

FINANCE QUARTERLY SPECIAL

A WORD ABOUT WIND 

EUROPE'S PPA REVOLUTION

Q3 2018

**SCANDINAVIA IS
SHOWING THE
REST OF EUROPE
HOW TO WIN BIG
CORPORATE PPAs.
HERE'S WHY.**

Featuring deals data, analysis of the biggest
Scandinavian PPAs in the last year, and more



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EDITORIAL



By Ilaria Valtimora,
Associate Editor

In the first half of 2018, companies such as Facebook, Norsk Hydro and Alcoa signed corporate wind power purchase agreements totalling almost 1.4GW in Norway and Sweden. This is as much as all the corporate PPAs signed in Europe in 2017.

Does this show Scandinavia is leading a PPAs revolution in Europe? Or does the region benefit from good conditions that others will struggle to replicate?

Plenty of investors will hope for the first option. The decline of government-set feed-in tariffs means corporate PPAs are becoming more important as a way for investors to take projects to financial close – and, in Europe, Scandinavia has been leading the way.

In this Finance Quarterly, we look at the big reasons why corporates are signing large PPAs in Scandinavia (page 6). We will follow this in Wind Watch columns and on our blog in the coming months; and will also discuss the topic as a key theme at our Financing Wind Europe conference in London on 1st November.

So why do the Nordics attract more wind PPAs than other European countries?

First, Scandinavia is popular with data centre owners, as a result of its cool weather and strategic position. This is why it has attracted technology giants

such as Facebook and Google. You can read more about the rise of wind-powered data centres on page 12.

And it's not just about data centres. For all firms, another attraction is cost, as Luxcara's managing partner Alexandra von Bernstorff said. Low power prices in the region have squeezed developers' margins and forced them to look at long-term PPAs; and enabled corporates to secure long-term low prices.

For investors, the question is whether other European nations can follow. There are indications that this could be the start of a revolution in Europe.

The European Union confirmed changes to its Renewable Energy Directive in June, with the stipulation that member states should identify any administrative barriers to the development of corporate renewable PPAs for wind and solar, and remove them. That could help remove regulatory and cultural barriers, which is much needed in today's market.

More countries are reducing or removing feed-in tariffs in favour of competitive tenders, which is squeezing developers' returns and exposing them to merchant risk. This means that more investors and developers will look at how they can make corporate PPAs work, so they can get comfortable with the risks and take schemes to financial close.

Investors across Europe don't yet know all the answers – but they are asking the right questions.

In addition, we have information about PPAs in the wind sector that were signed globally between April and June (page 5); and, for the first time, we're making our other market information available to everyone, including project finance, project M&A and corporate M&A deals; and activity in the offshore wind sector.

It's been a ridiculously busy quarter. We hope you enjoy the report. ■

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WIND DATABANK

In this Databank, we have delved into our archive to pick key stories for the last quarter, including M&A (table 1), power purchase agreements (table 2) and project finance (table 3).

Key deals include CPPIB's purchase of renewables assets worth C\$1.75bn (\$1.3bn) from Enbridge; and Eskom finally signing long-delayed power purchase agreements with the owners of 12 wind projects, totalling 1.4GW.

We have tried to be as comprehensive as possible, but we are also keen to hear about any deals we might have missed.

