

# Renewable energy discount rate survey results - 2018

A Grant Thornton and Clean Energy Pipeline initiative

January 2019



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# About this report

Grant Thornton, in collaboration with Clean Energy Pipeline, is pleased to present the 2018 Grant Thornton renewable energy discount rate survey report.

This report follows the 2017 renewable energy discount rate survey report which can be accessed here: <https://www.grantthornton.co.uk/insights/renewable-energy-discount-rate-survey/>

The discount rate (a proxy of cost of capital) for secondary market renewable energy M&A deals is a vitally important piece of information for investors. It is a key driver in determining the fair value or market price for projects. However, this data is extremely hard to gather so investors often have to rely solely on their own experience and advice from valuation experts in evaluating the cost of capital.

In this spirit, Grant Thornton launched a survey to gauge investors' perception of cost of capital. We asked one simple question: What most closely matches the discount rate you would expect to see for the following secondary market deals? We asked this with respect to levered and unlevered secondary market ground mount solar, onshore wind, offshore wind, biomass and hydro projects.

In addition, we have also asked about the level of premium for subsidy-free (100% merchant exposure) projects, terminal value assumptions, accounting practice for decommissioning costs in end of life forecasts, and percentage of capital expenditure (capex) considered as reasonable for a Maintenance Reserve Account (MRA).

The survey was distributed across thirteen major geographies: Australia, Brazil, Canada, France, Germany, India, Ireland Italy, Japan, Nordics, Spain, the UK, and the USA.

The results are shown in the following pages. Please note that cost of capital needs to be considered in the context of the various underlying assumptions such as power curves, inflation and project lives (amongst others), which will vary for all of the respondents.

## How to value renewable energy projects

Renewable energy represents a niche segment of the overall infrastructure asset class. These assets need to be approached slightly differently due to the varying risk return profiles associated with long-term incentive schemes, financial leverage, construction/technology risks and input/output price volatility.

Typically, when valuing renewable energy projects, an income approach is utilised. Sometimes, valuers use the capital asset pricing model ("CAPM") in determining the appropriate cost of equity and in turn the weighted average cost of capital ("WACC"). Because some of the risks associated with equities

are not present in renewable energy assets, the CAPM model may not always be the most appropriate method to rely on when deriving the appropriate discount rate.

As the pricing for renewable assets is competitive and unique to the specific aspects of the asset, the implied cost of capital (or IRR) from comparable transactions can be a strong indicator for valuing projects. Given this data is not readily available, Grant Thornton has surveyed investors to obtain the latest view on where cost of capital is across various technologies globally.

We hope you find this report insightful. If you have any questions or feedback, please contact:

### **Tomas Freyman**

Valuations Partner  
Grant Thornton UK LLP

**T** +44 (0) 20 7184 4336  
**E** tomas.freyman@uk.gt.com

### **Thai Tran**

Head of Data  
Clean Energy Pipeline

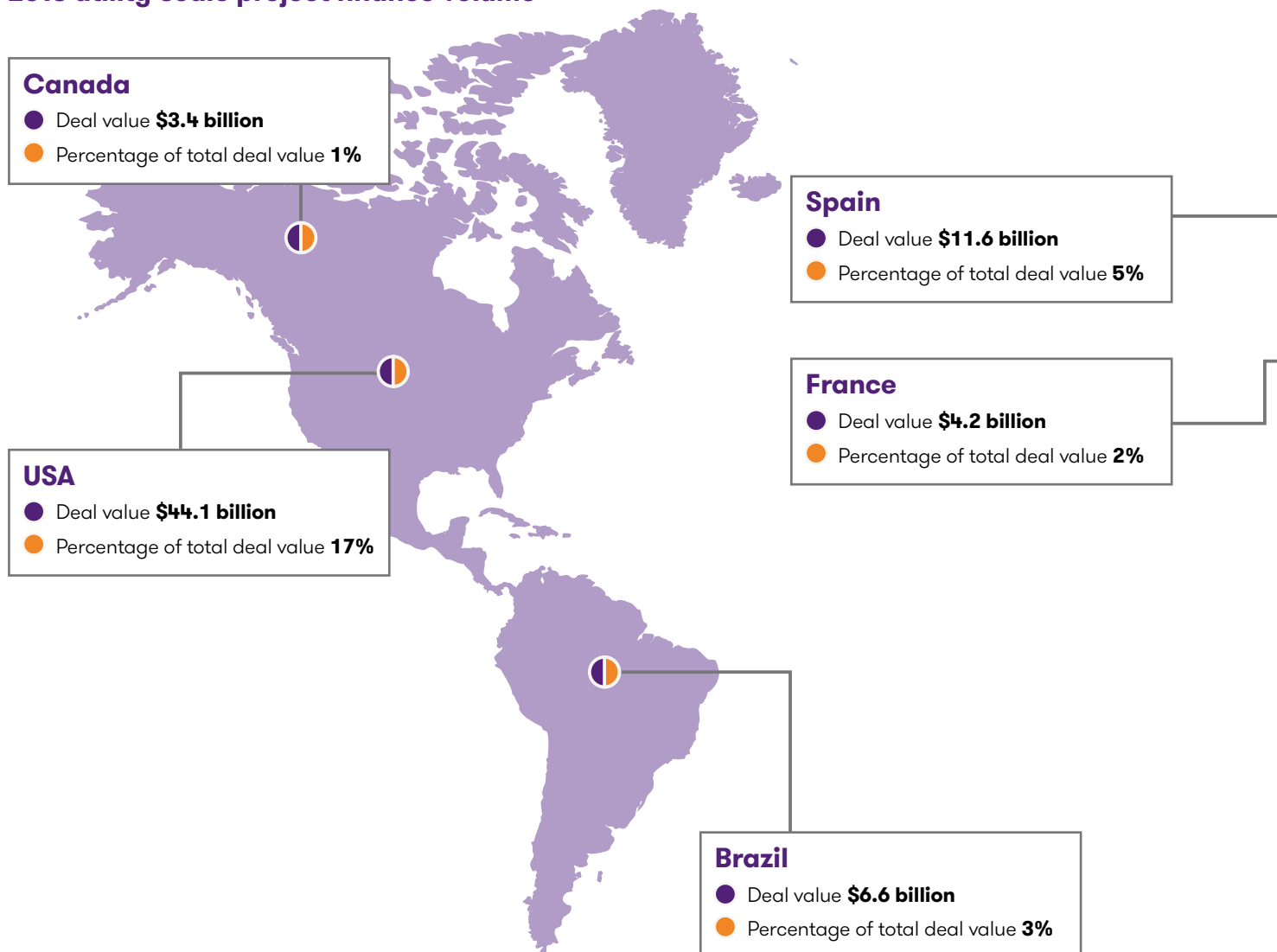
**T** +44 (0) 207 943 8114  
**E** thai.tran@cleanenergypipeline.com

# Global renewable energy sector overview

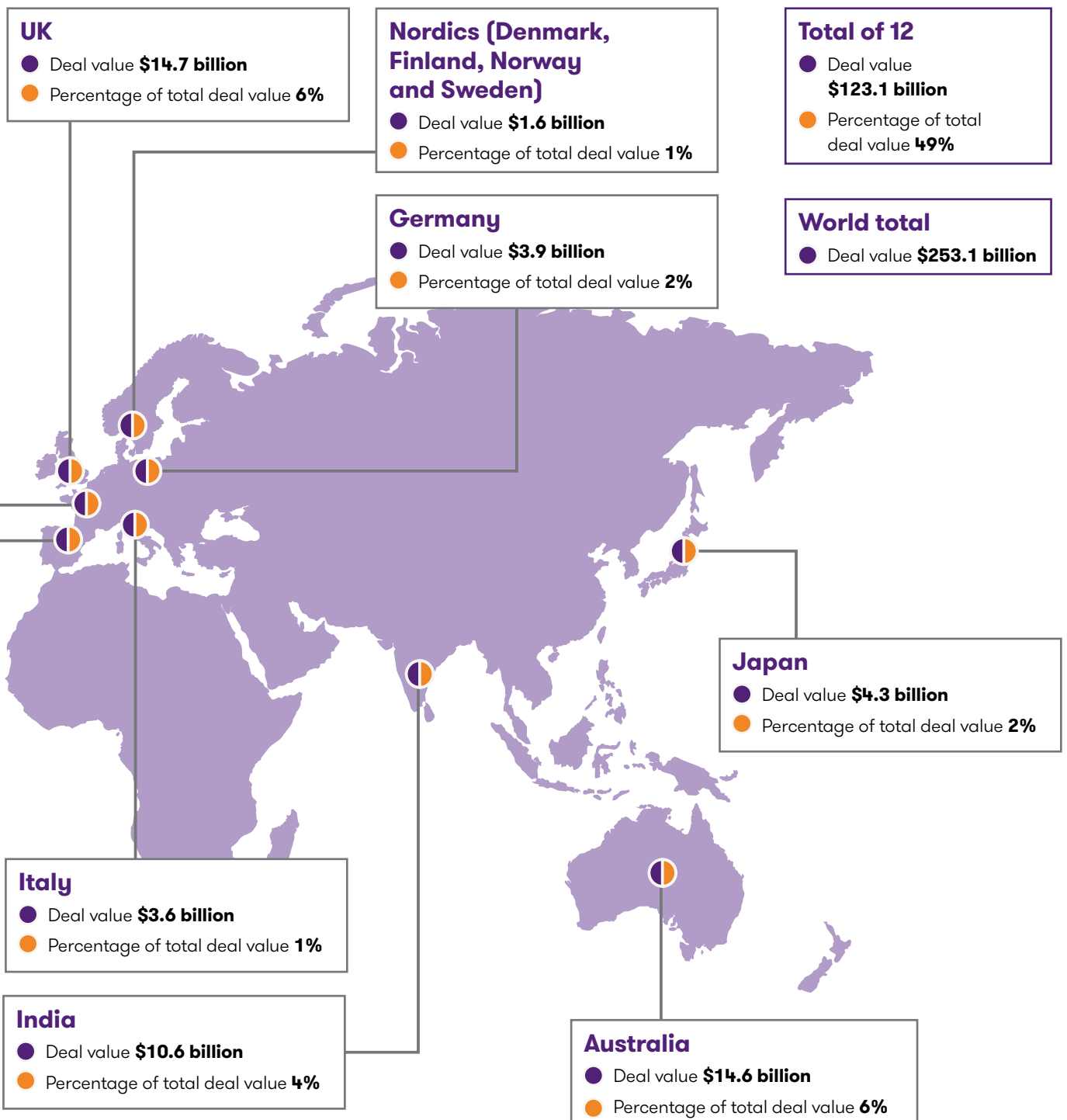
Renewable energy is at the forefront in the fight against climate change. This has translated into rapid renewable energy commercialisation and industry expansion, therefore leading to an increase in the number of deals in the sector.

