C&I Procurement Update

Issue 4: February 2021

Introduction

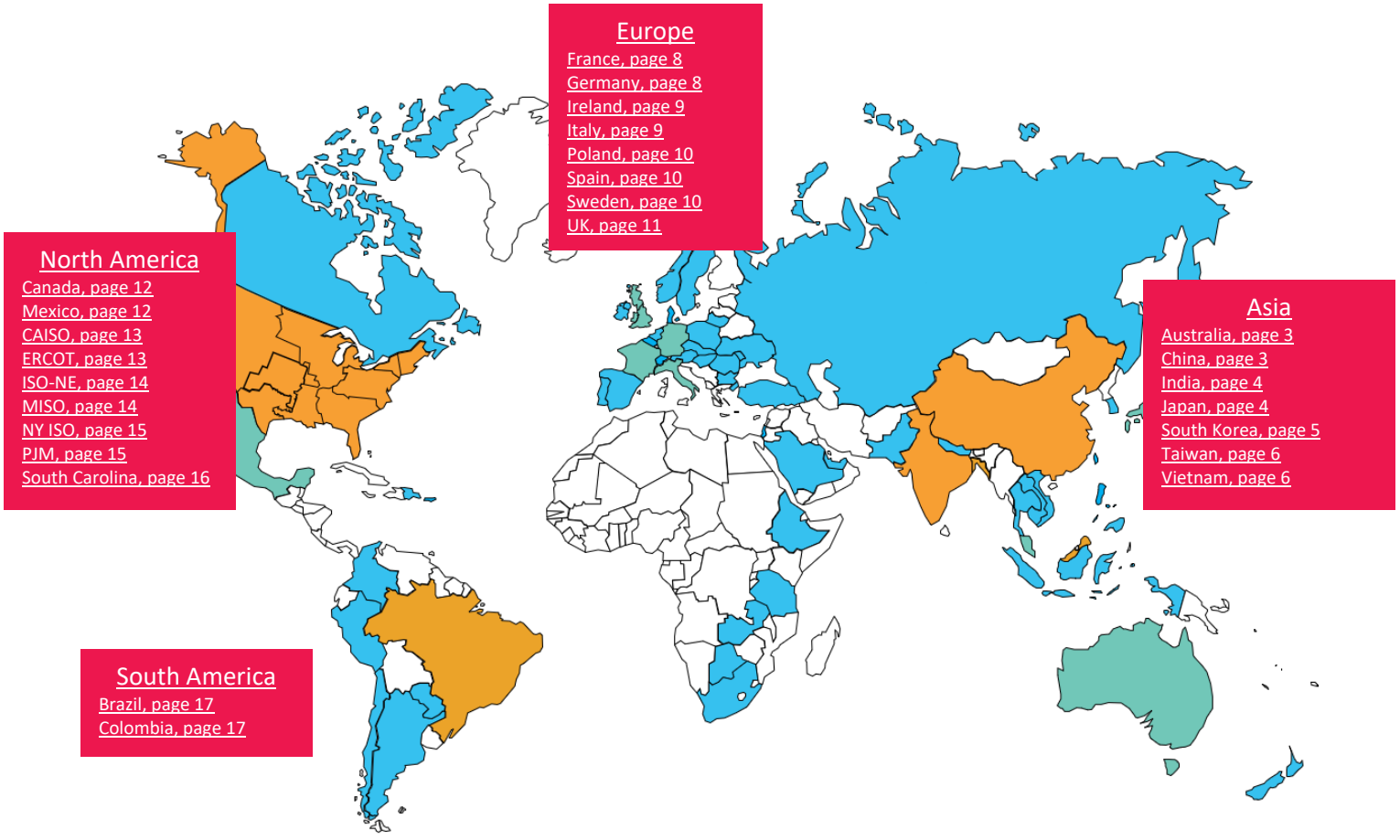
Large-scale energy buyers continue to drive the expansion of international clean energy markets as they look to reduce the energy impact of their operations and supply chain worldwide. The tri-annual **C&I Procurement Update** highlights international energy market updates, connects you with international organizations supporting sustainability practitioners, and communicates best practices implemented in the market to accelerate the procurement of renewable energy.

If you are interested in providing input, please contact the REBA team: supplychain@rebuyers.org

Table of Contents

The map below highlights the energy markets large energy buyers are interested in procuring renewable energy. Each issue of the C&I Procurement Update will reflect relevant market updates.

You have the option to read through the update in its entirety *or* use the map to jump to the specific market of interest.