If you have any, please get in touch: editorial@awordaboutwind.com

1. KEY WIND PROJECT M&A DEALS REPORTED IN Q2 2018

BUYER	SELLER	PROJECT(S)	SIZE (MW)	LOCATION	COMMENT
CPPIB	Enbridge	Portfolio deal	1,289	Canada	49% of wind assets part of wider C\$1.75bn deal
Pattern Development	Clean Line	Mesa Canyons	1,000	Mexico	Pattern to buy \$1bn project and its grid link
ERG	Impax A.M.	Portfolio deal	770	France	Italy's ERG pays €57m for French portfolio
Element Power	Gaelectric	N.I. Sea Array	750	Ireland	Element enters offshore wind with Irish deal
Alte Leipziger	Van Oord	Gemini	600	Germany	German insurer buy 10% of 600MW Gemini
PGGM	EDF Renewables	Wind + solar assets	588	US	Dutch firm buys 50% of 588MW US portfolio
Dalmore/PIP	EDF Renewables	Wind portfolio	550	UK	Investors buy 49% of UK portfolio for £701m
Greencoat UK/GLJL	SSE	Clyde	523	UK	SSE sells 14.9% stake to UK duo for £202m
CPPIB	Enbridge	Hohe See	497	Germany	24.5% stake is part of wider C\$1.75bn deal
EDF Renewables	Mainstream	Near na Gaoithe	450	UK	Deal for delayed project valued at €500m
Ameren	Terra-Gen	Unknown	400	US	Ameren to buy 400MW on completion
CPPIB	NextEra	Four projects	356	Canada	CPPIB buys 356MW of NextEra's wind assets
Vestas	Vattenfall	Blakliden Fäbodberget	353	Sweden	Vestas agrees to buy 40% of Swedish complex
PKA	Vattenfall	Blakliden Fäbodberget	353	Sweden	PKA agrees to buy 30% of Swedish complex
CPPIB	Enbridge	Cedar Point	250	US	49% stake is part of wider C\$1.75bn deal
Parkwind	KNK Wind	Arcadis Ost 1	247	Germany	Belgium's Parkwind buys scheme from KNK
InfraRed Cap. Partners	Macquarie Capital	Lal Lal	228	Australia	Investment manager buys 40% of Lal Lal...
Northleaf Cap. Partners	Macquarie Capital	Lal Lal	228	Australia	...and private equity firm buys another 40%
Boralex	Invenergy	Five projects	201	Canada	C\$215m deal for 201MW Canadian quintet
Ilmatar Energy	Metsähallitus	Piiparinmäki	200	Finland	Ilmatar buys 200MW as part of 1GW wind push
BlackRock	Zephyr	Guleslettene	197	Norway	BlackRock buys 197MW Norwegian project
Arise Windpower	NordanVind	Two projects	180	Sweden	Arise buys 180MW duo in its home country
Alliant	Invenergy	Unknown	150	US	Alliant to buy 150MW project from Invenergy
CMS	Tradewind	Gratiot Farms	150	US	CMS agrees to buy Gratiot Farms in Michigan
Xcel	NextEra	Foxtail	150	US	Xcel agrees to buy Foxtail in North Dakota
WEC Energy Group	Invenergy	Bishop Hill 3	132	US	WEC buys 80% of Bishop Hill 3 for \$148m
Arroyo	Pattern Energy	El Arrayán	115	Chile	Arroyo buys 70% stake of big Chilean project
CPPIB	Enbridge	Albatros	112	Germany	24.5% stake is part of wider C\$1.75bn deal
CMS	Starwood	Northwest Ohio	105	US	CMS agrees to buy Northwest Ohio project
Actis	Various owners	Kipeto	100	Kenya	Actis in talks to buy 88% of the Kipeto scheme
Southern Power	RES Americas/Vestas	Wildhorse Mountain	100	US	Southern buys 100MW Oklahoma wind farm
CGN Europe	Unknown	Portfolio deal	92	France	Chinese firm has grown its portfolio in France
AES	CMS de Argentina	Energetica 1	80	Argentina	US utility AES invests in Argentinian market
Aviva Investors	Fred Olsen Ren.	Two projects	75	UK	Aviva buys 49% interest in two wind projects
Cemig	Energimp	Two projects	71	Brazil	Cemig buys additional 51% of two projects
Mirova/Rive	Nordex	Le Douiche	60	France	Mirova and Rive buy development in France
Foresight	Belltown firms	Portfolio deal	58	UK	Foresight concludes its first major wind deal
TransAlta Renewables	TransAlta Corporation	Lakeswind	50	US	TransAlta buys asset from its parent group
TRIG	RES	Two projects	32	France	UK group pays €28m for two French projects
Energimp	Cemig	Praia do Morgado	30	Brazil	Energimp buys additional 49% of wind farm
TRIG	RES	Solwaybank	30	UK	£82m investment in under-construction project
FP Lux Investments	ABO Wind	Ratipera	27	Finland	Luxembourg's FP Lux buys 27MW wind farm
EDF Renewables	Fishermen's Energy	Atlantic City	24	US	EDF buys 24MW US offshore development
MPC Capital/ANSA McAL	Gruman Resources	Tilawind	21	Costa Rica	Investors acquire 21MW Costa Rican scheme
Eurus	Yard Energy	Spui	21	Netherlands	Japan's Eurus buys 21MW in the Netherlands
TransAlta Renewables	TransAlta Corporation	Kent Breeze	20	Canada	TransAlta buys Kent Breeze from its parent
Aquila Capital	OX2	Ykspihlaja	14	Finland	Aquila enters Finnish wind with 14MW deal
EBL Wind Invest	Win Energie & Orbis	Winsen-Pattensen 2	13	Germany	Swiss firm EBL acquires 13MW in Germany
Greencoat Capital	Undisclosed	Tullynamoyle 2	11.5	Ireland	Greencoat to buy Tullynamoyle 2 for €19.3m