Some \$253 billion has been invested in utility-scale renewable energy projects alone in 2018<sup>1</sup>, up by 10% from 2017, with wind and solar leading the industry in terms of megawatt (MW) deployment and deal value. The clean energy market is forecast to maintain its high growth in investments over the coming decades as project costs continue to decrease and grid parity is achieved in an increasing number of markets.

## 2018 utility-scale project finance volume



<sup>1</sup>Clean Energy Market Review 2018 - Clean Energy Pipeline (2019)



# Country profiles

## Australia

### Renewable energy regulatory landscape and incentives

Australia is one of the fastest growing renewable energy markets in the world with an estimated 10.4 GW of new solar and wind power to be brought online in 2018 and 2019<sup>2</sup>.

Australia has set its federal policy to meet its Renewable Energy Target (RET) for 33,000 GWh by 2020, and at the current rate, the country is not only on track to meet the target but also to reach 50% renewable electricity by 2025<sup>3</sup>.

Federal support for large-scale projects is being delivered through the provision of generation certificates, based on the amount of renewable electricity produced at a site. They can

be sold or traded to RET liable entities (generally electricity retailers), which must source large-scale generation certificates to meet their renewable energy obligations.

Although the Australian government hinted that it would scrap the RET after 2020<sup>4</sup> and there remains no clear set policy beyond the RET scheme, project developers believe that renewables could still be competitive with little or no financial government support from 2020 thanks to falling costs, rising electricity demand and the retirement of the existing coal plants.



<sup>2</sup> Latest renewable energy data shows Australia exceeding 2020 target – Energy Matters (2018)

<sup>3</sup> Latest renewable energy data shows Australia exceeding 2020 target – Energy Matters (2018)

<sup>4</sup> Australia decides against replacing RET – Clean Energy Pipeline (2018)

### Notable secondary M&A deals in the first nine months of 2018

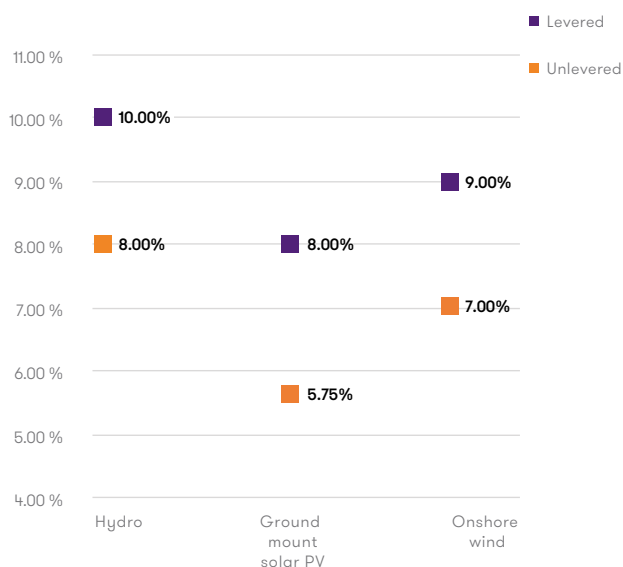
Date	Target	Acquirer	Target country/ Acquirer country	Deal value
September 2018	226 MW Murra Warra Phase 1 Wind Farm	Partners Group Holding	Australia/ Switzerland	A\$200 million (\$142 million)
June 2018	228MW Lal Lal Wind Farm	Northleaf Capital Partners Ltd., InfraRed Capital Partners Ltd.	Australia/ Canada	Undisclosed
February 2018	464 MW Limondale and Hillston Solar Plants	innogy SE	Australia/ Germany	Undisclosed
January 2018	1,140 MW Solar Portfolio - Gunning, Mumbil, Gunnedah, Suntop, Maryvale	Canadian Solar Inc.	Australia/ Canada	Undisclosed

### Discount rates

Please find beside the results of our survey for Australia.

We note the following observations from our survey respondent:

- 50% of respondents would apply less than a 200bps adjustment for subsidy free projects
- 60% of respondents assume salvage value will cover decommissioning costs versus using a decommissioning reserve
- 80% respondents consider an MRA of less than 25% capex to be sufficient



# Brazil

## Renewable energy regulatory landscape and incentives

The Brazilian renewable energy sector has been mainly driven by the tendering mechanism since 2011, resulting in an increasing share of wind, biomass and solar in the energy mix. Brazil added more than 2 GW of wind capacity in 2017 alone and ranks 8th in the Global Wind Energy Council's ranking of countries with the largest cumulative capacity at the end of 2017<sup>5</sup>. Wind power is expected to overtake biomass to become Brazil's largest non-hydro source of energy from 2019.

According to the ten-year Energy Plan 2026 (PDE 2026), the Brazilian government plans to increase its installed wind power capacity to 29 GW and solar capacity to 13 GW by 2026<sup>6</sup>. Competitive auctioning systems, which have drawn significant interest and bids from international investors such as Actis, Brookfield Energy, Enel Green Power, and Engie are expected to continue to be the key mechanism to drive investments in the renewable energy sector.



<sup>5</sup> From China to Brazil, these are the world titans of wind power – CNBC (2018)

<sup>6</sup> Brazil Clean Energy Market Review – Clean Energy Pipeline (2018)



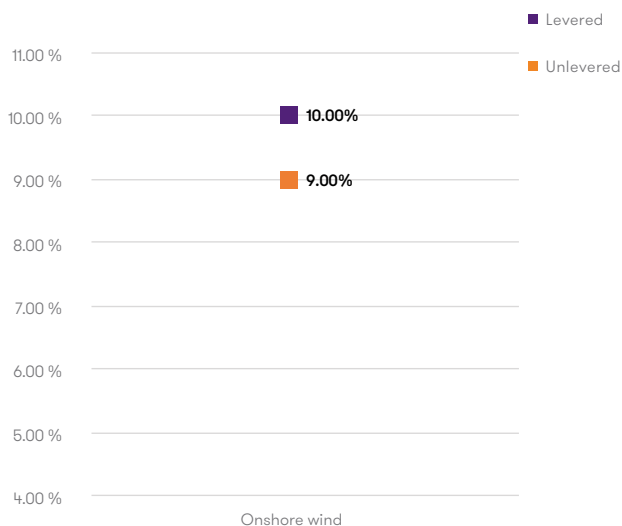
### Notable secondary M&A deals in the first nine months of 2018

Date	Target	Acquirer	Target country/ Acquirer country	Deal value
September 2018	197 MW Wind Portfolio in North East Brazil	Echoenergia e Participações S.A	Brazil/Brazil	Undisclosed
August 2018	321MW Pirapora Solar Complex	Omega Geracao	Brazil/Brazil	BRL 1,100 million (\$284 million)
May 2018	353 MW Wind Portfolio	Echoenergia e Participações S.A	Brazil/Brazil	Undisclosed
February 2018	400 MW Alto Sertao III Wind Complex	Brookfield Renewable Energy Partners LP	Brazil/Canada	BRL 650 million (\$200 million)

### Discount rates

Please find beside the results of our survey for Brazil.

It should be noted that we have only included results for which we have received numerous responses.



# Canada

## Renewable energy regulatory landscape and incentives

Canadian Regulatory Targets or Renewable Portfolio Standards (RPS) mandate that a certain portion of electricity should be generated from renewables by a certain date. The regulatory environment for power generation is centred at the provincial level, which has full authority over local electrical system regulations, policies, and enforcement. All provinces in Canada aim to reduce existing coal-based generation, replacing it with gas and renewable energy.