Legend: identified buyer interest

Low **Med** **High**

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Issue 4: February 2021

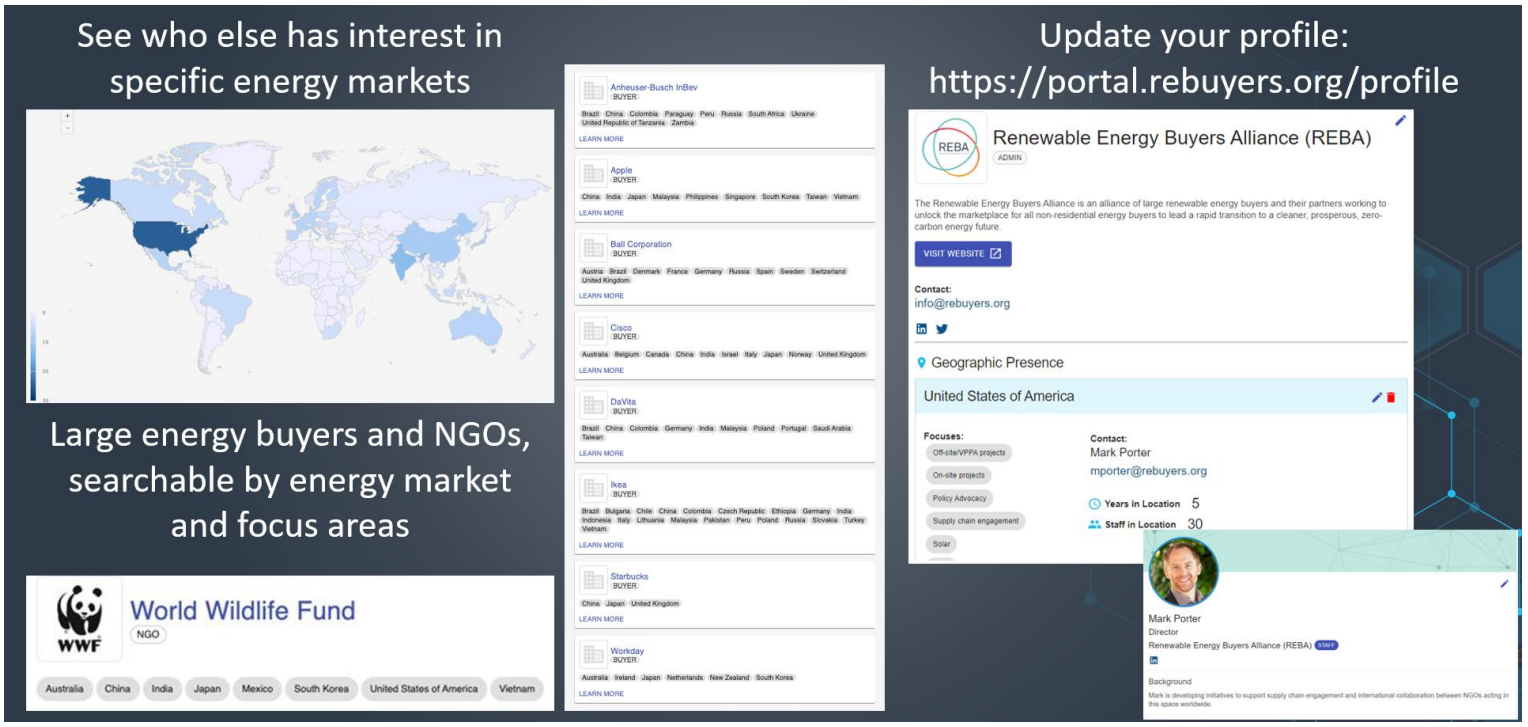
All buyer companies can connect with peers, worldwide

The International Connection Platform

The International Connection Platform (the Platform) enables connections and relationships among buyers and NGOs to accelerate sustainable energy goals in any energy market worldwide.

Through the Platform, you can see who else has interest and experience in specific energy markets, create company profiles, and connect with others working in markets of interest.

The Platform is free to any energy buyer and NGO acting to accelerate corporate procurement of renewable energy. To register and use the Platform, visit: https://rebuyers.org/international-connection-platform/



We would like to thank the We Mean Business Coalition for investing in this unique connection tool and the many partners and members that have been involved in feedback and development of the Platform.

Worldwide Wednesdays- an international connection discussion series

Worldwide Wednesday is a monthly virtual discussion series to share the latest developments and opportunities in renewable energy procurement in international markets of interest. Sessions will be co-hosted by energy buyers and NGOs with interest or experience in specific global energy markets. If your organization is interested in co-leading a session, please contact supplychain@rebuyers.org.

Future Updates

The C&I Procurement Update is meant to supplement existing information and research on international markets for large-scale energy buyers and should not be seen as a comprehensive product covering all aspects of an energy market.

REBA and all contributors welcome feedback on the content and will endeavor to expand market coverage pending interest.

To provide direct feedback, please contact the REBA team: supplychain@rebuyers.org

Contributor Acknowledgements

REBA is proud to collaborate on the C&I Procurement Update with peer NGOs and for profit companies to support large-scale energy buyers' journeys towards emissions reductions through the implementation of renewable energy and to accelerate the transition to a zero-carbon energy system.

The following collaborators supported the development of this C&I Procurement Update issue based on areas of interest and activity as identified by corporate buyers. Please note, not all NGOs active in the energy sector were able to contribute.

Contributors: NGOs

BRC Australia
BRC Canada
BRC China
RE 100
RE-Source
Rocky Mountain Institute
The Climate Group
World Resources Institute

REBA extends sincere gratitude to the NGOs that contributed and a special thanks to The We Mean Business coalition for supporting greater collaboration among NGOs worldwide and specifically the International Connection Platform.

Contributors: For profit companies

3Degrees
CustomerFirst Renewables
Edison Energy
Ernst & Young LLP
LevelTen Energy
Mt. Stonegate
Schneider Electric

Asia

Australia

Previous issues with content: 1 | 2 | 3

With thanks to BRC Australia

Amidst the turbulence of Covid-19, Corporate Renewable Power Purchase Agreements (PPAs) had a record year in Australia. Over 1 GW of deals with solar and wind farms were signed by corporates, universities, and councils, a remarkable result in the context of recession and falling wholesale electricity prices. As retailer investment in solar and wind sharply declined, after an investment boom to meet obligations under the 2020 national Renewable Energy Target, Corporate Renewable PPAs played a key role in 2020 avoiding a boom-bust cycle that has been a feature of the Australian renewable energy market for the past decade.

2020 saw 26 Corporate Renewable PPAs announced, directly contracting 1.3 GW of renewable energy and supporting more than 4.5 GWh of generation. Over $2 billion will be invested in renewable energy, led by household name businesses (such as Aldi, Amazon, Coles), large energy users (Newcrest Mining), and a range of mid-sized public sector buyers including universities and local governments. Together with publicly-owned retailers (CleanCo, Stanwell and CS Energy in Queensland, and Snowy Hydro in New South Wales), Corporate Renewable PPAs prevented a collapse in renewable energy investment as retailers withdrew from the market.

There are considerations to keep in mind when thinking about prospects for 2021. An industry survey by BRC Australia found around one-third of developers and consultants had observed a decline in buyer demand for PPAs, much lower than would be expected in the context of a pandemic, recession, and a fall in wholesale electricity prices. Nonetheless, there may be a hangover from 2020 with less deals being initiated, although wholesale electricity prices are also expected to be relatively stable during 2021 and could enhance the business case. There are good reasons to expect continuing PPA demand, in particular, the volume of organizations with ambitious renewable energy and/or carbon targets is increasing and ambitious programs by the three largest state governments were announced in late 2020. Governments are expected to create demand for Corporate Renewable PPAs in 2020 and beyond in a variety of ways, from acting as an anchor buyer (enabling industry to join Government PPAs), establishing public retailers on-selling PPAs, and other measures to facilitate PPAs within renewable energy zones.