2. KEY POWER PURCHASE AGREEMENTS SIGNED IN Q2 2018

BUYER	BUYER TYPE	OWNER	PROJECT	SIZE (MW)	LOCATION	COMMENT
Eskom	Utility	Various owners	12 projects	1,400	South Africa	Eskom signs long-delayed PPAs
Cemig	Utility	Undisclosed	Mixed portfolio	1,200	Brazil	Cemig agrees wind and solar deals
Walmart	Corporate	Engie	Triple H	500	US	Retailer buys undisclosed amount
Walmart	Corporate	Geronimo Energy	Crocker	400	US	Retailer buys undisclosed amount
Norsk Hydro	Corporate	Vestas/PKA/Vattenfall	Blakliden Fäbodberget	353	Sweden	Norsk buys 60% for metal plants
Luminant	Utility	Innervex	Foard City	350	US	Innervex wins 300MW deal
Undisclosed	Corporate	EnerAB	Mesa La Paz	306	Mexico	Unnamed client buys full output
AT&T	Corporate	NextEra	Two projects	300	US	Telecoms giant buys full output
Engie	Utility	Mirova/GE/Engie/Forestalia	Goya	300	Spain	Engie signs for majority of output
Grupo Bimbo	Corporate	Invenergy	Santa Rita East	300	US	Mexican baker signs 100MW PPA
Merck	Corporate	Invenergy	Santa Rita East	300	US	Drug giant signs 60MW wind deal
Facebook	Corporate	Luxcara	Bjerkeim cluster	294	Norway	Facebook signs at Norwegian trio
Burra Foods	Corporate	Flow Power	Ararat	240	Australia	Burra Foods signs for 50MW deal
Orora	Corporate	InfraRed/Northleaf/Macquarie	Lal Lal	228	Australia	Orora buys 80% of Lal Lal power
Good Energy	Utility	Ørsted	Westermost Rough	210	UK	Extension of PPA for 12% of output
Undisclosed	Corporate	EDP Renewables	Broadlands	202	US	Unnamed firm signs 50MW PPA
Wabash Valley Power Association	Utility	EDP Renewables	Broadlands	202	US	Indiana utility signs 100MW PPA
QTS Realty Trust	Corporate	Citi	Flat Top	200	US	Data centre firm signs 30MW deal
Alcoa	Corporate	BlackRock	Guleslettene	197	Norway	Aluminium giant buys entire output
General Motors	Corporate	Enel Green Power	Hill Topper	185	US	GM signs 100MW PPA with Enel
Bloomberg	Corporate	Enel Green Power	Hill Topper	185	US	...and Bloomberg signs 17MW PPA
Citi	Corporate	Sammons R.E.	Midway	163	US	Citi buys undisclosed proportion
Undisclosed	Corporate	Capital Power	Cardinal Point	150	US	Unnamed firm buys 85% of output
CIPCO	Utility	NextEra Energy	Heartland Divide	104	US	CIPCO purchase entire output
Undisclosed	Corporate	EDP Renewables	Hidalgo 2	50	US	EDPR secures 50MW PPA in Texas
Undisclosed	Corporate	Energiekontor	Withernwick 2	8	UK	Consumer goods signs 6MW deal
MGP Ingredients	Corporate	Westar Wind	-	-	US	Spirits giant commits to wind
Northumbrian Water	Utility	Ørsted	-	-	UK	Water company turns to wind

3. KEY ONSHORE WIND PROJECT FINANCE DEALS REPORTED IN Q2 2018

OWNER(S)	PROJECT	SIZE (MW)	DEAL VALUE*	LOCATION	INVESTOR(S)	COMMENT
Iberdrola	Three projects	-	€346m	Mexico	BBVA/Bancomer	\$400m package to refinance three schemes
Mirova/GE/Engie/Forestalia	Goya	300	€310m	Spain	Owners/EIB/BBVA/Caixa/Santander	300MW first phase reaches €310m close
Longroad Energy	Rio Brava	238	€260m	US	Pool of banks led by KeyBanc	Longroad closes \$300m financing in Texas
Mytrah Energy	in Tamil Nadu	252	€195m	India	OPIC	OPIC backs 252MW Mytrah project in India
ESB/Bord na Móna	Oweninny	89	€160m	Ireland	EIB/MUFG/BNP Paribas/AIB	ESB and Bord na Móna reach €160m close
CWP Renewables	Crudine Ridge	135	€159m	Australia	CEFC/Westpac/Sumitomo	CWP closes on 135MW in New South Wales
Tenaga Nasional	Two Projects	26	€136m	UK	Bayerische Landesban	Tenaga secures refinancing for 80% stakes
KenGen	Meru	400	€120m	Kenya	AFD/KfW IPEX-Bank	AFD and KfW back 80MW first phase
Geneia	Two Projects	78	€114m	Argentina	EKF/Sumitomo/ADC/FMO	Geneia secures financing for 78MW duo
Ethiopia Power Corp.	Assela	100	€80m	Ethiopia	Danida Business Finance	Danish government backs 100MW project
Lekela Power	Three projects	360	€62m	South Africa	MIGA	MIGA guarantees \$73m backing to Lekela
NextEra Energy	Three projects	256	€60m	US	Wells Fargo	US bank provides tax equity to NextEra trio
Pacific Hydro	Crowland	80	€51m	Australia	Commonwealth Bank/NAB	Financial close for 80MW Crowland project
Central Puerto	Achiras	48	€44m	Argentina	IDB Invest/IFC	IDB and IFC finance 48MW Argentina project
Energiepark Bruck	Two projects	17	€27.3m	Austria	EIB/Erste Bank	Energiepark wins funding for 17MW project
Grenergy Renovables	Kosten	24	€27m	Argentina	KfW IPEX-Bank	Grenergy reaches close on 24MW scheme
Mainstream	Two projects	250	-	South Africa	-	Financial close at 250MW South African duo
Green Investment Group	Canadian Breaks	200	-	US	Macquarie/NAB/Rabobank/Siemens	GIG enters America with 200MW Texas deal
Sammons R.E.	Midway	163	-	US	Citi/BHE Renewables/Siemens	Sammons wins tax equity and other funds
Invenergy	Pine River	161	-	US	Rabobank/Nord LB/SMBC	Invenergy closes on 161MW in Michigan
European Energy	Bosco Le Piane	39	-	Italy	Nord LB/Siemens Financial Services	European closes on 39MW Italian project
Invis Energy	-	35	-	Ireland	Nord LB/Asper	Invis reaches close on 35MW Irish project
Eurus Energy	Spui	21	-	Netherlands	ABN Amro/Rabobank/SMBC	Japan's Eurus closes on 21MW Dutch project
TuuliWatti	Viinämäki	21	-	Finland	-	Close at Finland's first no-subsidy wind farm
Energiekontor	Withernwick 2	8	-	UK	-	Close for UK's first subsidy-free wind farm

