD)	0.15
Emission intensity (kCO <sub>2</sub> per USD)	0.32	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	7.66
Energy affordability (USD per kWh, 2013)	0.21	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- The New Energy Act, which was adopted in Parliament at the beginning of 2014, implemented the provisions of the EU's Third Energy Package. Changes made in legislation are expected to increase competition in the electricity and especially in the gas market, investments in the use of renewable energy sources in final energy consumption as well as investments in energy efficiency. Furthermore, intense preparations are going on for the construction of a series of hydroelectric power plants on the Sava River, which will increase share of renewables in energy mix.
- Due to increased competition in the market, electricity prices for both industry and households dropped significantly at the beginning of the year 2012, and similarly, in the second half of the year 2012; natural gas prices dropped by approximately 20%. This trend continued through 2013 and 2014, and is expected to have a positive impact on Slovenia's energy equity performance.
- The construction of South Stream, a gas pipeline that will pass through Slovenian territory on the way to Italy and supply the southern and eastern countries of the European Union with natural gas from Russia, depends on the fulfilment of the respective European legislation on the complete corridor.
- To improve Slovenia's environmental performance additional financial investments are needed for energy efficiency measures, particularly in the energy consumption of buildings (thermal insulation, window replacement and replacement of obsolete heating systems) and into supporting schemes for the use of renewable energy sources for energy supply of buildings.

## TRILEMMA BALANCE



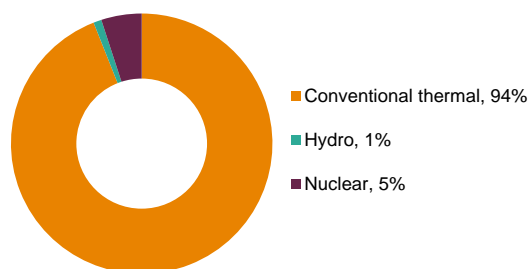
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	97	93	96	→	
Energy security	55	43	42	↑	<b>B</b>
Energy equity	75	78	85	↓	<b>C</b>
Environmental sustainability	129	128	129	→	<b>D</b>
Contextual performance	49	51	46	→	
Political strength	55	52	53	→	
Societal strength	84	84	76	↑	
Economic strength	17	20	24	↓	
<b>Overall rank and balance score</b>	<b>84</b>	<b>79</b>	<b>83</b>	<b>→</b>	<b>BCD</b>

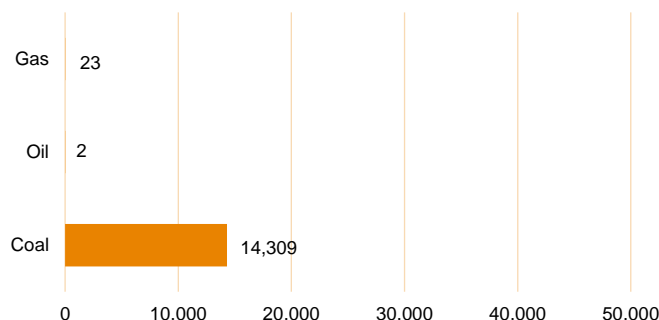
## INDEX COMMENTARY

South Africa, one of the 'Highly-industrialised' countries, drops four places to 83 in the overall Index rankings. Typical of the 'Highly-industrialised' group, South Africa's better energy security and energy equity rankings come at the high price of its poor performance on the environmental sustainability dimension. In energy security, South Africa's strongest dimension, performance remains stable and average as a result of a homogenous electricity mix that relies heavily on coal. Energy equity is low in South Africa, as gasoline and electricity prices become more expensive. South Africa ranks last globally on environmental sustainability, despite slight improvements across the board. This is due to the almost sole reliance on coal for electricity generation, extremely high emissions rates, and a slow development of renewable energy sources, despite bountiful natural endowments of sun and wind potential. Overall contextual performance for South Africa remains relatively constant, with almost no noticeable changes apart from a high-availability of domestic credit cementing its economic strength.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



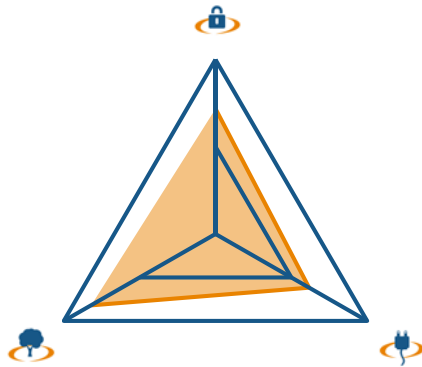
## KEY METRICS

Industrial sector (% of GDP)	29.0	GDP per capita (PPP, USD); GDP Group	11,033 (III)
TPEP / TPEC (net energy exporter)	1.11	Energy intensity (koe per USD)	0.28
Emission intensity (kCO <sub>2</sub> per USD)	0.73	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	7.15
Energy affordability (USD per kWh, 2011)	0.06	Population with access to electricity (%)	82.7

## TRENDS AND OUTLOOK

- South Africa's energy security dimension and Index ranking does not yet reflect the positive developments since 2008, which include no incidents of electricity load shedding or liquid fuel rationing.
- Most recently, independent power producers (IPPs) are being allowed into the electricity sector using renewable technologies. Once these are operational, the energy security and environmental performance dimensions will show an improvement.
- Issues policymakers should focus on are: 1) there is still much to be done on the social equity dimension, especially in terms of providing energy to rural communities; and 2) South Africa has abundant coal reserves but no natural gas or oil. The choice of technology for replacement and new electricity generation plant will be a very difficult one, especially since the issues of access and affordability are so critical to the social and economic development of the country.

TRILEMMA BALANCE



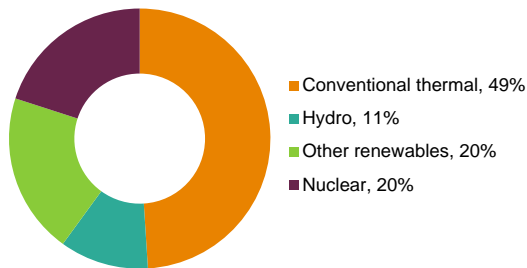
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	12	7	16	↓	
Energy security	31	22	37	↓	<b>B</b>
Energy equity	24	16	46	↓	<b>B</b>
Environmental sustainability	23	23	24	→	<b>A</b>
Contextual performance	27	24	27	→	
Political strength	46	40	44	→	
Societal strength	24	24	22	→	
Economic strength	20	25	37	↓	
<b>Overall rank and balance score</b>	<b>12</b>	<b>9</b>	<b>15</b>	<b>→</b>	<b>ABB</b>

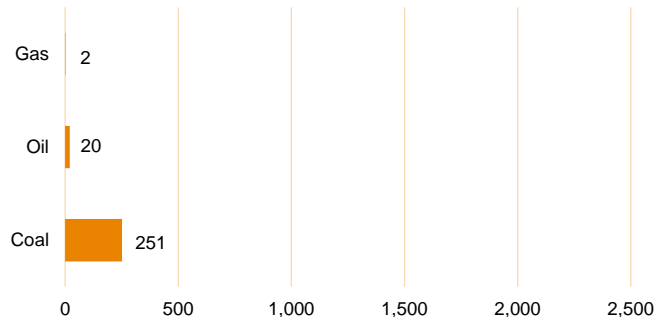
INDEX COMMENTARY

This year, Spain sees a deterioration of its energy equity and security performance, leading to a drop in the overall Index rankings. Spain still balances the competing dimensions of the energy trilemma well, with almost equally strong performance on all three. One of the world's larger energy importers, Spain maintains a diversified electricity mix and increases its strategic oil reserves, although higher distribution losses of electricity cause its performance in energy security to deteriorate. Spain's energy equity ranking drops significantly and the development of fuel and electricity prices needs to be monitored further. Like many of its fellow EU members, Spain performs well on the environmental sustainability dimension, with 20% of its energy coming from nuclear power, 11% from hydro, and 20% from other renewables (mostly wind). However, CO<sub>2</sub> emissions from electricity generation slightly increase as more fossil fuels were burned in the year under consideration. Spain's contextual indicators remain relatively constant.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)



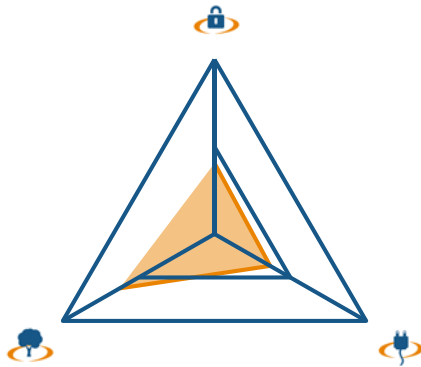
KEY METRICS

Industrial sector (% of GDP)	26.0	GDP per capita (PPP, USD); GDP Group	29,670 (II)
TPEP / TPEC (net energy importer)	0.28	Energy intensity (koe per USD)	0.10
Emission intensity (kCO <sub>2</sub> per USD)	0.21	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	5.64
Energy affordability (USD per kWh, 2011)	0.30	Population with access to electricity (%)	100.0

TRENDS AND OUTLOOK

- The Spanish administration keeps its commitment to renewable and low-carbon energy. In doing so, the country pursues a more efficient way of reducing CO<sub>2</sub> emissions, becoming a more environmental-friendly producer and consumer of energy.
- As for the energy equity aspects, the country has been dragging on a tariff deficit since 1997. In order to put an end to this situation, the Spanish government approved several regulatory measures during 2012 that concluded in July 2013 with the approval of an energy reform to reach tariff adequacy during 2013, and to guarantee budgetary stability in the future.
- Additionally, the Spanish administration's indicative energy plan for 2011-2020 has maintained its commitment with the triple goal of improving the security of supply, increasing competitiveness and guaranteeing the environmental sustainability. Spain is a net oil and gas importer with an energy mix mainly based on hydrocarbons. It produces little energy of its own, and must minimise the risks associated with this. Therefore, Spain is decreasing its energy dependence rate with a policy of energy savings, efficiency, and renewable energy sources. The exploration and production of indigenous hydrocarbons should also be strengthened. All these factors will reduce dependence on imported energy sources and improve the balance of payment.
- Policymakers need to continue focusing on several challenges such as: 1) the need for a higher electricity interconnection power grid capacity with other European member states; 2) its ageing nuclear system; and 3) the upcoming rises in the cost of electricity related to Spain's tariff deficit reduction objective.

## TRILEMMA BALANCE



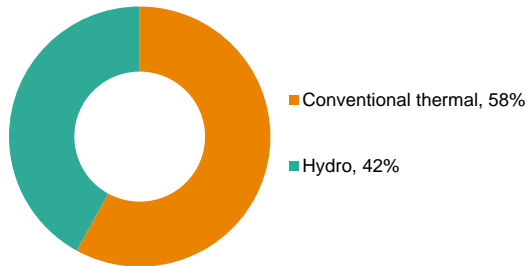
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	65	64	73	↓	
Energy security	72	72	77	↓	<b>C</b>
Energy equity	82	80	83	→	<b>C</b>
Environmental sustainability	45	40	49	↓	<b>B</b>
Contextual performance	74	71	80	↓	
Political strength	87	76	87	→	
Societal strength	54	54	55	→	
Economic strength	79	85	107	↓	
<b>Overall rank and balance score</b>	<b>69</b>	<b>69</b>	<b>80</b>	<b>↓</b>	<b>BCC</b>

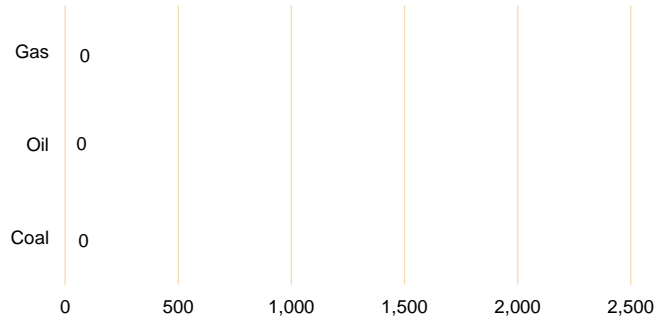
## INDEX COMMENTARY

Sri Lanka's overall Index ranking drops by 11 places this year. A member of the 'Hydro-powered' grouping of countries, Sri Lanka has a high degree of environmental sustainability that is offset by average performances on the energy security and equity dimensions. Its rank on the energy security dimension drops slightly as lower distribution losses and a decreased dependence from fuel imports are offset by a fuel generation mix that is less diversified. Energy equity remains mostly stable and the country's weakest dimension. While Sri Lanka has very low levels of energy and emissions intensity, rising CO<sub>2</sub> emissions from electricity generation cause its environmental footprint to increase. Contextually, all of Sri Lanka's political strength indicators marginally deteriorate, while indicators of societal strength remain relatively flat. Economic strength drops considerably this year caused by an update of data points underlying the indicator for cost of living expenditure.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



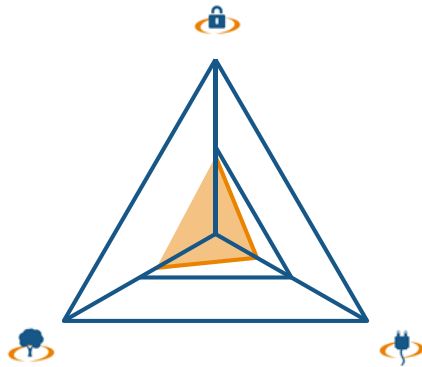
## KEY METRICS

Industrial sector (% of GDP)	32.4	GDP per capita (PPP, USD); GDP Group	6,043 (III)
TPEP / TPEC (net energy importer)	0.24	Energy intensity (koe per USD)	0.10
Emission intensity (kCO <sub>2</sub> per USD)	0.14	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.73
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	85.1

## TRENDS AND OUTLOOK



TRILEMMA BALANCE



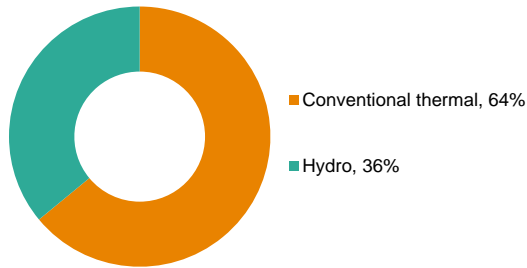
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	104	83	90	↑	
Energy security	104	61	72	↑	<b>C</b>
Energy equity	92	98	94	→	<b>C</b>
Environmental sustainability	78	76	79	→	<b>D</b>
Contextual performance	98	101	96	→	
Political strength	94	105	100	↓	
Societal strength	98	98	99	→	
Economic strength	94	92	75	↑	
<b>Overall rank and balance score</b>	<b>107</b>	<b>92</b>	<b>92</b>	<b>↑</b>	<b>CCD</b>

