

Sterlite Power Generates Optimal Powerline Routes with ArcGIS

Client

Sterlite Power

Industry

Utilities

Organization Profile

Sterlite Power is a leading private sector power transmission infrastructure developer and solutions provider with projects covering approximately 13,700 circuit km of transmission lines across India and Brazil. The Company has a portfolio of high-performance power conductors, extra high voltage (EHV) cables, and optical ground wires (OPGW). It provides bespoke solutions for the upgrade, uprate and fiberization of existing transmission infrastructure projects.

Website

www.sterlitepower.com

Project

GIS System for Powerline Route Planning and Finalization

Highlights

Key Benefits with GIS Integration

1. Better accuracy reduces project changes, cost impact by 1 to 1.5% Rs~ 2.3 Cr for a 100km 756kV line. Transmission projects are linear projects running long distances. For a 1000 km project, the project cost savings is at least 23 Cr.
2. 50%-time reduction in route finalization from 60 days to 30 days
3. Over 95% accuracy in route generation
4. Data confidentiality; enterprise grade secure and multi-tenant platform
5. Reducing competitive threat by 100%. Reliability of field survey improved to 100%

Project Summary

A key trend in the power sector is the revision of the time schedule for the development of transmission projects. Due to the shorter gestation periods of renewable energy projects, the time schedule has been reduced from 36 months to 18 months. This is expected to be reduced further in times to come. While thermal power projects take about five years for commissioning, renewable projects come online in just 18-24 months.

Sterlite Power, which is a leading global developer of power transmission infrastructure with about 25 projects spanning ~13,700 circuit kms in India and Brazil recognized this need to expedite the development of transmission projects to evacuate power from renewable energy projects and focused on developing solutions that could help it achieve the same.

To maintain its track record of commissioning power transmission projects ahead of schedule, addressing the key constraints of time and cost, Sterlite Power collaborated with Esri India to develop a first-of-its-kind integrated GIS Ecosystem for powerline route planning and finalization.

Challenges

The process of power line route finalization is broken down into two stages, namely, route generation and in-field route survey. The old manual methods of carrying out these activities led to delays and inaccuracy due to information gaps. The major problems that the manual systems caused were as follows:

1. **Delayed route generation:** The manual route generation methodology used by Sterlite Power required the survey team to perform an in-field survey and collect relevant data on forests, roads, railways, existing transmission lines, etc. from multiple sources. This was a time-consuming activity. As the desktop route generation process could happen only after this collected data was combed manually, the route generation process was delayed.
2. **Lack of data security and confidentiality:** As part of its Global Infrastructure Business, Sterlite Power bids, designs, constructs, owns and operates power transmission assets across multiple geographies. All bid-related data are highly confidential and the lack of proper access and usage controls pose a major risk to the business. Thus, to support an iterative process involving the continuous back and forth of data, automated versioning concepts and controls were required to simplify the process for the user and maintain data sanctity.

- Poor connectivity in remote areas:** In areas with poor or negligible network coverage, the conventional applications did not work effectively due to a lack of offline-mode support.
- Historical Field Survey and associated studies data (Soil/Hydrology etc.) are not easily accessible and hence not used for current bids.

A more robust digital approach to route finalization and survey was needed to overcome all these challenges and deliver better outcomes. A huge transformation from the conventional manual survey methodology has to be brought, and the integrated GIS system implemented with the help of Esri India provided the perfect solution.

Benefits

Improved data accuracy: The routes generated by TransAnalyst are based completely on pre-approved data. This, coupled with a lesser number of iterations, gives over 95% accuracy in route generation. The new automated process significantly improves the confidence level in the data and impacts the ROI of the project positively.