Read the BRC-A's 2020 State of the Market report on Corporate Renewable PPAs for a detailed analysis of the Corporate Renewable PPA market.

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China (National) (Guangdong) (Jiangsu)

Previous issues with content: 1 | 2 | 3

With thanks to Rocky Mountain Institute's BRC China

As reported in Issue 3, China's 2060 carbon neutrality pledge continues to build momentum for change and rising expectation for power sector decarbonization across China, indeed, Baowu Group, a leading steel producer, announced plans to achieve carbon neutrality by 2050.

At a provincial level, a trend is growing that allows increasing volumes of power in provincial power markets, and that provincial markets are beginning to open to renewable energy project participation and C&I procurement. For instance, Shandong province indicated in November 2020 that utility scale renewable energy generators are encouraged to participate in the direct power purchase agreement market. Guangdong, taking a step further, unprecedentedly gave clarity in November 2020 on (1) the relationship between renewable energy participation in direct power purchases (RE DPP), and (2) the "renewable power consumption guarantee mechanism" (referred to as RPS here). Based on the Guangdong policy, the Guangdong provincial power exchange center will play an

important role in verifying company's RPS compliance through any RE DPP agreements, as well as facilitating and managing transactions among RPS-obligated parties. It is hoped the planned coordination between RE DPP and RPS systems will provide system credibility and reduced double counting risk, and as 2021 is the first implementation year of provincial RPS systems Guangdong's legislation could become a standard for other provinces to follow.

Meanwhile in Jiangsu, additional clarity on transacting with renewable energy in the same local grid area was provided through a trilateral contract template for transactions with power sellers, buyers, and the grid company to clarify the rights and obligations of each participant.

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India

Previous issues with content: 1 | 2

With thanks to Ernst & Young LLP

The falling costs of renewables technology coupled with increased focus on sustainability has led to a rise in renewable procurement by Indian corporates. It is estimated that by end of 2023, the Indian corporate sector has the potential to offtake ~25 GW of renewable power. Since corporates in India cross-subsidize the electricity tariffs for other sectors, such as residential and agriculture, the adoption of renewable energy through Open Access leads to a financial burden on already stressed state electricity distribution companies. In response, these distribution companies and regulators have rolled back favourable renewable Open Access policies by introducing surcharges on electricity procured which act as a major deterrent to PPA models. As a result, the market is currently witnessing a shift from PPAs to co-investment and complete ownership by corporates for renewable energy plants to insulate against these surcharges. It is expected that as the Indian economy recovers from COVID-related lockdown restrictions, large corporate buyers will again explore renewable power procurement to reduce their electricity related operational costs.

In September 2020, a dedicated renewable energy power market, Green Term Ahead Market (GTAM) was launched by the Indian Electricity Exchange Limited. The GTAM could unlock corporate renewable power procurement potential as corporates can use GTAM to shift from current practice of long-term PPAs to shorter duration contracts and other types of procurement model such as contracts for difference, and should be watched.

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Japan

Previous issues with content: 1 | 2 | 3

With thanks to 3Degrees

As reported in an earlier update, Japan's system of renewable attributes transitioned in 2020 to a "Non-Fossil Certificate" system (NFCs). NFCs are registered to generators, and can be sold only alongside the generated electricity, and only to electricity retailers. Retailers can create renewable electricity products for their retail customers using NFCs, but retailers cannot sell NFCs unbundled. Retail electricity products, therefore, are the quickest and perhaps most cost-effective near-term renewable solution for most buyers; by definition, these products rely on existing renewable resources so would not be considered "high impact." Limited quantities of unbundled attributes from other schemes - J-Credits and Green Electricity Certificates - continue to be available and expensive ($12 - $40/MWh).

Regarding retail products:

- NFCs are divided into three categories of generation: FIT NFCs - for attributes from renewable projects receiving Feed-in-Tariff payments (for example, most wind and solar projects); Non-FIT NFCs - for attributes from renewable projects which are not receiving FIT payments, such as most hydropower; and Non-Renewable NFCs - for nuclear power and other non-fossil but non-renewable sources. None of the attributes are attached to a tracking system, so they are not automatically traceable to the specific generation project nor the type of generation - only to the categories noted here.
- FIT NFCs must be sold via an auction held quarterly on the JEPX and are subject to a price floor and ceiling (1.3 and 4 yen/kWh, respectively). The most recent auction prices averaged 1.3 yen/kWh - the price floor. Non-FIT renewable NFCs may be sold bi-laterally or at auction and have no price floor. The first non-FIT renewable auction was in November 2020, and the clearing price was 1.2 yen/kWh (about $11.60/MWh). Few non-FIT renewable NFCs were sold at auction relative to the volume generated, leading us to conclude that most NFCs of this type are either going un-used, or being sold via bi-lateral contracts with confidential pricing, such as between a utility owner and its related electricity retailer.

Regarding PPA options:

- Renewable subsidy programs in Japan are changing. The FIT is phasing out, and a new program which can be thought of as a 'one-sided contract for differences subsidy' is being implemented as of April 2022. The new program will subsidize qualifying renewable projects via a floating payment which trues up the market price to an agreed-upon 'feed in premium' price. The specifics for both market and FIP price determination are not yet decided, though specific options are under discussion. It does appear that the new system will enable unbundling of NFCs from FIP project electricity sales as would be required for Virtual PPA transactions or related non-retail renewable procurement mechanisms.
- Corporate physical PPA arrangements look to be excluded from participation in the FIP program but could continue to be structured privately without subsidies (as is the case today). Unfortunately, developers may be reluctant to commit to new project transactions until the details of the FIP program are finalized and its economic attractiveness made clear in the coming months.
- Corporate buyers, as individuals and as groups, have been actively engaging/pressuring METI, the regulatory agency, to make renewable options more affordable and more widely available. Additional changes and possibilities to emerge over the coming 1-3 years are expected.