Power Purchase Agreements (PPAs) underpin the construction of most renewable projects in Canada. Contracts can be awarded to investors through different mechanisms which vary in terms of objectives, level of support, and overall design; below are the four main mechanisms adopted by many Canadian jurisdictions:

- **Requests for Proposals (RFPs)** specifically for renewables power projects with specified capacity targets. RFPs often favour major developers in the market who can meet stringent requirements.
- **Feed-In Tariffs (FITs)** offer standardised long-term contracts and administratively set payments, often specific to a particular technology. Standard terms make it easier for small projects and new players in the market to qualify.
- **Standing Offer Programs (SOPs)** allow investors to apply at any time the program is in effect and provide guaranteed payments, however in contrast to FITs, these are typically the same for all renewable energy technologies.
- **Contracts for Difference (CfDs)** contracts in which the sellers and buyers agree to a fixed price, but the producer sells electricity in an open market and receives whatever price the market is offering. Subsequently, payment is made by either party to the contract to compensate for differences between the fixed price and the market price.

The Canadian government is supporting other mechanisms to support the growth of renewables from tradeable Renewable Energy Credits (RECs), to cost reduction policies. These include tax breaks and government loan guarantees, aiming to reduce lender risk and lower project finance costs.

This regulatory landscape has helped Canada rank 4th in the world in renewable power generation and 2nd in the world in hydroelectric generation, which is the dominant source of electricity in the country and accounts for over 60% of installed capacity and generation.

Despite impressive growth in wind and solar capacity in the last decade, non-hydro renewables account for only 5% of total generation capacity in Canada<sup>7</sup>. Also, new capacity additions in Canada have been limited as a result of low growth in electricity demand and the long operating life of existing facilities. Cost concerns and local opposition have also limited growth opportunities.

<sup>7</sup> Canada - Power Generation and Renewable Energy - International Trade Administration, U.S. Department of Commerce (2018)

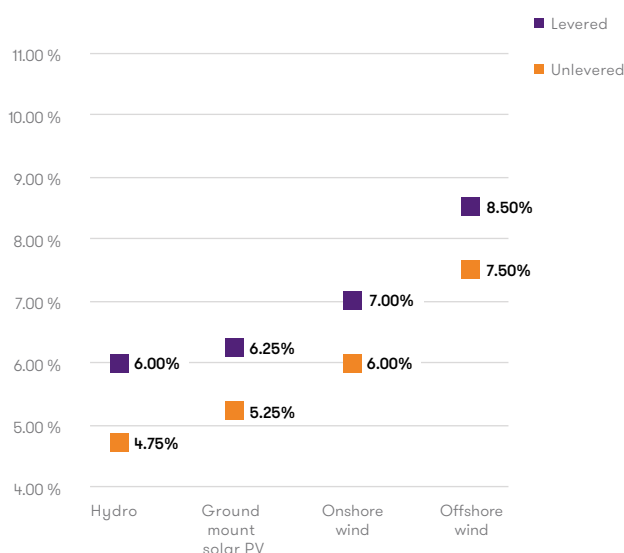
### Notable secondary M&A deals in the first nine months of 2018

Date	Target	Acquirer	Target country/ Acquirer country	Deal value
September 2018	201MW MRC d'Avignon and MRC des Appalaches Wind Farms	Borex Inc.	Canada/ Canada	C\$215 million (\$165 million)
August 2018	590 MW Wind Portfolio	Innergex Renewable Energy Inc.	Canada/ Canada	C\$630 million (\$483 million)
June 2018	277 MW Hydro Portfolio	Axium Infrastructure, Manulife	Canada/ Canada	C\$922 million (\$700 million)
May 2018	1,400 MW Wind & Solar Portfolio	Canada Pension Plan Investment Board	Canada and USA/ Canada	C\$1,750 million (\$1,360 million)
April 2018	396 MW Wind & Solar Portfolio	Canada Pension Plan Investment Board	Canada/ Canada	C\$741 million (\$582 million)

### Discount rate results

Please find beside the results of our survey for Canada<sup>8</sup>.

Anecdotally, we understand market participants are observing compression in yields across the renewable energy sector in Canada though this is yet to be seen in survey responses.



<sup>8</sup> Figures based on 2017 responses

# France

## Renewable energy regulatory landscape and incentives

French President Emmanuel Macron announced in October 2018 that his government would aim to close 14 of its 58 nuclear power plants by 2035, thereby fulfilling a pledge to lower France's dependency on nuclear energy from 75% to 50% by 2025.

Reducing the country's emissions and nuclear reliance would require an estimated 70% increase in renewable generation capacity by 2030, equivalent to approximately €45 billion of new investment into the sector.

Achieving such a feat would therefore require €10 billion of additional government subsidies<sup>9</sup>.

Incentives for renewables in France have shifted from the current 20-year (15-year for onshore wind) feed-in tariff scheme to a market premium system via a competitive bidding process. The tender regime was launched in 2016 to support the deployment of 3 GW of new renewables capacity over a three-year period.

The solar sector is expected to be the biggest beneficiary, with capacity levels estimated to reach between 18 GW and 20 GW by 2023<sup>10</sup>.

Four tenders for solar PV have been launched since 2016 and have brought in over €2 billion of investments. France's Ministry

of Ecological and Solidarity Transition also said it would seek bids for 850 MW of new solar generation at each of the final two rounds of its solar auction programme.

In May 2017, the French Government confirmed a tendering system for up to 3GW of onshore wind over the proceeding three years through six bidding rounds, each calling for about 500 MW of capacity. In the first round, a combined capacity of 508 MW were awarded. The second round, which was significantly undersubscribed due to delays in the permit process, only awarded 118 MW of capacity to four bidders.

A competitive auction system is also being used to fulfil the government's installation target for 3 GW of free-standing offshore wind energy by 2023<sup>11</sup>. Two completed tenders in 2012 and 2013 resulted in the award of six offshore wind farm projects to three consortia, with an aggregate capacity of 2.9 GW located across six sites along the Atlantic coastline.

In November 2018, a third tender was launched for up to 500 MW of offshore wind capacity off the coast of Dunkirk in northern France, with plans to announce the winner in mid-2019.

<sup>9</sup> French turn on nuclear opens €45 billion renewables investment opportunity – PV Magazine (2018)

<sup>10</sup> France to install 20 GW by 2023 – Solar Power Europe (2016)

<sup>11</sup> France Pre-Selects 10 Dunkerque Offshore Wind Bidders – Offshore Wind (2017)

### Notable secondary M&A deals in the first nine months of 2018

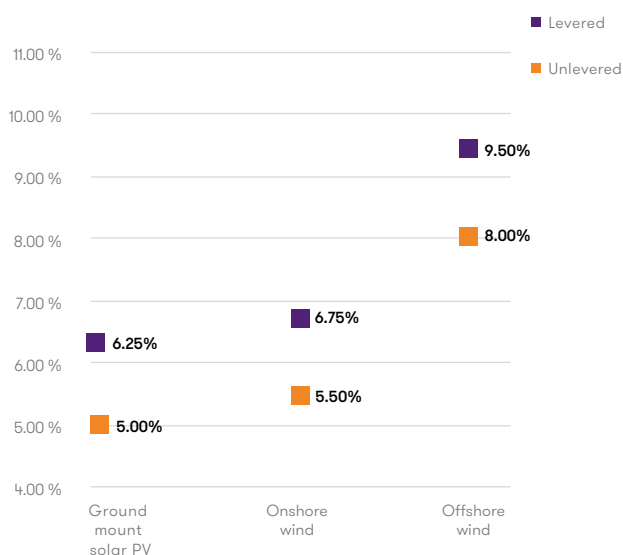
Date	Target	Acquirer	Target country/ Acquirer country	Deal value
September 2018	55MW Guiana Solar and Energy Storage Plant	Meridiam	France/ France	Undisclosed
June 2018	30 MW Rosieres and Montigny Wind Farms	The Renewables Infrastructure Group	France/UK	€28 million (\$32.8 million)
May 2018	60 MW Le Douiche Fins and Le Douiche Heudicourt Wind Farms	Mirova (Eurofideme), Rive Private Investment, Mirova 3 Fund	France/ France	Undisclosed
April 2018	26 MW Vallee de Torfou and Melier Wind Farms	ERG SpA	France/Italy	€57 million (\$70 million)
January 2018	21 MW Longeves and Riaucourt Wind Farms	Quaero Capital	France/ Switzerland	Undisclosed

### Discount rate results

Please find beside the results of our survey for France.