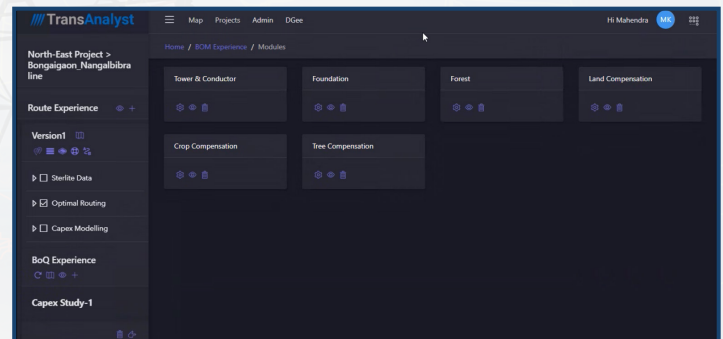
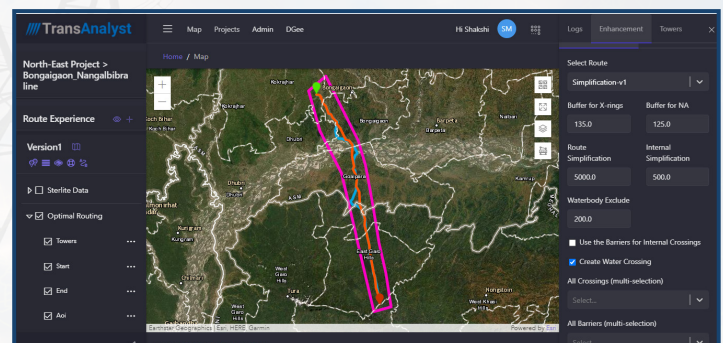
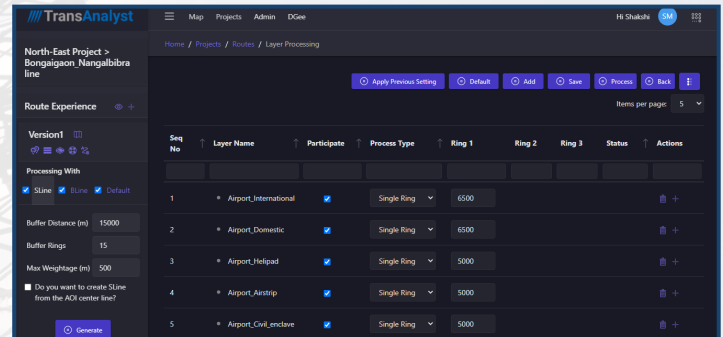
Near real-time data capture: From survey to route generation and feasibility reporting, the automation and digitization have led to in-sync, real-time operation (field team and D&E can look at the same data instantly and make necessary changes). This allows for the right route generation at the very first attempt, thereby leading to more timely decisions.

Lesser time required for project completion: The solution for route generation not only delivers an accurate route but does that in less than one hour for a 200 km route while adhering to all the business rules. Additionally, the process of data generation takes a maximum of 1-2 hours. Manually, the route generation process itself would take 2-3 days with 6-8 days for the data creation process, prior to that. The integrated GIS ecosystem allows Sterlite Power to save on an average 2-4 months in a project. Each month saved (early competition) is equivalent to revenue for that month for the project which is a huge saving.

TransAnalyst helps the company to plan multiple route options between two substations in a few minutes by changing weightages of different layers. TransAnalyst reduces 2-3 days effort for creating any one route option, also modify the route based on survey feedback on near to real time basis. Users can analyze the BoM/BoQ of different route options by using its capex model where the tool calculates Steel Tonnage, Conductor cost, RoW cost in terms of Land, Crop, tree, etc., and identify the best route option for bid.

With CanvasR, the time required to have updated information from the in-field surveys is reduced to minutes. The surveyors are now able to provide real-time inputs through mobile apps which get updated in desktop systems in the office in real-time. This reduces the risk of continued visits to the field and thus leads to huge savings in terms of time and cost. The tools, Trans Analyst + CanvasR allow Sterlite

Power to save on average a month in each Transmission Line to finalize bid proposal. Each day saved increases the probability equivalent to revenue in terms of identifying risk and deriving the accurate cost to build the transmission line. In-field surveys usually take about 10-15 days to complete when done manually. Mr.



“ The solution has been helping us gain a significant advantage in winning bids and delivering unmatched outcomes in powerline route finalization projects. With Trans Analyst + CanvasR, the route optimization process takes not more than 3-4 days while providing better accuracy using continuous feed from the field. With these tools in place, we are looking at about 1-2% savings in costs in each project. The reason we chose ESRI as a partner for establishing this GIS ecosystem for powerline route optimization is due to the extensive support the company provides. The availability of resources, flexibility, and the in-depth knowledge base are other factors that made the choice easier. ”

- Mr. Trilok Chouhan, AVP, GIS - Corporate IT, Sterlite Power