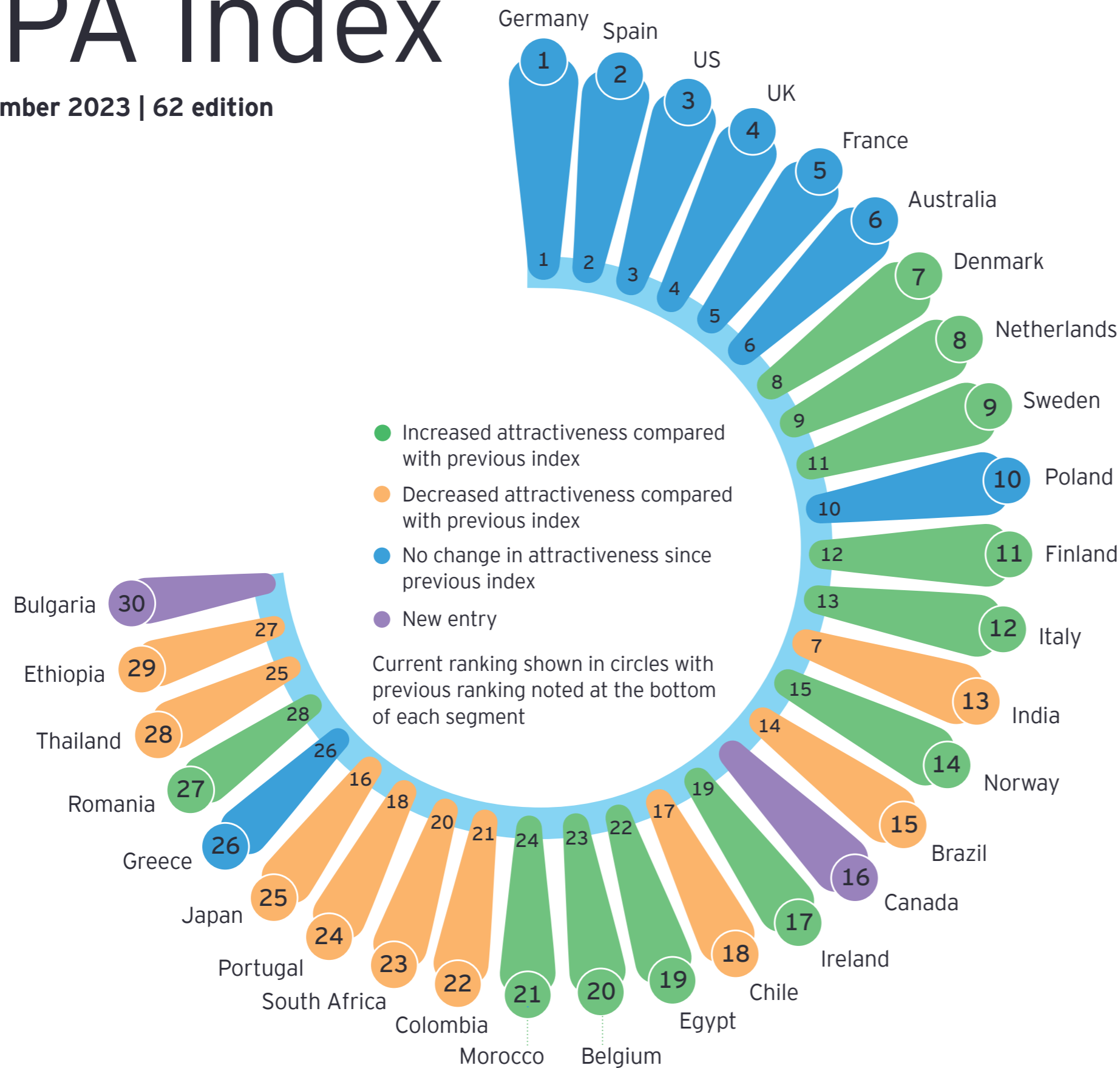


PPA Index

November 2023 | 62 edition



Spain

Although it was knocked off the top spot by Germany in June 2023, Spain continues to be a strong market for corporate PPAs, with more than 800MW in more than eight deals during Q3 2023.⁴ Spain also leads all markets (except the US) in terms of total capacity of corporate PPAs to date: an impressive 7.4GW.⁵ This huge supply of projects, 59% of which are solar, has led to bottlenecks in grid connection queues, however, and some summertime cannibalization of prices – showing the importance of negotiating liquidated damages for delay and fully understanding profile risk.

UK

Staying at number four in our index, the UK has experienced quite a shift in the PPA market in the past few months, because of some surprising results in the government's latest Contracts for Difference auction: No offshore wind projects bid in because recent increases in offshore costs made the low clearing price unviable, so 1.5GW of onshore wind, and 1.9MW of solar photovoltaic (PV), won awards instead. Consequently, a large number of onshore wind and solar projects were taken away from potential corporate PPAs, thinning liquidity in the market and placing some upward pressure on prices.

