

Corporate Renewable Energy Procurement Monthly

This is the inaugural issue of a monthly analysis of corporate renewable energy procurement by Bloomberg New Energy Finance. This publication will highlight recent contracts signed between renewable energy asset owners and corporate off-takers, relevant policies and power market changes from around the world, and an interview with a key player. We will also include data on contract volumes, power prices, and other relevant metrics and provide links to our growing body of research in this area.

RECENT DEALS

Off-taker	Project name	Country	Size (MW)	Current project owners	Our take
Google	Cimarron Bend Wind Farm	US	200	Enel Green Power	The largest corporate PPA in 2016 (through August) is also Google's first foray into Kansas and second in the Southwest Power Pool (SPP). It inked a contract with a 100.8MW wind farm in Oklahoma in 2011. <i>Sign date: 8 April.</i>
Google	Tellenes Wind Farm	Norway	160	BlackRock	The largest corporate PPA in EMEA, signed on the same day as Google's deal with Lyrestad wind farm in Sweden. More details can be found below. <i>Sign date: 30 June.</i>
Switch and Apple	Playa 1 and Boulder 2 PV Plants	US	152	First Solar and SunPower	Both deals were signed under NV Energy's 'green tariff' program. In reality, this means there are two contracts for each project: one between the corporate and the utility, another between the utility and the developer (the PPA). Both PPAs had prices starting below \$40/MWh. <i>Sign date: 25 January.</i>
3M	Gunsight Mountain Wind Farm	US	120	Invenergy	3M's first 'virtual' PPA was signed in Texas, where excellent wind conditions have projects hitting 50% capacity factors and, in some cases, still turning a profit selling power at negative prices. <i>Sign date: 9 February.</i>
Wal-Mart	Lafayette PV Plant	US	108	Origis Energy	Wal-Mart's largest solar deal and a first of its kind in the Southeast US, the contract is another 'green tariff'-like arrangement. In this case, Wal-Mart signed a 15-year contract with its utility, Alabama Power, who in turn signed a 28-year PPA with the developer, Origis Energy. <i>Sign date: 6 June.</i>

Source: Bloomberg New Energy Finance. Note: This table represents the largest deals during the period of January-July 2016.

MARKET UPDATES

AMERICAS (AMER)

US corporate PPAs: current market

The US corporate power purchase agreement (PPA) market has slowed – at least temporarily – and will take time to recover, at least in terms of the number and size of transactions. Thirty-one offsite corporate PPAs (excluding government and university contracts), representing 3.1GW of capacity, were signed in 2015. Just 12 (794MW) such contracts have been inked this year (see Figure 3).

Looming uncertainty prior to the extension of the federal tax credits at the end of last year promoted a sense of urgency to sign deals – among developers and corporate off-takers alike. Developers were desperate to lock in contracts so they could raise project finance in time to finish construction by the end of 2016. Corporates didn't want to lose out on a chance to sign a deal at a fully subsidized rate. (Not surprisingly, this was a common sales pitch for developers.)

Now, with the federal tax credits extended by a vote in Congress in December, the urgency is gone. Companies eager to transact already did, suggesting growth will have to come from new entrants or add-on deals from existing players. Yet low power prices have left first-mover 'contract-for-difference'-style contracts (such as Google's initial 2009-10 deals) in the red and continue to make economics on new deals today challenging, even for the most competitive developers.

In addition, conversations with industry players suggest that developers and corporate buyers are not seeing eye-to-eye on key issues, such as how long contracts should be and who should bear the risk of curtailment.

Looking into the future, deal volume and new announcements are likely to pick back up in 2017 (from 2016's depressed levels) and continue to grow thereafter. In the meantime, 'green tariffs' – structures in which the corporate essentially signs a PPA, or an agreement like it, through the utility – are proving to be one saving grace for the market (see, for example, Wal-Mart and Apple's deals mentioned in table above).

