

# NEW PPAS – DE-RISK SOLUTIONS

POWER PURCHASE AGREEMENTS WITH CORPORATE AND INDUSTRIAL BUYERS HAVE CATALYSED THE DEVELOPMENT OF RENEWABLE ENERGY IN THE UNITED STATES. BY **GIJI M JOHN**, PARTNER, HOUSTON OFFICE, **ORRICK HERRINGTON & SUTCLIFFE LLP**<sup>1</sup>.

Beginning with an almost anaemic 320MW of wind energy contracted in 2013, the current market is quite robust – with more than 5,000MW of wind and solar energy contracted this year<sup>2</sup>.

Initially led by major technology companies, the current market includes a broad array of companies from the financial, manufacturing, consumer goods and oil and gas sectors.

This market is becoming increasingly creative, engineering new products such as green tariffs<sup>3</sup>; and three-way intermediated deals between projects, corporate and industrial (C&I) buyers and financial institutions<sup>4</sup> or utilities<sup>5</sup>.

Two new products, designed to provide greater financial certainty to C&I buyers, were recently introduced into this market<sup>6</sup>. The first product is the Proxy Generation power purchase agreement (the Proxy Generation PPA). The Proxy Generation PPA removes the variability of hour-to-hour operational decisions in financial settlements of electricity.

The second product is the Volume Firming Agreement (VFA). The VFA hedges C&I buyers from weather-related risks. These products work in concert to provide C&I buyers with effective hedging strategies and, ultimately, to de-risk their renewable energy positions. This article introduces the basic features of both products, and how they work together to provide a solution to C&I buyers' need for contracting certainty<sup>7</sup>.

## Virtual power purchase agreements

Due to regulations restricting the direct sale and purchase of electricity in the wholesale market<sup>8</sup>, C&I buyers have opted to procure renewable energy through the use of financially-settled virtual power purchase agreements (vPPAs), which are utilised when a renewable energy project sells its physical electricity into a tradable power market in exchange for the prevailing variable, market price.

For every megawatt-hour of electricity actually sold into the market by the project, the vPPA establishes the following transactions: (1) the C&I buyer pays to the project a fixed per megawatt-hour price (the fixed amount) and (2) the project pays to the C&I buyer the variable per megawatt-hour price payable by the power market (the floating amount).

These transactions are then netted into a single amount. If the fixed amount exceeds the floating amount, the C&I buyer owes that difference to the project; but if the floating amount exceeds the fixed amount, the project owes that difference to the C&I buyer.

This net transaction effectively provides the project with a fixed price over the term of the vPPA, enabling it to obtain third-party debt and equity financing. As a related transaction, the vPPA transfers to the C&I buyer the project's right, title and interest in and to environmental attributes associated with each megawatt-hour of electricity generated by the project.

While the vPPA's contractual architecture draws primarily from swap documentation, the vPPA also adds features from the traditional physical delivery power purchase agreement, including provisions ensuring the timely and full completion of projects and their operational requirements.

The vPPA has been the conduit for forming a very particular C&I market of contractual provisions, governing the delivery of C&I buyer credit support; restrictions around project maintenance to optimise high pricing intervals; naming rights for projects; and Dodd-Frank reporting responsibility.

## Evaluating the vPPA

vPPAs have largely been successful in governing the relationship between projects and C&I buyers, inasmuch as they have (1) provided fixed price certainty to projects sufficient to attract third-party debt and equity financing and (2) facilitated the sustainability goals of C&I buyers. Where vPPAs have proven less successful is in providing similar financial certainty to C&I buyers.

In contracting for as-generated electricity from an intermittent renewable energy resource under vPPAs, C&I buyers must settle financially (1) on quantities of electricity that may bear no relation to their actual load and (2) at fixed pricing that may deviate significantly from prevailing market pricing. This particular combination creates tremendous uncertainty for a C&I buyer attempting to predict its near-term electricity needs as well as its ultimate financial exposure under a vPPA.

### The elusive hedging solution

Customarily, hedges are designed to remediate uncertainty of this sort. An effective hedging strategy for a C&I buyer would both hedge the market pricing - which is passed through from the project to the C&I buyer under the vPPA - as well as fix the variable, intermittent electricity quantities, constituting the “as-generated” quantities typically contracted under the vPPA. To-date, however, implementing that strategy has proven untenable for C&I buyers.

First, fixing electricity quantities in the renewable energy context is exceedingly difficult. While weather (re)insurers are available to hedge weather-related risks, their hedges are inherently dirty since a project’s operational decisions – ie, when to dispatch, curtail, perform maintenance, etc – are not necessarily forecastable and may change hourly or daily. Second, attempting to hedge pricing in the context of a variable electricity quantity is at best costly, and at worst not possible.

### Proxy Generation and VFA

In October 2018, Microsoft announced its pioneering use of both the Proxy Generation PPA and the VFA<sup>9</sup>. These products share use of the Proxy Generation calculation methodology, and thereby work in concert to enable C&I customers to adopt effective hedging strategies and, ultimately, to de-risk their renewable energy positions. This article introduces the basic features of those products.

### Proxy Generation calculation

Common to both the Proxy Generation PPA and the VFA is the Proxy Generation calculation. While these two products are new, the Proxy Generation has been tested over the last four years in more than 4,000MW of renewable energy transactions between projects and (re) insurance firms.

Summarily, Proxy Generation financially settles electricity based on a project’s expected generation rather than its actual generation. That expected generation is a function of weather conditions, power generation technology and expected operations.