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South Korea

Previous issues with content: -

With thanks to The Climate Group

This January, the South Korean government has revised their electricity regulations to implement a suite of 'RE100 policies.' For context, in 2019, the government first promised to introduce policies enabling companies to buy renewables and reaffirmed intentions in a Green New Deal last year. The government held off introducing some of the measures until now to be seen supporting corporate sourcing in a meaningful way. Following last month's updates companies will be able to source renewables in the following five ways:

1. Green pricing - a green tariff based on an auction scheme
2. REC purchases - REC trading platform will be established (not linked with RPS)
3. Indirect PPAs – PPAs with Korea Electric Power Corporation (KEPCO) as an intermediary (renewable energy generation stations larger than 1MW can sell power directly to KEPCO, which then sells power to consumers)

4. Equity investment in renewable energy projects
5. Self-generation, for example on-site solar PV projects

SK Group, the first Korean company to join RE100 in December, demonstrated that Korean companies seek access to renewables (and not just international companies). The Ministry of Trade, Industry, and Energy is now introducing the 'Korean RE100 system (K-RE100)' to allow more domestic electricity consumers to voluntarily purchase and use renewable energy by registering with the Korea Energy Agency.

South Korea has been one of many challenging markets to source renewables and these regulatory reforms are a very welcome step to unlock the market.

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Taiwan

Previous issues with content: 1 | 2

With thanks to Mt. Stonegate Green Asset Management

In November 2020, the Bureau of Standards, Metrology, and Inspection (BSMI) announced a second batch of Taiwan Renewable Energy Credit (T-REC) transfers to 10 companies equating to 700,000 MWh, a x7 increase over the first batch announced in 2019. The BSMI press release can be seen here (in Chinese) and shows the barely tapped demand from the voluntary market.

Building on November's announcement, a 'Large User Act' was passed requiring over 300 end-users with a contracted capacity of over 5,000kW to purchase bundled electricity with T-RECs. Presently, T-REC prices, determined via bidding, average around 30-35% of the price of electricity. End-users could benefit from executing renewable energy commitments through long-term contracts to increase price competition and supply options for corporate buyers, especially considering that project development plans imply an under-supply situation to meet voluntary-market demand, i.e.: project developers are not seeing, or corporates aren't showing, the demands from Taiwan's global supply chain leading industries, particularly the manufacturing sector, for renewable energy. In practical terms a lack of supply could challenge corporates, such as Taiwan Semiconductor Manufacturing Company (TSMC), in meet their targets.

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Vietnam

Previous issues with content: 1 | 2 | 3

With thanks to Schneider Electric

While Vietnam's pilot Direct Power Purchase Agreement (DPPA) program still awaits formal launch, there is significant activity in the corporate buyer community as companies position themselves to take advantage of the opportunity when it is approved by the government. To meet tight program timelines, companies need to explore the market and find PPA options in advance of the government's approval. In addition, competition for projects exists, given the high levels of demand and interest – another reason for entering the market now if a company has not done so already.

In a region with limited PPA options, Vietnam provides an interesting opportunity to address consumption in part of SE Asia, but companies would be well advised to move fast if they haven't already.

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Europe

France

Previous issues with content: 3

With thanks to Ernst & Young LLP

Historically, the corporate PPA market in France has lagged its European neighbors, mainly because of the rather generous incentive scheme in place in the country for both solar PV and wind, which made corporates an unattractive option for project developers. However, the ending of the feed-in-tariff period for an increasing number of plants and the switch to competitive auctions, with intense international competition, have pushed project developers to find new routes to market and to consider corporate PPAs as a credible option.

In this context, the year 2020 marked a significant development for the French corporate PPA market. Major deals disclosed included a corporate PPA signed between the telecom company Orange and Canadian developer Boralex, for an annual volume of 67 GWh for five years, an agreement between the airport operator ADP with solar developer Urbasolar to buy an annual volume of 43 GWh, and a deal between Decathlon and Voltalia to buy electricity produced from a 16 MW solar PV plant from 2023. This growing demand underlines that, even if French electricity is largely produced from nuclear and decarbonized, procurement of renewable electricity through PPAs is seen by corporates as one of the key options for achieving their sustainability and climate goals.

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Germany

Previous issues with content: 2

With thanks to Ernst & Young LLP

Heading towards climate neutrality by 2050, renewables power production surpassed production from fossil fuels in Germany in 2020 for the first time. The German regulatory environment is driving decarbonization efforts with significant effects on companies (e.g. by the Climate Protection Act). While specific sectoral targets for emissions reduction are enforced by carbon pricing, the awareness of carbon footprints within German corporates increases across the board and translates into corporate strategies. A promising future has a few hurdles to overcome:

- Short-term: the ongoing COVID-19 pandemic is slowing project development as construction projects face delays due to temporary lack of supply for key parts and work force;
- Mid-term: the recently updated EEG 2021 renewable energy subsidy scheme may have a limited impact on corporate procurement as asset owners with expired feed-in tariffs are now allowed to opt for additional subsidies until 2022 instead of making the asset available to the market. However, many business cases should favor PPAs as subsidies may well be lower than expected PPA prices, especially when considering the high balancing costs of old projects due to non-availability of remote-control functionality and lower market values caused by outdated technology; and
- Long-term: the potential increases significantly, as auction bids for offshore wind volumes are decreasing dramatically, gravitating towards subsidy-free bids, which makes the corporate PPAs a valid alternative. Eventually, the demand for renewable energy may exceed supply, as renewable power is also the source for Germany's green hydrogen ambition, one major example of several electrification trends. A directive outlining the required quality of renewable power required to produce EEG-levy exempted green hydrogen is expected by the end of Q2 2021, and high quality standards will likely increase demand for renewable energy in Germany.

