From Siloed Data to Centralized Intelligence: Developing a Technical Complexity Index (TCI) Dashboard in Power BI to De-Risk Project Pipelines and Optimize Resource Allocation.

Project Management & Engineering Risk Assessment for Large-Scale Energy Projects

Technology: Microsoft Power BI, Power Query (M), DAX, SharePoint Integration

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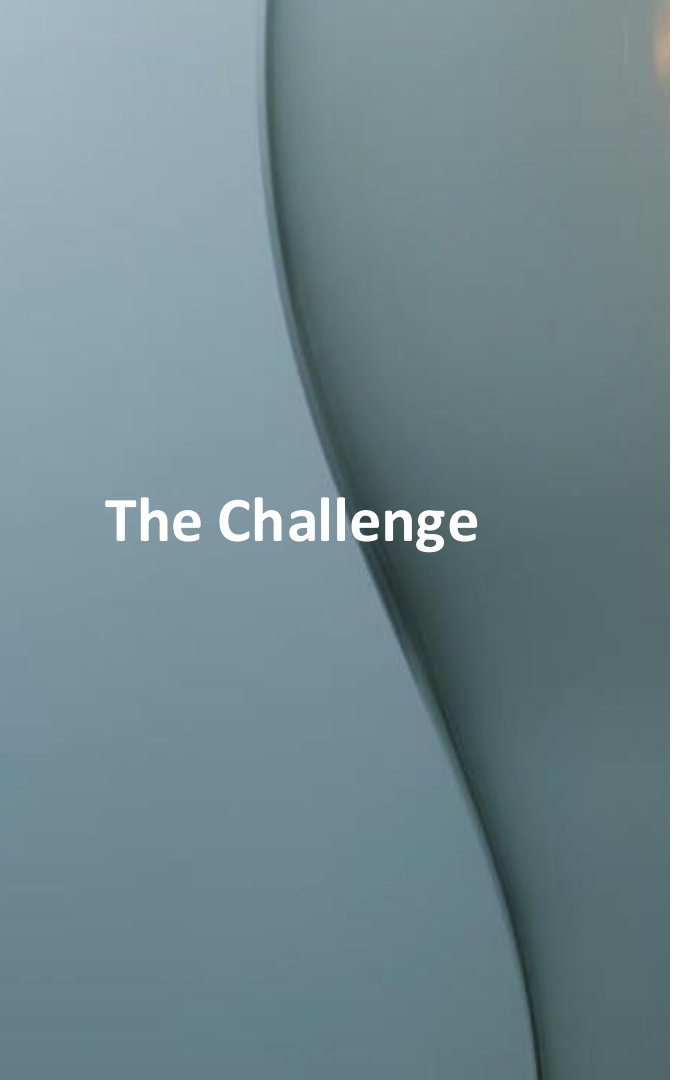
Content

Executive Summary

An interactive Power BI dashboard was developed to replace a fragmented, spreadsheet-based analysis of project pipeline complexity. This solution aggregates data from multiple project files in SharePoint to calculate and visualize a standardized Technical Complexity Index (TCI) for a global portfolio of energy projects. The dashboard provides executives and engineering leads with an at-a-glance view of portfolio-wide risk, enables deep-dive analysis into individual project drivers, and includes interactive "what-if" simulation tools for preliminary engineering. The solution has transformed project evaluation from a subjective, manual process into a consistent, data-driven framework, enabling faster decision-making and more accurate resource forecasting.



The Challenge

The project development team faced significant challenges in evaluating their growing global pipeline of potential projects. The previous manual process was characterized by:

Lack of a Unified View

- Project data was siloed in numerous individual Excel files, making portfolio-level comparison nearly impossible.

Inconsistent Project Evaluation

- Without a standardized metric, assessing project complexity was subjective, leading to inconsistent risk assessment and resource allocation.

Slow & Manual Risk Assessment

- Identifying high-risk projects required manually consolidating data and performing calculations, delaying critical decisions.

