CUSTOMER STORY

# How the PI System™ Helped EDF Renewables Shed Light on Lost Revenue

**INDUSTRY**
POWER

**CHALLENGE**
Determine whether potential revenue lost from turbine outages merits after-hours maintenance call-out.

**SOLUTION**
PI System operational data combined with weather forecasting and maintenance crew schedules to inform call-out decisions.

**BENEFIT**
Expected savings of $2 million per year.

**PARTNER**
DIEMUS

It's late on a Friday night in San Diego and Max, a controller you might imagine working in the operations control center (OCC) for EDF Renewables, has his eyes full of lights. He scans multiple control screens displaying the status of all the company's wind turbines scattered across North America. A glance at one screen reveals that a few turbines at a site in Canada are down. After Max realizes he cannot reset the turbines remotely, a fraught but inevitable question arises: should he call out an after-hours maintenance crew, or not? Every hour a turbine is down means more lost revenue. Max knows there is a potentially huge amount of money on the line. But how much? And how much lost potential revenue merits a call-out? If only OCC controllers like Max had data to help answer such questions, the savings could be enormous.

## Using Old Data for New Ends

EDF Renewables is a subsidiary of the French energy company EDF that specializes in renewable energy production. EDF Renewables provides grid-scale power across the United States, Canada, and Mexico, producing 16 GW of renewable energy from solar storage and wind energy. The company has been using the PI System since 2009 to collect operational data from its turbines and solar storage facilities. But OCC staff were unable to use this data to make informed decisions about when to send out after-hours maintenance crews. Knowing money was being left on the table, EDF Renewables turned to David Rodriguez, an analytics and intelligence engineer and his operational intelligence team to find a solution.

Previously, the OCC relied on tables that measured the number of wind turbines currently off-line against the current wind speed at a site to determine whether or not to place an after-hours call-out to maintenance crews. But the tables had limitations. They didn't account for fluctuations in windspeed, which change the amount of power expected to be generated over a given time. The tables also didn't consider how long it would be until the next maintenance crew shift. Maintenance crews typically work 40-hour work weeks. When there is no crew on shift, it can techs hours to reach remotely-located turbines. Once there, techs face a long and potentially dangerous climb up the 300-500 ft. body of the turbine. The tables did not account for these additional human and monetary costs. "Without visibility into what revenue is actually at stake [...] it ends up being more of a judgement call than it needs to be," Rodriguez explained during his online presentation at PI World 2020.

First Rodriguez and his team identified the factors that affect how much it costs for a turbine to be down while the maintenance crew is out. and the amount of lost revenue that would merit a call-out. The team used the Dark Sky weather API to pull in windspeed forecasts for each site and stored the information in the PI System as data tags. The team also relied on turbine operational data previously stored in the PI System. They looked at factors like the active power status, long-term downtime status (for turbines waiting on new parts, for example), turbine fault codes, and power curve forecasts (the amount of power a

> This whole platform is designed to support our goals of operational intelligence. The idea is you build systems that take raw data and turn it into actionable information so you can make smarter decisions."
>
> — David Rodriguez
> Sr. Analytics & Intelligence Engineer
> EDF Renewables

*PI System data supports custom call-out dashboards. Red boxes display forecast lost revenue until next maintenance crew shift and call-out threshold.*

turbine is expected to produce at a given windspeed). The team also talked with several asset managers to get a sense of the typical price for power under different conditions and determined a minimum amount of lost revenue that would merit a call-out. Last, they gathered crew shift information and stored it in an Asset Framework (AF) table.

Next Rodriguez and his team enlisted the help of Lonnie Bowling and his company Diemus, which specializes in data visualization, to create a custom dashboard for the controllers in the OCC. Bowling had worked with EDF before to build a custom application called Orca which provides real-time visualization of the turbines' operational data.

## Dashboards for Decision-making

Building on PI System data, Bowling created a new live dashboard inside Orca. The dashboards show how many turbines are down at a given site and predict how much an outage will cost. The dashboards then indicate whether or not to perform a call-out depending on the combination of factors identified by Rodriguez and his team. The dashboards also display call-outs currently in progress, and allow controllers to generate new call-outs which get sent as an email notification to crew members in the field.

Since the dashboards went live about six months ago, there have been close to 700 call-outs. Extrapolated over twelve months, Rodriguez and his team estimate the new dashboards will save the company around $2 million per year.

**For more information about EDF Renewables and the PI System, watch the full presentation here.**

Bowling, Lonnie A.; Rodriguez, David. "When Turbines go Bump in the Night—Shedding Light on Lost Revenue." https://gateway.on24.com/wcc/eh/2239398/lp/2242505/when-turbines-go-bump-in-the-night---shedding-light-on-lost-revenue-%5Bedf-renewables%5D/