*Transactions converted to € for ease of comparison

Analysis

WHY IS SCANDINAVIA LEADING EUROPE ON WIND PPAS?

How can wind farm owners in Europe win corporate power deals like they see in the US? This was a big question at our Financing Wind conference in London last year.

We are set to look at corporate power purchase agreements (PPAs) again at this year's conference, on 1st November, but the question will be different: why has Scandinavia hoovered up so many large wind PPAs when other European nations haven't? Let's put on our Nordic Noir jumpers to look at the evidence.

The most recent of these PPAs came out in early July: Hydro Energi agreed a 25-year deal to buy all of the electricity from Engie and SUSI's 208MW Tonstad project in Norway. Meanwhile, Alcoa signed a PPA at a 197.4MW BlackRock project, also in Norway, in late June.

Before this, we saw significant PPAs in May, when Facebook committed to buy all of the energy produced by three wind farms that German investor Luxcara is developing in Norway. These three projects make up the 294MW Bjerkreim cluster that is due to complete in 2019.

Facebook is set to use the electricity to power a data centre in Odense in Denmark and some of its campus in Lulea in Sweden. Globally, this continues a trend that is well-established in the US: tech giants signing renewables PPAs in

order to lock in long-term power prices and show off their green credentials.

Building data centres

Facebook isn't the first. Google signed its first PPA in Europe in 2013 at OX2's 72MW Maevaara wind farm in Sweden. It followed this with a ten-year deal with Eolus for electricity from four projects totalling 59MW, to power a data centre in Finland; and a 12-year deal at BlackRock's 160MW Tellenes wind scheme in Norway. Therefore, the first

reason for these Nordic PPAs is the data centres developments in Scandinavia.

Mortimer Menzel, partner at Augusta & Co., advised on the Tellenes deal in 2016, and on 1GW of Scandinavian wind PPAs in total. He said large wind farms in Scandinavia offered predictable wind speeds to support these developments.

The region is also good for data centres due to its cool climate, which helps the centres to run smoothly, and its links to



Data centres: Wind PPAs can help tech giants cope with huge data demands



It offers a predictable and reliable regulatory framework. Also, the power market is very liquid and transparent.



Northern lights: PPAs in Scandinavia are lighting up Europe's wind market

other major nations including Germany, the UK and the Netherlands.

We are set to see more deals backed by data centre owners. Cisco, for example, is looking to roll out 30 data centres in Europe by 2030, and it won't be alone. The European Union is backing cross-border digital corridors in the region – the Aurora Borealis corridor and the Nordic Way – with fibreoptic links that open up more data centre opportunities.

Heavy metal

But there's more to Scandinavia's PPAs market than just data centres. In the last year, we've seen a handful of major industrial players sign wind PPAs too, in addition to the recent Hydro Energi and Alcoa deals at the start of this article.

In the last quarter, Norsk Hydro agreed to buy 60% of the electricity from the 353MW Blakliden/Faebodberget project in Sweden by Vestas, Vattenfall and PKA; and earlier this year Alcoa signed a 15-year PPA at a 330MW Eolus scheme.

Alcoa also signed a deal in late 2017 to buy power from Norsk Miljøkraft's 281MW Nordlicht project. And then there's the biggest of them all: Norsk Hydro agreed last year to buy all of the energy produced by General Electric and Macquarie's 650MW Markbygden 1. This is just the first phase of the 4GW-plus Markbygden cluster.

For these companies, stability and cost are both major attractions.

Alexandra von Bernstorff, managing partner at Luxcara, said these PPAs are key to its strategy. She said the growth of subsidy-free onshore wind projects meant Luxcara focused on "direct PPAs with utilities and companies" in order to give it the certainty to proceed with new schemes. She isn't alone.