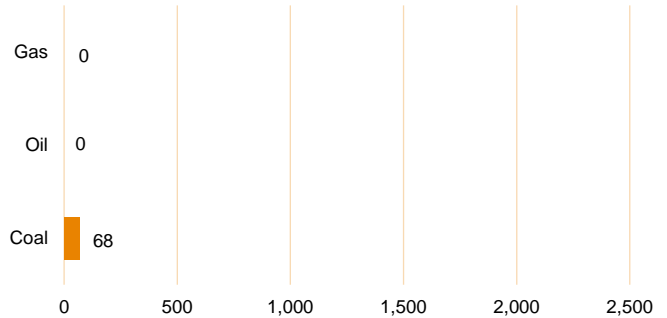
INDEX COMMENTARY

Swaziland's overall Index ranking is unchanged. Energy security drops as the share of fossil fuels in the electricity mix, while other indicators remain stable. On the energy equity dimension, Swaziland continues to lag, largely because only 35% of the country's population has access to electricity and gasoline prices keep rising. Although it does not have high emissions intensity, the country struggles with mitigating its impact on the environment. Contextual indicators are low but improve across the board with marginal improvements across all indicators measuring political strength and a considerably stronger macroeconomic stability.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)



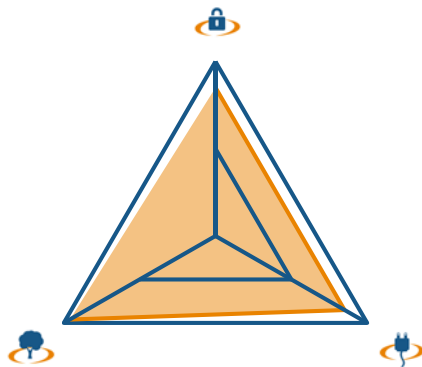
KEY METRICS

Industrial sector (% of GDP)	47.8	GDP per capita (PPP, USD); GDP Group	6,031 (III)
TPEP / TPEC (net energy importer)	0.85	Energy intensity (koe per USD)	0.16
Emission intensity (kCO <sub>2</sub> per USD)	0.16	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	35.2

TRENDS AND OUTLOOK

- A trend towards an increased share of renewable energy is both power (off and on-grid) and fuel (biofuels) sector is apparent and the development of a renewable energy strategy, independent power producer policy, and feed-in-tariffs are underway.
- Coal will continue to play an important role in the energy mix of Swaziland. The country has vast reserves and is considering building a 300MW coal fired thermal power station using clean coal technologies, which is expected to supply the country and allow export to the Southern African Power Pool. However, companies are investing in cogeneration to replace coal. These efforts are expected to improve the country's energy independence by reducing the heavy reliance on imported energy.
- In addition, the country is looking to increase its strategic fuel reserves, enhance bulk purchasing (better prices), explore the possibility of setting up a petroleum products refinery, and tap into the natural gas market in Mozambique.
- The recently conducted GHG inventory, submitted to the UNFCCC in March 2012, shows that Swaziland is a net source for GHGs. The energy-related activities account for only 6.7% of total GHG emissions. There is, however, room for pollution reduction. That is why Swaziland has approved waste and air pollution regulations to enforce pollution control.
- Policymakers need to: 1) support the adoption of renewable energy technologies and the development of incentives to enable market penetration; and 2) increase the budget for the energy sector to enable economic development and poverty reduction, through increased rural electrification, energy access, research and development, development of skills, and capacity building.

TRILEMMA BALANCE



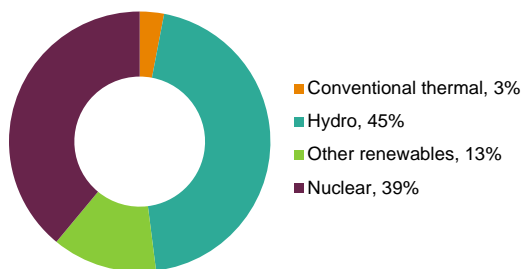
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	4	4	2	→	
Energy security	18	24	20	→	A
Energy equity	21	14	19	→	A
Environmental sustainability	8	6	6	→	A
Contextual performance	6	5	5	→	
Political strength	5	4	5	→	
Societal strength	2	2	1	→	
Economic strength	29	26	16	↑	
<b>Overall rank and balance score</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>→</b>	<b>AAA</b>

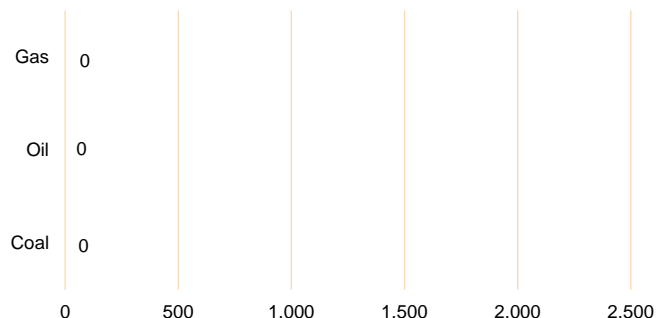
INDEX COMMENTARY

Sweden continues its exceptional performance in the Index and improves its position to rank second overall. As a 'Pack Leader', Sweden exhibits strong, well-balanced performance on all three energy dimensions. Energy security improves as the country increases its strategic oil stocks, and decreases its dependence on fuel imports. Performance on the energy equity dimension slightly declines, although Sweden keeps providing high-quality and affordable energy services. The country's mitigation of its impact on the environment continues to rank among the best in the world, with comparatively low emissions intensity and air and water pollution levels. Part of Sweden's success on this dimension is undoubtedly due to its diverse electricity mix, with 97% of its electricity generation coming from low or zero-carbon sources. Only 3% of electricity is generated using fossil fuels, and almost all oil plants have been either shut down or relegated to reserve use. Sweden performs extremely well on indicators of political and societal strength, with economic strength trailing slightly behind due solely to the country's high cost of living.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)



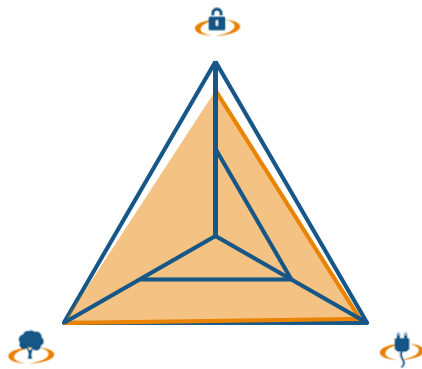
KEY METRICS

Industrial sector (% of GDP)	31.3	GDP per capita (PPP, USD); GDP Group	40,294 (I)
TPEP / TPEC (net energy importer)	0.61	Energy intensity (koe per USD)	0.15
Emission intensity (kCO <sub>2</sub> per USD)	0.12	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	4.24
Energy affordability (USD per kWh, 2013)	0.23	Population with access to electricity (%)	100.0

TRENDS AND OUTLOOK

- In order to maintain a high Index ranking, a key issue for Sweden is to make the transportation sector sustainable. Currently, the transportation sector (except trains, metro and trams) relies on fossil fuels. Special policies and financial support to incentivise the purchase of electric cars are in place, but results are not yet fulfilling expectations. Improvements have been made in terms of increasing the share of biofuels. The EU target to increase the share of biofuels used in transport to 10% by 2020 will be achieved several years in advance, and is close to 10% already. This is mostly due to blending ethanol and other biofuels in gasoline and diesel, and an increased number of cars running on biogas.
- Sweden has had a successful market-based green certificate system for promoting renewable energy sources (RES) in place from 2003, and since 2012 this is a joint system with Norway. The joint system is a major step forward but it is important to review and improve targets and policies for the transportation sector.
- Policymakers need to focus on finding a solution to replace the existing 10 nuclear reactors that will be taken out of operation gradually to meet the future electricity demand. The first reactors are expected to close around 2025. Permit applications for building new reactors to replace existing ones have been filed, in line with the government decision to allow the replacement of existing reactors at existing sites.
- In addition to finding measures to meet the EU CO<sub>2</sub> reduction and RES targets, energy efficiency needs to be a top priority.

## TRILEMMA BALANCE



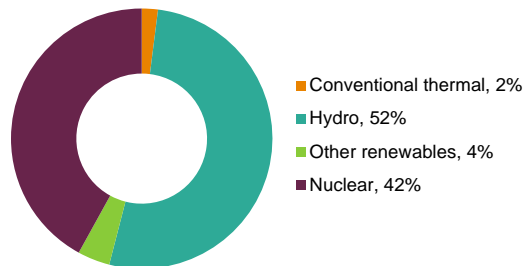
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	2	1	1	→	
Energy security	26	19	22	↑	A
Energy equity	4	6	5	→	A
Environmental sustainability	1	1	1	→	A
Contextual performance	2	3	1	→	
Political strength	6	7	4	→	
Societal strength	2	6	2	→	
Economic strength	8	6	1	↑	
<b>Overall rank and balance score</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>→</b>	<b>AAA</b>

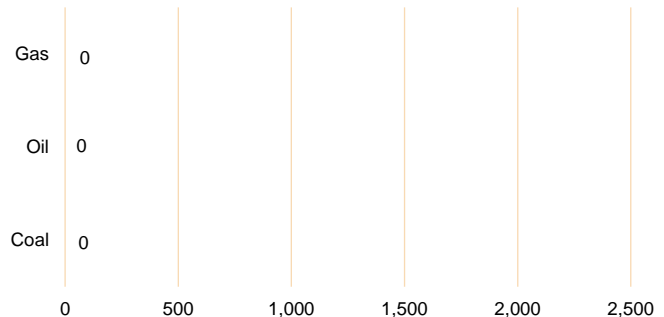
## INDEX COMMENTARY

Switzerland maintains the top spot in the Index for yet another year and exhibits strong, balanced performances on all three dimensions. Energy security is Switzerland's least-strong dimension, as the country imports around half of the energy it uses. Energy equity is high and Switzerland continues to be the best in the world at limiting its impact on the environment, with its low levels of pollution and ultra-low emission energy infrastructure, which uses fossil-fuelled power plants for only 2% of electricity generation. Contextual performance remains among the best in the world.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



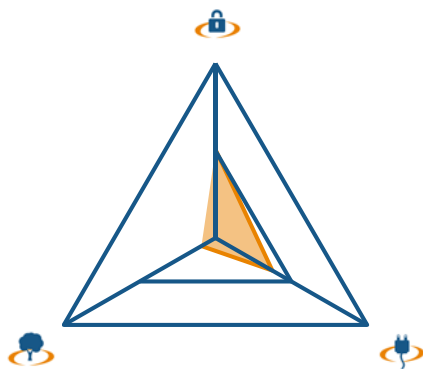
## KEY METRICS

Industrial sector (% of GDP)	26.8	GDP per capita (PPP, USD); GDP Group	45,128 (I)
TPEP / TPEC (net energy importer)	0.50	Energy intensity (koe per USD)	0.08
Emission intensity (kCO <sub>2</sub> per USD)	0.12	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	4.71
Energy affordability (USD per kWh, 2013)	0.20	Population with access to electricity (%)	100.0







## TRENDS AND OUTLOOK

- Switzerland's leading position in the Index reflects the country's past energy and energy-related policy decisions. However, the recent developments and expected changes are likely to have a strong impact on the country's energy sustainability balance.
- Most recent energy policy developments include the decision to refrain from building new nuclear power plants, which will be included in the new energy strategy that is under development and expected to be implemented fully by 2050. The necessary measures and next steps to phase out nuclear are not yet known and will be matter of political discussions in the next few months (a public referendum is probable). To achieve the transition to a low-carbon energy system in the long term, in the short term Switzerland is likely to become more dependent on gas-fired electricity generation.
- Policymakers need to focus on: 1) construction of new electricity grids; 2) completing the liberalisation of the electricity market; and 3) come to a bilateral agreement with the European Union regarding electricity and renewable energy. Furthermore, there is the need to be ambitious and increase the renovation rate of buildings as part of the transition to a low-carbon energy system.

## TRILEMMA BALANCE



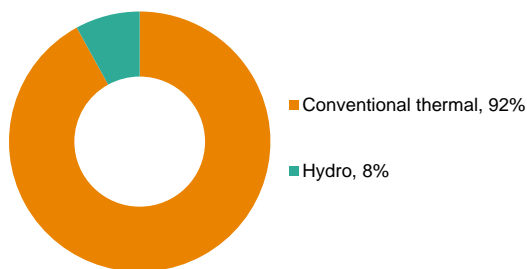
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	84	75	103	↓	
 Energy security	33	52	64	↓	<b>B</b>
 Energy equity	87	52	81	↑	<b>C</b>
 Environmental sustainability	116	113	117	→	<b>D</b>
Contextual performance	110	117	127	↓	
 Political strength	109	114	129	↓	
 Societal strength	113	113	122	↓	
 Economic strength	82	93	123	↓	
<b>Overall rank and balance score</b>	<b>94</b>	<b>87</b>	<b>119</b>	<b>↓</b>	<b>BCD</b>

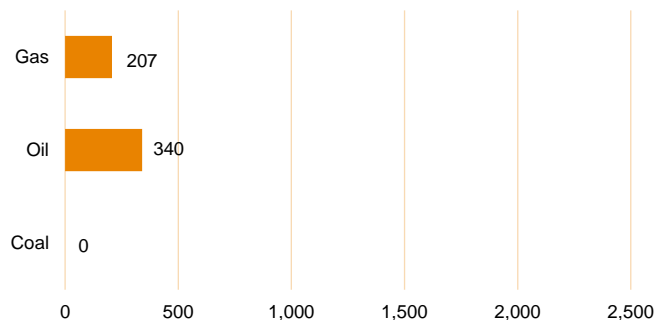
## INDEX COMMENTARY

Overall, Syria drops 32 places in this year's Index. Syria's energy trilemma balance is weighted with average performances on the energy security dimension and a lower performance on energy equity being negated by a poor environmental sustainability ranking. Syria is an oil exporter, but its performance on the energy security dimension suffers. Energy equity ranking drops as the quality and reliability of the electricity supply suffers. Meanwhile, the country's performance on environmental sustainability falls further behind, with an emissions and energy-intensive economy, high levels of pollution, and an electricity generation mix that is 92% conventional thermal. Indicators of political, societal, and economic strength are all low and continue to fall, potentially in the lowest percentile, reflecting some of the effects of Syria's civil war.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

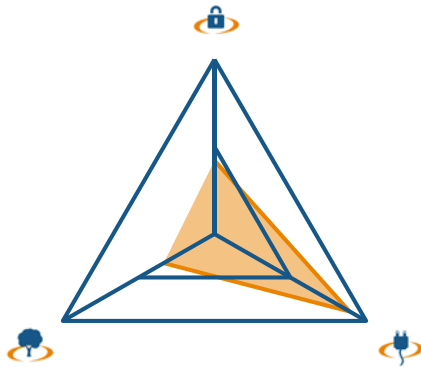


## KEY METRICS

Industrial sector (% of GDP)	22.2	GDP per capita (PPP, USD); GDP Group	n/a (IV)
TPEP / TPEC (net energy exporter)	1.19	Energy intensity (koe per USD)	0.23
Emission intensity (kCO <sub>2</sub> per USD)	0.61	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	2.32
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	92.7