We note the following observations from our survey respondents:

- 89% of respondents would apply less than 200+bps adjustments for subsidy free projects with the largest proportion of respondents considering no premium for 100% merchant risk with 23% of the responses
- 60% of respondents assume salvage value will cover decommissioning costs versus using a decommissioning reserve
- 89% respondents consider an MRA of less than 25% capex to be sufficient



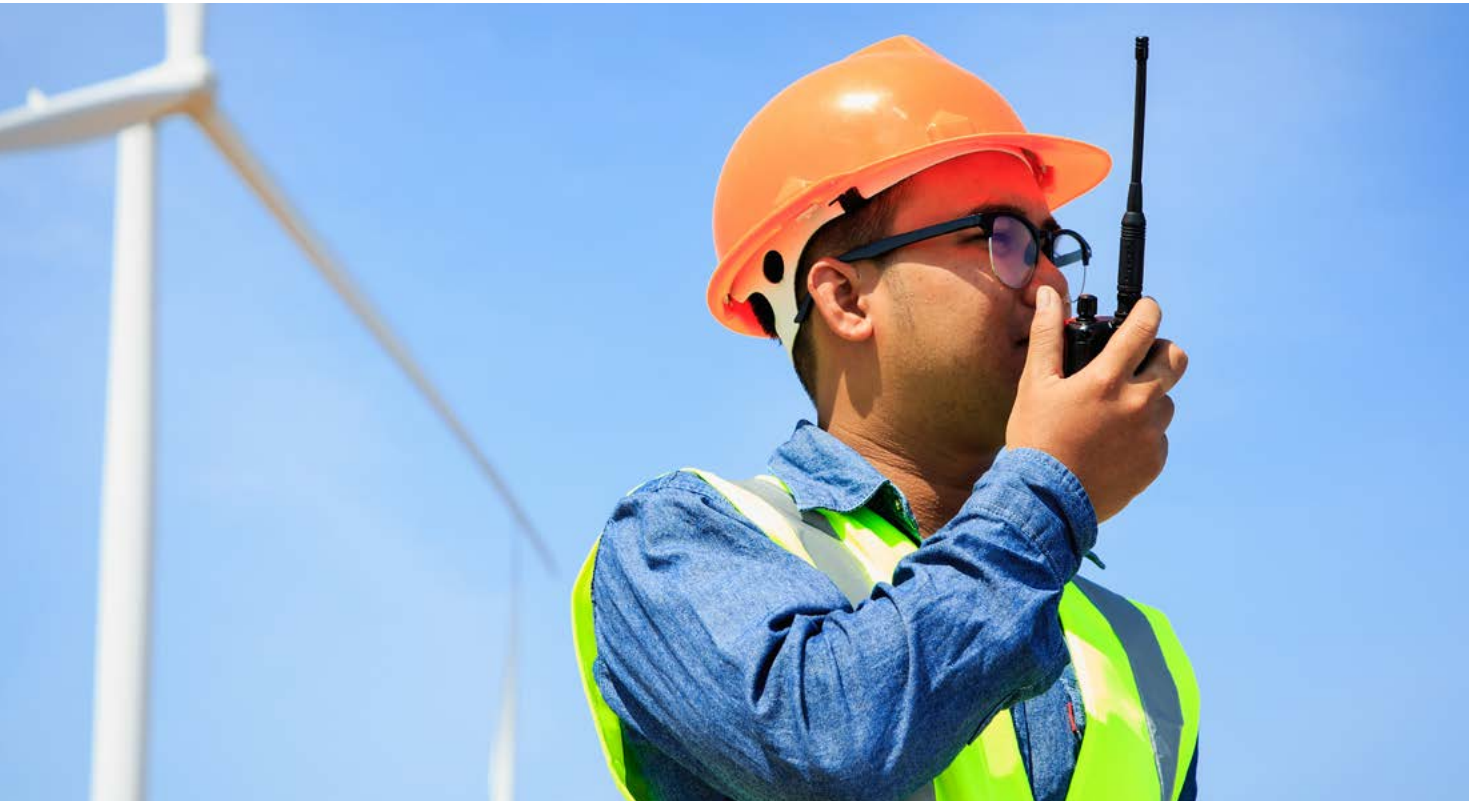
## Germany

### Renewable energy regulatory landscape and incentives

Germany reformed its Renewable Energy Act (EEG) in 2016, introducing a new system of auctions for clean energy project development to monitor new renewables capacity being added each year. The new competitive tender model replaces a highly successful feed-in tariff scheme that has contributed significantly to Germany's renewable energy sector build-out since 1990. To receive the market premium, which is still paid out for 20 years, project developers must bid and compete in technology-specific auctions for certain tender volumes.

The current cap planned for each of onshore wind and solar is 1 GW in 2019, increasing to 1.4 GW in 2020 and subsequently 1.6 GW in 2021, following a landmark agreement reached by the German coalition government in November 2018<sup>12</sup>.

At that time, the coalition government also pledged to add a further 4 GW of onshore wind and 4 GW of solar via "special auctions" over the next three years to respond to concerns that the annual cap for wind and solar were still blocking the growth of the renewable energy sector.



<sup>12</sup> Government coalition reaches deal to boost renewable energy capacity – Clean Energy Wire (2018)

<sup>14</sup> Renewable energy discount rate survey results – 2018

### Notable secondary M&A deals in the first nine months of 2018

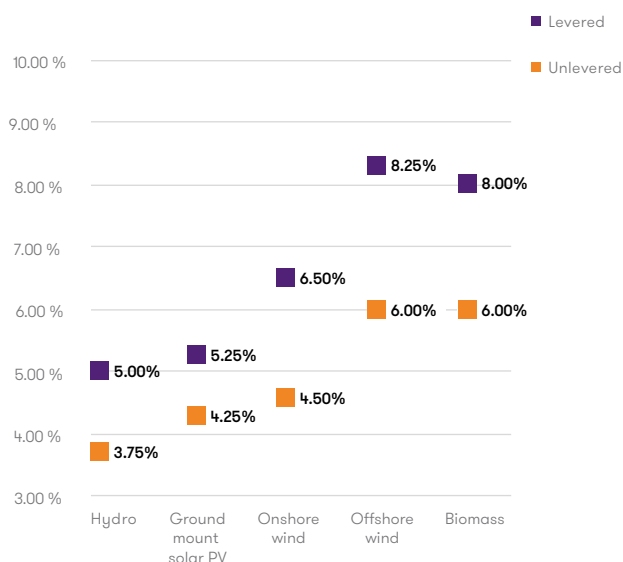
Date	Target	Acquirer	Target country/ Acquirer country	Deal value
September 2018	53MW Bavaria Wind Farms	IST3 Investment Foundation.	Germany/ Switzerland	Undisclosed
July 2018	18.15MW Amöneburg and Zellertal Wind Farms	Trianel	Germany/ Germany	Undisclosed
May 2018	610 MW Hohe See and Hohe See Extension Wind Farms	Canada Pension Plan Investment Board	Germany/ Canada	C\$1,750 million (\$1,363 million)
May 2018	247MW Arcadis Ost 1 Wind Farm	Parkwind	Germany/ Belgium	Undisclosed
January 2018	75.9MW Wind Portfolop	Undisclosed	Germany/ Undisclosed	Undisclosed

### Discount rate results

Please find beside the results of our survey for Germany.

We note the following observations from our survey respondents:

- 37% of respondents would apply no premium adjustment for subsidy free projects and 37% of the respondents would apply a premium of 50bps – 100bps
- 42% of respondents consider an MRA of less than 25% capex to be reasonable, 58% respondents consider an MRA of between 25% and 50% capex to be reasonable



# India

## Renewable energy regulatory landscape and incentives

The Indian Government has set an ambitious goal of reaching 175 GW of installed clean energy capacity by March 2022. Roughly 100 GW of that total is expected to come from solar power<sup>13</sup>. By June 2018, 71 GW of India's installed generating capacity came from renewable energy sources. The amount of clean energy capacity that India has auctioned has also increased by 68% since 2017. Additionally, around \$7.4 billion of clean energy investments, mostly for solar projects, were recorded in the first half of 2018<sup>14</sup>.

Renewable energy installations surpassed those by coal power plants for the first time in 2017. But India is still reliant on the coal power sector. The country still depends on the coal for roughly 75% of its energy requirements, though new coal-fired capacity fell to 4 GW in 2017, from 17 GW per year between 2012 and 2016<sup>15</sup>.

India has also witnessed increased competition in its solar power tenders. However, successful bidders are at risk to sudden adverse market conditions changes, such as an unexpected increase in project costs. Regulatory risk arising from the sudden announcement of import tariffs on PV modules plus the insolvency of off-takers have caused solar project economics to diverge sharply from developer expectations. This has resulted in a sharp decline in new solar capacity in 2018.



<sup>13</sup> A target of installing 175 GW of renewable energy capacity by the year 2022 has been set - Ministry of New and Renewable Energy (2018)

<sup>14</sup> Global clean energy market review - H1.2018 - Clean Energy Pipeline (2018)

<sup>15</sup> India is now a world leader in renewable energy - Quartz India (2018)

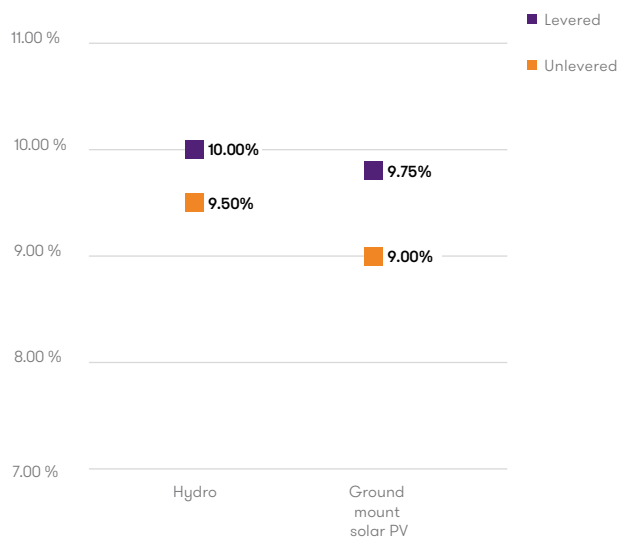


### Notable secondary M&A deals in the first nine months of 2018

Date	Target	Acquirer	Target country/ Acquirer country	Deal value
September 2018	70 MW Dhule Solar Portfolio	CLP Holdings Ltd.	India/China	Undisclosed
June 2018	185 MW Fortum Solar Portfolio	UK Climate Investments, Elite Alfred Berg	India/UK	€150 million (\$177 million)
May 2018	685 MW Wind and Solar Portfolio	ReNew Power Ventures Pvt. Ltd.	India/India	Undisclosed
February 2018	40 MW Malwa Solar Plant	IDFC Private Equity Co. Ltd	India/India	Undisclosed

### Discount rate results

Please find beside the results of our survey for India.