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Ireland

Previous issues with content: 1 | 2 | 3

With thanks to Ernst & Young LLP

Corporate PPAs are gaining popularity and traction in Ireland. This can primarily be attributed to:

(i) the replacement of the government subsidy feed in tariff scheme, with a competitive auction support scheme, the Renewable Electricity Support Scheme, which levels the playing field between government support and Corporate PPAs;
(ii) renewable electricity generation prices, which continue to fall; and
(iii) large electricity users, particularly in the technology/ data centre sector taking a more active role in corporate sustainability.

Corporate PPAs are viewed by the Irish government as a key component to achieving Ireland's 2030 renewable energy targets and a key enabler in developing Ireland's ambitious renewable pipeline. The Irish government has set a goal for 15% of renewable electricity to be sourced through corporate PPAs by 2030.

The viability of corporate PPAs in Ireland is evidenced by the PPAs recently signed by technology giants, and PPA procurement processes in progress (such as with a leading Irish financial institution). Increasingly, developers are also seeking to be corporate PPA counterparts to diversify their funding model/pipeline from purely RESS-based funded projects.

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Italy

Previous issues with content: 1 | 2 | 3

With thanks to RE-Source

The pandemic-driven economic situation and ensuing price volatility had a dampening effect on PPA transactions and renewables investment, more broadly, in 2020. The COVID-19 pandemic, in combination with low energy input costs, such as natural gas, significantly impacted Italian wholesale electricity prices in 2020. Prices averaged 39 €/MWh in 2020, the lowest recorded annual average price since the beginning of the Italian electricity market and lower than the 52 €/MWh 2019 average. Forecasts expect a return to pre-pandemic conditions by 2022-2023.

There is cause for optimism in the coming year. The number of Italian PPA offers continues to increase: a boost during the post-COVID recovery phase can be expected if authorization procedures are simplified and renewable market parity occurs thanks to technology cost decreases. In addition, the Italian government's Recovery and Resilience National Plan, presented for the allocation of European financial resources in the medium-term, has proposed a set of interventions focused on "Renewable Energy, Hydrogen, and Sustainable Mobility." Although still under discussion, the proposal references potential measures to provide renewable energy project support and public instruments to hedge against long-term PPA risks.

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Poland

Previous issues with content: 1 | 2 | 3

With thanks to Altenex Energy

Poland continues to be an intriguing market for buyers seeking opportunities to add renewable energy to a carbon-intensive grid. With locally sourced coal constituting a large portion of the fuel mix, there is a strong case for a renewable energy PPA both in terms of carbon impact and market fundamentals. There are also signs that Poland's regulatory regime is becoming more receptive to renewable energy development. In January, the Polish Parliament passed the Offshore Wind Act which will regulate the development of offshore wind projects in the Polish Baltic Sea. The bill is expected to be signed into law by President Andrzej Duda marking a positive step in wind energy deployment in this market.

There remain, however, obstacles to renewable energy development in Poland that will continue to slow PPA activity relative to other, very active, European markets. For one, Poland is only now considering a change to its "10H" setback requirement that requires wind projects to be sited ten times the height of the turbines away from other structures or areas considered to be protected. This has significantly thinned the pipeline of projects in development. As development slowly rebounds with softening regulations, corporate and institutional buyers will need to compete with upcoming government auctions for PPA capacity. That said, Poland remains one of the more intriguing markets in Europe due to both its regulatory backdrop, potential carbon impact, and market fundamentals.

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Spain

Previous issues with content: 1 | 2 | 3

With thanks to LevelTen Energy

Spain remains one of the most active project development markets in Europe, thanks to the relatively high availability of suitable land and favorable PPA values, and is driving competition among developers that continues to put downward pressure on PPA offer prices.

LevelTen's P25 Index of PPA offer prices for Spanish solar projects dropped 5.2% from Q3 to Q4 2020, while wind prices dropped 9.3% in that same period. Spain was the only European market covered in LevelTen's report that saw wind prices decrease quarter over quarter.

The Spanish renewables market is also benefitting from new government-sponsored auctions, which are expected to contract roughly 3 GW per year over the next 6 years, with the first round scheduled for Q1 2021. In addition, the news of a new energy reform bill that includes state-funded PPA credit support of up to 600 million euros is helping reduce risk in Spanish projects, and could lower return requirements and thereby reduce PPA prices.

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Sweden

Previous issues with content: -

With thanks to Ernst & Young LLP

The Swedish PPA market is maturing following an evolution in the type of corporate clients and PPA technology emerging over the past year. For several years, corporate PPAs have driven the rapid expansion of onshore wind projects in Sweden and following a traditional dominance by international metal and mining companies and data centers, we are now seeing smaller corporates actively entering the PPA market.

Low prices in the Northern price zones have made PPA pricing less attractive during 2020, however for consumers and projects in south and central Sweden, pricing is still at attractive levels. Onshore wind continues to dominate the Sweden PPA market but during 2020 we have seen increasing numbers of solar PPAs in support of the expansion of solar projects in south Sweden and there is a growing pipeline of developers and projects emerging in this market segment. Physical PPAs were the dominant structure in the early corporate PPAs, but Virtual PPA structures are increasingly seen.

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UK

Previous issues with content: 1 | 2 | 3

With thanks to Schneider Electric

Interest in the UK corporate PPA market has seen an upswing in the last year, despite Brexit and COVID dominating headlines and bringing their own sets of challenges. PPA economics have been improving, although not to the level of transactions in Spain, Sweden, or Italy. The attractiveness of UK PPAs will depend on the strategic approach. UK deals will be more attractive if there is a focus on in-country PPAs to meet national goals, rather than a European-wide approach. The UK is unlikely to be competitive with other top tier markets in Europe due to economic constraints. It is important to note, for those wishing to cover UK consumption from GOs sources in another European country and still comply with CDP guidelines must sign the PPA by the end of December 2021.

Regarding procurement mechanisms, virtual PPAs are gaining momentum. Most deals signed under the Rehabilitation Outcomes Collaborative (ROC) system employed direct PPAs – and the usual considerations apply when deciding upon direct versus virtual, including any accounting implications of a virtual deal (particularly for those companies reporting under international financial reporting standards) or the complexity of adding in sleeving services under the direct model. The choice of mechanism depends on the risk and benefit analysis, however it is encouraging to see choice in the market.