In the context of a wind energy project, Proxy Generation would be calculated as the aggregate over all wind turbines in the project: (1) the actual measured weather conditions at each individual turbine; (2) each such wind turbine’s power curve; and (3) the wind project’s expected operational efficiency (EOE).

Every ten minutes, the average wind speed at each turbine is measured and adjusted for air density and blade interference. That wind speed is applied to the turbine’s power curve to yield an amount of implied energy. Finally, that quantity of energy is then multiplied by the EOE, a percentage always less than 100% and typically greater than 85%.

The resulting volume of energy in MWh per turbine is then summed across all turbines

comprising the project, and all time intervals within each hour, yielding a project-level, hourly Proxy Generation value that can be applied to the particular settlement price.

### Smoothing out through the EOE

Fixing the EOE means that all operational decisions are averaged into a single value; and that any real-time outage, curtailment or other downtime does not affect hourly Proxy Generation. For example, in a contract where the expected operational efficiency (EOE) is set at 90%, a complete outage in a given hour resulting in zero electricity production would still be treated as an operating hour at 90% efficiency.

Similarly, a fully dispatched plant at 100% efficiency would nevertheless be treated as an operating at 90% efficiency. Thus, in some hours the project’s inefficiency as against the EOE may result in it having a short position relative to its contract; but its greater efficiency as against the EOE may result in it having a long position relative to its contract.

### Proxy Generation PPA

The Proxy Generation PPA applies the Proxy Generation calculation to settlements between the project and the C&I buyer, but otherwise applies the same vPPA architecture to these arrangements.

Specifically, Proxy Generation generates the electricity quantity calculation driving the vPPA’s fixed amount versus floating amount settlement. Notably and in contrast to the as-generated vPPA, the project will bear some basis risk between its Proxy Generation and its actual generation – only the latter of which is paid by the power market. Environmental attributes are similarly sized based on Proxy Generation versus the project’s actual generation.

### Volume Firming Agreement

The VFA applies the Proxy Generation calculation to settlements between the C&I buyer and weather (re)insurers, and is otherwise a fixed for floating volume swap. Unlike the Proxy Generation PPA, neither the C&I buyer nor the weather (re)insurer bears any basis risk as against actual generation. And in this case, no environmental attributes are exchanged between the C&I buyer and weather (re)insurer.

### Pairing the products

Ideally, the C&I buyer will simultaneously enter into a Proxy Generation PPA with a renewable energy project and a VFA with a weather (re) insurer, in each case with settlement terms commencing upon commercial operation of the project. During the settlement term, the Proxy Generation calculation is identical between the Proxy Generation PPA and the VFA.

Conceptually, the C&I buyer receives a variable Proxy Generation amount of electricity that it swaps with the weather (re)insurer for a

fixed amount of Proxy Generation electricity; and since the Proxy Generation calculation is identical, the hedge is optimal.

These paired transactions provide the C&I buyer with a fixed notional quantity of Proxy Generation-calculated electricity, with a variable market based price.

In fixing this notional quantity, the C&I buyer is now able to approach the commodities market for a fixed for floating price swap derived on the forward price curve for electricity - a more or less standard offering. The C&I buyer also has its contracted environmental attributes, which will pair to the fixed notional quantity of Proxy Generation-linked electricity.

### Conclusion

While sustainability goals have driven the C&I market to-date, the general unpredictability of renewable energy transactions and their potential downside effects on corporate balance sheets could be expected to give many potential C&I buyers pause.

While hedging options have been unavailable or cost-prohibitive in these transactions, the Proxy Generation PPAs and VFAs introduce the potential to employ cost-effective hedging strategies. And the employment of those strategies is the key to further adoption of renewable energy by C&I customers and the further acceleration of renewable energy projects. ■

### Footnotes

1 – Special acknowledgements to Kenneth Davies of Microsoft and Lee Taylor of RESurety - the architects of the Proxy Generation PPA and the VFA.

2 – See <http://businessrenewables.org/corporate-transactions/>.

3 – World Resources Institute tracks existing green tariffs at: <https://www.wri.org/publication/emerging-green-tariffs-us-regulated-electricity-markets>.

4 – Citi's 10 year agreement with QTS Realty Trust serves as a recent example of such an intermediated deal. See "Citi to Power QTS Data Center in Irving, TX with Clean, Renewable Energy," BusinessWire (April 2 2018).

5 – Exelon intermediated a renewable energy transaction between the HillTopper wind project in Illinois and Starbucks. See "Wind Power to Power Hundreds of Illinois Starbucks Locations," North American Windpower (November 29 2018).

6 – See "Buying Renewable Energy Should be Easy – Here's One Way to Make it Less Complex," Microsoft Corporate Blogs (October 16 2018): <https://blogs.microsoft.com/on-the-issues/2018/10/16/buying-renewable-energy-should-be-easy-heres-one-way-to-make-it-less-complex/>

7 – For a more extensive analysis of the value proposition of the Proxy Generation PPA and an in-depth analysis of its main features, see "Proxy Generation PPAs: The Next Evolution of PPAs for the Corporate & Industrial Buyer", co-authored by Microsoft, Orrick and RESurety and available here: [https://orrick.blob.core.windows.net/orrick-cdn/Proxy\\_Generation\\_PPAs.pdf](https://orrick.blob.core.windows.net/orrick-cdn/Proxy_Generation_PPAs.pdf).

8 – Due to regulatory restrictions around the sale and purchase of physical electricity in the wholesale markets, these PPAs tend to be financially settled transactions rather than contracts for physical electricity delivery.

9 – See Note 6.



The Microsoft sign is shown on top of the Microsoft Theatre in Los Angeles © REUTERS/Mike Blake