Amazon Energy

Amazon Energy LLC debuted in Q2 2016, buying and selling its first electrons under a PPA with the Fowler Ridge IV wind farm (ostensibly, a physical PPA), located in Benton, Indiana and originally developed by Pattern Energy Group. The e-commerce giant's energy trading subsidiary ultimately lost about \$850,000 under the contract in the three months from April–June 2016, according to Bloomberg New Energy Finance analysis of data from the Federal Energy Regulatory Commission (FERC). Amazon Energy paid \$33/MWh for 63GWh of output under the arrangement, only to resell the electricity for just shy of \$20/MWh (on average) in the PJM Interconnection.

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EUROPE, MIDDLE EAST & AFRICA (EMEA)

Google targets Nordic wind to power data centers

On 30 June 2016, Google added 236MW to its European renewable energy portfolio, making it the largest procurer of renewables through PPAs in the region. Google signed two PPAs. One was with Riksvind and Rabbalshede Kraft for the Lyrestad wind farm, a 76MW project situated in Sweden. The other was with BlackRock for the Tellenes wind farm (160MW) in Norway. This is the largest PPA for a single project signed to date in EMEA.

Google's total renewable energy PPA portfolio now stands at about half a gigawatt in EMEA. This is still short of its much larger portfolio of almost 1.9GW in the US, but does represent substantial yearly capacity additions for the last three years.

Of Google's 10 PPAs for onshore wind in the EMEA region, nine are in the Nordics (eight in Sweden and one Norway), close to its Finnish data center, with the only other signed in the Netherlands for a center there. The Nordics offer highly competitive capacity factors, which make wind production economical even at low tariff levels. The cool temperatures in the region also reduce the power demand of the company's data centers. The joint Swedish-Norwegian REC scheme is suitable for corporate PPA structures, as separate hedging contracts can be signed for the power price and the green certificates.

ASIA PACIFIC (APAC)

The rise of independent power retailers in China and Japan

Since the start of 2016, China and Japan have seen a surge of new companies becoming certified as power retailers, as electricity market reforms accelerate. As of the end of June, 757 companies had registered themselves as power retailers in China. As of the end of August, 334 companies had obtained electricity retail licences in Japan. Until very recently, both countries were dominated by regional power companies and direct procurement of power from independent power producers (IPPs) was rather challenging.

In the short term, we expect the incumbent utilities in both countries to maintain a competitive advantage in the retail market. The new retailers are trying to differentiate themselves from incumbents by proposing new services including direct renewable energy PPAs. While it remains to be seen how successful these new players will be, increased competition is already spurring the incumbents to consider offering similar services. As such, we expect the rise of retail competition will make renewable energy PPAs possible.

In China, electricity retail competition is now being piloted across several provinces, primarily in the south and west of the country. The new retailers come from a variety of backgrounds, including IPPs, and city gas distributors, who already have access to consumers. Others include smart meter and battery manufacturers and wind and PV equipment manufacturers (see Figure 5). The former seek to combine an energy management product with power retailing. The latter are looking to find new outlets for the electricity generated by their renewable projects.

UK subsidy slash boosts interest in corporate PPAs

The turbulence of renewable energy policy in the UK in recent years provides an opportunity for corporates procuring renewable electricity directly from project developers. A reduced Feed-in Tariff (FiT) and deployment cap for PV has affected the project economics for developers. This, in combination with the early closure of the Renewable Obligation (RO), has made developers scramble for alternative off-takers. However, is this drop in government support truly an opportunity for bilateral deals between renewable developer and corporate? According to BNEF's database, PPA deals in the UK have surged over 300% post-2013 (see Figure 4). Cumulatively, 687MW have been signed in the UK, representing 37% of the corporate PPA deals in the EMEA region.

Renewable developers will indeed be increasingly looking for alternative off-takers, as government subsidies for PV and onshore wind are scrapped. Long-term contracts with large corporates provide robust credit security, which helps developers to secure financing. Corporates are also seeking fixed price reassurance and renewable generation to meet more stringent sustainability targets. Yet, as the UK transitions away from RO certificates, the price associated with a renewable energy PPA may be too high for corporates to sign versus the market. The further growth of corporate PPAs in the UK may need to await grid parity.