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



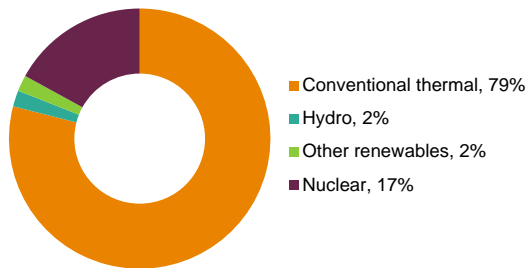
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	40	41	54	↓	
Energy security	67	71	75	↓	<b>C</b>
Energy equity	17	22	14	→	<b>A</b>
Environmental sustainability	63	59	86	↓	<b>C</b>
Contextual performance	11	11	15	↓	
Political strength	25	23	22	→	
Societal strength	22	22	24	→	
Economic strength	5	5	9	↓	
<b>Overall rank and balance score</b>	<b>24</b>	<b>27</b>	<b>34</b>	<b>↓</b>	<b>ACC</b>

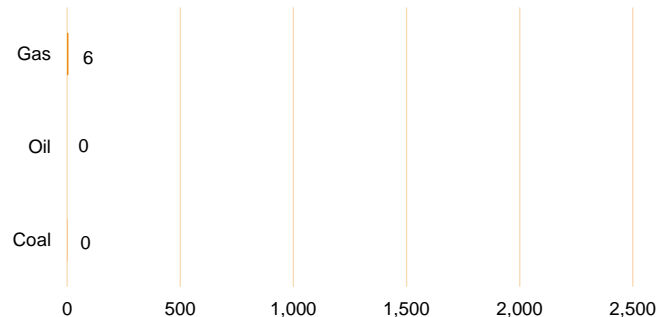
## INDEX COMMENTARY

Taiwan drops seven places in the overall Index rankings. Average performances on the energy security and environmental sustainability dimensions are balanced out by a high degree of energy equity. Taiwan's energy security ranking suffers mostly due to its heavy reliance on energy imports. The island's small size and lack of natural energy resources means that it only produces 10% of the energy it consumes, although Taiwan is trying to change this by increasing the amount of nuclear and wind power in its electricity generation portfolio. Energy equity, Taiwan's best performing dimension, is high and improving. Taiwan sees a significant drop in environmental sustainability performance as energy intensity increases. Contextually, Taiwan continues to perform well with no noteworthy changes.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

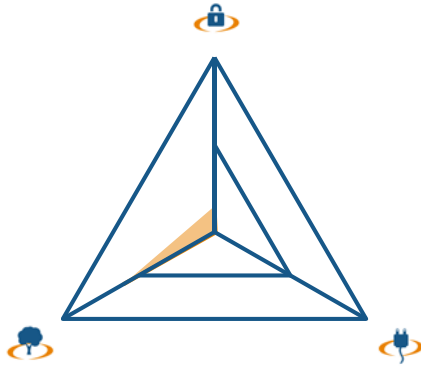


## KEY METRICS

Industrial sector (% of GDP)	29.4	GDP per capita (PPP, USD); GDP Group	38,462 (I)
TPEP / TPEC (net energy importer)	0.10	Energy intensity (koe per USD)	0.23
Emission intensity (kCO <sub>2</sub> per USD)	0.56	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	10.98
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	99.0

## TRENDS AND OUTLOOK

## TRILEMMA BALANCE



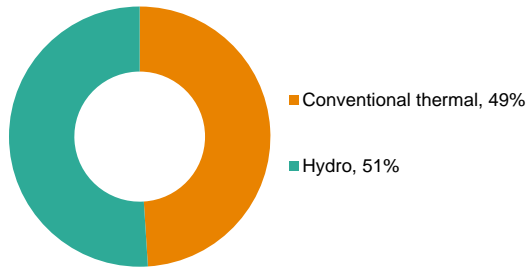
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	117	117	118	→	
Energy security	117	117	110	↑	<b>D</b>
Energy equity	123	125	128	↓	<b>D</b>
Environmental sustainability	57	53	52	↑	<b>B</b>
Contextual performance	92	91	113	↓	
Political strength	86	89	92	↓	
Societal strength	93	93	113	↓	
Economic strength	91	83	97	↓	
<b>Overall rank and balance score</b>	<b>114</b>	<b>116</b>	<b>121</b>	<b>↓</b>	<b>BDD</b>

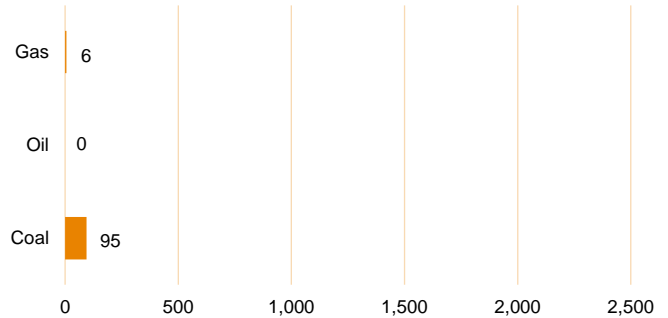
## INDEX COMMENTARY

Tanzania drops five places in this year's Index to rank 121 overall. The country performs poorly on the energy security dimension, challenged by a high reliance on energy imports, a domestic electricity generation portfolio that is largely hydropower and vulnerable to droughts, and a high percentage of transmission and distribution losses. Tanzania ranks very low on the energy equity dimension with gasoline that is not affordable and less than 15% of its population having access to electricity. Once the country develops economically and is able to provide modern energy services to a larger share of its population, it will face the challenge of continuing to meet growing demand while sustaining its currently small environmental footprint. Contextually, performance across most indicators remains low.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)

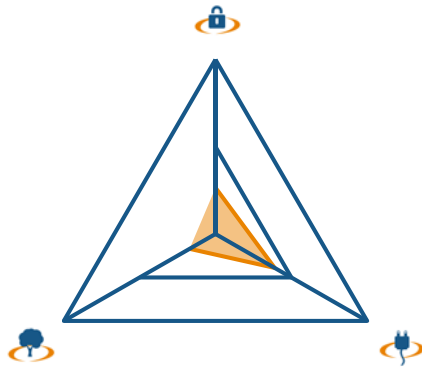


## KEY METRICS

Industrial sector (% of GDP)	25.0	GDP per capita (PPP, USD); GDP Group	1,627 (IV)
TPEP / TPEC (net energy importer)	0.46	Energy intensity (koe per USD)	0.34
Emission intensity (kCO <sub>2</sub> per USD)	0.13	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	0.17
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	14.8

## TRENDS AND OUTLOOK

TRILEMMA BALANCE



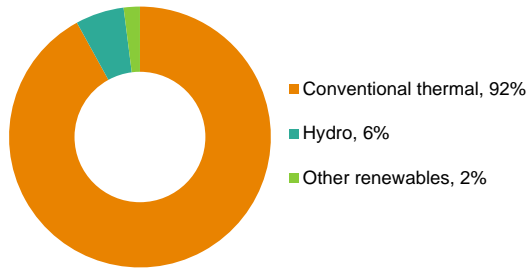
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	101	107	110	↓	
Energy security	82	91	95	↓	<b>C</b>
Energy equity	85	88	77	↑	<b>C</b>
Environmental sustainability	103	101	107	↓	<b>D</b>
Contextual performance	48	46	44	↑	
Political strength	80	75	77	→	
Societal strength	70	70	62	↑	
Economic strength	4	2	4	→	
<b>Overall rank and balance score</b>	<b>89</b>	<b>89</b>	<b>90</b>	→	<b>CCD</b>

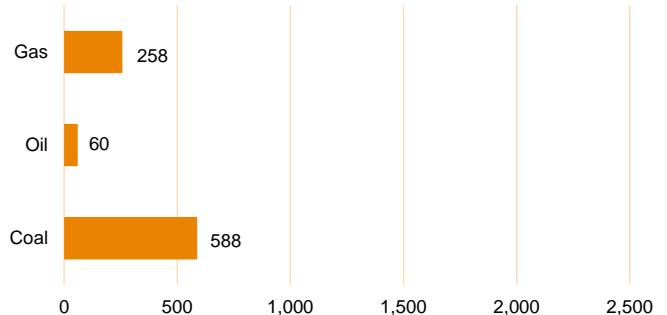
INDEX COMMENTARY

Overall, Thailand maintains a stable position in the Index throughout the years. Performance on all three dimensions is fairly low. Thailand’s energy security ranking falls despite the continued efforts to diversify the electricity mix, which is still almost entirely based on fossil fuels. Energy equity performance as prices for gasoline and electricity increase only very slowly. Thailand struggles with its performance on the environmental sustainability dimension, as both energy and emissions intensities remain high and air and water quality stay low. Contextually, indicators are relatively stable across the board. Economic strength continues to be by far the strongest dimensions, the result of a stable, growing economy, with very low cost of living, and a wide domestic availability of credit.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)



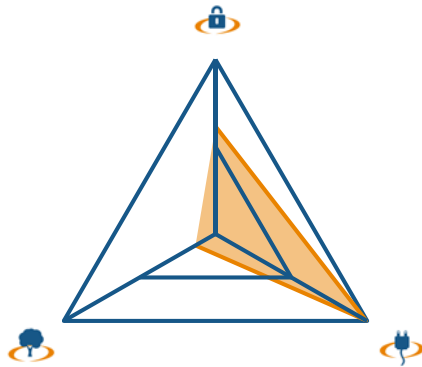
KEY METRICS

Industrial sector (% of GDP)	43.6	GDP per capita (PPP, USD); GDP Group	9,503 (III)
TPEP / TPEC (net energy importer)	0.54	Energy intensity (koe per USD)	0.22
Emission intensity (kCO <sub>2</sub> per USD)	0.44	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	3.55
Energy affordability (USD per kWh, 2011)	0.09	Population with access to electricity (%)	99.7

TRENDS AND OUTLOOK

- In order to enhance energy security and become more self-sufficient, the Thai government is committed to increase energy production. To achieve its goals, it will advance the exploration and production of energy resources at domestic and international levels; explore the joint development of energy resources with neighbouring economies; develop a more diversified energy mix; and encourage electricity production from renewable and other alternative energy sources.
- Alternative energy is very promising in Thailand. The government has developed a set of aggressive policies to encourage the production and use of alternative energy, in particular biofuels, biomass, solid waste and animal manure. These measures are expected to enhance energy security, reduce pollution and support farmers by encouraging the production and use of renewable energy at the community level.
- The Thai government is keen to encourage competition and investment in the energy industry by creating a business-friendly, transparent environment. To achieve its goals, a designated agency, the Investor Relation Office, will be responsible for investment procedures and processes in the energy industry. Furthermore, a mechanism for a company to be a ‘service company’ in the operations and maintenance of the electricity industry, refineries, gas separation plants and both domestic and overseas oil and gas rigs will be created.

## TRILEMMA BALANCE



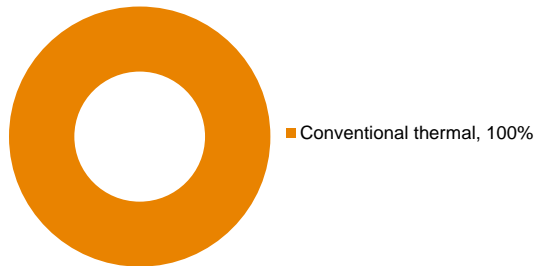
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	86	113	64	↑	
Energy security	74	79	50	↑	<b>B</b>
Energy equity	49	95	30	↑	<b>A</b>
Environmental sustainability	116	115	112	↑	<b>D</b>
Contextual performance	64	53	59	↑	
Political strength	54	53	52	→	
Societal strength	64	64	70	↓	
Economic strength	72	43	65	↑	
<b>Overall rank and balance score</b>	<b>80</b>	<b>98</b>	<b>64</b>	<b>↑</b>	<b>ABD</b>

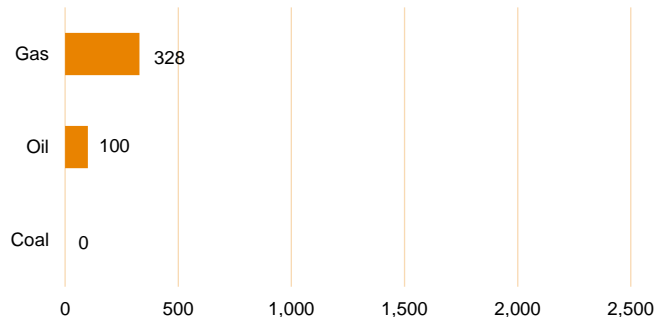
## INDEX COMMENTARY

Trinidad and Tobago improves its position in this year's Index reaching rank 64. Energy security for the oil and petroleum products exporter improves as the quality and reliability of the network increases. The country's energy equity performance becomes better measurable in 2014, as data points used to calculate the affordability of gasoline become available for the first time. Compared to other countries, prices for gasoline are very affordable. Regarding the island nation's environmental footprint, greenhouse gas emissions, as well as energy and emissions intensity continue to be among the worst in the world, but start to show signs of improvement. Contextually, political and societal indicators remain stable this past year, whereas economic strength deteriorates as macroeconomic stability decreases and data points underlying the indicator for cost of living expenditure become available for the first time.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



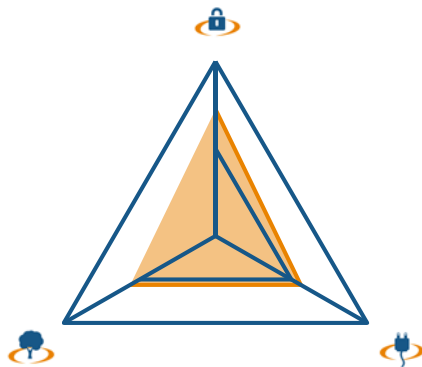
## KEY METRICS

Industrial sector (% of GDP)	57.7	GDP per capita (PPP, USD); GDP Group	19,911 (II)
TPEP / TPEC (net energy exporter)	1.98	Energy intensity (koe per USD)	0.70
Emission intensity (kCO <sub>2</sub> per USD)	1.37	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	30.22
Energy affordability (USD per kWh, 2011)	0.04	Population with access to electricity (%)	99.0

## TRENDS AND OUTLOOK



## TRILEMMA BALANCE



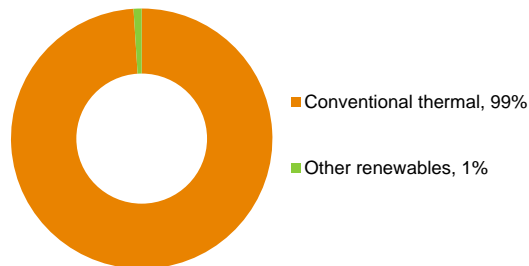
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	29	35	42	↓	
Energy security	15	28	36	↓	<b>B</b>
Energy equity	55	57	58	→	<b>B</b>
Environmental sustainability	59	56	57	→	<b>B</b>
Contextual performance	56	59	70	↓	
Political strength	59	70	85	↓	
Societal strength	60	60	60	→	
Economic strength	53	39	70	↓	
<b>Overall rank and balance score</b>	<b>34</b>	<b>36</b>	<b>45</b>	<b>↓</b>	<b>BBB</b>

