WIND ENERGY IMPLEMENTATION TO MITIGATE WILDFIRE RESK

Wind energy and wildfires are popular subjects these days, but they are rarely talked about at the same time. Dr. Francisco Haces-Fernandez, assistant professor in the College of Business Administration at Texas A&M University-Kingsville, connected both these topics for a study that was chosen for inclusion in *Energies,* a peer-reviewed scientific journal.

It is Haces-Fernandez' hypothesis that wind power is the solution to the number of wildfires caused as damaged overhead transmission lines create sparks when subjected to high winds.

In his paper, *Wind Energy Implementation to Mitigate Wildfire Risk and Preemptive Blackouts*, he explains that having local wind energy resources cannot only help prevent wildfires, but it can also help when electric companies curtail power in areas of high wildfire risk during high winds leaving customers without power.

He said that in 2018, one of the world's most expensive disasters was California's wildfire caused by power line failure. Damages from this wildfire exceeded $16.5 billion.

Haces-Fernandez proposes supplying communities under risk of wildfires and blackouts with local wind energy. His proposal would shorten the length of the transmission lines required to provide power to these communities.

"This research developed a Geographic Information System (GIS) methodology to assess the potential to supply communities with local wind energy resources, therefore shortening the length of the electric supply chain," Haces-Fernandez said. "Strong winds would be transformed from a risk factor to a resource capable of supplying power to many communities."

Haces-Fernandez said his work started in September 2019 and it is currently branching out in several areas including local analysis with high-resolution data; financial and economic analysis; and generalizing the methodology for use in other states and world regions.

"The research and its methodologies were developed by applying conventional computer resources and the open source software QGIS (Quantum GIS)," he said. "Analysis were performed from publicly available data from federal state and local governments and research institutions."

Undergrounding current transmission lines has been identified as a solution for wildfire and blackout risks in California and both Pacific Gas and Electric and Southern California Edison have undertaken efforts to do so, Haces-Fernandez said. "However, this is very expensive and will take many decades to complete"

"Data applied for this research indicated that California has more than 37,000 miles of transmission lines, 62 percent of which are under disconnection risk from wildfires. The cost of undergrounding transmission lines has been estimated between $1 to $23 million dollars per mile," he added. "It has been estimated that undergrounding electric lines would increase the consumer's average monthly electric bill from $80 to $260 for 30 years.

“Using local wind energy resources to supply electricity to communities in California would shorten significantly the required transmission lines, therefore, decreasing their undergrounding costs,” Haces-Fernandez said.

California ranks second nationally in the number of installed wind turbines and fourth in installed capacity, he said. There are more than 140 wind farms, 25 which are over 100 megawatt (MW) installed capacity.

The research proposes two alternatives. “For communities in proximity to the existing wind farms, creating interconnection with them for the supply of electricity will create important benefits on reduction of risk from wildfire and blackouts,” Haces-Fernandez said. “For communities at longer distances from existing wind farms, the research proposes identifying nearby locations with optimal wind resources to install new wind turbines which will be interconnected with these local communities.

“These future wind turbines would be installed in optimal wind locations close to the affected communities to serve them,” Haces-Fernandez said. “The underground transmission lines required for these new facilities would be shorter. For smaller communities in rural areas, interconnection costs would be lower.”

In addition, Haces-Fernandez said his research suggested that having several wind farms offshore along the California coast to serve local communities and potentially sell excess power to the grid would be a good alternative.

“This research indicated that 24 percent of California’s cities are at risk of wildfire, while 52 percent are at risk of blackout,” he said. “However, shortening the length of the electricity supply chain and supplying affected communities with onshore and offshore wind energy could lower these numbers.”