These retailing pilots are potentially more promising for corporate customers seeking long-term renewable energy PPAs than the direct power purchase (DPP) program, which is now running across most of the country. The DPP program has been mostly dominated by coal power plants selling their excess capacity to large industrial customers at low prices with contracts that are renegotiated frequently (typically after six to 12 months). For more, see our profile of China's new electricity retailers.

Retail competition in Japan started in 2000 when large industrial consumers were allowed to purchase electricity from outside their vertically integrated regional utility (VIRU). This was gradually expanded to include more segments and, since April 2016, all customer classes, including residential users, are now contestable. Full retail market liberalisation has led to a surge of new power suppliers entering the market and helped to make the business of electricity retail more viable for the non-VIRUs. This potentially opens up new possibilities for direct renewable energy procurement as a number of these new entities sign up with the intention of being renewable power retailers.

For example, NTT Facilities, a subsidiary of NTT group, Japan's largest telecom operator, has been a leading solar developer in the country. It has also obtained a retail license and has 123MW of disclosed solar capacity. While overall, the VIRUs lead in terms of renewable generation capacity thanks to their hydro assets, the new retailers have been more active in the solar, wind and biomass sectors. Of the 309 electricity retailers, a third described their primary business focus as electricity retail, followed by city-gas retail (16%) and renewables development or asset ownership (12%) (see Figure 6). For more, see our profile of Japan's new electricity retailers.

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INTERVIEW: BMW Group targets 100% renewable electricity as part of its long-term business case

Jury Witschnig, head of sustainability strategy, product and production at BMW Group, spoke to Bloomberg New Energy Finance about the drivers behind its sustainable strategy and plan to procure 100% electricity from renewables.



Q: What benefits do sustainable strategies bring to BMW?

A: BMW sees sustainability as core to achieve success in the future. To be sustainable we need to understand what challenges we have to face as a company. These are not only the classic challenges such as markets, but also non-financial challenges, such as the impacts of climate change, growing population and what is happening in

alternative energies. Our work in sustainability is focused on finding solutions to secure our future success, particularly in terms of energy resources. Renewable energy is one of our core topics to work on, not just in terms of reducing carbon dioxide (CO₂), but also in terms of production and cost reduction.

We realise that the priorities of society and our customers are moving towards sustainable solutions, especially regarding mobility. We already see customers that want to manage and lower CO₂ emissions. Therefore being sustainable is important for the competition of the car industry.

Another perspective is production at our plants. To be more efficient, we need to run at a lower cost of production. Between 2006 and now, we have reduced costs for resources like energy by almost EUR 160m. Being more energy-efficient makes the business more profitable.

Q: How does BMW plan to continue its leading position in sustainability ratings?

A: We look at this from a holistic, product life-cycle perspective. It is easier to improve efficiency in our own production than in our supply chain. But we do try to leverage our own steps and successes into our supply chain. We also look at the life-cycle of the product to understand what we can change in production, the product itself, and how we recycle materials. Beyond climate change and CO₂, we also see other challenges such as data security and urban areas. One of our next targets is looking more at mobility services and solutions in urban areas. If you are in the lead in sustainability ratings, you know that your strategies are on the right path, which is important, but being at the top is not the goal of our sustainability strategy. It's a result of our long-term measures.

Q: BMW has committed to procure 100% of electricity from renewable sources for its operations, with an interim target of more than two-thirds by 2020. When and how do you expect to reach 100%?

A: Hopefully soon! We want to use renewable energy where it comes with an economical benefit. We have to look at projects on a plant by plant, region by region basis. In some areas, there are policy barriers for purchasing renewable energy, whereas in others there may not be any economic benefits. But where we have it, we use it. For example, in Washington State (production of carbon fibre), we buy as much green electricity

as we want, so it's not hard to reach 100% renewable electricity. In South Carolina, we run our plant partly with landfill gas. But for the rest of the electricity needed, there is no company offering electricity from renewable sources. In some regions you just can't get the electricity, even if you would like it.