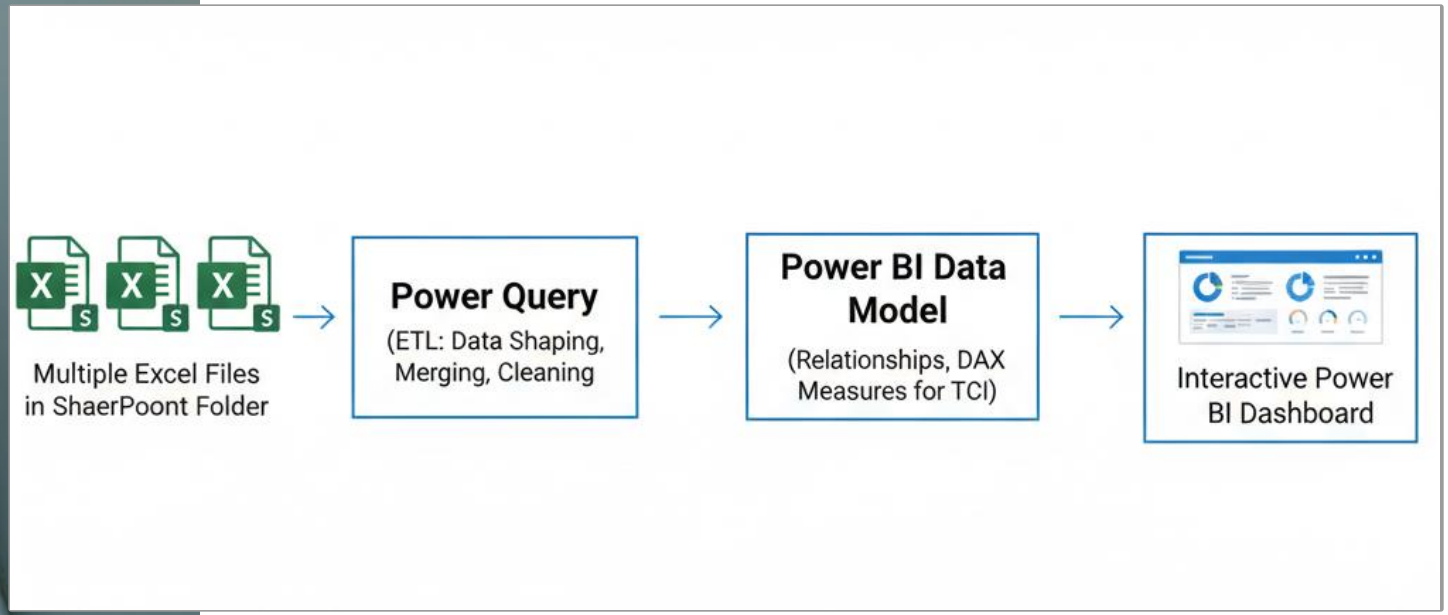
Difficulty in Resource Forecasting

- It was challenging to accurately forecast the engineering effort and potential cost adders required for complex projects early in the development cycle.

Key Components of the Solution

1. Data Ingestion & ETL
2. Advanced Data Modelling
3. Dynamic Visualization & UI
4. Interactive Simulation

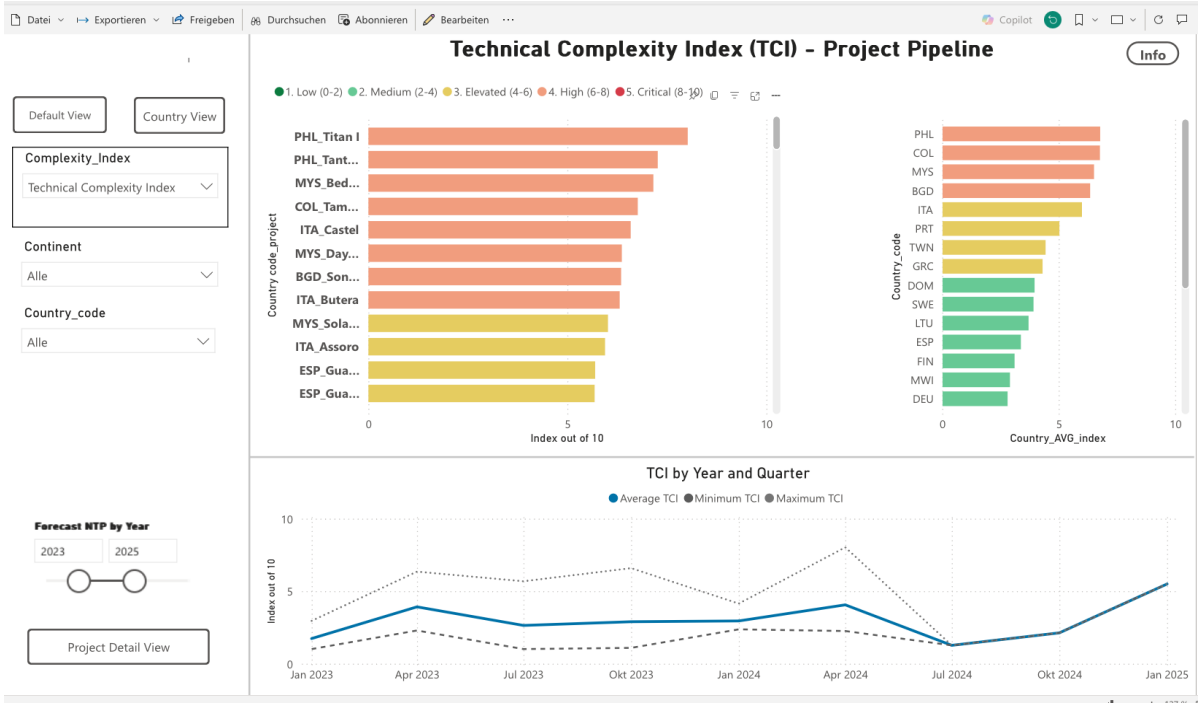
Solution - From Siloed Data to Centralized Intelligence



Pipeline View

To provide leadership with a high-level overview of the entire project pipeline, sorted and color-coded by risk.