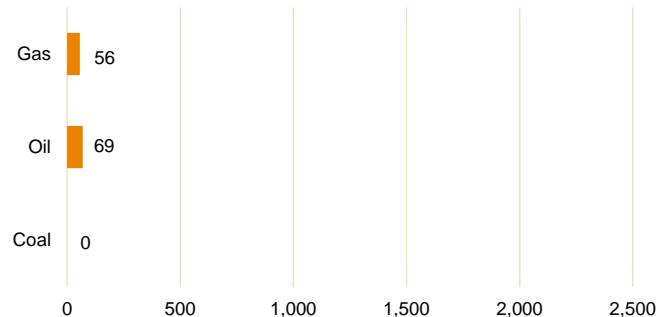
## INDEX COMMENTARY

Tunisia drops nine places in 2014, mostly due to a decrease in performance on the energy security dimension caused by reduced production (depletion of existing fields, some difficulties related to the new Tunisian constitution). While the majority of indicators remain unchanged, higher distribution and transmission losses decrease the overall reliability of the electricity supply and cause the energy security ranking to fall. Performance on energy equity slipped slightly as cheap gasoline prices are counterbalanced by a dip in the perceived quality of electricity. With regards to Tunisia's environmental sustainability, energy intensity remains low but emissions intensity increases. Contextually, political stability, regulatory quality and rule of law indicators worsen, probably due to the conditions that ultimately led to the 2011 Arab Spring. Despite high availability of credit to the private sector, Tunisia's economic stability performance slightly worsens due to some macroeconomic disturbances.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



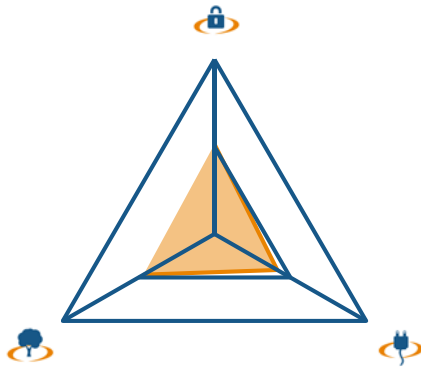
## KEY METRICS

Industrial sector (% of GDP)	30.4	GDP per capita (PPP, USD); GDP Group	9,651 (III)
TPEP / TPEC (net energy importer)	0.84	Energy intensity (koe per USD)	0.11
Emission intensity (kCO <sub>2</sub> per USD)	0.24	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	2.02
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	99.5

## TRENDS AND OUTLOOK

- Over the past few years, Tunisia has made continued efforts to sustain its economic development and improve the energy sustainability balance. To achieve the latter, policies have been implemented to manage the exploration and production of hydrocarbons that will allow Tunisia to accelerate its economic development and to establish its position on the world market. Furthermore, programmes for the promotion of energy efficiency, renewable energy and energy substitution have been instigated.
- Key issues policymakers need to focus on are: 1) increasing the share of renewable energy in electricity generation (including wind, solar and a new CSP scheme) and households (solar water heat, micro generation); and 2) extending the natural gas network in the south and central part of the country.

## TRILEMMA BALANCE



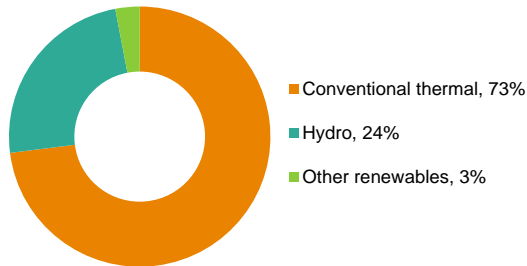
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	90	74	71	↑	
Energy security	91	64	63	↑	<b>B</b>
Energy equity	81	82	76	↑	<b>C</b>
Environmental sustainability	72	70	69	→	<b>C</b>
Contextual performance	74	68	69	↑	
Political strength	67	65	68	→	
Societal strength	51	51	52	→	
Economic strength	102	91	95	↑	
<b>Overall rank and balance score</b>	<b>87</b>	<b>75</b>	<b>73</b>	<b>↑</b>	<b>BCC</b>

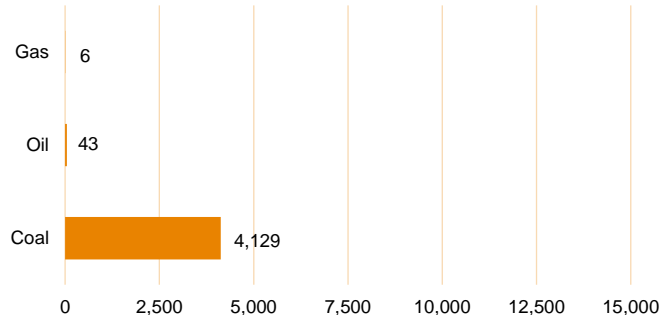
## INDEX COMMENTARY

Turkey continues the positive trend and moves up two more places in this year's Index. Turkey balances the three competing sides of the energy trilemma well, despite low to below average rankings on all three dimensions. With regards to energy security, the country's performance remains mostly stable as it further decreases its dependence on imports. Performance on the energy equity dimension improves as gasoline and electricity prices are stable. Turkey continues to struggle with mitigating its impact on the environment, although some progress is reflected in slightly lower energy and emissions intensity. Contextually, Turkey's performance remains largely unchanged, with small losses made across the board.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



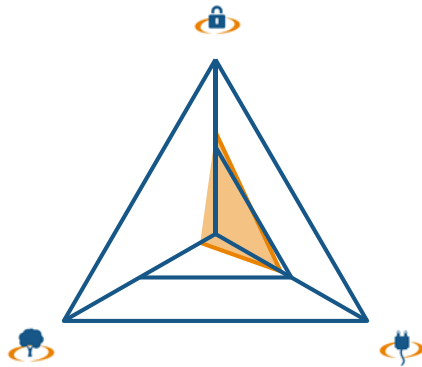
## KEY METRICS

Industrial sector (% of GDP)	27.3	GDP per capita (PPP, USD); GDP Group	14,812 (II)
TPEP / TPEC (net energy importer)	0.30	Energy intensity (koe per USD)	0.11
Emission intensity (kCO <sub>2</sub> per USD)	0.29	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	3.98
Energy affordability (USD per kWh, 2012)	0.18	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- Turkey has to accommodate a fast growing demand for energy and enormous investment volumes are required to meet this growth. Furthermore, only 23% of energy consumption is met by domestic resources, thus energy dependence is of great concern.
- Policymakers should consider increased support for the development of domestic resources, such as hydropower and lignite to meet the increasing energy demand.

## TRILEMMA BALANCE



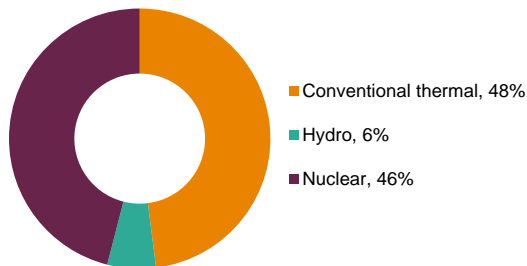
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	92	92	89	→	
Energy security	60	59	54	↑	<b>B</b>
Energy equity	73	73	74	→	<b>C</b>
Environmental sustainability	114	114	116	→	<b>D</b>
Contextual performance	104	97	110	↓	
Political strength	100	99	96	↑	
Societal strength	88	88	83	↑	
Economic strength	109	101	113	↓	
<b>Overall rank and balance score</b>	<b>99</b>	<b>97</b>	<b>94</b>	<b>↑</b>	<b>BCD</b>

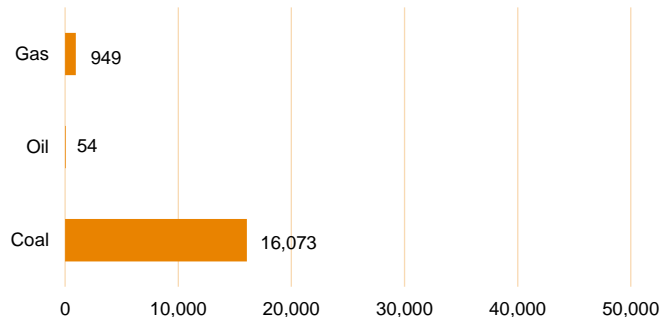
## INDEX COMMENTARY

Ukraine improves three positions in this year's Index. Performance on all three dimensions of the energy trilemma remains mostly stable. As gasoline prices move upwards, the perceived quality of electricity services improves, helping to balance Ukraine's energy equity ranking. From an environmental sustainability point of view, energy and emissions intensity decrease, but remain among the highest in the world. Emissions from electricity generation increase as more fossil fuels are burned. Contextual performance is also essentially flat, but low.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



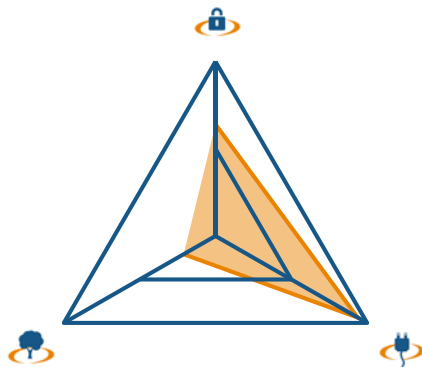
## KEY METRICS

Industrial sector (% of GDP)	29.6	GDP per capita (PPP, USD); GDP Group	7,296 (III)
TPEP / TPEC (net energy importer)	0.61	Energy intensity (koe per USD)	0.42
Emission intensity (kCO <sub>2</sub> per USD)	0.94	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	6.02
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	99.8

## TRENDS AND OUTLOOK

- Ukraine's energy sector faces great challenges, from a high dependence on expensive fossil-fuel imports such as oil and gas, to inefficient infrastructure and markets. Recent energy policy developments to address those challenges include the decision to replace Russian gas by Ukrainian coal, increase oil and gas production, for example, from the Black Sea shelf, and develop the nuclear power capacity.
- Furthermore, there is a need to strengthen energy-efficiency policies, make full use of the country's renewable energy potential such as biogas and municipal waste for heat and power generation, and lower gas consumption in the district heating sector to ensure heat supply and lower energy bills.

## TRILEMMA BALANCE



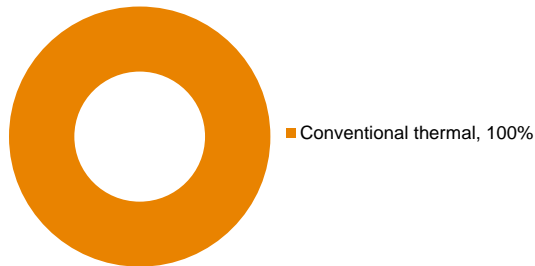
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	67	62	47	↑	
Energy security	56	49	47	↑	<b>B</b>
Energy equity	39	37	8	↑	<b>A</b>
Environmental sustainability	106	102	102	↑	<b>D</b>
Contextual performance	24	22	32	↓	
Political strength	38	39	35	→	
Societal strength	33	33	34	→	
Economic strength	13	11	45	↓	
<b>Overall rank and balance score</b>	<b>53</b>	<b>44</b>	<b>35</b>	<b>↑</b>	<b>ABD</b>

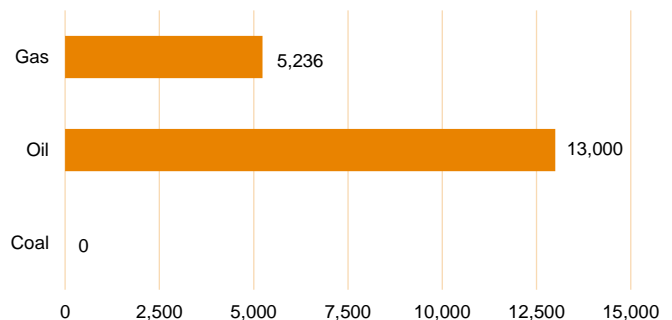
## INDEX COMMENTARY

The United Arab Emirates continues the positive trend of previous years and moves up another nine places to an overall Index position of rank 35. Well-endowed with plentiful deposits of oil and natural gas, the UAE maintains an above average energy security ranking. The country's energy equity performance is easier to measure in 2014 because data points used to calculate the affordability of gasoline are available for the first time. Compared to other countries, prices for gasoline are very affordable. Similarly, electricity remains affordable and of high quality. Environmentally, emissions intensity and emissions from electricity generation are high given that the UAE's electricity mix is still 100% fossil fuel-based. The Emirates' first nuclear power plant becomes operational in 2017, and solar power projects and increased efforts to raise awareness around energy efficiency are likely to improve the UAE's energy security and environmental sustainability performances in the coming years. Contextually, the UAE continues to perform well with strong indicators across the board.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



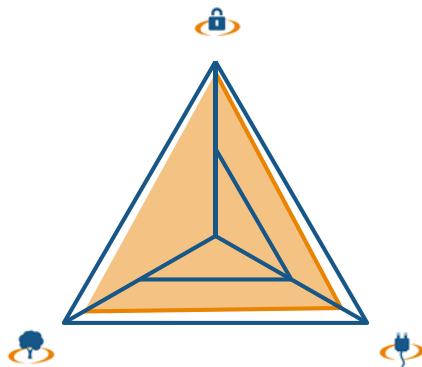
## KEY METRICS

Industrial sector (% of GDP)	61.1	GDP per capita (PPP, USD); GDP Group	29,176 (II)
TPEP / TPEC (net energy exporter)	2.16	Energy intensity (koe per USD)	0.20
Emission intensity (kCO <sub>2</sub> per USD)	0.49	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	19.83
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	94.1

## TRENDS AND OUTLOOK

- The UAE is making major investments across the energy spectrum to improve environmental sustainability. Of particular note among specific actions are: 1) construction of 5.4 GW of nuclear power, managed under one of the most internationally transparent programmes to date, which is on schedule to deliver the first reactor in 2017 and the last in 2020; 2) enactment in 2010 of Estidama, the first mandatory building and landscaping sustainability regulations (energy/water performance) in the Middle East, which is set to cut consumption by over one third from the baseline; 3) establishment of renewable energy targets, including 7% generation capacity in Abu Dhabi by 2020 and 5% consumption in Dubai by 2030 that will be met with solar, wind, and waste-to-energy; 4) establishment of 30% demand reduction target by 2030 in Dubai, achieved through a mix of pricing reforms, performance codes, and efficiency investments; 5) development of commercial-scale carbon capture and sequestration project by Masdar and ADNOC; 6) completion of the region's first carbon inventory in 2013 for Abu Dhabi and Dubai, to be extended to Northern Emirates; and 7) development of the MENA region's first green growth plan, released in 2013 in partnership with GGGI and includes policy steps for all major economic sectors to minimise the environmental impact.
- The UAE also has an extensive overseas clean energy investment portfolio, which includes: the establishment of a US\$350 million concessional loan facility for renewable energy projects in developing countries in partnership with IRENA; a US\$50 million grant for renewable energy projects in Pacific island countries; and other significant grant renewable energy projects.

