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EDFRenewables

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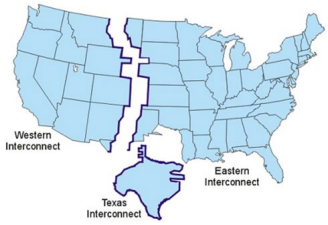
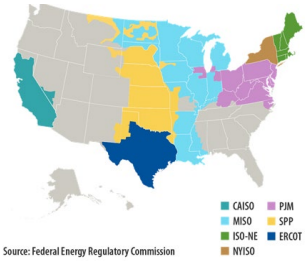
The US power grid is split into the Western, Eastern and Texas interconnects, and each of these interconnects includes wholesale electric power markets.

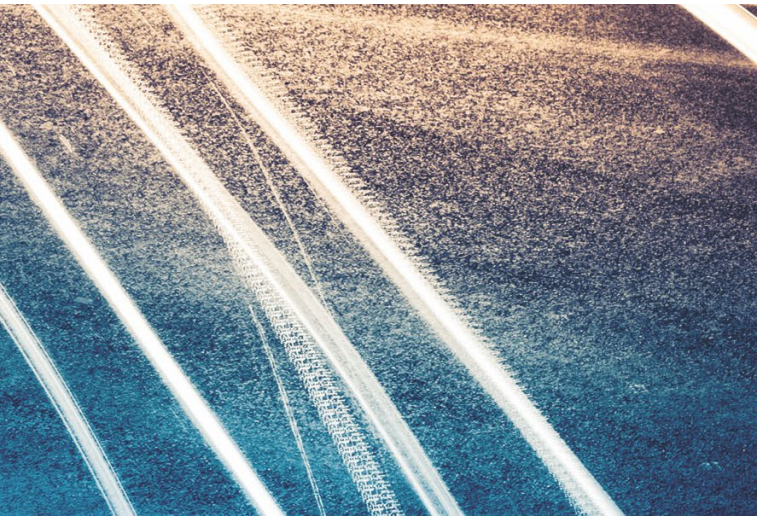
North American Electric Power Grids



Wholesale Electric Power Markets



Source: Federal Energy Regulatory Commission



An article written in collaboration with John McCown, Energy Trader

EDF Renewables owns and operates more than 8,000 megawatts (MW) of wind and solar projects across North America, making it one of the largest renewable energy companies in the United States. Most of the electricity produced by these facilities is sold to customers through contracts called power purchase agreements (PPAs). However, some of the electricity from EDFR's wind farms – about 2,000 MW total from a combination of projects – is sold into wholesale energy markets.

John McCown is responsible for executing these wholesale market transactions. When he joined EDFR in 2018 and stepped into the newly created role of Day-Ahead/Real-Time Analyst, he was well-prepared, having spent the previous 14 years as an energy trader.

John handles what are called day-ahead and real-time trades in the ERCOT, SPP, MISO and PJM markets. These wholesale electric power markets are managed by independent system operators (ISOs), and they're characterized as "competitive" markets because non-utility, independent power producers like EDFR can buy and sell power.

> "Most of my job is focused on two tasks," John explains. "I want to sell any excess or 'merchant' generation, and to cover any 'deficiencies' or shortfalls in production."

Merchant generation refers to any megawatt hours of electricity that are not claimed by a buyer under a PPA. This can occur if a facility produces more electricity than the buyer agreed to purchase, but there may also be times when a facility doesn't have a PPA, either because the previous PPA expired or because EDFR acquired the project and doesn't yet have a PPA in place.

Deficiencies in production are situations in which EDFR has contracted to sell a specific amount of electricity to a buyer but the facility produces less than that amount on a given day. In such a case, John has to buy power in the wholesale market to cover the shortfall.

To understand John's role, it's important to distinguish between busbar PPAs and non-busbar PPAs. Under a busbar PPA, the buyer takes delivery of the power at the point where the facility interconnects to the grid. In contrast, with a non-busbar PPA the facility delivers electricity to one point on the grid, the buyer withdraws electricity from another point on the grid, and the contract is settled financially on the basis of the price difference between the two points (to learn why prices differ, read *Forecasting the Future*). Approximately one-quarter of EDFR's wind facilities sell power under non-busbar PPAs, which is where John comes in.

A lot of time and effort goes into planning and designing wind farms, and in most cases a facility's annual production is fairly close to what's expected. That said, wind is a weather-dependent intermittent resource, so production can vary from day to day and season to season. Depending on how a facility's non-busbar PPA is structured, excesses and deficiencies in power production can create **merchant exposure**.

Merchant Exposure

The risk (exposure) associated with selling the electricity from a facility in the wholesale, or merchant, power market, which can experience big swings in pricing. A facility with a busbar PPA has no merchant exposure because each megawatt hour of electricity delivered to the grid receives a fixed price.

"My goal is simple," he says with a laugh. "I try to optimize the revenue streams from these intermittent resources in the short-term markets by maximizing profits from any sales of merchant generation and minimizing losses from any additional energy purchases I have to make."

To accomplish this, John analyzes market data and comes up with strategies to mitigate the risks of the assets. He also writes code and develops models that forecast market behavior and pricing.

"A lot of traders, particularly if they're on a big trading desk, rely on their feelings or bias about the market on any given day," John observes. "What I like about EDFR is that the approach is totally different. We're not looking to take big risks, and we're really focused on data and models. I build my models, gather all the data I can, and let the numbers tell me what to do. The only time I don't listen to the models is when they point me to something that carries a lot of risk!"

The bulk of John's time – maybe 60 or 65% – is spent coding and refining his market models. "Most days, it probably takes me about ten minutes to do the trading part of my job," he chuckles. "The other 35-40% of my time is spent providing cross-functional support to other groups and departments that need help understanding the energy markets."

A case in point is the Battery Development group, which is currently working on product management for EDFR's first large-scale solar-plus-storage project, the Desert Harvest Solar Farm. Located in California, the 500 MW facility is scheduled to come online by the end of 2020 and will have a 40 MW battery that can function independently from the solar facility. John is facilitating conversations among the team to help them think about how the battery can be deployed strategically (i.e., charged vs. discharged) to optimize its revenue streams.

> My job is to model around market participants' biases. I try to eliminate any of my own bias from the models and just look at what the market is telling me. I don't ignore my own bias, but I do try to justify it with fundamentals and impute that into the models."

Asked if he expects building models to trade merchant power from solar projects will present a learning curve, John replies that he is studying up on meteorology. "I'm already fairly comfortable interpreting weather data, but I want to have a better understanding of cloud science and behavior," he explains. "We typically get forecasts from a variety of sources, and when there are discrepancies, I want to be in a better position to understand why so I can decide which ones I'm going to rely on. As energy markets shift away from fossil fuels, the ability to be successful will be predicated on being able to forecast and understand weather patterns."

John earned a Bachelor of Business Administration with a focus on finance following a two-year stint with the US Navy, where he served as a Fire Control Technician 3rd Class. He was initially considering a career in finance, but his plans changed after he won Howard University's School of Business Trading Challenge. "The competition is something business majors have the option to participate in," he explained. "At the time, we were each given $100,000 to trade. The first semester I participated, I came in first place. In my next and final semester, I came in second. It whetted my appetite for trading, and I decided that's what I wanted to pursue as a career."