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North America

Canada

Previous issues with content: 1 | 2 | 3

With thanks to BRC Canada

In December 2020, Capital Power announced it signed a power purchase agreement (PPA) with an undisclosed Canadian company for a 40.5 MW solar plant in southern Alberta. This deal closed out the year with a total of 126MW of PPAs, making 2020 the second largest year for corporate procurement in Canada.

Looking forward, two recently announced requests for proposals (RFPs) will result in the signature of PPAs of significant size in 2021. The City of Edmonton will procure clean electricity to power its operations from projects bidding by March 1, 2021. Additionally, the federal government's procurement will also contribute to meeting the electricity demand from its Alberta operations and to offset the electricity consumption in provinces where clean energy options are not immediately available. The federal RFP is closing on February 16, 2021. Depending on which technologies make it to winning the bids, between wind and solar, these RFPs will result in well over 200 MW of new renewable electricity projects in Canada.

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Mexico

Previous issues with content: 2 | 3

With thanks to Edison Energy

A widespread blackout fueled the ongoing debate of renewable energy penetration in Mexico, reinforcing the perception that renewables are under attack by the current administration (the government has claimed that renewable energy integration has "weakened" Mexico's electric system), creating further uncertainty for corporates seeking to procure renewable energy. On December 28, 2020, Mexico experienced a widespread blackout that interrupted power supply to 10 million users. More than 15 generators went offline, eliminating over 7.5 GW of generation, and some estimates suggest as much as 30% was renewable power. The blackout affected Mexico City, Nuevo Leon, Jalisco, Hidalgo, Yucatan, Quintana Roo, Veracruz, Sinaloa, Tamaulipas, and Coahuila. Power was reestablished to most users within two hours and by the next day all users had power again. There is an ongoing investigation to find out how the blackout started, a fire under transmission lines in Tamaulipas was quickly blamed for the event, however local authorities denied it, and the prompt response of the system operator (CENACE) to avoid wider impacts of the blackout and the swiftness in bringing all users back online was noted.

Adding to the mixed signals sent by the government towards renewables, Mexico's 2020-2034 PRODESEN (Electric System Planning Program, equivalent to an IRP in the US, but on a national scale) that should have been published in May 2020 has yet to be published. Since 2015, PRODESEN has provided a view from the government, regulatory bodies, and state-owned participants (PEMEX, CFE) on actions that should be implemented to develop and strengthen Mexico's Electric System, notable by its absence.

Commercial and Industrial users continue to look for alternatives, such as Qualified Supply and on-site generation, to reduce perceived- and real-risks of CFE-originated supply. CFE risks relate to an aging fleet in operation with low maintenance that is expected to require rate increases in the absence of increased subsidies. CFE's board has recently approved an updated contractual TEPC model -Technology, Engineering, Procurement, Construction that will allow it to contract new infrastructure build at lower costs and avoid rate increases.

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United States (CAISO)

Previous issues with content: 2

With thanks to Schneider Electric

The CAISO market has become increasingly attractive to corporates. Solar PPA rates have declined significantly over the last two years to become some of the lowest in the country, while wholesale spot market and forward pricing remains elevated relative to other ISOs. Despite valid concerns with the high saturation of solar and the corresponding "duck curve" in which afternoon energy prices are generally low and evening energy prices are generally high, new-build solar PPA offers continue to show promising financial outcomes. To help combat the duck curve, informed buyers are wise to request and closely evaluate battery storage solutions that can be paired with wholesale solar PPAs to balance and smooth out the intraday pricing and settlement volatility.

Despite having relatively few corporate deals announced to date, CAISO has the chance to benefit from higher deal flow in 2021 and beyond and counteracting some of the headwinds being experienced in other US wholesale markets. Corporate buyers should know the CAISO market features unique complexities and characteristics related to project development, REC treatment, renewable saturation risk, and physical PPA opportunities that should be understood before initiating any renewable energy procurement event.

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United States (ERCOT)

Previous issues with content: 2 | 3

With thanks to LevelTen Energy

ERCOT remains one of the most attractive corporate procurement markets in North America, due to strong solar and wind resources, an abundant supply of competitive projects, and favorable market structures. In 2020, however, the PPA pricing dynamics in ERCOT altered: according to LevelTen's Q4 PPA Price Index, in 2020, solar PPA prices began to rise in all U.S. ISOs, reversing the slow and steady price decline seen throughout 2019. ERCOT was the least volatile of all the markets, but solar prices still rose steadily throughout the year, and in Q4 they surpassed 2018 levels.

Wind prices in ERCOT rose steeply from Q3 to Q4, reaching a new high and surpassing prices in SPP. Though the IRS extended the placed-in-service safe harbor deadlines for wind production tax credits eligibility from 4 to 5 years as part of COVID relief measures in Spring 2020, the number of 100% and 80% PTC-eligible projects still available for PPA contracting is in short supply. Developers may be increasing PPA prices to compensate for revenue losses caused by decreasing PTC eligibility. In ERCOT, a region with high wind penetration and historically low wind prices, these impacts may be felt even more robustly.

Despite the recent spike in prices, ERCOT PPA prices are expected to remain lower than other ISOs. While other ISOs face issues with interconnection bottlenecks and permitting challenges that limit economically competitive supply, these development issues are not a constraint in ERCOT. As new projects come online, the high renewable penetration rate in ERCOT will lower wholesale energy market prices and cause developers to keep prices low to stay competitive. Corporate buyers should note developments related to the West-to-East ERCOT transmission constraint, a project that has exacerbated basis risk and congestion for projects on the wrong side of the transmission constraint.

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United States (ISO-NE)

Previous issues with content: 1 | 3

With thanks to CustomerFirst Renewables

Spanning Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont, ISO-NE is a challenging market for commercial and industrial buyers due to a combination of factors: a relatively clean grid, reducing the carbon impact of additional renewables relative to other ISOs, and high PPA prices paired with low wholesale revenues, creating unattractive economics. While PPA prices are continuing to fall, the pace has slowed (consistent with the broader US market), meaning that the status quo is likely to persist for the next few years.