TRILEMMA BALANCE



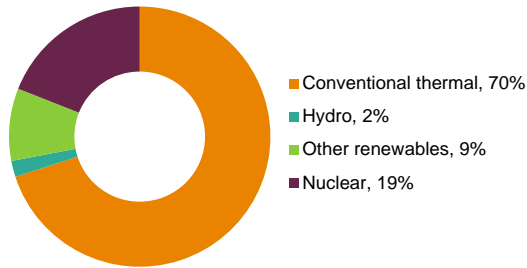
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	1	2	3	→	
Energy security	3	11	9	↓	A
Energy equity	5	8	22	↓	A
Environmental sustainability	20	19	18	→	A
Contextual performance	19	27	20	→	
Political strength	19	21	21	→	
Societal strength	17	17	19	→	
Economic strength	39	55	35	↑	
<b>Overall rank and balance score</b>	<b>2</b>	<b>5</b>	<b>4</b>	<b>→</b>	<b>AAA</b>

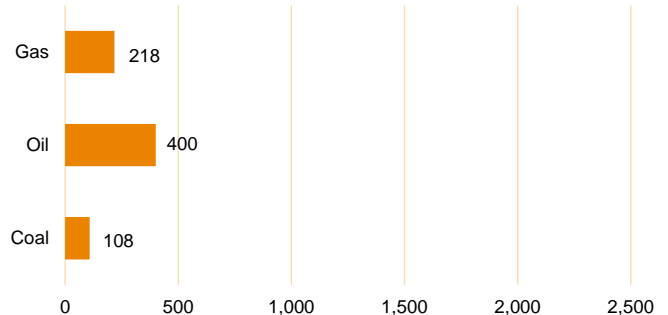
INDEX COMMENTARY

Overall, the United Kingdom maintains a stable position in the Index throughout the years. The UK remains a 'Pack Leader' and continues to balance the energy trilemma well. It should be noted that the latest power plant accidents, which resulted in a tightening of capacity margins, are not yet reflected in the data. Performance in energy equity suffers this year, as electricity and gasoline become more expensive. The environmental sustainability dimension sees improvement in absolute performance on CO<sub>2</sub> emissions from electricity generation as well. Unlike most other 'Pack Leaders', the UK still relies on fossil fuels for 71% of its electricity fuel mix. Contextually, indicators of political and societal strength stay robust but are at risk without further effort.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)



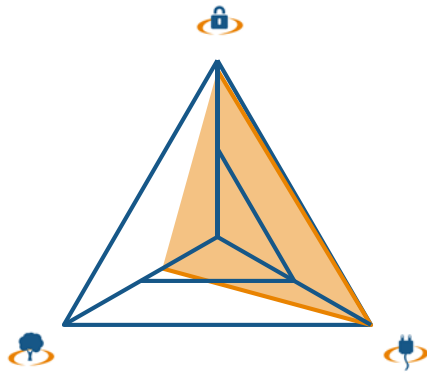
KEY METRICS

Industrial sector (% of GDP)	20.5	GDP per capita (PPP, USD); GDP Group	36,334 (I)
TPEP / TPEC (net energy importer)	0.69	Energy intensity (koe per USD)	0.09
Emission intensity (kCO <sub>2</sub> per USD)	0.22	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	7.24
Energy affordability (USD per kWh, 2013)	0.23	Population with access to electricity (%)	100.0

TRENDS AND OUTLOOK

- The UK faces significant challenges in securing its energy supply. Domestic production of fossil fuels has steadily declined. Aspirations to produce unconventional oil and gas have to surmount technical barriers and secure public acceptance. In the power sector, the nuclear fleet is being run down, and many coal plants will be forced to close by European legislation. Constraints in domestic supply have been further aggravated by a number of unscheduled incidents in 2014, which have caused the closure of three power supply plants and four nuclear reactors.
- The UK is implementing policies that aim at decarbonising the power sector while securing supply through comprehensive reforms in the Energy Act 2013, notably contracts for difference to support low carbon generation and the creation of a capacity market. A renewables energy target is already in place (15% of energy demand is to come from renewables by 2020). The fourth carbon budget has been confirmed, requiring a cut of 40% in CO<sub>2</sub> emissions compared with 1990, setting the UK on a path to meet its long-term objective of reducing GHG emissions by 80% by 2050 compared to 1990 levels.
- The greatest challenges for policymakers will be executing the reforms, monitoring their impact and if necessary adjusting the new policies to ensure they are effective while staying within the overall prescribed cost framework. Difficulties with implementation are vividly illustrated by the unsatisfactory start to the Green Deal, designed to drive more demand-side efficiency. The challenges of implementing such far reaching reforms are exacerbated by the growing politicisation of the debate on energy policy.

## TRILEMMA BALANCE



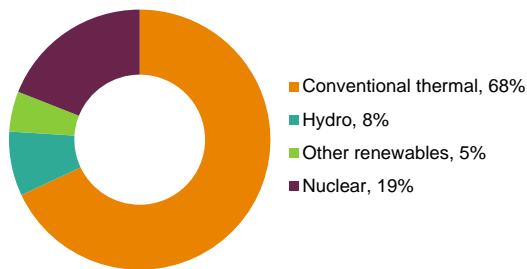
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	16	15	13	→	
Energy security	17	12	8	↑	<b>A</b>
Energy equity	1	1	1	→	<b>A</b>
Environmental sustainability	88	86	83	↑	<b>C</b>
Contextual performance	22	20	19	→	
Political strength	30	24	20	↑	
Societal strength	27	27	21	↑	
Economic strength	23	29	28	↓	
<b>Overall rank and balance score</b>	<b>16</b>	<b>15</b>	<b>12</b>	<b>↑</b>	<b>AAC</b>

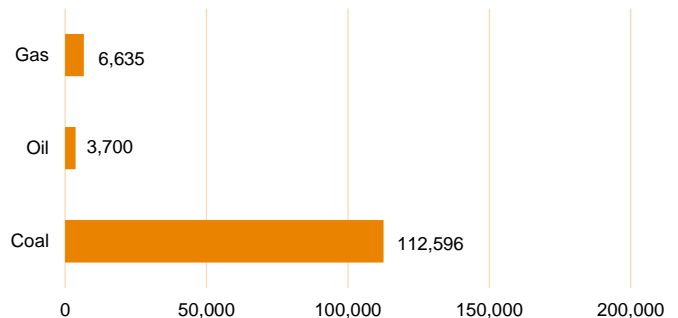
## INDEX COMMENTARY

The United States moves up three places in this year's Index to rank 12 overall. The United States balances the three dimensions of the energy trilemma in a fashion that is typical for a 'Fossil-fuelled' country. Strong performances on energy security and energy equity are partially offset by the country's large environmental footprint. A further diversified electricity generation portfolio and greater oil stocks, lead to an improved energy security ranking. Furthermore, the recent development of sources of shale gas will very likely help the United States become a net energy exporter in the near future. The country maintains its global first-place ranking on the energy equity dimension, as it continues to offer some of the most (relatively) affordable energy in the world. Performance on the environmental sustainability dimension lags behind but shows improvements across the board, with slightly lower levels of energy and emissions intensities. CO<sub>2</sub> emissions from electricity generation are also reduced but remain high as a result of the United States' predominantly conventional thermal energy mix. Contextually, the country's performance is constant and

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



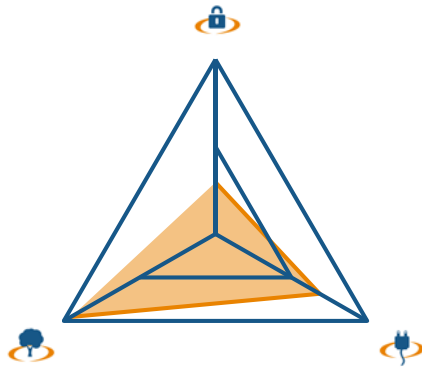
## KEY METRICS

Industrial sector (% of GDP)	19.5	GDP per capita (PPP, USD); GDP Group	51,709 (I)
TPEP / TPEC (net energy importer)	0.76	Energy intensity (koe per USD)	0.16
Emission intensity (kCO <sub>2</sub> per USD)	0.37	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	15.89
Energy affordability (USD per kWh, 2013)	0.12	Population with access to electricity (%)	100.0

## TRENDS AND OUTLOOK

- Due to advances in horizontal drilling and in hydraulic fracturing, shale gas production has become economically viable in recent years. The Energy Information Administration (EIA) estimates that the country has more than 1,744 trn cubic feet of technically recoverable natural gas, including 211 tcf of proved reserves (the discovered, economically recoverable fraction of the original gas-in-place). Production of shale gas is expected to increase from a 2007 US total of 1.4 tcf to 4.8 tcf in 2020. The significant increases in domestic oil and gas production will greatly reduce oil imports over the next 10 years, and lead to increased exports of refined products and possibly natural gas.
- Important energy policy developments in the United States that will impact on the country's balance in the three dimensions of energy sustainability include: 1) the Environmental Protection Agency (EPA) regulations on coal leading to the projected closure of more than 200 coal plants in the next few years accounting for more than 10% of the USA's current energy production; 2) possible regulations on unconventional gas production; and 3) the extension (or not) of the wind production tax credit, which can cut the cost of developing a wind project by nearly a third.

TRILEMMA BALANCE



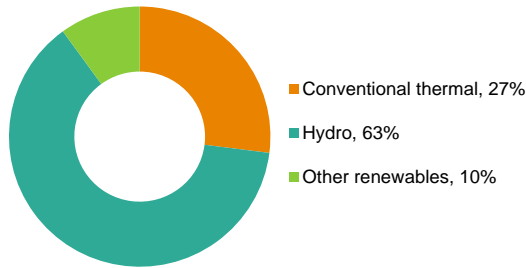
INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	35	47	33	→	
Energy security	68	92	91	↓	<b>C</b>
Energy equity	66	67	41	↑	<b>B</b>
Environmental sustainability	5	5	7	→	<b>A</b>
Contextual performance	53	56	64	↓	
Political strength	39	42	45	↓	
Societal strength	35	35	40	↓	
Economic strength	85	86	117	↓	
<b>Overall rank and balance score</b>	<b>39</b>	<b>46</b>	<b>39</b>	<b>→</b>	<b>ABC</b>

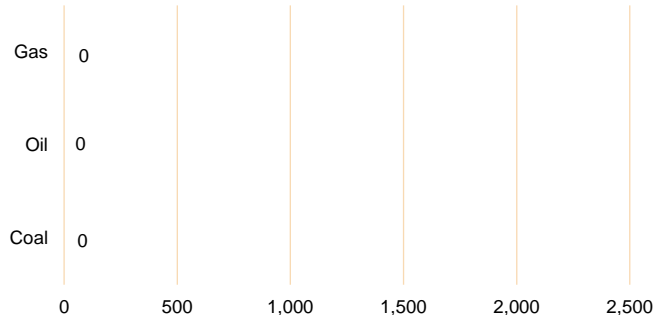
INDEX COMMENTARY

A member of the 'Hydro-powered' group of countries, Uruguay moves up seven places in this year's Index rankings. This is largely due to a higher energy equity ranking. Uruguay's energy security rank remains stable with a well-diversified electricity generation portfolio but still fairly high distribution and transmission losses. While a steady decline is being observed for the latter, performance on the energy equity dimension improves as gasoline and electricity prices become more affordable. Due to its low-carbon electricity generation profile, Uruguay continues to rank among the best in the world at mitigating its impact on the environment, with low energy and emissions intensities. As more fossil fuels are burned to produce electricity, CO<sub>2</sub> emissions from electricity generation double. Contextually, Uruguay performs much as it did last year in political and societal strength, but sees a decline in economic strength as macroeconomic stability decreases and the cost of living comparatively increases.

DIVERSITY OF ELECTRICITY GENERATION



FOSSIL FUEL RESERVES (IN MTOE)



KEY METRICS

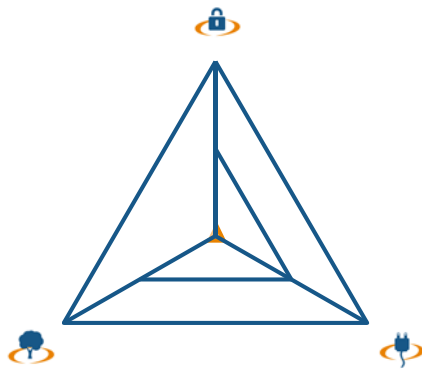
Industrial sector (% of GDP)	21.5	GDP per capita (PPP, USD); GDP Group	15,865 (II)
TPEP / TPEC (net energy importer)	0.44	Energy intensity (koe per USD)	0.10
Emission intensity (kCO <sub>2</sub> per USD)	0.18	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	2.52
Energy affordability (USD per kWh, 2011)	0.16	Population with access to electricity (%)	99.1

TRENDS AND OUTLOOK

- Uruguay has defined a long term (2030) National Energy Policy, approved by all political parties. The country has no proven oil, natural gas or coal reservoirs but a high availability of renewable energy sources. By carefully choosing renewable energy sources and technologies such as hydropower, wind energy, biomass cogeneration, and biofuels it was possible, without subsidies, to reach a 49.2% share of renewable energy in the 2013 energy mix (up from 30% in 2005). This has enhanced the country's energy sovereignty, sustainability, security, and contributed to the reduction of energy costs.
- Currently, the installed wind power capacity is 384 MW. Under the National Energy Policy, an additional 800 MW of wind energy are to be installed by 2015 as part of the energy transformation. The average national power demand is currently 1,100 MW, while peak demand is 1,918 MW. Furthermore, a re-gasification LNG plant is under construction and 70% of the Uruguayan off-shore area is being explored for natural gas and oil. Between 2010 and 2015 US\$7 billion is being invested in the energy sector (15% of the annual GDP). As a result of this process, during the last 2 years Uruguay has moved from being an energy importer to become an energy exporter. For the first time in 20 years, during the last 24 months Uruguay did not have to import electricity. This is not yet reflected in this year's Index due to the fact that data reflects the years 2010 to 2012. Future Index editions will capture the improved Uruguayan situation.