Menzel said that corporate PPAs were important for the wind farm developers, as they offered the certainty these firms need to take schemes to financial close: "[At Tellenes] we needed a PPA to raise the equity to build it," he said.

Von Bernstorff said that these deals are particularly attractive in Scandinavia, because the market is stable for energy buyers and sellers: "Scandinavia offers a predictable and reliable regulations framework. Additionally, the power market is very liquid and transparent," she said. Regulators in Scandinavia have also been approving big schemes.

She said one of the main attractions of PPAs in this region, when compared to the rest of Europe, is the low power prices. This has been caused by a fall in the price of fossil fuels and growing supply from renewables, including hydro. This has forced developers to look at long-term PPAs to get certainty.

It is great for the corporates buying the power, though, as it gives them secure long-term low prices.

Eurostat has reported that electricity prices for non-household consumers in the second half of 2017 were €0.15/kWh in Germany and Italy, compared to €0.06–€0.07/kWh in Sweden, Finland and Norway. That influences where energy users decide to set up.

Finally, there is a predictable regulatory structure. The governments in Norway and Sweden have cut energy taxes and backed the rollout of new renewables projects, including onshore giants such as the 4GW Markbygden complex and the 1GW Fosen. These rival the biggest onshore complexes globally.

In Sweden, this regulatory certainty is evident in the closure of Vattenfall's Ringhals 1 and 2 nuclear plants, due to happen in 2020 and 2019 respectively. It opens the way for renewable energy developers to bring forward projects to fill the gaps – and these projects need new power deals in place.

That's why Scandinavian countries are seeing so many of these deals, and why the rest of Europe has a long way to go to match the combination of certainty, cost and buyer demand. With that in its favour, how could it not? You don't need Wallander to work that one out. ■



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OFFSHORE ACTIVITY TRACKER

In each Finance Quarterly, we look back at the most significant stories in the offshore sector globally. Here are the biggest market developments in Q2 2018.