As a result, many New England-based buyers have chosen to pursue a two-pronged approach to renewables: transacting for PPAs in markets outside ISO-NE, while pursuing in-state incentive programs to support local renewable development and receive bill credits for their retail electricity load. These programs are tied to a buyer's local utility rate, taking the form of bill credits generated by community solar or clean peak projects. These bill credits can be very valuable and provide guaranteed cost savings. At the same time, an out-of-region PPA enables buyers to make a greater impact on global avoided emissions while providing RECs for their full load, given that many in-region programs do not convey environmental attributes.

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United States (MISO)

Previous issues with content: 1 | 2 | 3

With thanks to Ernst & Young Infrastructure Advisors

Grid connection continues to be top of mind when it comes to renewables projects in MISO. While there is no shortage of projects contemplated — MISO active renewables queue requests submitted in 2019–2020 alone exceeded Wood Mackenzie's 10-year build forecast — the queue size, pace and grid upgrade cost allocation process could remain a stumbling block for new projects, despite the FERC-approved reforms to generator interconnection procedures in recent years. Analysis by the Natural Resources Defense Council found that almost 250 clean energy projects had been withdrawn from the interconnection queue during advanced stages of development over the past four years, with congestion and the reality of imposed network upgrade costs often cited as key reasons. This issue has been acknowledged by MISO, with talks of further queue reform and increasingly including joint planning with SPP around interconnection challenges, although no clear path forward or near-term improvement is visible at this point.

Notwithstanding, MISO may continue to offer an opportunity to replace older carbon-intensive generation in a relatively dirty grid in states that are home to many industrial hubs and corporate headquarters. Solar, in particular, is dominating the queue, representing three-quarters of all 2020 requested capacity, though solar PPA prices are starting to rise in MISO following decreases through early 2020, according to LevelTen's Q4 PPA Price Index. In the second half of 2020, solar prices reached the region's previous high set in Q1 2019, while wind prices in MISO rose even higher in Q4 after a spike in Q3 2020.

This coming year may also start to see the impact of FERC's August 2020 approval for storage to be treated as a transmission asset for transmission planning and project selection. The potential for increasing volumes of storage coming online could further cement the role of solar projects in the region by addressing intermittency and grid stability concerns. Both utility and corporate offtakers could benefit from any resulting uptick in solar or solar-plus-storage projects and PPAs.

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United States (NYISO)

Previous issues with content: -

With thanks to Edison Energy

Corporate buyers with load in New York have a variety of procurement options to consider, as the state is becoming a leader in both distributed and utility-scale renewables. Buyers interested in the New York market should note that the value of a New York State Tier 1 renewable energy certificate (REC) is high, recently valued at $22.09/MWh, driven by the state's aggressive goal of 70% renewable energy by 2030. Although note that Tier 1 RECs are priced under a compliance mechanism, with specific supply-demand constraints, and voluntary transaction prices are likely to differ.

At the distributed generation scale, buyers can pursue on-site behind-the-meter, remote net-metered, or Community Distributed Generation (community solar) options to address facility load. These options allow buyers to take advantage of New York's Value of Distributed Energy Resources (VDER) tariff. Under VDER, power generated by renewable energy assets and sold back to the grid results in a credit on the buyer's bill at a rate based on the VDER Value Stack, which is a reflection of the value solar generation adds at the time it is injected into the grid. Solar asset owners typically also sell project-generated RECs under VDER as an additional revenue stream. This yields more favorable economics but may require the buyer to be comfortable with receiving no RECs, or replacement RECs, preventing asset-specific sustainability claims. Buyers interested in distributed solar options are encouraged to procure in the near term, as the value of the state's financial incentives are scheduled to decline over time.

At the utility-scale, buyers can explore virtual power purchase agreements from off-site wind or solar projects. Developers are actively expanding their portfolios in New York, with over 200 wind and solar projects in the interconnection queue. The most common projects being marketed today are solar projects expected to become operational by the end of 2023. From an economic perspective, the most attractive offers are from projects that plan to sell their RECs for compliance purposes, reducing the required PPA price for energy and replacement RECs (although, note the sustainability-story impact of this approach). Depending on the project's settlement zone and the offtaker's location in the state, NYISO renewables have recently been able to offer price points that can be competitive against wholesale market pricing.

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United States (PJM)

Previous issues with content: 1 | 2 | 3

With thanks to Ernst & Young Infrastructure Advisors

FERC's controversial Minimum Offer Price Rule (MOPR) — which, for the past year, has created regulatory uncertainty in PJM, fears of uncompetitive pricing for renewables, and even calls for states and utilities to exit PJM altogether — is likely to be back under the spotlight and subject to reworking under the new administration. Confirmation that Democrat Rich Glick, a vocal critic of the December 2019 MOPR order, will take over as FERC chairman in July 2021, also indicates a potential unwinding.

While it is likely that many renewable energy projects would be eligible for the various MOPR exemptions announced in 2020, the general uncertainty around this still-untested auction mechanism has inhibited the corporate PPA growth that was previously expected in PJM. Developers could still find themselves facing difficult choices and potential trade-offs under the various exemptions. The competitive exemption, for example, requires that a project forgo state subsidies for the entire asset life or else forfeit capacity revenues — this may limit upside potential for projects initially offering shorter-term corporate PPAs with bundled RECs, which could, in turn, impact PPA pricing decisions. Meanwhile, market forecasters, such as Wood Mackenzie, anticipate that the resource-specific exemption will likely favor utility-scale solar until onshore wind economics recover in the late 2020s.

The volume of projects in the PJM interconnection queue is still encouraging, with around 18GW of solar power capacity, 2.1GW of solar-plus-storage and 5GW of onshore wind expected to come into service in 2021, compared with just 3GW of new natural gas-fired capacity, according to S&P analysis of PJM queue data. Like neighboring ISOs, PJM is preparing for queue reform to address uncertain and sometimes prohibitively high transmission upgrade cost allocations — a number of workshops and market soundings were held in late 2020 and early 2021, and some anticipate a PJM federal filing proposing reforms by mid-2021.