- Conditional formatting to instantly identify 'Critical' and 'Elevated' complexity projects.
- Advanced slicers to filter the entire portfolio by complexity type (e.g., Flood Risk vs. Terrain), continent, and country.
- Trend analysis of average TCI over time to monitor portfolio health.

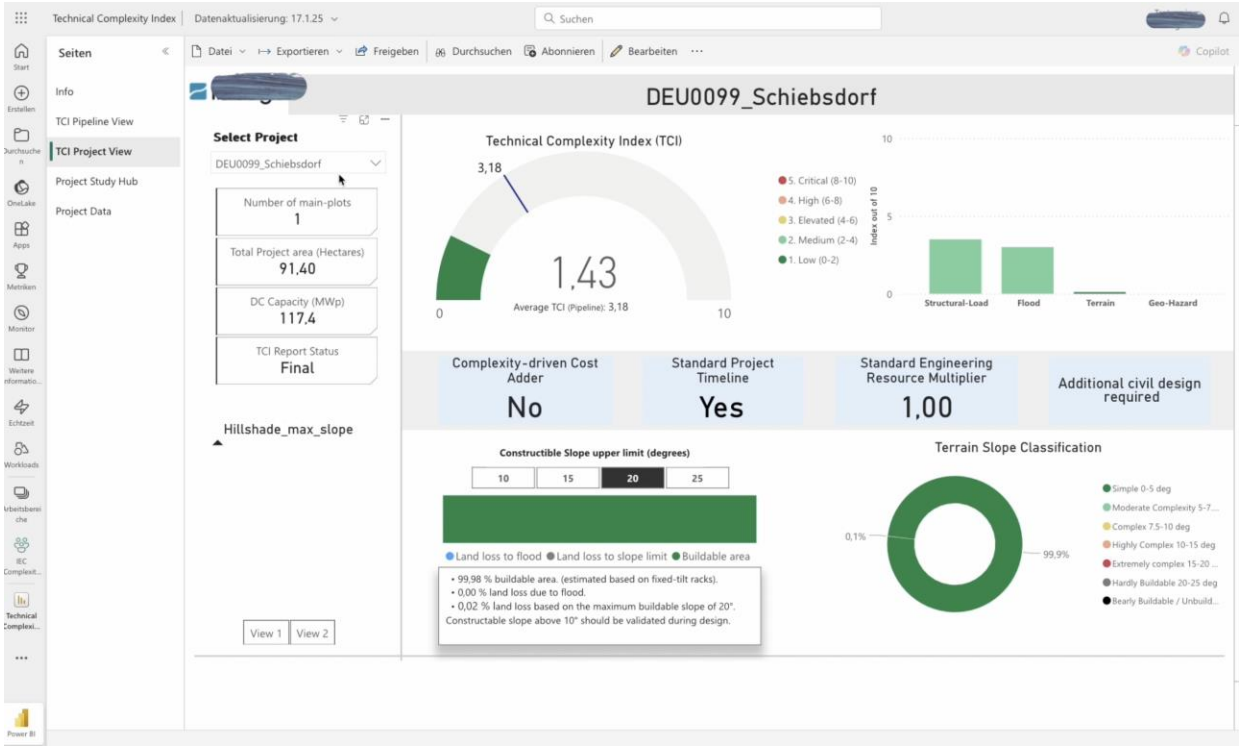


Project View (The Deep Dive)

To allow project managers and engineers to analyze the specific factors driving a single project's complexity.

- Detailed single-project dashboard showing key metrics like DC capacity, project area, and the overall TCI score.
- A breakdown of the TCI into its core components, highlighting the biggest risk factors.
- Direct business logic outputs like "Complexity-driven Cost Adder" and "Standard Engineering Resource Multiplier" for immediate budget and staffing insights.