PHASE	PROJECT(S)	SIZE (MW)	COUNTRY	OWNER(S)	COMMENT
Operational	Gemini	600	Netherlands	Northland/Siemens/Alte Leip./HVC	German insurer buy 10% from Van Oord
Operational	Race Bank	573	UK	Ørsted/Macquarie/Sumitomo	Diamond T.P. wins Race Bank OFTO race
Operational	Nordsee One	332	Germany	Northland/Innogy/Triodos	Ethical bank Triodos buys unknown stake
Operational	Burbo Bank Ext.	258	UK	Ørsted/Kirkbi/PKA	Diamond T.P. buys transmission assets
Operational	Prinses Amalia	120	Netherlands	Eneco	Siemens Gamesa to refurbish gearboxes
Operational	Hywind	30	UK	Equinor/Masdar	Equinor and Masdar add 1MW battery
Construction	EWDC	93	UK	Vattenfall	Trump-baiting project exports first power
Development	Norfolk Vanguard	1,800	UK	Vattenfall	Vattenfall applies for planning consent
Development	Seagreen pair	1,500	UK	SSE/Fluor	Seagreen to take part in CfD auction
Development	Hornsea 2	1,400	UK	Ørsted	Siemens Gamesa wins 1.4GW order
Development	Creyke Beck A	1,200	UK	Statoil/SSE	Creyke Beck A to take part in CfD auction
Development	Creyke Beck B	1,200	UK	Statoil/SSE	Creyke Beck B to take part in CfD auction
Development	Teesside A	1,200	UK	Statoil/SSE	Teesside A to take part in CfD auction
Development	Ocean Wind	1,000	US	Ørsted	Ørsted wins first permit for Ocean Wind
Development	Vineyard Wind	800	US	Avangrid Renewables/COP	Avangrid and COP win in Massachusetts
Development	N.I. Sea Array	750	Ireland	Element Power	Element takes over offshore scheme
Development	Borssele 3 and 4	731	Netherlands	Partners/Shell/Mitsubishi/others	Financial close for 731MW Borssele pair
Development	Changua South East	605	Taiwan	Ørsted	Ørsted secures grid access in Taiwan
Development	Changua NW	583	Taiwan	Ørsted	Ørsted wins Taiwan's second auction
Development	Zhang Fang	552	Taiwan	CIP	CIP wins Taiwan's first offshore auction
Development	Hai Long 3	512	Taiwan	Northland Power/Yushan Energy	Hai Long 3 secures grid access in Taiwan
Development	Fécamp	498	France	EDF/Enbridge/Wpd	France cuts subsidies to €150/MWh
Development	Hohe See	497	Germany	EnBW/Enbridge/CPPIB	CPPIB buys 24.5% stake from Enbridge
Development	Saint Brieuc	496	France	Iberdrola/Avel Vor	France cuts subsidies to €150/MWh
Development	Dieppe-Le Tréport	496	France	Engie/EDP/Caisse des Dépôts	France cuts subsidies to €150/MWh
Development	Ile d'Yeu	496	France	Engie/EDP/Caisse des Dépôts	France cuts subsidies to €150/MWh
Development	Saint-Nazaire	480	France	EDF/Enbridge	France cuts subsidies to €150/MWh
Development	Baltic Eagle	476	Germany	Iberdrola	Iberdrola wins in Germany, FID in 2020
Development	Nearf na Gaoithe	450	UK	EDF Renewable Energy	EDF buys Nearf from Mainstream
Development	Coursesulles-sur-Mer	450	France	EDF/Enbridge/Wpd	France cuts subsidies to €150/MWh
Development	Borkum Riff. West 1	420	Germany	Ørsted	Ørsted wins auction with no subsidy
Development	Revolution	400	US	Deepwater Wind	Deepwater wins in Rhode Island
Development	Formosa 2	378	Taiwan	Macquarie/Swancor	Formosa 2 secures grid access in Taiwan
Development	Yunlin 1	360	Taiwan	Wpd	Wpd wins first Taiwan's offshore auction
Development	Li Wei	350	Taiwan	Wpd	Wpd wins first Taiwan's offshore auction
Development	Yunlin 2	348	Taiwan	Wpd	Wpd wins first Taiwan's offshore auction
Development	Arcadis 1	348	Germany	Parkwind	Parkwind buys Arcadis following auction
Development	Taichung Southwest	337	Taiwan	Ørsted	Ørsted wins Taiwan's second auction
Development	Kaskasi	325	Germany	Innogy	Innogy secures support for Kaskasi
Development	Thanet 2	300	UK	Vattenfall	Vattenfall applies for planning permission
Development	Zhong Neng	300	Taiwan	China Steel/CIP	CIP and China Steel win in Taiwan
Development	Taipower	300	Taiwan	Taipower	Taiwan's utility wins 300MW
Development	Hai Long 2 (Phase 1)	300	Taiwan	Northland Power/Yushan Energy	Phase 1 secures grid access in April
Development	Changua South West	295	Taiwan	Ørsted	Ørsted secures grid access in Taiwan
Development	Hai Long 2 (Phase 2)	232	Taiwan	Northland Power/Yushan Energy	Phase 2 secures grid access in June
Development	Northwester 2	224	Belgium	Parkwind	MHI Vestas wins order for its 9.5MW
Development	Revolution	200	US	Deepwater Wind	Deepwater adds 200MW in Connecticut
Development	Redwood Coast	150	US	EDPR/Principle Power/others	EDPR and Principle join 150MW floater
Development	Gode Wind 4	132	Germany	Ørsted	Ørsted to build 132MW at €98.30/MWh
Development	Formosa 1	120	Taiwan	Macquarie/Ørsted/Swancor	Formosa 1 reaches \$626m financial close
Development	Albatros	112	Germany	EnBW/Enbridge/CPPIB	CPPIB buys 24.5% stake from Enbridge
Development	Westland	48	Taiwan	CIP	CIP wins Taiwan's first offshore auction
Development	Atlantic City	24	US	EDF Renewable Energy	EDF to buy 24MW pilot from Fishermen's
Development	Borssele 5	19	Netherlands	Van Oord/Investri/Green Giraffe	Trio wins at Borssele 5, picks MHI Vestas
Development	Wikinger Sud	10	Germany	Iberdrola	Iberdrola wins in Germany, FID in 2020
Early Stage	Undisclosed	1,000	South Korea	Gyeongbuk/Macquarie	Partners to develop 1GW floating project
Early Stage	Morro Bay	1,000	US	Trident Winds/EnBW	Partners to develop 1GW floating project

CORPORATE M&A DATABANK

In each Finance Quarterly, we cover the most notable corporate M&A deals in wind in the last quarter, and look at one key deal

In May, China Three Gorges made a €9.1bn bid to buy Portuguese utility EDP. The Chinese giant has been EDP's largest individual shareholder since 2011, and owns 23.3%. Now it wants to buy the other 76.7%.

This looks like it would be an exciting deal for CTG, which would diversify and expand its portfolio in Europe and Latin America, with a focus on renewables including wind. However, the Chinese will have to fight for it.

EDP has rejected CTG's bid for being too low. In addition, CTG would need to win competition authority approval in the countries where EDP operates. This is why CTG is reportedly looking to find a buyer for EDP's US renewables arm, to smooth the process for a takeover.

The saga has just started and we look forward to seeing how it develops.

