

GE  
Digital Energy

# GE's Wind Collector Optimization Service



imagination at work

# GE's Wind Collector Optimization Service

## Optimized Designs for Wind Plant Collector Systems

Collector cable systems are a critical component of a wind plant and play a vital role in efficiently delivering power from wind turbines to the grid. When planning a wind plant, an optimal design of the collector system will minimize electrical losses, minimize cable and trenching costs, and minimize substation configuration costs maximizing the return on investment.

GE's Wind Collector Optimization Service provides customers with a comprehensive service from initial consultation to a completed and validated design. GE's optimization service utilizes a leading-edge, proprietary design tool with multi-variable analysis to route and size a wind plant collector system. By utilizing the optimization software, GE can reduce the cost of a rationally designed collector system and provide potential savings of greater than 20% in design and build costs.

## Challenges Utilizing Today's Traditional Wind Plant Methods

The traditional method of designing a wind plant collector system is a manually intensive series of trial and error calculations, each taking days to calculate. The designers are limited by time and ability to explore multiple collector route scenarios for the most efficient design.

Using the traditional design method negatively impacts the project through:

- Longer design cycles, especially when the number of wind turbines is large or complex right-of-way exceptions occur
- Difficulty in accommodating design changes, which often occur mid-project, when time is of the essence
- Higher material and labor costs as the collector route is not optimized
- Substation designs that are more costly due to minimal experience or a narrow focus on one objective versus a holistic view of the impact on the entire plant

The result is a time consuming, costly, non-optimized design with little flexibility to change the project after implementation has begun.



Traditional method of designing a wind plant collector system

## GE's Solution

GE's Wind Collector Optimization Service incorporates GE's extensive experience of bringing over 4,000MW of renewable energy online coupled with over 40 years of substation Engineer, Procure and Construct (EPC) experience.

Utilizing a proprietary algorithm that computes an optimized collector circuit design while balancing cost and power losses, GE's Wind Collector Optimization Service provides customers with a collector system design which optimizes the cable routing and sizing and addresses the challenges with traditional design methods. This is achieved by:

### Faster Design Delivery

GE offers more than 2 times faster design delivery through a 60%\* reduction in design cycle time, in addition to engineering flexibility with near real-time design iterations.



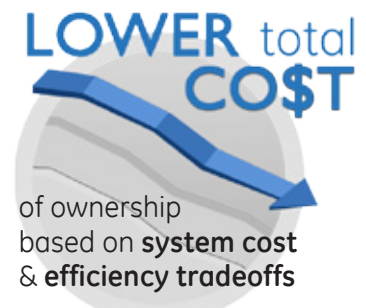
### Increased Efficiency

Achieve efficiency in the design of cable sizes, trenching paths, and power losses leading to potential design & build cost savings of over 20%.



### Lower Total Cost of Ownership

Optimize total cost of ownership based on calculated system cost and efficiency tradeoffs.



\* GE commits to 2 day design cycle time on receipt of order

## Four Simple Steps for Optimized Design

Optimizing the collector system can be accomplished in four simple steps, and can typically be completed in about two days given that a “baseline” design has already been reviewed. A baseline design is necessary as it establishes the go forward savings that can be obtained on future designs.

Once the baseline design is received, the new project follows the four steps outlined below. After the initial project consultation, the true design work begins with data collection for turbines, substations and keep-out zones etc. Once the data inputs are confirmed, GE engineers begin the work of optimizing the plant configuration by utilizing years of developed expertise and the automation tools created uniquely for this service.

The GE team is able to quickly run hundreds of iterations to optimize across cable lengths, splices required, directional boring under roadways and cable losses. The delivered output to the customer is a complete and optimized design that illustrates the geographic routing, tabular tables of each node connection and costs and any financial evaluations to assist customers to determine the best tradeoffs between initial costs and long term efficiency savings.

When the optimized design is delivered, the service also extends into optional ongoing design support. If site conditions dictate changes in turbine locations, keep out zones or substation location, the team can easily run those design changes and provide an updated, optimized design.



Initial Project Consultation	Project Data Collection	Develop Design	Project Design Support
<p><b>Initial Project Consultation</b></p> <p>GE meets with the customer to discuss and agree on:</p> <ul style="list-style-type: none"> <li>• The project</li> <li>• Design scope</li> <li>• Deliverables</li> <li>• Timelines</li> </ul>	<p><b>Project Data Collection</b></p> <p>Customer sends GE their required parameters for design work to commence.</p> <ul style="list-style-type: none"> <li>• Wind turbine locations</li> <li>• Voltage and power rating of wind turbines</li> <li>• Substation location</li> </ul> <p>If certain parameters are not available, a standard will be assumed for the following parameters:</p> <ul style="list-style-type: none"> <li>• Maximum power per feeder</li> <li>• Restricted area</li> <li>• Restricted area location's penalty costs for crossing</li> <li>• Specific cable sizes to be used for the design</li> </ul>	<p><b>Develop Design</b></p> <p>GE provides the optimized design based on parameters provided by and agreed* upon with the customer.</p> <p>GE will provide the following deliverables in this scope of work:</p> <ul style="list-style-type: none"> <li>• A KMZ mapping file with the collector routing that can be accessed via Google Earth</li> <li>• Preliminary Cable Table with ampacity of each collector circuit and run including power losses</li> <li>• Trenching and Cable Cost Estimates</li> </ul> <p><i>*Design will be based on parameters provided and clarifications discussed.</i></p>	<p><b>Project Design Support</b></p> <p>As site or other circumstances dictate, customers can request design iterations from the original design. By submitting updated data parameters, GE can run additional iterations that optimize the design to the latest requirements.</p> <p>These additional iterations can generally be done within 24 hours, and are provided at no additional cost to the customer.</p>

For more information about  
GE's Wind Collector Optimization Service visit  
[GEDigitalEnergy.com/WindCollector](http://GEDigitalEnergy.com/WindCollector)



GE Digital Energy

+1 877-605-6777 (toll free in North America)

+1 678-844-6777 (direct number)

[GEDigitalEnergy.com](http://GEDigitalEnergy.com)

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