## Ireland

### Renewable energy regulatory landscape and incentives

At present, Ireland has a 2020 target to reach 40% renewable electricity contribution to its total power mix, and it is increasingly likely that the country will fall short of this target<sup>16</sup>. It therefore comes as no surprise that the Irish Government responded to this challenge by introducing a new regime to support renewable energy deployment.

In July 2018, the long-awaited Renewable Electricity Support Scheme (RESS) was finally approved to facilitate wider public and community participation in the development of utility-scale renewable energy projects.

The new competitive bidding regime also marks a change from the island nation's feed-in tariff scheme, which provided developers with a minimum sale price for the electricity generated at their assets for a 15-year period.

RESS auctions will be designed to hit targets set out in the country's draft National Energy and Climate Plan (NECP), which is yet to be published by the time of this report publication and is expected to aim for 55% renewable electricity supply by 2030. The auctions will occur at 'frequent intervals', allowing the country to gain from falling technology costs, with the first to take place in 2019<sup>17</sup>.



<sup>16</sup> Group calls for 70% target for renewable electricity by 2030 – The Irish Times (2018)

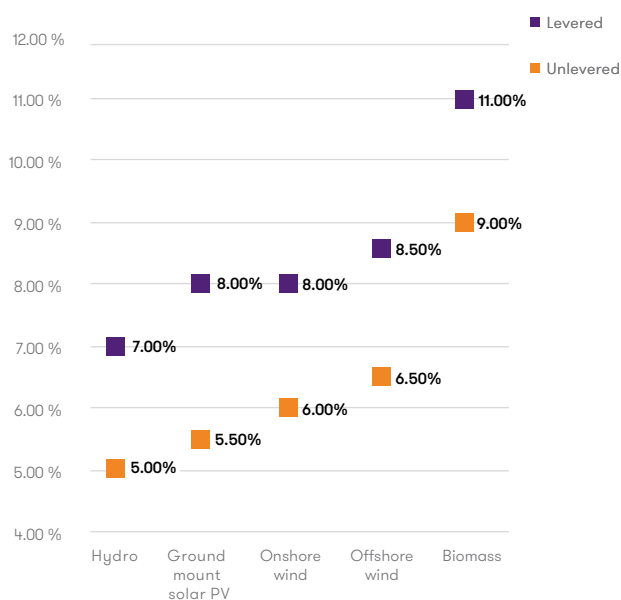
<sup>17</sup> Ireland approved new renewable energy auction regime – Clean Energy Pipeline (2018)

### Notable secondary M&A deals in the first nine months of 2018

Date	Target	Acquirer	Target country/ Acquirer country	Deal value
September 2018	238 MW Wind Portfolio	Greencoat Renewables PLC	Ireland/Ireland	€136 million (\$158 million)
April 2018	750MW North Irish Sea Array Wind Farm	Element Power	Ireland/USA	Undisclosed
April 2018	28 MW Aeolus Wind Farm	NTR plc	Ireland/Ireland	Undisclosed
March 2018	104 MW Wind Portfolio	Undisclosed	Ireland/ Undisclosed	Undisclosed
January 2018	55 MW Clahane I & II Wind Complex	TRIG Investments	Ireland/ Netherlands	€72 million (\$88 million)

### Discount rate results

Please find beside the results of our survey for Ireland.



# Italy

## Renewable energy regulatory landscape and incentives

By the end of 2015, Italy had already surpassed its 2020 target of 17% renewable electricity in its total power mix and in June 2018, the country joined hands with other nations to support a binding renewables target of 35% by 2030 across the EU. According to industry forecasts, the amount of installed wind and solar capacity in Italy is expected to reach some 63 GW by 2030 from around 35 GW at the end of 2017<sup>18</sup>.

Italy has also shifted towards a competitive bidding regime, aiming to contract around 4.8 GW of renewable energy capacity between January 2019 and January 2021 through

seven wind-solar auctions specifically for 1+ MW projects. Regardless of the technology, projects that are linked with electric vehicle charging stations will be prioritised. The first two tenders will each assign around 500 MW of capacity, with the third to fifth seeing around 700 MW each and the last two contracting 800 MW each. The first 500 MW has been scheduled to take place in January 2019<sup>19</sup>.

The new auction scheme is expected to revive the utility scale solar sector in Italy, which has suffered from the end of the Conto Energia FIT schemes since 2011.



<sup>18</sup> Wind and solar 'set to soar' in Italy – ReNews (2018)

<sup>19</sup> Italy to hold first 500 MW wind-solar auction in January – PV Magazine (2018)

### Notable secondary M&A deals in the first nine months of 2018

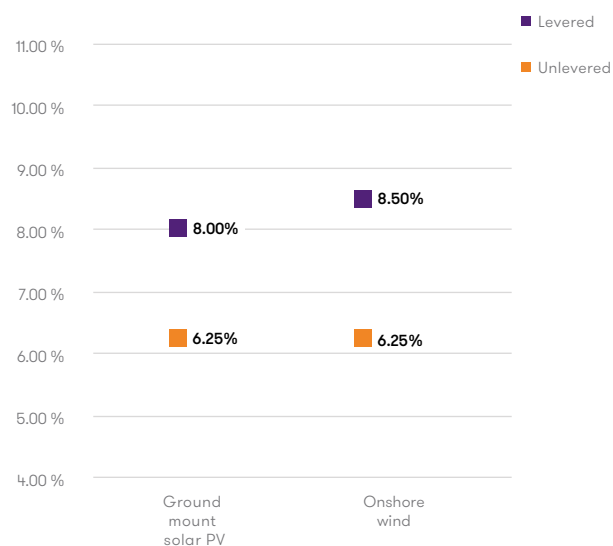
Date	Target	Acquirer	Target country/ Acquirer country	Deal value
August 2018	65 MW Contour Global Solar Portfolio	Credit Suisse	Italy/ Switzerland	Undisclosed
June 2018	108 MW Enel Biomass Portfolio	F2i Fondi Italiani per le Infrastrutture	Italy/Italy	€136 million (\$158 million)
March 2018	51.2 MW Tages Helios Solar Plant	Tages Group	Italy/Italy	Undisclosed
January 2018	41.7 MW Lacedonia Wind Farm	Nisida	Italy/Italy	Undisclosed

### Discount rate results

Please find beside the results of our survey for Italy.

We note the following observations from our survey respondents:

- 50% of respondents use one consultant's forecasts when estimating power prices, 25% use a combination



## Japan

### Renewable energy regulatory landscape and incentives

According to the official statistics, renewable energy currently accounts for almost 15% of Japan's energy mix but is dwarfed by coal at 30% and liquefied natural gas at almost 40%<sup>20</sup>. Renewables, including solar and hydropower, are projected to make up between 22% and 24% of the energy mix in 2030, according to an official blueprint released in 2015. That compares with 26% for coal and 27% for liquefied natural gas.

In the aftermath of the Fukushima nuclear disaster, Japan was under pressure to increase the share of renewable energy in its energy mix through private investments in the sector. The strategy helped fuel rapid growth in the solar sector between 2013 and 2017.

The growth was mainly driven by the attractive FiT system that was introduced in 2012. Credit rating firm Fitch expects another 17 GW worth of solar capacity to be brought online between 2018 and the end of 2020 thanks to a sizeable project backlog stemming from the attractive FiT.

However, the longterm outlook may slow down in the wake of the country's transition to competitive auctions for utility-scale solar power capacity procurement in 2017 and reductions of FiT. Such transitions come as the Japanese government begins to prioritize reducing retail electricity prices, rather than simply prioritising solar growth. Unfortunately, both of the competitive auctions held in 2017 and 2018 were less than inspiring. Contracts were awarded for only 141 MW out of the 500 MW put up for offer in its maiden solar tender in 2017, while the second round failed to attract any successful bidders, leaving the transition trading water for the time being<sup>21</sup>.