If we've missed your big deal, tell us at editorial@awordaboutwind.com

DEALS DONE: M&A DEALS IN WIND (COMPLETED Q2 2018)

TARGET	BUYER	DEAL VALUE*	COMMENT	TARGET COUNTRY	BUYER COUNTRY
Westar Energy	Great Plains	€12bn	Great Plains closes \$14bn Westar takeover	US	US
Alstom	General Electric	€2.6bn	GE buys Alstom's stakes in three joint ventures	France	US
Eletropaulo	Enel	€1.7bn	Enel wins race for BRL7.6bn Eletropaulo buyout	Brazil	Italy
Direct Energie	Total	€1.4bn	Oil giant agrees to buy 74.3% of Direct Energie	France	France
Saeta Yield	TerraForm Power	€1.04bn	TerraForm acquires 95% of Spain's Saeta Yield	Spain	US
TerraForm Power	Brookfield R.P.	€562m	Brookfield grows its stake in Terraform to 65%	US	Canada
Neija Energia	Eesti Energia	€493m	Estonian utility agrees €493m Neija buyout	Estonia	Estonia
Kallista	Boralex	€223m	Boralex expands in France with €223m buyout	France	Canada
Tilt Renewables	Mercury	€91m	Kiwi utility buys 20% of Australian developer	Australia	New Zealand
Infigen	Brookfield A.M.	€32m	Brookfield buys 9% of Aussie developer Infigen	Australia	Canada
UPC Renewables	Ayala Corp.	€26m	Philippines' Ayala buys 30% of Australia's UPC	Australia	Philippines
Yushan Energy	Mitsui	-	Mitsui buys 50% of Yushan to enter Taiwan	Taiwan	Japan
Bright Energy Inv.	Cbus Super	-	Cbus acquires 40.5% of Aussie firm Bright Energy	Australia	Australia
Bright Energy Inv.	DIF	-	Dutch fund buys 39.6% of Aussie developer	Australia	Netherlands
Seaproof Solutions	Balmoral	-	Scottish engineering firm expands in offshore	Norway	UK
FIM Services	Gresham House	-	Asset manager buys renewables investor FIM	UK	UK
Vortex Energy	E.On	-	E.On buys German unit of wind developer Vortex	Germany	Germany
Axis Renewable Group	World Wind & Solar	-	Renewables services provider expands in wind	US	US
Becon Consultancy	BayWa r.e.	-	BayWa buys UK-based renewables consultancy	UK	Germany
Invenery	CDPQ	-	CDPQ grows its stake in Invenery to 52.4%	US	Canada
Gulf Power	NextEra Energy	-	NextEra buys wind pioneer as part of \$6.5bn deal	US	US
Xero Energy	ITP Energised	-	Scottish renewables consultancies agree merger	UK	UK
Langa Group	Engie	-	Engie strengthens position in wind with Langa buy	France	France
Gaia Wind	IPWI	-	Middle Eastern investor saves Scottish wind firm	UK	UAE
Innosea	LOC Renewables	-	LOC buys 70% of Innosea for expansion drive	France	UK
Entap	Greensolver	-	Greensolver buys investor Entap to grow in wind	UK	France
Lumo	Societe Generale	-	Bank buys renewables crowdfunding platform	France	France
Total Wind	Global Wind Services	-	Danish firm acquires service provider Total Wind	Denmark	Denmark

FIVE TO WATCH: ONGOING WIND M&A DEALS

TARGET	BIDDER	DEAL VALUE*	COMMENT	TARGET COUNTRY	BIDDER COUNTRY	STAGE
Innogy	E.On	€60bn	Eon and RWE agree €60bn tie-up including Innogy	Germany	Germany	Deal Agreed
Orange Renewable	Greenko	€797m	Greenko announces \$922m buyout of Orange	India	India	Deal Agreed
EDP	China Three Gorges	€9bn	Chinese negotiate €9bn EDP buyout for green push	Portugal	China	Early Stage
Mytrah Energy	CPPIB	€259m	CPPIB in talks to acquire a \$300m stake in Mytrah	India	Canada	Early Stage
Polenergia	PGE	€172m	PGE launches PLN740m buyout bid for Polenergia	Poland	Poland	Early Stage

*Transactions converted to € for ease of comparison



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THE RISE OF WIND-POWERED DATA CENTRES

by *Richard Heap*,
Editor-in-Chief

People in the wind sector will rightly get excited about electric vehicles, and how they could seriously raise demand for electricity. Phwoar! Look at those charging points!

But let's not let this overshadow another sector that is a big user of electricity and where demand is growing. Yes, data centres. Okay, this may not be as sexy as a load of shiny new cars – unless you have a fetish for rooms full of computers – but it is still a power-hungry sector that could help re-shape the electricity sector.

In the 'Global Cloud Index' report from IT giant Cisco that came out in late 2016, the company forecast that internet traffic going via data centres could rise from 4.7ZB at the end of 2015 to 15.2ZB at the end of 2020, or a threefold increase.

Growth forecasts

Installed capacity in data centres is set to grow fivefold over the same period to around 1.8ZB in 2020. That's huge.

The ZB there is a 'zettabyte', which is a unit of digital information that is equivalent to about 1trillion gigabytes, and the additional demand for this data is coming from two trends with which you will be familiar.

First, increased demand from consumers for services like video streaming and social media on their phones and computers; and second, more businesses storing their data remotely 'in the cloud' rather than locally.

