Wind farms and solar PhotoVoltaic (PV) parks have become a prominent solution to meeting tomorrow’s energy needs. The increased penetration of distributed and renewable energy resources brings a number of engineering challenges, including interconnection impact and protection considerations. Quanta Technology has worked extensively with utilities and wind farm/PV system developers in both Canada and across North America to investigate these challenges and perform detailed transient studies to ensure that project designs and equipment specifications met all standard requirements, utility practices, and market rules.

Key areas of Quanta Technology’s expertise in the field of wind farm studies are shown in the diagram below, as examples.

With the help of electromagnetic transient modeling and analysis, the system design and behavior in response to fast transient phenomena (faults, switching inrush/outrush, capacitor switching, lightning surge, etc.) are verified and mitigation solutions are proposed and evaluated.
Quanta Technology service offerings in this area include:

- Wind/Solar interconnection impact studies and design review
- Utility and market rule requirements
- Wind farm transient studies and risk assessment (such as switching inrush/outrush, energization, capacitor switching, fault ride through, temporary over voltage (TOV), reactive power and voltage capability studies)
- Wind farm protection and coordination studies
- Power quality impact of wind farms
- Wind generation applications at distribution system levels
- Integration and Application of Battery Energy Storage Systems (BESS) for wind and PV farms
- Wind farm reactive power compensation and voltage regulation capability analysis (in PSS/E, PSLF, PSCAD)
- Voltage rise and fluctuation
- Reverse power flow studies, interaction with LTCs, voltage regulators and capacitor banks

For more information regarding Quanta Technology's Transient Studies & Design Assessment expertise, please contact Farid Katiraei at (647) 330-7379 or fkatiraei@quanta-technology.com.