The potential MOPR-reworking and pending queue reform are anticipated to benefit corporates seeking PPAs in PJM, who may otherwise tend to rely on projects that qualify for exemptions to support project economics and can secure timely approvals in the interconnection queue. Any such changes will still take time to crystalize, however, and 2021 is likely to be a year of transition.

The market is also waiting to determine whether PJM's Base Residual Auction in May 2021 — the first since 2018 — will provide further clarity on economics, PPA pricing and exemption eligibility for projects that are expected to come online in 2022–2023. This could also be a key date after which developers taking a "wait and see" approach on the MOPR and its impacts have enough information to pull the trigger, or pull away, on projects for the next December 2021 auction while also providing potential additional insights on the role of corporate PPAs in PJM going forward.

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South Carolina

Previous issues with content: -

With thanks to CustomerFirst Renewables

South Carolina is the 17th largest producer of solar energy in the U.S., with one of the highest growth rates of solar penetration driven by policy changes enacted by the Energy Freedom Act (e.g., removal of net metering caps, open and fair access of utility-scale programs, development of renewable purchase programs, etc.). Nevertheless, South Carolina was a regulated state with limited access to large scale renewable energy procurement that enables energy buyers to achieve their sustainability goals, however, on December 4, 2020, the South Carolina Public Service Commission approved Duke Energy's Green Source Advantage (GSA) program, after a two-year regulatory review process.

Duke GSA -- similar but not to be confused with the North Carolina iteration -- is a green tariff program that enables customers to purchase renewable energy and associated RECs from an in-region asset. Program eligibility is limited to commercial and industrial customers with a minimum aggregated annual peak demand of 5 MW. The program is capped at 200 MW. Customers are provided supply choice and will negotiate price terms directly with a supplier for an asset sited within the utility's service territory. Program applications are accepted on a first-come-first-served basis accompanied by a $2,000 application fee and an executed term sheet.

Duke is currently finalizing program details with the commission, with enrollment likely to begin Q2/Q3 2021. This development is an exciting new opportunity for South Carolina Duke customers to drive large scale renewable deployment in the burgeoning Southeast region.

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South America

Brazil

Previous issues with content: 1 | 2

With thanks to Schneider Electric

Brazil provides an excellent opportunity to secure cost-effective renewable electricity at scale. Following significant interest, deal numbers have risen over the last year or so, with local- and multinational-companies signing PPAs.

The economics of deals can be strong, supported by good wind and solar resources and, and while the dominance of hydro in the energy mix means greenhouse gas emissions impacts may be lower compared to other countries, the reliance on rainfall patterns creates volatility in the marketplace which a PPA can help to address. The prevalence of wind projects in the North East versus the majority of demand in the South East is one risk to consider. The type of contract a company wishes to employ is also an important factor – the market offers a number of different contract structures to contemplate, from self-generation contracts (involving more direct involvement and investment in a project) to more traditional PPAs, each with its own unique considerations.

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Colombia

Previous issues with content: 1 | 2

With thanks to World Resources Institute

In 2020, the government pledged to reduce greenhouse gas emissions by 51% and install 4 GW of new renewable energy, prioritizing solar and wind resources, by 2030. That same year, Colombia's government launched a renewable energy auction for 1,374 megawatts of new wind and solar power generation. These policies, along with the declining cost of renewable energy technologies, have opened significant opportunities for commercial and industrial customers in Colombia to procure renewable energy and save money on their electricity expenses.

A new Clean Energy Investment Accelerator publication, **Renewable Energy Procurement Guidebook for Colombia**, provides an overview of the three primary procurement options currently available in Colombia for commercial and industrial customers interested in renewable energy: on-site turnkey purchases; on-site third-party power purchase agreements or leases; and off-site third-party power purchase agreements. This guidebook offers additional context and details to help potential renewable energy consumers assess which procurement option best fits their needs and gain a stronger understanding of how to move forward with renewable energy procurement for their facilities in Colombia.

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About REBA

A community of energy buyers accelerating the zero-carbon energy future—greening the grid for all

Learn more about REBA

Upcoming NGO-hosted events

Dates	Event	Location
March 9-10	Renewable Energy Markets Asia	Online
March 24	Worldwide Wednesday: India	Online
April 21	Worldwide Wednesday: China	Online
October 13-15	RE-Source 2021	Amsterdam, The Netherlands

C&I Procurement Update market coverage

The following energy markets have been discussed in the C&I Procurement Update series

Energy market	Issue 1	Issue 2	Issue 3	Issue 4
Asia				
Australia	✓	✓	✓	Page 3
China (National)	✓	✓	✓	Page 3
China (Guangdong)			✓	Page 3
China (Jiangsu)	✓			Page 3
China (Sichuan)	✓			
India	✓	✓		Page 4
Indonesia	✓	✓	✓	
Japan	✓	✓	✓	Page 4
Russia	✓	✓	✓	
Singapore			✓	
South Korea				Page 5
Taiwan	✓		✓	Page 6
Vietnam	✓	✓	✓	Page 7
Europe				
Demark			✓	
France			✓	Page 8
Germany		✓		Page 8
Ireland				Page 9
Italy	✓	✓	✓	Page 9
Poland	✓	✓	✓	Page 10
Spain	✓	✓	✓	Page 10
Sweden				Page 10
UK	✓	✓	✓	Page 11
North America				
Canada	✓	✓	✓	Page 12
Mexico		✓	✓	Page 12
United States (CAISO)		✓		Page 13
United States (ERCOT)		✓	✓	Page 13
United States (ISO NE)	✓		✓	Page 14
United States (MISO)	✓	✓	✓	Page 14
United States (NYSO)				Page 15
United States (PJM)	✓	✓	✓	Page 15
United States (South Carolina)				Page 16
United States (SPP)			✓	
South America				
Brazil	✓	✓		Page 17
Colombia	✓	✓		Page 17