Cisco says this means that the number of 'hyperscale' data centres globally needs to grow from 259 at the end of 2015 to 385 at the end of 2020; and that 53% of all internet traffic in 2020 would go through those data centres, up from 42% now.

And what is 'hyperscale' in this context? Well, this refers to the company that is operating or owning the data centre, not the data centre itself.



Cisco says it means a company that raises sales of \$8bn a year from e-commerce; \$4bn from internet, social networking and search engines; \$2bn from software-as-a-service services; or \$1bn from infrastructure-as-a-service. That includes giants like Amazon, Alibaba, Apple, eBay, Facebook, Google, Rackspace, Salesforce and Yahoo.

These companies may not own the data centres themselves. Some will, but others might simply lease it from an independent developer. However, even in those cases, many have green goals and will power it with wind energy.

Amazon, Apple, Facebook and Google are among the corporate energy buyers who have committed to source 100% of their electricity need from renewables and signed power purchase agreements (PPAs) with wind farm operators.

And so, if they need to build more data centres to cope with the growing demand for data the firms such as Cisco have identified, then that should mean more PPAs for the wind sector and more certainty for the investors in the schemes that will be providing the electricity.

We also wonder about another potential knock-on effect. Will we see more of these

firms develop wind farms by themselves?

At present, PPAs are a well-used model – mainly in the US and increasingly in Scandinavia – and we have seen these firms get involved as a co-developer on wind projects. It seems likely that one or more of these firms could easily find a piece of land and then develop the project themselves.

This would give those businesses the security of supply they demand, and with the potential to sell any power that they do not use. Let's not forget that Apple set up an arm a few years ago to sell excess power produced by its solar panels.

In the meantime, this is an opportunity for wind developers to get the certainty for their projects by securing PPAs. In the last year, we've seen large PPAs signed by manufacturers including Anheuser-Busch, General Motors and Kimberly-Clark, and it is great to see that diversity of firm in the market for wind power.

But we should not forget the large tech companies who, whether we like or not, are a big part of many of our lives. Many have been pioneers in the PPAs market and, thanks to the growth of data centres, should be in the market to sign more of them in the next 12 months. ■

KEY DATES

Learn more about PPAs at our Financing Wind Europe conference in London on 1st November.

Do you want to learn more about the growth of corporate PPAs in the European wind market? Then come to our annual Financing Wind Europe conference at The Crystal in London on 1st November.

This is one of the key topics for investors in the European wind market that we, and a series of big-name speakers, will be discussing at this exclusive one-day event. We also plan to focus on areas including investment trends, emerging markets, offshore wind, and risk.

If you are a member then you are able to attend this conference as part of your membership package. You can secure a place at www.financingwind.com, and please nominate a colleague to attend if you can't be there yourself.

If you're not yet a member, you can book your place with an early bird rate of 25% off until the end of July. You can find out full details at www.financingwind.com, where we also have a draft agenda and will be sharing full details in the next few months. See you there.

EVENTS

Legal Power List - 14th August

Finance Quarterly Q4: Emerging Markets - 9th October

Top 100 Power People - 13th November

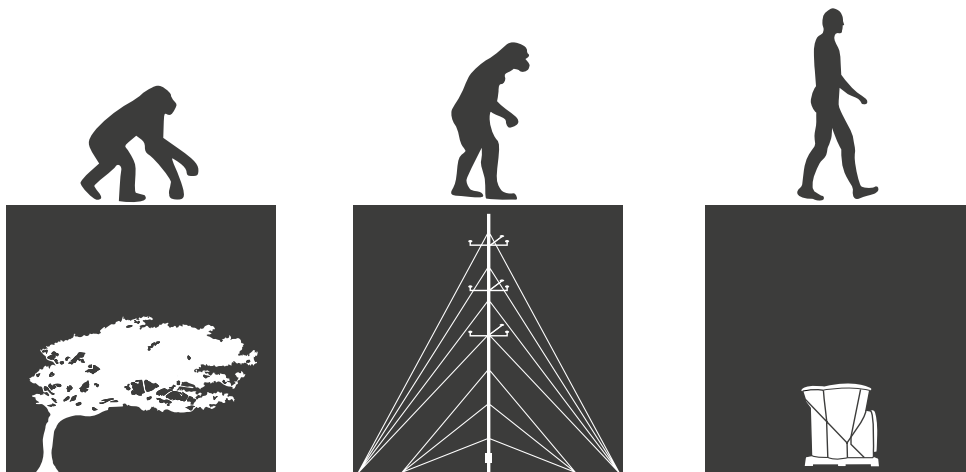
London: Q3 Quarterly Drinks - 6th September

Financing Wind London - 1st November

London: Q4 Quarterly Drinks - 29th November

New York: Q3 Quarterly Drinks - 13th September

New York: Q4 Quarterly Drinks - 13th November



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A WORD ABOUT WIND