Sweden

Sweden has jumped up two ranks into the top 10, as it continues to see appetite from corporates in the region. Although predominantly a wind market, historically, 7% of Sweden's 4.2GW PPAs to date have been solar PV.⁶ This proportion is expected to rise because of the scarcity of solar-shaped generation in the Nordic mix and much higher prices in the sunnier southern grid regions of SE3, and especially SE4, compared with the windy north – SE1 and SE2 – with much lower prices.

Canada

Canada has entered the index for the first time as the number of corporate PPAs build in the Alberta market. There have been at least five deals in the past year covering 500MW, four from onshore wind projects and one from solar PV. Typical tenors are 15 years in length. It is hoped that other provinces may follow Alberta's direction in terms of opening up for corporate PPAs, further extending the growth across the rest of Canada.

See page 3 for PPA methodology.

PPA Index scores

| Ranking | Market | Previous ranking | Movement vs. previous | Normalized score (0-100) | PPA Index score | PPA market maturity | PPA future market score | PPA policy score | RECAI score |
|---------|--------------|------------------|-----------------------|--------------------------|-----------------|---------------------|-------------------------|------------------|-------------|
| 1 | Germany | 1 | ● | 100.0 | 25,458,114.4 | 74.4 | 88.2 | 54.3 | 71.4 |
| 2 | Spain | 2 | ● | 99.0 | 25,200,665.6 | 82.5 | 89.1 | 51.1 | 67.1 |
| 3 | US | 3 | ● | 90.8 | 23,107,989.4 | 100.0 | 55.1 | 56.7 | 73.9 |
| 4 | UK | 4 | ● | 82.3 | 20,946,282.6 | 73.4 | 82.2 | 50.8 | 68.3 |
| 5 | France | 5 | ● | 78.8 | 20,067,288.7 | 64.8 | 82.0 | 53.5 | 70.6 |
| 6 | Australia | 6 | ● | 66.4 | 16,908,887.9 | 76.2 | 54.2 | 58.4 | 70.2 |
| 7 | Denmark | 8 | ▲ | 63.6 | 16,183,026.8 | 58.1 | 82.3 | 51.1 | 66.3 |
| 8 | Netherlands | 9 | ▲ | 61.7 | 15,705,718.6 | 61.4 | 76.0 | 50.9 | 66.1 |
| 9 | Sweden | 11 | ▲ | 58.4 | 14,871,986.5 | 63.2 | 78.6 | 48.8 | 61.4 |
| 10 | Poland | 10 | ● | 56.6 | 14,412,940.2 | 64.1 | 64.7 | 55.7 | 62.4 |
| 11 | Finland | 12 | ▲ | 56.2 | 14,299,173.4 | 64.3 | 70.1 | 52.9 | 60.0 |
| 12 | Italy | 13 | ▲ | 56.1 | 14,272,693.3 | 54.0 | 82.9 | 50.4 | 63.2 |
| 13 | India | 7 | ▼ | 48.7 | 12,408,130.7 | 63.2 | 41.8 | 68.0 | 69.2 |
| 14 | Norway | 15 | ▲ | 42.5 | 10,810,453.7 | 57.6 | 65.0 | 49.6 | 58.2 |
| 15 | Brazil | 14 | ▼ | 34.5 | 8,789,615.4 | 62.5 | 54.3 | 42.5 | 60.8 |
| 16 | Canada | | | 28.2 | 7,181,813.4 | 43.1 | 50.2 | 51.0 | 65.1 |
| 17 | Ireland | 19 | ▲ | 26.2 | 6,657,809.5 | 51.0 | 35.7 | 57.5 | 63.4 |
| 18 | Chile | 17 | ▼ | 21.5 | 5,484,434.4 | 43.5 | 38.5 | 52.9 | 61.9 |
| 19 | Egypt | 22 | ▲ | 21.2 | 5,386,356.5 | 45.2 | 38.8 | 54.4 | 56.5 |
| 20 | Belgium | 23 | ▲ | 20.5 | 5,225,614.0 | 55.0 | 31.9 | 49.8 | 59.9 |
| 21 | Morocco | 24 | ▲ | 19.8 | 5,052,994.9 | 39.3 | 37.1 | 58.9 | 58.8 |
| 22 | Colombia | 21 | ▼ | 18.9 | 4,817,710.6 | 50.5 | 39.4 | 49.6 | 48.8 |
| 23 | South Africa | 20 | ▼ | 16.7 | 4,260,528.5 | 40.8 | 36.2 | 53.2 | 54.3 |
| 24 | Portugal | 18 | ▼ | 16.5 | 4,205,165.4 | 20.9 | 65.8 | 51.3 | 59.7 |
| 25 | Japan | 16 | ▼ | 16.4 | 4,167,144.7 | 26.3 | 47.5 | 52.7 | 63.3 |
| 26 | Greece | 26 | ● | 15.3 | 3,894,946.4 | 35.9 | 35.5 | 49.9 | 61.1 |
| 27 | Romania | 28 | ▲ | 14.5 | 3,688,908.0 | 35.8 | 36.0 | 53.0 | 53.9 |
| 28 | Thailand | 25 | ▼ | 12.8 | 3,270,352.6 | 40.3 | 24.3 | 61.6 | 54.2 |
| 29 | Ethiopia | 27 | ▼ | 12.4 | 3,155,146.3 | 36.1 | 34.6 | 58.6 | 43.1 |
| 30 | Bulgaria | | | 11.2 | 2,843,785.6 | 33.9 | 31.1 | 55.7 | 48.4 |