Q: How much do your renewable energy projects contribute to your energy consumption?

A: Our renewable energy use is around 1.2 TWh. This is not only through our own projects but also through purchasing renewable energy. Energy efficiency is our most important contribution to addressing climate change, and it is where we start. At every plant we try to look at the onsite possibilities to use and produce renewables. We have wind power in Leipzig [Germany] because it makes sense to have it at that location. In other parts of the world, wind power doesn't make sense. Then we look at innovations, for example, what is possible with combined heat and power and what can we do with recycled batteries to charge them?

Renewable technology will improve. A few years ago, this technology didn't make sense as an option, but it is now getting cheaper and a more attractive investment.

Q: Some of the renewable power projects that you have use PPAs directly with the generators. What drivers led you to use this approach versus alternatives?

A: Building the business case drives us to find the best local solution. Sometimes this means investing directly in solar panels. Sometimes it is better to have a PPA with a partner or build a JV [joint-venture].

Producing renewable energy, which is a new market for our organisation, is not one of our core competencies. We try to find the best partner for this. To reach a target of 100% renewable energy, we look at which partners have the best competencies, best investment options, and best return on investments. Internally we consider this in light of developing and producing the best cars for our customers. For example, the wind power at Leipzig is used to produce our electric cars, the BMW i series. We promise our customers that this car is produced with 100% renewable energy, which is very important to us. In this case it makes sense to work together with an onsite partner to ensure secure energy supply even with volatile renewables from wind.

Q: Do you expect to use the corporate PPA approach more frequently?

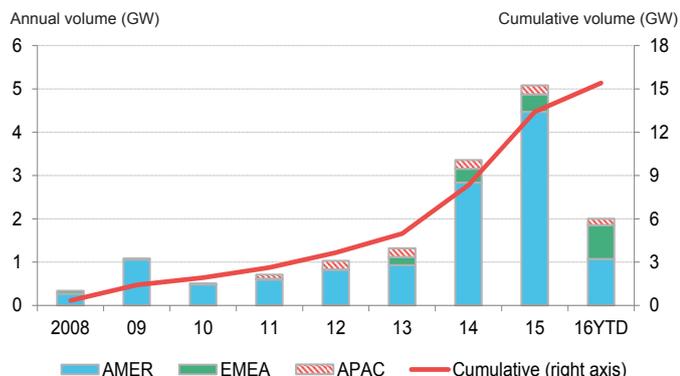
A: This will still be considered on a case-by-case basis, but the more renewable energy we use, the more we will have to look to external partners for risk sharing. If we have more electricity than required for production we will need to sell it. If we have more demand than electricity, we will need to purchase this on the market. PPAs are very interesting but there are still many local discussions to be had around the policy situation and grid.

BMW Group is part of RE100 – a collaborative, global initiative of influential businesses committed to 100% renewable electricity.

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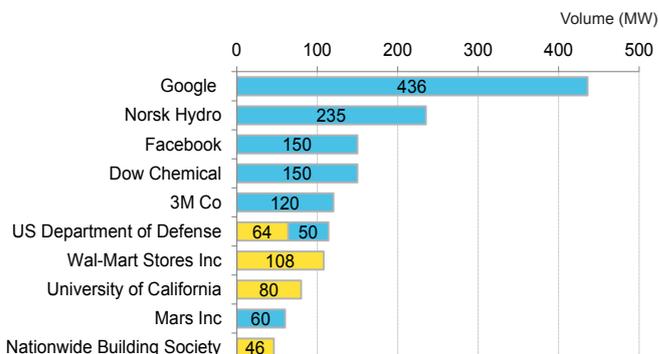
DATA