<sup>20</sup> Japan's renewable energy puzzle: solar push threatens environment - The Guardian (2018)

<sup>21</sup> What are the ten biggest clean energy project finance markets in 2018? - Clean Energy Pipeline (2018)

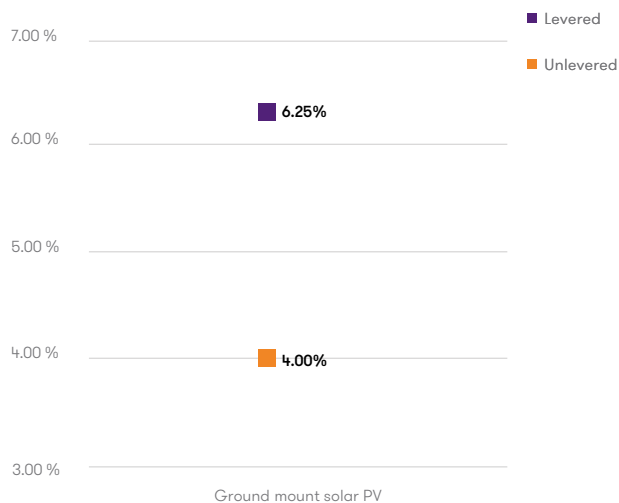
### Notable secondary M&A deals in the first nine months of 2018

Date	Target	Acquirer	Target country/ Acquirer country	Deal value
July 2018	187 MW Solar Portfolio	A consortium of unnamed Japanese investors	Japan/Japan	\$700 million
February 2018	206 MW Wind and Solar Portfolio	Pattern Energy Group Inc.	Japan/USA	\$325 million
January 2018	610 MW Japan Solar LP Portfolio	Global Infrastructure Partners	Japan/USA	Undisclosed
January 2018	100 MW Solar Portfolio (five plants)	Pacifico Energy	Japan/Japan	Undisclosed

### Discount rate results

Please find beside the results of our survey for Japan.

It should be noted that we have only included results for which we have received numerous responses.



## Nordics

### Renewable energy regulatory landscape and incentives

The Nordics – defined as Denmark, Finland, Norway and Sweden – is at the frontier of renewable energy generation, having built up a reputation over recent years for harbouring very favourable project development market conditions. As such, some 75% of the total primary energy supply in the Nordic region now comes from renewable sources, including hydro power. The share is expected to rise to nearly 80% by 2040, with hydro remaining the dominant source of energy<sup>22</sup>. Each country has a differing policy to incentivise new clean energy generation.

Norway, where 99% of electricity production comes from hydro power, promotes renewable energy through a quota system including a certificate trading scheme. Each megawatt-hour produced from approved sources receives a tradeable certificate. Utilities are obliged to buy permits every year to match their sales of electricity. In October 2018, the Norwegian government announced further funding in the form of grants towards renewable energy from NOK 570 million in 2018 to more than NOK 1 billion in 2019.

Similar to Norway, Sweden promotes renewable energy through a quota system that is based on a certificate trading system.

Tax exemptions and a subsidy scheme have also played a significant role in driving investors towards the renewables sector, especially for onshore wind. Sweden is now on track to reach its 2030 target of 18 TWh of renewable electricity generation by the end of 2018<sup>23</sup>.

In Denmark, electricity generation from renewable sources is primarily promoted through a premium tariff and net-metering. The premium tariff for offshore wind farms is awarded through tenders while renewable energy is given priority over conventional sources when brought to the grid. At least 2.4 GW of offshore wind capacity via three offshore wind projects has been scheduled by 2030 and a technology neutral tendering model is being adopted to ensure competitive energy prices.

Finland has witnessed significant policy changes over the past few years. In November 2016, the Finnish Government announced the National Energy and Climate Strategy for 2030, which aims to scrap the current premium tariff system for onshore wind in favour of a tendering system. The strategy has also set a target of 50% renewable energy consumption by 2030 to make way for coal being phased out<sup>24</sup>.



<sup>22</sup> Beyond the Tipping Point – Bloomberg (2017)

<sup>23</sup> Sweden to reach its 2030 renewable energy target this year – World Economic Forum (2018)

<sup>24</sup> Strategy outlines energy and climate actions to 2030 and beyond - Ministry of Economic Affairs and Employment of Finland (2017)



### Notable secondary M&A deals in the first nine months of 2018

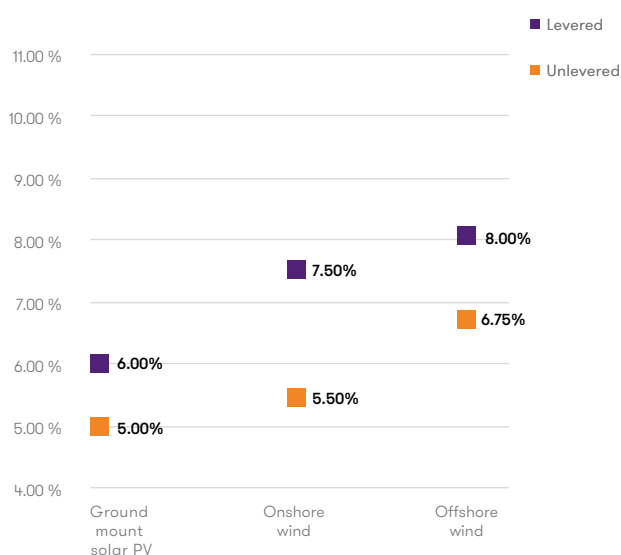
Date	Target	Acquirer	Target country/ Acquirer country	Deal value
September 2018	45MW Brocklingeberget Wind Farm	re:cap global investors AG	Sweden/ Switzerland	Undisclosed
January 2018	232 MW Kråktorpet and Nylandsbergen Wind Farms	Aquila Capital	Sweden/ Germany	€264 million (\$342 million)
June 2018	200MW Metsähallitus Wind Farm	Omnes Capital, Ilmatar Windpower	Finland/France and Finland	Undisclosed
June 2018	197.4MW Floro Wind Farm	BlackRock	Norway/USA	Undisclosed
June 2018	Ranasjohojden and Salsjohojden Wind Farms	Arise AB	Sweden/Sweden	Undisclosed
January 2018	232 MW Kråktorpet and Nylandsbergen Wind Farms	Aquila Capital	Sweden/Germany	€264 million (\$342 million)

### Discount rate results

Please find beside the results of our survey for the Nordics.

We note the following observations from our survey respondents:

- 60% of respondents would apply a 50bps – 100bps premium for subsidy free projects with 40% applying no premium
- 60% of respondents assume salvage value will cover decommissioning costs versus using a decommissioning reserve
- 80% of respondents consider an MRA of less than 25% capex to be sufficient



## Spain

### Renewable energy regulatory landscape and incentives

Spain's renewable energy market lay in ruin for years following retroactive cuts made to its subsidy regime through Royal Decree-Act 1/2012.

However, long-awaited competitive auctions in 2017 have since sparked a renaissance of interest in the market with developers and investors flocking to participate in Spain's renewable energy market. In the two auctions that were held in 2017, Spain awarded a total of 8 GW of renewable energy capacity, comprising 3.9 GW of solar PV power, 4.1 GW of wind power and 20 MW for other technologies<sup>25</sup>.

There was no auction in 2018 as the bidding rules were reviewed to ensure that wind and solar are at a level playing field in future tenders. In 2017 auctions, wind secured almost all the capacity

in the first round while solar won the lion's share in the second round due to changes in bidding rules. The timeline for the next auction has not been set at the time of the report publication.

In another notable milestone, the Spanish government in November 2018 announced its commitment to go beyond the current EU renewable energy target plan by aiming at 100% renewable electricity by 2050 and completely decarbonising the economy soon after<sup>26</sup>. To achieve this goal, some 3 GW of wind and solar power capacity will need to be built every year for ten years, sparking further interest amongst project developers and investors.



<sup>25</sup> Analysis: Fierce competition drives Spanish renewables auction - Clean Energy Pipeline (2017)

<sup>26</sup> Spain sets out plan for 100% renewable electricity by 2050 - Independents (2018)

### Notable secondary M&A deals in the first nine months of 2017

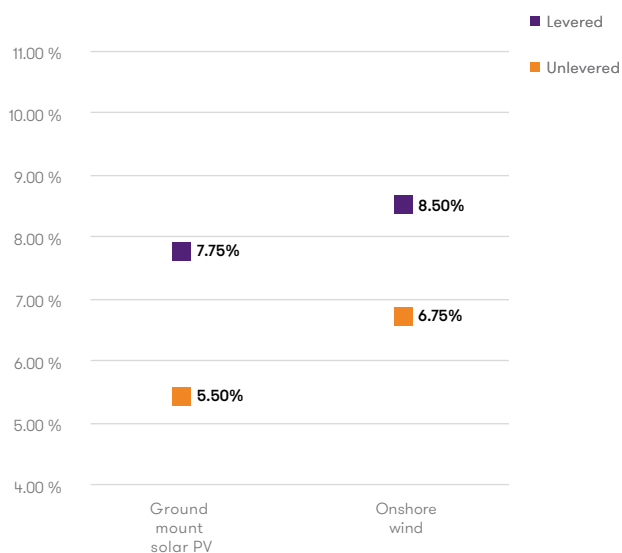
Date	Target	Acquirer	Target country/ Acquirer country	Deal value
September 2018	230MW Greenalia Solar Plant	Greenalia	Spain/Spain	Undisclosed
April 2018	100MW Solar Portfolio	T-Solar SA	Spain/Spain	Undisclosed
March 2018	660 MW Cox Energy Solar Portfolio	Sonnedix	Spain/ Netherlands	Undisclosed
February 2018	250 MW Solar Portfolio	ContourGlobal LP	Spain/USA	€962 million (\$982 million)
February 2018	131.5MW Galicia and Catalonia Wind Portfolio	Endesa SA	Spain/Spain	€178 million (\$222 million)

### Discount rate results

Please find beside the results of our survey for Spain.