## TRILEMMA BALANCE



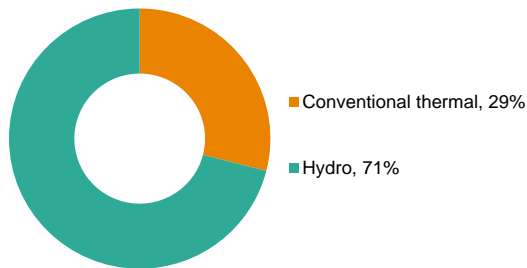
## INDEX RANKINGS AND BALANCE SCORE

	2012	2013	2014	Trend	Score
Energy performance	129	129	129	→	
Energy security	113	112	120	↓	<b>D</b>
Energy equity	125	128	122	→	<b>D</b>
Environmental sustainability	127	127	122	↑	<b>D</b>
Contextual performance	127	124	107	↑	
Political strength	127	127	122	↑	
Societal strength	123	123	126	→	
Economic strength	116	110	39	↑	
<b>Overall rank and balance score</b>	<b>129</b>	<b>129</b>	<b>129</b>	<b>→</b>	<b>DDD</b>

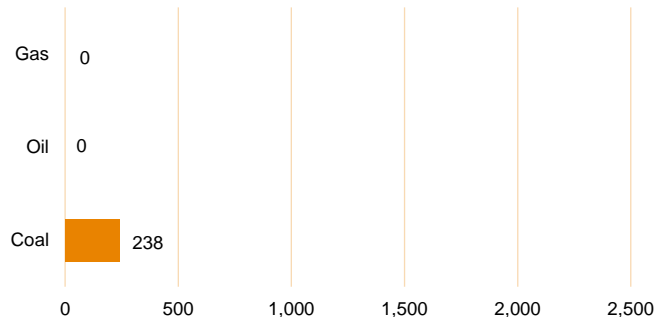
## INDEX COMMENTARY

Zimbabwe remains in last place in the overall Index rankings. With virtually no fossil fuel resources of its own, Zimbabwe faces problems with meeting the growing energy demand from economic and social development. Because of the high cost of renewable energy infrastructure and technologies, the development of additional electricity generation capacity remains stalled. Energy equity is very low, as only one-third of Zimbabweans have access to electricity, and gasoline and electricity prices continue to be unaffordable to the majority of the population. Due to the heavy use of coal and firewood, Zimbabwe is one of the most emissions-heavy, least efficient countries in the world. Nevertheless, performance on this dimension improves as the share of hydropower in the country's electricity mix increases, thus cutting CO<sub>2</sub> emissions from electricity generation significantly. Zimbabwe still performs poorly on contextual indicators of political and societal strength. Economic strength sees a significant improvement caused by an update of the data points underlying the indicator for cost of living expenditure.

## DIVERSITY OF ELECTRICITY GENERATION



## FOSSIL FUEL RESERVES (IN MTOE)



## KEY METRICS

Industrial sector (% of GDP)	25.4	GDP per capita (PPP, USD); GDP Group	762 (IV)
TPEP / TPEC (net energy importer)	0.75	Energy intensity (koe per USD)	1.70
Emission intensity (kCO <sub>2</sub> per USD)	1.76	CO <sub>2</sub> emissions (tCO <sub>2</sub> ) per capita	-
Energy affordability (USD per kWh)	-	Population with access to electricity (%)	36.9

## TRENDS AND OUTLOOK

- Over the past few years Zimbabwe has made continued efforts to improve its energy security, energy access and environmental footprint. Policy developments include: establishment of an independent energy regulator to regulate and supervise the entire energy sector; amendment of the Electricity Act to promote energy efficiency in the public utility; adoption of biofuels and incentives to promote uptake with a minimum target of 20% by 2015; promotion of public private partnerships to spur development in the petroleum and power sector; adoption of a long-term, government-driven renewable energy technologies programme, which encourages independent power producers and public private partnerships to develop renewable energy technologies in Zimbabwe; establishment of a comprehensive household energy plan addressing issues related to shortages, inefficient use of biomass and affordability of modern energy services; and establishment and adoption of energy efficiency programmes.
- Key issues policymakers need to focus on are: 1) increase the use of renewable energy, including, biofuels and the use of solar power, by developing appropriate incentives; 2) improve energy efficiency and decrease the high electricity losses, which are currently more than 30% because of inefficiency and obsolete equipment); and 4) develop mechanisms to increase power generation capacity.





## Appendix A: Index methodology and balance score

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The Energy Trilemma Index ranks countries in terms of their likely ability to provide a stable, affordable, and environmentally-sensitive energy system. The rankings are based on a range of country-level data and databases that capture energy performance and the contextual framework. Energy performance considers supply and demand, the affordability and access of energy, and the environmental impact of the country's energy use. The contextual indicators consider the broader circumstances of energy performance including societal, political and economic strength and stability.

Each country is also given a balance score identifying those that address the three dimensions of energy sustainability – energy security, energy equity, and environmental sustainability – equally well by giving them a score for high performance (AAA). Other letter scores (for example, BBC, CCD) show where countries need to improve to balance the energy trilemma. The goal of the score system is to help energy leaders identify areas to focus on to develop a balanced energy profile, necessary for minimising uncertainties and risks.

The findings of the Index analysis are complemented with the individual country profiles – of WEC member countries only – captured in this report.

Indicators were selected based on the high degree of relevance to the research goals, exhibited low correlation, and could be derived from reputable sources to cover a high proportion of countries. The Index also includes 36 non-WEC member countries and, since 2013, measures the performance of 129 countries. Data sources used include the International Energy Agency, the US Energy Information Administration, the World Bank, the International Monetary Fund, the World Economic Forum, Enerdata, the WEC and others.

The structure of the Index and the coverage of its 23 indicators are set out in Figure A-1. More than 60 data sets are used to develop 23 indicators. The Index is weighted in favour of the energy performance axis by a ratio of 3:1, with the scores for each dimension carrying equal weight within their axis.

Overall, the Index displays the aggregate effect of energy policies applied over time in the context of each country and provides a snapshot of current energy sustainability performance. It is very difficult to compare the effectiveness of particular policies across countries, since each one interacts with a unique set of policies specific to that country. But it is possible to broadly measure the aggregate outcome of policies – for example, how countries with similar levels of energy intensity per capita perform in mitigating their environmental impact or the overall use of electricity per capita.

Full details of country scores in the three dimensions, further key metrics and analytical commentaries for each country can be found in the country profiles online at [www.worldenergy.org](http://www.worldenergy.org) or in the companion report 2014 Energy Trilemma Index: Benchmarking the sustainability of national energy systems. The full methodology can be obtained on request.

**Figure A-1**  
**Index structure**

Source: WEC/Oliver Wyman, 2014

Total score	Indicator type	Dimension	Indicators	
Country performance <b>100%</b>	1. Energy performance <b>75%</b>	1.1 Energy security <b>25%</b>	1.1.1 Ratio of total energy production to consumption 1.1.2 Diversity of electricity generation 1.1.3 Distribution losses as a percentage of generation 1.1.4 Five year CAGR of the ratio of TPEC to GDP 1.1.5 Days of oil and oil product stocks 1.1.6a For importers – Net fuel imports as a percentage of GDP 1.1.6b For exporters – Fuel exports as a percentage of GDP <b>1/6 Each</b>	
		1.2 Energy equity <b>25%</b>	1.2.1 Affordability of retail gasoline 1.2.2 Affordability and quality of electricity relative to access <b>1/2 Each</b>	
		1.3 Environmental sustainability <b>25%</b>	1.3.1 Total primary energy intensity 1.3.2 CO <sub>2</sub> intensity 1.3.3 Effect of air and water pollution 1.3.4 CO <sub>2</sub> grams/kWh from electricity generation <b>1/4 Each</b>	
		2. Contextual performance <b>25%</b>	2.1 Political strength <b>8.3%</b>	2.1.1 Political stability 2.1.2 Regulatory quality 2.1.3 Effectiveness of government <b>1/3 Each</b>
			2.2 Societal strength <b>8.3%</b>	2.2.1 Control of corruption 2.2.2 Rule of law 2.2.3 Quality of education 2.3.4 Quality of health <b>1/4 Each</b>
			2.3 Economic strength <b>8.3%</b>	2.3.1 Cost of living expenditure 2.3.2 Macroeconomic stability 2.3.3 Availability of credit to the private sector <b>1/3 Each</b>

## Structure of the Index and selection of indicators

The structure of the Index and the selection of indicators have been governed by a suite of intellectual and pragmatic principles:

1. **Relevance:** Indicators are chosen or developed to provide insight into country situations in the context of the project goals.
2. **Distinctiveness:** Each indicator focuses on a different aspect of the issue being explored, unless reinforcement is required.
3. **Balance:** Indicators within each dimension (and dimensions across the Index) exhibit coverage of different issues.
4. **Contextual sensitivity:** Indicators capture different country situations (for example, wealth, size) and, where appropriate, indicators are normalised by gross domestic product (GDP) at purchasing power parity (PPP) and per capita.
5. **Coverage:** Individual indicators are required to provide data for 85% of WEC member countries. Only countries with data available for at least 75% of all indicators were included in the Index calculation.
6. **Robustness:** Indicators to be taken from reputable sources with the most current information.
7. **Comparability:** Data to calculate an indicator is derived from a single source to ensure comparability between countries.

## Data updates

The Index is based on 60 data sets which are used to develop 23 indicators. While some of the indicators are derived from a single data set, others are a combination of two, three or more sub sets.

Where possible, data has been updated. However, due to constraints on the collection, processing, and dissemination of data, the current Index generally reflects data from 2010 to 2013. Recent world events that could affect the Index's outcomes are not completely captured. Policies generally take two to three years to become fully implemented and it may take longer for their effects to become evident.

While the majority of the indicators are updated annually or biannually, some are reviewed irregularly or at longer time intervals. These irregular updates sometimes lead to more significant changes of the individual indicator results, and hence the dimensional rankings.

For example, the World Bank's International Comparison Program (ICP) was published only twice so far: the first time with results for 2005 and the second time with results for 2011. The ICP produces internationally comparable price and volume measures for GDP with component expenditures based on purchasing power parities. The recently published ICP includes additional countries that were not covered before; others, such as Argentina and Lebanon, are not included anymore. As can be observed in the 2014 Index, the data update and change of data availability for certain countries caused significant changes for indicators underlying the Index's energy equity and economic stability dimensions.

## Index results by GDP group




To understand how each dimension of the Index is affected by wealth, countries were also organised into four economic groups:

- ▶ Group I: GDP (PPP) per capita greater than US\$33,500
- ▶ Group II: GDP (PPP) per capita between US\$14,300 and US\$33,500
- ▶ Group III: GDP (PPP) per capita between US\$6,000 and US\$14,300
- ▶ Group IV: GDP (PPP) per capita lower than US\$6,000.

Figures A-2 to A-5 present the rankings of each country in these GDP groups.




**Figure A-2**  
**Country ranking for GDP Group I**

Source: WEC/Oliver Wyman, 2014

GDP group rank	Country	Importer/ Exporter				2014 Index
			Energy security	Energy equity	Environmental sustainability	
1	Switzerland	I	22	5	1	1
2	Sweden	I	20	19	6	2
3	Norway	E	45	15	5	3
4	United Kingdom	I	9	22	18	4
5	Denmark	E	6	47	9	5
6	Canada	E	1	2	56	6
7	Austria	I	44	10	8	7
8	Finland	I	26	16	37	8
9	France	I	41	11	10	9
10	Germany	I	27	42	27	11
11	United States	I	8	1	83	12
12	Australia	E	10	3	98	13
13	Netherlands	I	55	33	31	14
14	Luxembourg	I	109	4	23	18
15	Qatar	E	3	6	103	20
16	Belgium	I	65	29	32	21
17	Ireland	I	69	39	13	22
18	Japan	I	62	20	41	23
19	Hong Kong, China	I	101	9	60	27
20	Iceland	I	94	18	36	31
21	Taiwan, China	I	75	14	86	34
22	Singapore	I	124	35	50	41
23	Israel	I	104	27	88	66
24	Kuwait	E	79	26	121	76

**Figure A-3**  
**Country ranking for GDP Group II**

Source: WEC/Oliver Wyman, 2014

GDP group rank	Country	Importer/ Exporter				2014 Index
			Energy security	Energy equity	Environmental sustainability	
1	New Zealand	I	16	28	42	10
2	Spain	I	37	46	24	15
3	Slovakia	I	15	37	34	17
4	Slovenia	I	52	40	45	24
5	Portugal	I	53	65	22	25
6	Malaysia	E	28	21	84	26
7	Czech Republic	I	12	38	87	28
8	Italy	I	70	48	21	29
9	Croatia	I	74	31	26	32
10	Hungary	I	43	53	35	33
11	United Arab Emirates	E	47	8	102	35
12	Lithuania	I	90	45	20	37
13	Mexico	E	30	43	74	38
14	Uruguay	I	91	41	7	39
15	Poland	I	32	36	91	42
16	Latvia	I	96	59	14	43
17	Panama	I	86	50	17	44
18	Mauritius	I	107	60	15	46
19	Bahrain	I	40	13	126	47
20	Gabon	E	33	89	12	49







GDP group rank	Country	Importer/ Exporter				2014 Index
			Energy security	Energy equity	Environmental sustainability	
21	Russia	E	2	44	104	50
22	Greece	I	59	23	82	51
23	Chile	I	89	55	67	53
24	Korea (Rep.)	I	98	25	85	55
25	Argentina	E	14	96	44	60
26	Barbados	I	117	34	40	61
27	Cyprus	I	106	32	77	63
28	Trinidad and Tobago	E	50	30	112	64
29	Malta	I	128	51	65	65
30	Saudi Arabia	E	68	7	125	68
31	Oman	E	97	12	124	72
32	Turkey	I	63	76	69	73
33	Estonia	I	71	68	115	75
34	Botswana	I	126	98	71	91
35	Lebanon	I	127	123	68	123

Figure A-4




## Country ranking for GDP Group III

Source: WEC/Oliver Wyman, 2014

GDP group rank	Country	Importer/ Exporter				2014 Index
			Energy security	Energy equity	Environmental sustainability	
1	Colombia	E	5	63	4	16
2	Costa Rica	I	51	56	2	19
3	Brazil	I	29	86	19	30
4	Ecuador	E	23	52	28	36
5	Peru	I	18	97	38	40
6	Tunisia	I	36	58	57	45
7	El Salvador	I	61	71	11	52
8	Romania	I	4	78	95	54
9	Kazakhstan	E	13	17	118	56
10	Albania	I	83	84	3	57
11	Angola	E	25	100	25	59
12	Bulgaria	I	24	80	109	67
13	Azerbaijan	E	21	57	99	71
14	China	I	19	82	127	74
15	Paraguay	E	81	103	16	77
16	Algeria	E	80	49	78	79
17	Sri Lanka	I	77	83	49	80
18	Venezuela	E	56	62	73	82
19	South Africa	E	42	85	129	83
20	Egypt	E	58	54	89	85
21	Namibia	I	123	92	46	88
22	Iran	E	66	24	120	89
23	Thailand	I	95	77	107	90
24	Swaziland	I	72	94	79	92
25	Ukraine	I	54	74	116	94
26	Montenegro	I	116	69	93	95
27	Dominican Republic	I	111	87	54	97
28	Macedonia	I	103	75	111	102
29	Jamaica	I	121	79	90	112
30	Libya	E	73	91	108	114
31	Serbia	I	105	70	119	116

**Figure A-5**  
**Country ranking for GDP Group IV**

Source: WEC/Oliver Wyman, 2014

GDP group rank	Country	Importer/ Exporter				2014 Index
			Energy security	Energy equity	Environmental sustainability	
1	Guatemala	I	31	73	29	48
2	Philippines	I	34	93	51	58
3	Bolivia	E	7	88	70	62
4	Indonesia	E	17	64	106	69
5	Cameroon	E	38	111	30	70
6	Georgia	I	102	67	39	78
7	Nigeria	E	11	108	81	81
8	Armenia	I	92	66	75	84
9	Côte d'Ivoire	E	35	110	66	86
10	Vietnam	E	39	99	101	87
11	Mozambique	E	67	124	61	93
12	Ghana	I	78	106	76	96
13	Mongolia	E	49	95	128	98
14	Mauritania	I	48	115	94	99
15	Congo (Dem. Rep.)	E	46	126	58	100
16	Chad	E	85	121	48	101
17	Malawi	I	93	129	33	103
18	Kenya	I	84	114	63	104
19	Nicaragua	I	100	101	59	105
20	Tajikistan	I	82	107	53	106
21	Honduras	I	114	102	55	107
22	Jordan	I	112	61	114	108
23	Nepal	I	125	117	43	109
24	Niger	I	57	127	92	110
25	Morocco	I	118	72	96	111
26	Zambia	I	108	118	62	113
27	Ethiopia	I	99	119	47	115
28	Cambodia	I	115	113	64	117
29	Pakistan	I	60	104	97	118
30	Syria	E	64	81	117	119
31	Madagascar	I	88	125	72	120
32	Tanzania	I	110	128	52	121
33	India	I	76	105	123	122
34	Moldova	I	119	90	113	124
35	Bangladesh	I	113	112	80	125
36	Yemen	E	87	109	110	126
37	Senegal	I	122	116	100	127
38	Benin	I	129	120	105	128
39	Zimbabwe	I	120	122	122	129

## 2014 Index profile groups

To support decision makers, the 2014 Index analysis (for the second time) highlights five distinct profiles. Countries in each group share common energy trilemma characteristics and challenges. While simplified and not comprehensive, these profiles serve as benchmark guides to other countries with similar preconditions.