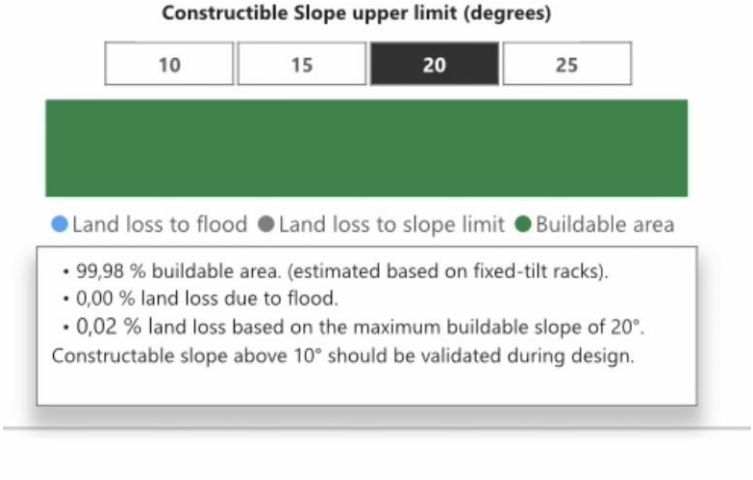
Technical Complexity Index (TCI - Project View)



Interactive 'What-If' Analysis

To empower engineers to perform rapid preliminary design simulations directly within the dashboard.

- A dynamic slicer for "Constructible Slope Upper Limit" allows users to change the maximum allowable slope and instantly see the calculated impact on "Land loss" and total "Buildable area," saving hours of manual calculation.



Tangible Business Outcomes

Accelerated Decision-Making:

- Reduced the time to evaluate and compare project feasibility from days to minutes, allowing for a more agile project selection process.

Proactive Risk Mitigation:

- The clear, color-coded dashboard allows management to immediately identify and address high-risk projects before significant resources are invested.

Optimized Resource Allocation:

- The "Standard Engineering Resource Multiplier" provides a data-driven basis for allocating engineering staff and budget, improving operational efficiency.

Standardized & Objective Analysis

- Established a single source of truth and a consistent methodology for evaluating all projects, removing subjectivity and ensuring fairness.

Enhanced Engineering Efficiency

- The 'what-if' slope analysis tool empowers engineers to conduct rapid scenario planning, drastically reducing the time spent on preliminary site-fit assessments.

Full-Stack Development & Strategic Expertise

Business & Strategic Skills:

- Problem-Solving & analytical Thinking
- Systems Thinking
- Requirements Elicitation
- Communication: (Adaptability & Learning
- Stakeholder Management

Technical Stack:

- **Power BI Development:** End-to-end report and dashboard creation.
- **Power Query (M Language):** Advanced data extraction, transformation, and loading (ETL) from multiple sources.
- **DAX:** Creation of complex, context-aware measures for custom business calculations
- **Data Modelling:** Designing and implementing efficient star schemas.
- **UI/UX Design:** Creating intuitive, clean, and highly interactive user interfaces with bookmarks, buttons, and drill-throughs.
- **"What-If" Parameter Analysis:** Implementing dynamic slicers for user-driven simulations.
- SharePoint Integration: Expertise in connecting Power BI to cloud-based file storage for automated data refresh.

The Development Team & Responsibilities

***Power BI & Platform developer(me)**
***Internal Engineering Consultancy Department lead**
***Civil and Hydrology development team**

My responsibilities

- Extract-Transform-Load Development: Designed the data ingestion process from SharePoint and built all Power Query transformations.
- DAX & Business Logic: Authored all DAX measures, including the complex TCI calculation and the logic for the resource multiplier.
- Developed visuals, and configured all interactivity (slicers, drill-downs, buttons).
- Stakeholder Collaboration: Worked closely with the engineering team to understand their analytical needs and validate the TCI model.

Team effort on the development

- Requirements gathering.
- Power BI UI/UX conceptualisation & selection
- Testing and documentation of the solution.

Recommendation

Abhishek Gawde · 1st

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I had the privilege of working with Samuel Adenigba, a seasoned professional whose expertise in solar PV project analysis and energy performance optimization is truly exceptional. Samuel's contributions have been instrumental in driving the success of solar projects, through critical milestones such as project sales, commissioning, and operational performance.

Samuel is a master of leveraging data and technology to solve complex challenges. His proficiency in tools like Microsoft Fabric, Power Platform, SQL, and Python enables him to build scalable data solutions and automate processes that significantly enhance business intelligence and asset performance. His work in orchestrating big data pipelines, developing automation tools, and optimizing PV plant designs demonstrates his innovative approach to driving efficiency and value.

What sets Samuel apart is not just his technical acumen but also his ability to bridge the gap between technical and non-technical teams. His ability to communicate requirements and align stakeholders ensures due diligence across all phases of solar projects.

If you're developing a solar project or tackling the challenges of underperforming assets, Samuel is the expert you need. His hands-on experience in energy simulations, financial analysis, and engineering design, combined with his deep industry knowledge, makes him an invaluable asset to any team or organization.

It’s been an absolute pleasure collaborating with Samuel, and I highly recommend him for his unparalleled expertise and dedication to excellence in the solar energy sector.

Thank You

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