We note the following observations from our survey respondents:

- 62% of respondents would not apply a premium for subsidy free projects
- 62% of respondents assume salvage value will cover decommissioning costs versus using a decommissioning reserve
- 100% respondents consider an MRA less than 25% capex is sufficient



<sup>12</sup> Spain awards 3 GW in competitive renewables auction – Clean Energy Pipeline (2017)

<sup>13</sup> Analysis: Fierce competition drives Spanish renewables auction – Clean Energy Pipeline (2017)

Note: Due to the limited number of responses for levered onshore wind, we have referred to the 2017 results.

## United Kingdom

### Renewable energy regulatory landscape and incentives

The UK's renewable energy sector grew significantly between 2010 and 2015 thanks to a mix of attractive FiTs, Renewables Obligation Certificates and other forms of state-led remuneration for greenfield clean energy projects that were being offered up to developers and investors at the time.

In October 2017, the UK Government released its Clean Growth Strategy which set out how £2.5 billion will be spent on low carbon innovation from 2015 to 2021<sup>27</sup>. The Clean Growth Strategy continues to support the offshore wind sector and a range of other innovative renewables technologies in the new CfD scheme, introduced in 2015 under the Energy Act 2013, effectively becoming the only support scheme for clean energy remaining in the UK. Under this CfD scheme, renewable generators will be guaranteed an agreed 'strike price' for the energy they produce. Each technology will have its own strike price.

The next CfD allocation round is expected to take place in May 2019, with further biennial tenders taking place throughout the 2020s. Technologies benefiting include offshore wind, anaerobic digestion and now remote island wind.

Due to the government's perceived maturity of solar photovoltaic and onshore wind, the two technologies were both excluded from the most recent CfD allocation round in September 2017 and are highly unlikely to feature in any future rounds.

The maturity of solar PV and onshore wind is allowing a new crop of developers to realise their projects without the need for subsidies, often co-located with a battery energy storage component to help accrue additional value and boost the economic feasibility to help attract third-party investment.

### Notable secondary M&A deals in the first nine months of 2018

Date	Target	Acquirer	Target country/ Acquirer country	Deal value
September 2018	1200 MW Hornsea Phase 1 Wind Farm	Global Infrastructure Partners	UK/USA	£4,460 million (\$5,870 million)
June 2018	550MW UK Wind Portfolio	Pensions Infrastructure Platform, Dalmore Capital	UK/UK	£701 million (\$919 million)
May 2018	75.3 MW Brockloch Rig and Crystal Rig III Wind Farms	Aviva Investors	UK/UK	£239 million (\$327 million)
March 2018	142 MW UK Solar Portfolio	Greencoat Capital, Greencoat Solar II LP	UK/UK	£191 million (\$267 million)
March 2018	47.5 MW Brockaghboy Wind Farm	Greencoat UK Wind plc	UK/UK	£163 million (\$226 million)

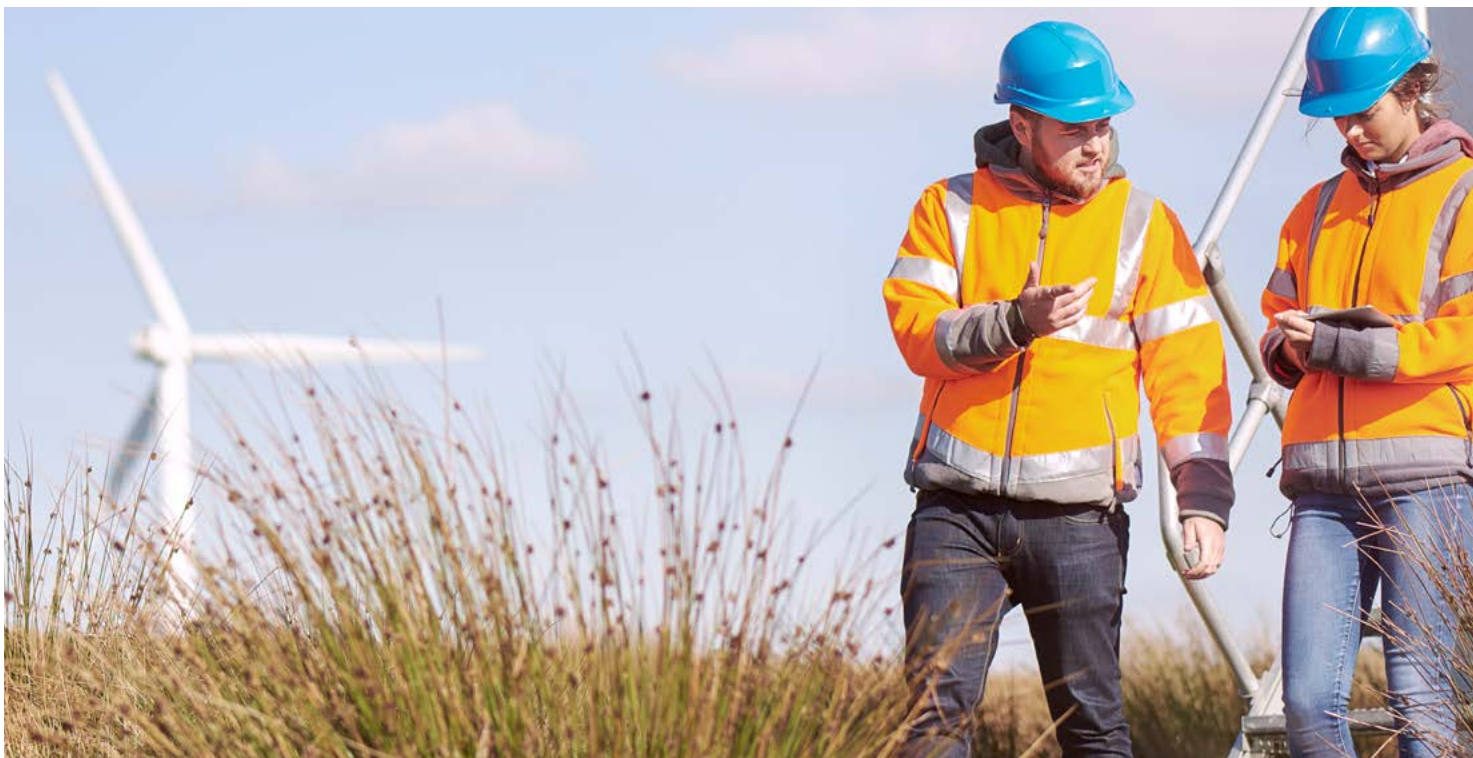
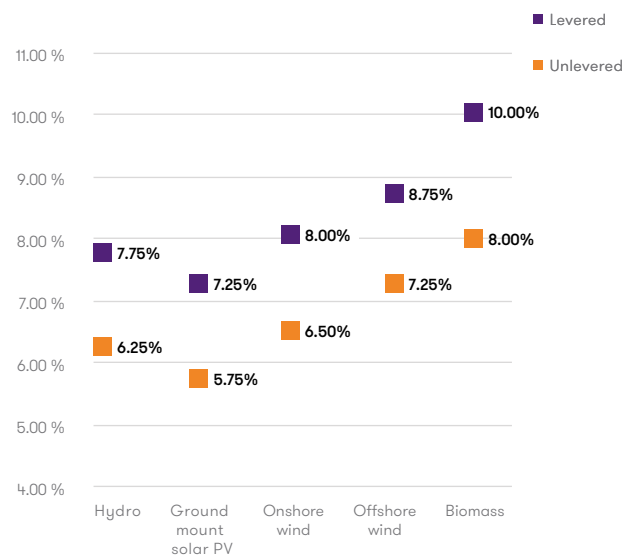
<sup>27</sup> UK's Clean Growth Strategy finally published – Clean Energy Pipeline (2017)

### Discount rate results

Please find beside the results of our survey for the UK.

We note the following observations from our survey respondents:

- 21% of respondents would apply a premium for subsidy free projects of over 200bps, 11% of respondents would apply no premium for subsidy free projects with a largely equal split of respondents adding premiums of 50bps – 200bps
- 79% of respondents assume salvage value will cover decommissioning costs versus using a decommissioning reserve
- 89% of respondents consider an MRA of less than 25% capex to be sufficient
- 50% respondents use one consultant's forecasts when estimating power prices with an even split of respondents using an in-house view or an average of two or more consultant's forecasts



# USA

## Renewable energy regulatory landscape and incentives

The US renewable energy market remains resilient despite the antipathy towards renewable energy stemming from the current Federal Administration. Renewable power sources accounted for half of the 24.6 GW of new electric power capacity placed into service in 2017. Nearly all the rest, 49%, was new natural gas capacity. At the end of 2017, all renewables (including hydropower) accounted for more 20% of the country's installed generating capacity - up from 15.4% in 2012<sup>28</sup>.