Figure 1: Global corporate PPAs by region and year



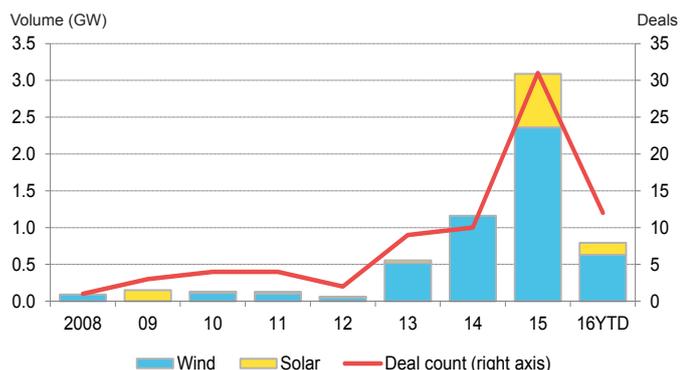
Source: Bloomberg New Energy Finance.
Note: Includes onsite generation like commercial rooftop PV installations. APAC capacity is estimated and will be updated on an ongoing basis.

Figure 2: Top 10 corporate PPA off-takers in 2016



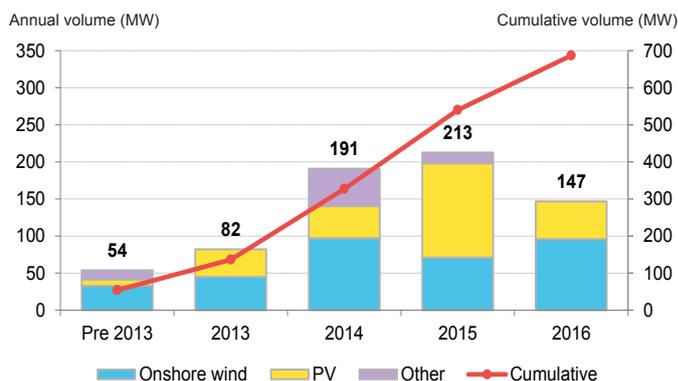
Source: Bloomberg New Energy Finance.
Note: Norsk Hydro's corporate PPAs are for its aluminium portfolio.

Figure 3: Offsite US corporate PPAs by year



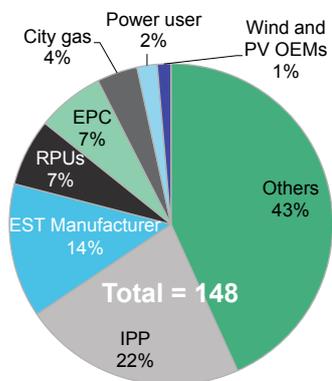
Source: Bloomberg New Energy Finance.
Note: Graph is private sector offsite US corporate PPAs. 'Private sector' excludes deals with government or university off-takers. Also excludes onsite generation like commercial rooftop PV installations.

Figure 4: UK PPA capacity by sector



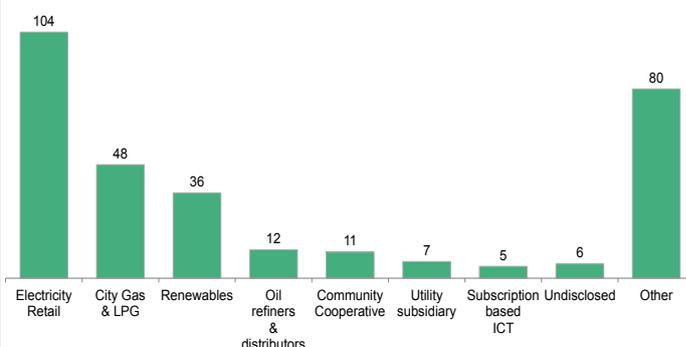
Source: Bloomberg New Energy Finance.
Note: 'Other' includes biomass and waste, and tidal.

Figure 5: Backgrounds of China's new power retailers



Source: State Administration for Industry and Commerce, National Energy Administration, Bloomberg New Energy Finance.
Note: We have included only 148 of the largest power retailers in this chart (with registered capital of CNY 100m (\$15m) or above).

Figure 6: Japan's electricity retail companies by primary business focus



Source: Companies, Bloomberg New Energy Finance.
Note: As of 30 August 2016, 334 companies had registered for electricity retail. Sample size above is 309 companies as it excludes the 25 subsidiaries of J:COM.