- ▶ Pack leaders: top performers in terms of both dimensional balance and overall ranking on the Index.
- ▶ Fossil-fuelled: well-endowed with fossil fuel resources, tend to rely heavily on fossil fuels for electricity generation with associated comparatively high CO<sub>2</sub> emissions per kWh generated, trilemma profile is imbalanced and is tilted towards energy security and energy equity, while they struggle to minimise their environmental impact.
- ▶ Highly-industrialised: emerging economies with large manufacturing sectors (30% or higher), trilemma profile is imbalanced and is tilted heavily towards energy security, with progress needed to ensure energy equity and environmental sustainability.
- ▶ Hydro-powered: have a high share of electricity generation from hydropower (40% or higher), trilemma profile is imbalanced and is tilted towards the environmental sustainability dimension, although these countries also perform reasonably well on the energy security dimension.
- ▶ Back of the pack: tightly clustered, less-developed and developing countries that struggle to make progress on all three dimensions.

Only 42 of the 95 WEC member countries are included in the five illustrative groups. While some countries may be closely associated with one group from the point of view of region, economy, or structure of the energy sector, others cannot be readily classified into a single profile as they may align to two profiles.

Readers are encouraged to review the detailed country profiles presented in the companion report 2014 Energy Trilemma Index: Benchmarking the sustainability of national energy systems to consider which energy profile serves as a guide for a particular country.

## Score system methodology

The Index ranking measures both energy and contextual performance of a country. Although the weighting of the dimensions is tilted towards the energy dimensions, the contextual dimensions often give an advantage to developed countries while penalising developing countries. Furthermore, the Index ranking does not indicate how well a country is meeting the energy trilemma challenge (balancing the three dimensions).

To overcome this challenge, a balance score system that highlights how well a country manages the trade-offs between the three competing dimensions was introduced. The score looks at the energy performance only – energy security, energy equity and environmental sustainability. This leaves aside the performance in the three contextual dimensions – political, societal and economic strength.

The score enables the WEC to identify and show countries that perform very well in the energy dimensions and balance the energy trilemma, by giving them an easy-to-understand score for high performance. High performers receive a score of AAA, while countries that do not yet perform well receive a DDD score.

The scores are calculated by splitting the normalised 0–10 results on the energy performance dimensions into four groups. Countries were then provided with a three-letter score. Note, the sequence of the letters in the score does not correspond to a



specific energy dimension, but presents the letter scores in descending alphabetical order.

The best score A was given for results higher than 8. Countries with normalised results higher than 5 were given score B. Average results of between 2.51 and 5 were given a C. Lastly, the score D was given for underperformance.

To ensure that countries' scores are up- or downgraded only in the cases of a systemic trend (as opposed to a short term fluctuation), a 10% 'margin of appreciation' is used (see Figure A-6). For a country to be awarded a new score for any of the dimensions it has to exceed the set margin in case of an improvement or fall below in case of deterioration. Otherwise, the 2013 balance score remains in place.

The following countries' scores fall within the margin of appreciation and were hence not up or downgraded in 2014: Angola, Belgium, Cambodia, Colombia, Estonia, Finland, Indonesia, Iran, Korea (Rep.), Kuwait, Latvia, Mauritania, Mongolia, New Zealand, Oman, Peru, Portugal, Saudi Arabia, Senegal, and Swaziland.

**Figure A-6**

**Balance score system**

Source: WEC/Oliver Wyman, 2014

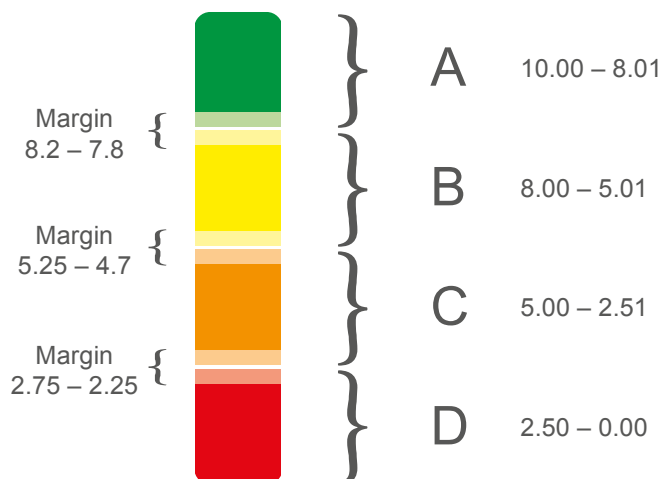






Figure A-7

## 2014 Energy Trilemma Index ranking and balance score

Source: WEC/Oliver Wyman, 2014





					
Index	Country	Balance score	Energy security	Energy equity	Environmental sustainability
1	Switzerland	AAA	22	5	1
2	Sweden	AAA	20	19	6
3	Norway	AAB	45	15	5
4	United Kingdom	AAA	9	22	18
5	Denmark	AAB	6	47	9
6	Canada	AAB	1	2	56
7	Austria	AAB	44	10	8
8	Finland	ABB	26	16	37
9	France	AAB	41	11	10
10	New Zealand	AAB	16	28	42
11	Germany	BBB	27	42	27
12	United States	AAC	8	1	83
13	Australia	AAD	10	3	98
14	Netherlands	BBB	55	33	31
15	Spain	ABB	37	46	24
16	Colombia	AAC	5	63	4
17	Slovakia	ABB	15	37	34
18	Luxembourg	AAD	109	4	23
19	Costa Rica	ABB	51	56	2
20	Qatar	AAD	3	6	103
21	Belgium	ABB	65	29	32
22	Ireland	ABC	69	39	13
23	Japan	ABB	62	20	41
24	Slovenia	BBB	52	40	45
25	Portugal	ABB	53	65	22
26	Malaysia	ABC	28	21	84
27	Hong Kong, China	ABD	101	9	60
28	Czech Republic	ABC	12	38	87
29	Italy	ABC	70	48	21
30	Brazil	ABC	29	86	19
31	Iceland	ABC	94	18	36
32	Croatia	ABC	74	31	26
33	Hungary	BBB	43	53	35
34	Taiwan, China	ACC	75	14	86
35	United Arab Emirates	ABD	47	8	102
36	Ecuador	ABB	23	52	28
37	Lithuania	ABC	90	45	20
38	Mexico	BBC	30	43	74
39	Uruguay	ABC	91	41	7
40	Peru	ABC	18	97	38
41	Singapore	BBD	124	35	50
42	Poland	BBC	32	36	91
43	Latvia	ABD	96	59	14
44	Panama	ABC	86	50	17
45	Tunisia	BBB	36	58	57
46	Mauritius	ABD	107	60	15
47	Bahrain	ABD	40	13	126
48	Guatemala	BBC	31	73	29
49	Gabon	ABC	33	89	12
50	Russia	ABD	2	44	104
51	Greece	ABC	59	23	82
52	El Salvador	ABC	61	71	11
53	Chile	BCC	89	55	67
54	Romania	ACC	4	78	95
55	Korea (Rep.)	BCD	98	25	85
56	Kazakhstan	AAD	13	17	118
57	Albania	ACC	83	84	3
58	Philippines	BBC	34	93	51
59	Angola	ABD	25	100	25
60	Argentina	ABC	14	96	44
61	Barbados	BBD	117	34	40
62	Bolivia	ACC	7	88	70
63	Cyprus	BCD	106	32	77
64	Trinidad and Tobago	BBD	50	30	112
65	Malta	BCD	128	51	65



Index	Country	Balance score	Energy security	Energy equity	Environmental sustainability
66	Israel	BCD	104	27	88
67	Bulgaria	ACD	24	80	109
68	Saudi Arabia	ABD	68	7	125
69	Indonesia	ACD	17	64	106
70	Cameroon	BBD	38	111	30
71	Azerbaijan	ABD	21	57	99
72	Oman	ACD	97	12	124
73	Turkey	BCC	63	76	69
74	China	ACD	19	82	127
75	Estonia	BCD	71	68	115
76	Kuwait	BCD	79	26	121
77	Paraguay	ACD	81	103	16
78	Georgia	BCD	102	67	39
79	Algeria	BCC	80	49	78
80	Sri Lanka	BCC	77	83	49
81	Nigeria	ACD	11	108	81
82	Venezuela	BBC	56	62	73
83	South Africa	BCD	42	85	129
84	Armenia	CCC	92	66	75
85	Egypt	BBC	58	54	89
86	Côte d'Ivoire	BCD	35	110	66
87	Vietnam	BDD	39	99	101
88	Namibia	BCD	123	92	46
89	Iran	BCD	66	24	120
90	Thailand	CCD	95	77	107
91	Botswana	CDD	126	98	71
92	Swaziland	CCD	72	94	79
93	Mozambique	BCD	67	124	61
94	Ukraine	BCD	54	74	116
95	Montenegro	CCD	116	69	93
96	Ghana	CCD	78	106	76
97	Dominican Republic	BCD	111	87	54
98	Mongolia	BDD	49	95	128
99	Mauritania	BDD	48	115	94
100	Congo (Dem. Rep.)	BBD	46	126	58
101	Chad	BCD	85	121	48
102	Macedonia	CDD	103	75	111
103	Malawi	BCD	93	129	33
104	Kenya	BCD	84	114	63
105	Nicaragua	BDD	100	101	59
106	Tajikistan	BCD	82	107	53
107	Honduras	BDD	114	102	55
108	Jordan	BDD	112	61	114
109	Nepal	BDD	125	117	43
110	Niger	BCD	57	127	92
111	Morocco	CCD	118	72	96
112	Jamaica	CCD	121	79	90
113	Zambia	BDD	108	118	62
114	Libya	CCD	73	91	108
115	Ethiopia	BDD	99	119	47
116	Serbia	CDD	105	70	119
117	Cambodia	CDD	115	113	64
118	Pakistan	BDD	60	104	97
119	Syria	BCD	64	81	117
120	Madagascar	CCD	88	125	72
121	Tanzania	BDD	110	128	52
122	India	CDD	76	105	123
123	Lebanon	CDD	127	123	68
124	Moldova	CDD	119	90	113
125	Bangladesh	CDD	113	112	80
126	Yemen	CDD	87	109	110
127	Senegal	CDD	122	116	100
128	Benin	DDD	129	120	105
129	Zimbabwe	DDD	120	122	122

**Figure A-8**  
**2013 Energy Trilemma Index ranking and balance score**

Source: WEC/Oliver Wyman, 2014




					
Index	Country	Balance score	Energy security	Energy equity	Environmental sustainability
1	Switzerland	AAA	19	6	1
2	Denmark	AAA	3	25	10
3	Sweden	AAA	24	14	6
4	Austria	AAB	33	7	7
5	United Kingdom	AAA	11	8	19
6	Canada	AAB	1	2	60
7	Norway	AAB	51	10	8
8	New Zealand	AAB	15	26	37
9	Spain	AAA	22	16	23
10	France	AAB	44	5	9
11	Germany	ABB	31	11	30
12	Netherlands	ABB	42	23	35
13	Finland	ABB	37	21	45
14	Australia	AAD	10	3	97
15	United States	AAC	12	1	86
16	Japan	ABB	48	17	33
17	Belgium	ABB	63	13	34
18	Qatar	AAC	8	9	95
19	Luxembourg	ABD	107	4	29
20	Ireland	ABC	82	30	15
21	Costa Rica	ABB	57	45	2
22	Slovakia	ABB	20	38	48
23	Portugal	ABB	55	53	20
24	Colombia	AAC	5	85	4
25	Slovenia	BBB	60	27	42
26	Argentina	ABB	14	33	38
27	Taiwan, China	ABC	71	22	59
28	Italy	ABC	69	34	24
29	Panama	ABB	53	58	18
30	Croatia	ABC	66	31	21
31	Hungary	BBB	46	42	44
32	Czech Republic	ABC	16	32	90
33	Iceland	ABC	96	15	41
34	Brazil	ABC	27	86	17
35	Ecuador	ABB	25	62	28
36	Tunisia	BBB	28	57	56
37	Malaysia	BBC	34	40	92
38	Bahrain	AAD	23	19	125
39	Greece	ABC	54	18	81
40	Hong Kong, China	ABD	99	24	58
41	Mexico	BBC	29	47	75
42	Lithuania	ABC	93	46	26
43	Latvia	ABD	98	54	14
44	United Arab Emirates	BBD	49	37	102
45	Peru	ABC	21	96	43
46	Uruguay	ACC	92	67	5
47	Singapore	BBD	124	43	51
48	Poland	BBC	38	39	94
49	El Salvador	ABC	68	64	11
50	Barbados	ABD	118	41	25
51	Saudi Arabia	ABD	45	12	124
52	Romania	ACC	9	70	88
53	Mauritius	ABD	109	60	16
54	Russia	ABD	2	61	99
55	Bolivia	ACC	4	84	71
56	Gabon	ABC	35	92	12
57	Chile	BCC	90	56	72
58	Kazakhstan	ABD	6	35	116
59	Angola	ABD	7	104	31
60	Albania	ACC	87	76	3
61	Guatemala	BBC	40	75	36
62	Oman	ACD	78	20	120
63	Cyprus	BCD	104	36	80
64	Korea (Rep.)	BCD	103	49	85
65	Philippines	BBC	39	93	54