An important driving force was the corporate renewable energy procurement activities that were underpinned by customer expectations, sustainability commitments and market economics rather than federal energy policies. In the first ten months of 2018, nearly 5 GW of capacity has been signed by US corporates with renewable energy generators, a record over the previous high of 3.2 GW set in 2015<sup>29</sup>.

The US solar market is expected to rise again in 2019 after stabilising in 2017 and 2018. In fact, 2019 is the last year in which the federal residential renewable energy tax credit is at 30%, after which the tax credit gradually drops until 2022, when only commercial installations can use a 10% federal tax credit<sup>30</sup>.

Wind power became the US' largest source of renewable energy capacity in 2017. The US wind sector is forecasted to maintain its strong growth momentum in the next three years thanks to the production tax credit, various state-level policies, and improvements in the cost and performance of wind power technologies, yielding low-priced wind energy for utility, corporate, and other power purchasers. An estimated 32 GW of new wind capacity is to be built in the US in the next three years as developers rush to take advantage of the tax credits before they begin to decline in 2021<sup>31</sup>.



<sup>28</sup> Energy Infrastructure Update - Federal Energy Regulatory Commission (2018)

<sup>29</sup> US Corporate Renewable Energy Procurement Hits Record Levels - Cleantechica (2018)

<sup>30</sup> Top Trends To Watch In Renewable Energy In 2019 - Oil Price (2018)

<sup>31</sup> US Wind Industry 'Full Steam Ahead' Despite Wind Catcher Cancellation - Green Tech Media (2018)

### Notable secondary M&A deals in the first nine months of 2018

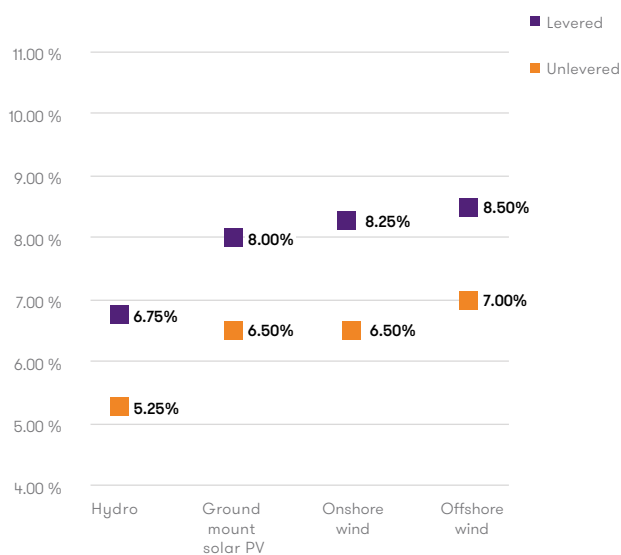
Date	Target	Acquirer	Target country/ Acquirer country	Deal value
September 2018	980 MW Renewables Portfolio	Consolidated Edison Inc.	USA/USA	\$1,540 million
September 2018	1,388 MW Solar and Wind Portfolio	NextEra Energy Partners LP	USA/USA	\$1,275 million
July 2018	204 MW Solar Portfolio	Goldman Sachs	USA/USA	\$350 million
May 2018	1,700 MW Solar Portfolio	Global Atlantic Financial Group	USA/USA	\$1,175 million
February 2018	277MW Truscott-Gilliland East Wind Farm	Taaleri Energia	USA/Finland	\$350 million

### Discount rate results

Please find beside the results of our survey for the USA.

We note the following observations from our survey respondents:

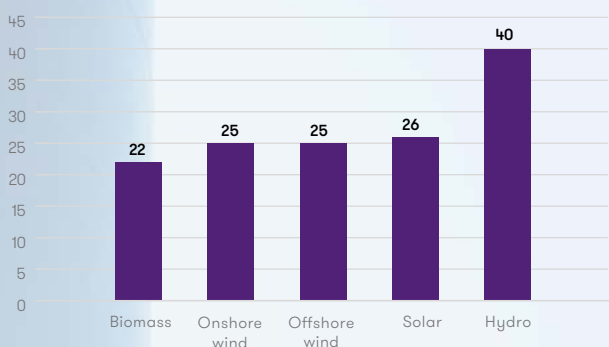
- 75% of respondents use an average of two or more consultant's forecasts when estimating power prices, the remainder use an in-house view



# Global project life assumptions

The below graph outlines respondents' project life assumptions globally across renewable energy technologies.

**Average project life assumption by technology**



In line with expectations, we observe solar projects with 20 year life assumptions in jurisdictions where PPAs are restricted such as in Japan. Where the solar market is comparatively more established such as the United Kingdom, Germany, Italy and Spain, project life assumptions hover around 25 years to 30 years. Biomass observes project life assumptions conservatively of around 20 years on a global basis. Onshore wind and offshore wind are considered by respondents to have average project lives of 25 years with established markets such as Germany, Ireland and the Nordics exhibiting project lives between 25 and 30 years.

Furthermore, we note that on average where project lives are considered to be at the higher end of market expectations, the use of a terminal value assumption falls, which suggests there is an inverse relationship between project life and the use of a terminal value.

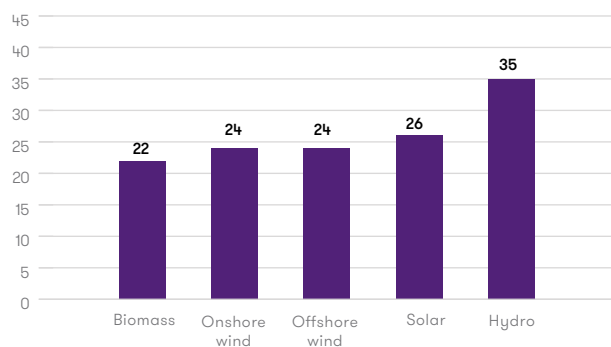


# Project life versus terminal value United Kingdom

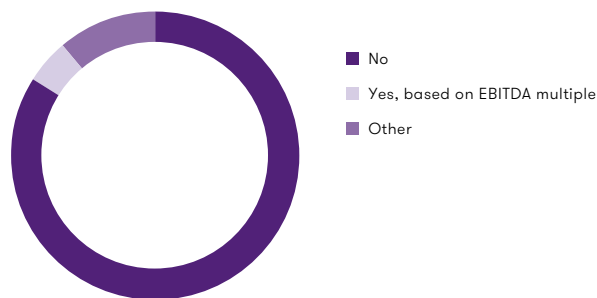
Responses for the United Kingdom, on average, estimated project lives of 26 years for solar, 24 years for onshore and offshore wind, 35 years for hydro and 22 years for biomass. The United Kingdom is considered one of the most established renewable energy markets given its robust subsidy regime.

However, when asked about the use of a terminal value assumption, 84% of respondents do not use a terminal value assumption. This suggests that end of life cash flow is being captured using life extension relative to the use of a terminal value estimate.

Average project life assumption by technology



Use of terminal value assumption



# Contacts

We hope you find this report insightful.

If you have any feedback please contact:

## Jaysel Pankhania

Valuations Associate Director  
Grant Thornton UK LLP

**T** +44 (0) 20 7865 2813

**E** jaysel.pankhania@uk.gt.com

## Jade Palmer

Valuations Manager  
Grant Thornton UK LLP

**T** +44 (0) 20 7865 2250

**E** jade.l.palmer@uk.gt.com

## Thai Tran

Head of Data  
Clean Energy Pipeline

**T** +44 (0) 207 943 8114

**E** thai.tran@cleanenergypipeline.com

Should you wish to share any comments or ideas for questions you would like included in subsequent surveys, please contact **Jaysel Pankhania**, Valuations Associate Director, or **Jade Palmer**, Valuations Manager at Grant Thornton UK LLP.

## Australia

Jannaya James

**T** +61 3 8663 6376

**E** jannaya.james@au.gt.com

## Brazil

Paulo Funchal

**T** +55 11 3886-5117

**E** paulo.funchal@br.gt.com

## Canada (Quebec)

Patrick Ouimet

**T** +1 514 390 4141

**E** ouimet.patrick@rcgt.com

## Canada (outside Quebec)

Dennis Leung

**T** +1 416 360 3476

**E** dennis.leung@ca.gt.com

## France

Philippe Leduc

**T** +33 1 41 25 89 36

**E** philippe.leduc@fr.gt.com

## Germany

Martin Festerling

**T** +49 211 9524 8555

**E** martin.festerling@wkggt.com

## Japan

Dai Okuyama

**T** +81 3 6434 0729

**E** dai.okuyama@jp.gt.com

## India

Alok Verma

**T** +91 9971033994

**E** alok.verma@in.gt.com

## Ireland

Peter McArdle

**T** +353 1 6805 683

**E** peter.mcardle@ie.gt.com

## Italy

Stefano Salvadeo

**T** +39 02 006 339 28

**E** stefano.salvadeo@bgt.it.gt.com

## Nordic

David Wastå

**T** +46 706 76 37 21

**E** david.wasta@se.gt.com

## Spain

Ramón Galcerán

**T** +34 93 206 39 00

**E** ramon.galceran@es.gt.com

## UK

Tomas Freyman

**T** +44 20 7184 4336

**E** tomas.freyman@uk.gt.com

## USA

Kevin Schroeder

**T** +1 405 415 3550

**E** kevin.schroeder@us.gt.com

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