PPA Index methodology

By analyzing the same 100 markets as in the full RECAI database, the goal is to create a new ranking that focuses on the attractiveness of renewable power procurement — via offsite corporate PPAs — rather than the attractiveness of renewable project investment.

The final score for the top 30 markets is calculated from a weighted combination of 12 key parameters, which act as a proxy for corporate PPA potential. The PPA Index focuses on four pillars (three PPA-specific pillars together with a RECAI score pillar):

- ▶ **PPA market maturity** – this focuses on activities carried out within each market in the past decade. It concentrates on market maturity, looking at past PPA deal frequency and volume, as well as a quantitative analysis of more recent PPA deal growth.
- ▶ **PPA future market** – this forward-looking score assesses the forecast activity of each market. Forecast power capacity is a key driver of the magnitude of a market, so this has a significant weighting on the score as well as the wholesale power price relative to the levelized cost of energy (LCOE) or PPA price in each market. Forecast capacity installations and a weighted project pipeline score from RECAI are used. The Index has focused on wind and solar PPAs (together weighted at 93%) as these represent the vast majority of offsite corporate PPAs.
- ▶ **PPA policy score** – this focuses on the ease of operation in a given market. If a market is to have potential for corporate PPA growth, supporting government policy must be in place for efficient and large-scale expansion. This is considered in the core RECAI, but is also examined here, with a more nuanced focus on PPA supportive policy.
- ▶ **RECAI score** – the overall score yielded by RECAI is also factored in as one of the fundamental pillars, because it provides a strong overview of the existing and potential strength of a market's renewable energy landscape.

The PPA Index uses a multiplicative formula to prioritize well-rounded markets with strengths in all aspects of corporate PPA development and integration. For example, this will mean that markets with zero PPA deals to date will score zero overall and will not yet be included.

However, with strong weighting on forward-looking parameters, even markets with just a few deals to date could score highly if significant growth is expected in the corporate PPA market within the next five years – the horizon of RECAI.

The RECAI PPA Index score (which can be very large) has been normalized into a score from 0 to 100, to create a more manageable reference value. The leading market will score 100 – but this does not mean that the market is perfect for corporate PPAs. It means that, relatively speaking, it is the most attractive market for corporate PPAs across the coming five years.

Data sets are based on publicly available or purchased data, EY analysis or adjustments to third-party data. We are unable to publicly disclose the exact data sets or weightings used to produce the indices.

For more information on the services that EY teams provide to corporates around renewable energy strategies and PPAs, please refer to our website: www.ey.com/uk/ppa.

PPA market maturity

(Sources: Pexapark, DLA Piper and EY analysis)

1. Number of PPAs signed in the past five years
2. Total PPA volume in the past five years
3. Number of PPAs signed in the past year
4. Total PPA volume in the past year

PPA future market

(Sources: Wood Mackenzie, GlobalData, IRENA, IEA, Pexapark and EY analysis)

1. Pipeline of projects:
 - a. Forecast power capacity
 - b. Forecast installation growth
 - c. Project pipeline
2. Wholesale power pricing:
 - a. Wholesale power price relative to the historic LCOE
 - b. Wholesale power price relative to the PPA price

PPA policy score

(Sources: World Bank, GlobalData, IEA and EY analysis)

1. Ease of doing business index (World Bank)
2. Renewable energy imperative:
 - ▶ Renewable energy percentage of total generation
 - ▶ Percentage of population with access to electricity
 - ▶ Forecast energy consumption growth
 - ▶ CO₂ emissions

RECAI score

(Source: EY analysis)

1. Macro fundamentals
2. Energy imperative
3. Policy
4. Project delivery
5. Technology

Special thanks to Pexapark for providing access to their data.

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