Index	Country	Balance score	Energy security	Energy equity	Environmental sustainability
66	Kuwait	BCD	73	28	122
67	Israel	BCD	102	29	83
68	Estonia	BCD	65	51	117
69	Sri Lanka	BCC	72	80	40
70	Bulgaria	ACD	26	77	108
71	Malta	BCD	128	48	65
72	Georgia	ACD	106	66	22
73	Indonesia	ACD	17	83	104
74	Paraguay	ACD	84	99	13
75	Turkey	BCC	64	82	70
76	Egypt	BBC	47	59	84
77	Venezuela	BBC	41	55	82
78	China	ADD	18	101	126
79	South Africa	BCD	43	78	128
80	Congo (Dem. Rep.)	BBD	30	121	27
81	Azerbaijan	BCD	32	74	98
82	Cameroon	BBD	62	107	39
83	Montenegro	BCD	115	71	57
84	Nigeria	ACD	13	111	79
85	Armenia	CCC	95	69	73
86	Macedonia	BCD	89	50	106
87	Syria	BBD	52	52	113
88	Algeria	CCC	86	68	74
89	Thailand	CCD	91	88	101
90	Namibia	BCD	123	94	49
91	Iran	BCD	75	44	119
92	Swaziland	BCD	61	98	76
93	Côte d'Ivoire	BCD	36	108	68
94	Malawi	BCD	74	129	32
95	Mongolia	BDD	50	100	129
96	Jordan	BDD	119	63	107
97	Ukraine	BCD	59	73	114
98	Trinidad and Tobago	CCD	79	95	115
99	Botswana	BDD	126	97	62
100	Honduras	BCD	111	90	52
101	Vietnam	CDD	77	102	105
102	Ghana	CCD	85	105	77
103	Mozambique	CCD	67	124	66
104	Chad	BCD	83	123	50
105	Morocco	CCD	110	79	96
106	Serbia	CDD	101	65	118
107	Tajikistan	BCD	81	109	61
108	Kenya	BCD	88	114	63
109	Lebanon	CCD	127	87	89
110	Dominican Republic	BDD	114	106	55
111	Nepal	BDD	125	122	46
112	Ethiopia	BDD	97	119	47
113	Nicaragua	CCD	100	91	87
114	Pakistan	BDD	56	103	100
115	India	CDD	76	110	121
116	Tanzania	BDD	117	125	53
117	Libya	CCD	70	72	123
118	Cambodia	CDD	121	113	67
119	Mauritania	BDD	58	117	112
120	Zambia	BDD	108	120	64
121	Jamaica	CDD	116	81	110
122	Niger	CCD	80	127	91
123	Bangladesh	CDD	113	115	78
124	Madagascar	CDD	105	126	69
125	Moldova	CDD	122	89	109
126	Senegal	CDD	120	118	93
127	Yemen	CDD	94	112	111
128	Benin	DDD	129	116	103
129	Zimbabwe	DDD	112	128	127

**Figure A-9**  
**2012 Energy Trilemma Index ranking**

Source: WEC/Oliver Wyman, 2014

Index	Country			
		Energy security	Energy equity	Environmental sustainability
1	Switzerland	26	4	1
2	United Kingdom	3	5	20
3	Sweden	18	21	8
4	Austria	30	7	7
5	Denmark	5	34	19
6	Norway	44	10	6
7	New Zealand	19	18	36
8	Germany	24	13	31
9	France	41	8	9
10	Canada	2	2	66
11	Finland	25	20	49
12	Spain	31	24	23
13	Netherlands	48	22	39
14	Japan	49	9	29
15	Australia	14	3	99
16	United States	17	1	88
17	Qatar	7	11	94
18	Luxembourg	96	6	28
19	Argentina	11	23	38
20	Belgium	69	15	41
21	Ireland	85	28	15
22	Slovakia	20	40	46
23	Slovenia	57	36	37
24	Taiwan, China	67	17	63
25	Portugal	58	48	26
26	Colombia	6	86	4
27	Italy	76	29	22
28	Hungary	39	41	44
29	Panama	54	60	14
30	Croatia	59	38	21
31	Barbados	70	45	25
32	Iceland	98	12	40
33	Malaysia	22	42	85
34	Tunisia	15	55	59
35	Czech Republic	16	37	90
36	Lithuania	80	46	16
37	Costa Rica	77	47	2
38	Hong Kong, China	84	25	60
39	Uruguay	68	66	5
40	Ecuador	23	65	27
41	Peru	9	91	34
42	Latvia	78	54	18
43	Chile	61	50	64
44	Brazil	43	89	12
45	Singapore	123	43	48
46	Mexico	35	52	73
47	Albania	63	71	3
48	Bahrain	40	19	126
49	Saudi Arabia	38	14	124
50	Poland	34	44	93
51	El Salvador	71	67	11
52	Romania	4	59	92
53	United Arab Emirates	56	39	106
54	Korea (Rep.)	89	32	86
55	Greece	88	26	76
56	Mauritius	107	61	17
57	Kazakhstan	8	35	119
58	Russia	1	57	102
59	Cyprus	109	27	84
60	Bolivia	21	80	65
61	Kuwait	62	33	122
62	Gabon	46	97	10
63	Israel	100	30	83
64	Guatemala	51	72	35
65	Estonia	64	51	117







Index	Country	Energy security	Energy equity	Environmental sustainability
66	Bulgaria	28	74	107
67	Oman	97	16	121
68	Malta	126	58	62
69	Sri Lanka	72	82	45
70	Venezuela	29	53	79
71	Philippines	42	99	55
72	Angola	10	121	32
73	Egypt	52	56	81
74	Georgia	103	69	30
75	Cameroon	32	108	42
76	China	12	100	125
77	Iran	50	31	118
78	Vietnam	45	98	100
79	Azerbaijan	27	78	97
80	Trinidad and Tobago	74	49	116
81	Paraguay	95	96	13
82	Montenegro	114	77	43
83	Armenia	83	70	68
84	South Africa	55	75	129
85	Algeria	80	63	77
85	Indonesia	37	94	109
87	Turkey	91	81	72
88	Congo (Dem. Rep.)	47	124	24
89	Thailand	82	85	103
90	Nigeria	13	109	82
91	Côte d'Ivoire	36	111	61
92	Namibia	125	93	50
93	Jordan	108	62	110
94	Syria	33	87	116
95	Macedonia	99	64	105
96	Mozambique	66	120	56
97	Honduras	116	83	53
98	Botswana	121	96	69
99	Ukraine	60	73	114
100	Serbia	81	68	120
101	Malawi	92	129	33
102	Morocco	112	79	95
103	Mongolia	65	102	128
104	Ghana	90	106	75
105	Lebanon	122	84	87
106	Tajikistan	87	105	58
107	Swaziland	104	92	78
108	Nepal	118	122	47
109	Libya	53	90	113
110	Ethiopia	102	118	51
111	Dominican Republic	119	107	54
112	Cambodia	111	112	71
113	Kenya	93	114	74
114	Tanzania	117	123	57
115	Zambia	101	119	67
116	Jamaica	127	76	98
117	India	86	110	123
118	Nicaragua	105	101	89
119	Bangladesh	110	115	80
120	Mauritania	75	116	112
121	Pakistan	73	103	108
122	Madagascar	106	127	70
123	Yemen	94	104	101
124	Chad	124	126	52
125	Senegal	120	117	91
126	Moldova	128	88	111
127	Niger	115	128	96
128	Benin	129	113	104
129	Zimbabwe	113	125	127

Figure A-10

## 2014 mapping of the balance scores using the heat map system

Source: WEC/Oliver Wyman, 2014

					
Index	Country	Balance score	Energy security	Energy equity	Environmental sustainability
1	Switzerland	AAA	8.35	9.68	10.00
2	Sweden	AAA	8.51	8.59	9.60
3	Norway	AAB	6.56	8.90	9.68
4	United Kingdom	AAA	9.37	8.35	8.67
5	Denmark	AAB	9.60	6.40	9.37
6	Canada	AAB	10.00	9.92	5.70
7	Austria	AAB	6.64	9.29	9.45
8	Finland	ABB	8.04	8.82	7.18
9	France	AAB	6.87	9.21	9.29
10	New Zealand	AAB	8.82	7.89	6.79
11	Germany	BBB	7.96	6.79	7.96
12	United States	AAC	9.45	10.00	3.59
13	Australia	AAD	9.29	9.84	2.42
14	Netherlands	BBB	5.78	7.50	7.65
15	Spain	ABB	7.18	6.48	8.20
16	Colombia	AAC	9.68	5.15	9.76
17	Slovakia	ABB	8.90	7.18	7.42
18	Luxembourg	AAD	1.56	9.76	8.28
19	Costa Rica	ABB	6.09	5.70	9.92
20	Qatar	AAD	9.84	9.60	2.03
21	Belgium	ABB	5.00	7.81	7.57
22	Ireland	ABC	4.68	7.03	9.06
23	Japan	ABB	5.23	8.51	6.87
24	Slovenia	BBB	5.93	6.95	6.56
25	Portugal	ABB	5.93	5.00	8.35
26	Malaysia	ABC	7.89	8.43	3.51
27	Hong Kong, China	ABD	2.18	9.37	5.39
28	Czech Republic	ABC	9.14	7.10	3.28
29	Italy	ABC	4.60	6.32	8.43
30	Brazil	ABC	7.81	3.35	8.59
31	Iceland	ABC	2.73	8.67	7.26
32	Croatia	ABC	4.29	7.65	8.04
33	Hungary	BBB	6.71	5.93	7.34
34	Taiwan, China	ACC	4.21	8.98	3.35
35	United Arab Emirates	ABD	6.40	9.45	2.10
36	Ecuador	ABB	8.28	6.01	7.89
37	Lithuania	ABC	3.04	6.56	8.51
38	Mexico	BBC	7.73	6.71	4.29
39	Uruguay	ABC	2.96	6.87	9.53
40	Peru	ABC	8.67	2.50	7.10
41	Singapore	BBD	0.39	7.34	6.17
42	Poland	BBC	7.57	7.26	2.96
43	Latvia	ABD	2.57	5.46	8.98
44	Panama	ABC	3.35	6.17	8.75
45	Tunisia	BBB	7.26	5.54	5.62
46	Mauritius	ABD	1.71	5.39	8.90
47	Bahrain	ABD	6.95	9.06	0.23
48	Guatemala	BBC	7.65	4.37	7.81
49	Gabon	ABC	7.50	3.12	9.14
50	Russia	ABD	9.92	6.64	1.95
51	Greece	ABC	5.46	8.28	3.67
52	El Salvador	ABC	5.31	4.53	9.21
53	Chile	BCC	3.12	5.78	4.84
54	Romania	ACC	9.76	3.98	2.65
55	Korea (Rep.)	BCD	2.42	8.12	3.43
56	Kazakhstan	AAD	9.06	8.75	0.85
57	Albania	ACC	3.59	3.51	9.84
58	Philippines	BBC	7.42	2.81	6.09
59	Angola	ABD	8.12	2.26	8.12
60	Argentina	ABC	8.98	2.57	6.64
61	Barbados	BBD	0.93	7.42	6.95
62	Bolivia	ACC	9.53	3.20	4.60
63	Cyprus	BCD	1.79	7.57	4.06
64	Trinidad & Tobago	BBD	6.17	7.73	1.32
65	Malta	BCD	0.07	6.09	5.00





Index	Country	Balance score	Energy security	Energy equity	Environmental sustainability
66	Israel	BCD	1.95	7.96	3.12
67	Bulgaria	ACD	8.20	3.82	1.56
68	Saudi Arabia	ABD	4.76	9.53	0.31
69	Indonesia	ACD	8.75	5.07	1.79
70	Cameroon	BBD	7.10	1.40	7.73
71	Azerbaijan	ABD	8.43	5.62	2.34
72	Oman	ACD	2.50	9.14	0.39
73	Turkey	BCC	5.15	4.14	4.68
74	China	ACD	8.59	3.67	0.15
75	Estonia	BCD	4.53	4.76	1.09
76	Kuwait	BCD	3.90	8.04	0.62
77	Paraguay	ACD	3.75	2.03	8.82
78	Georgia	BCD	2.10	4.84	7.03
79	Algeria	BCC	3.82	6.25	3.98
80	Sri Lanka	BCC	4.06	3.59	6.25
81	Nigeria	ACD	9.21	1.64	3.75
82	Venezuela	BBC	5.70	5.23	4.37
83	South Africa	BCD	6.79	3.43	0.00
84	Armenia	CCC	2.89	4.92	4.21
85	Egypt	BBC	5.54	5.85	3.12
86	Côte d'Ivoire	BCD	7.34	1.48	4.92
87	Vietnam	BDD	7.03	2.34	2.18
88	Namibia	BCD	0.46	2.89	6.48
89	Iran	BCD	4.92	8.20	0.70
90	Thailand	CCD	2.65	4.06	1.71
91	Botswana	CDD	0.23	2.42	4.53
92	Swaziland	CCD	4.45	2.73	3.90
93	Mozambique	BCD	4.84	0.39	5.31
94	Ukraine	BCD	5.85	4.29	1.01
95	Montenegro	CCD	1.01	4.68	2.81
96	Ghana	CCD	3.98	1.79	4.14
97	Dominican Republic	BCD	1.40	3.28	5.85
98	Mongolia	BDD	6.25	2.65	0.07
99	Mauritania	BDD	6.32	1.09	2.73
100	Congo (Dem. Rep.)	BBD	6.48	0.23	5.54
101	Chad	BCD	3.43	0.62	6.32
102	Macedonia	CDD	2.03	4.21	1.40
103	Malawi	BCD	2.81	0.00	7.50
104	Kenya	BCD	3.51	1.17	5.15
105	Nicaragua	BDD	2.26	2.18	5.46
106	Tajikistan	BCD	3.67	1.71	5.93
107	Honduras	BDD	1.17	2.10	5.78
108	Jordan	BDD	1.32	5.31	1.17
109	Nepal	BDD	0.31	0.93	6.71
110	Niger	BCD	5.62	0.07	2.89
111	Morocco	CCD	0.85	4.45	2.57
112	Jamaica	CCD	0.62	3.90	3.04
113	Zambia	BDD	1.64	0.85	5.23
114	Libya	CCD	4.37	2.96	1.64
115	Ethiopia	BDD	2.34	0.78	6.40
116	Serbia	CDD	1.87	4.60	0.78
117	Cambodia	CDD	1.09	1.25	5.07
118	Pakistan	BDD	5.39	1.95	2.50
119	Syria	BCD	5.07	3.75	0.93
120	Madagascar	CCD	3.20	0.31	4.45
121	Tanzania	BDD	1.48	0.07	6.01
122	India	CDD	4.14	1.87	0.46
123	Lebanon	CDD	0.15	0.46	4.76
124	Moldova	CDD	0.78	3.04	1.25
125	Bangladesh	CDD	1.25	1.32	3.82
126	Yemen	CDD	3.28	1.56	1.48
127	Senegal	CDD	0.54	1.01	2.26
128	Benin	DDD	0.00	0.70	1.87
129	Zimbabwe	DDD	0.70	0.54	0.54

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