



Case Study

Mine to Market Value Chain



Value chain optimization software to increase profit, reduce costs and maximize efficiency.



Maximized revenue

New sales channels unlocked, adding \$28M in potential revenue.



Cost efficiency

Saved \$400K annually through streamlined logistics and resource use.



Enhanced planning

Integrated system for seamless, mathematically optimized, data-driven decisions.

Optimizing a multi-mine coal value chain to drive efficiencies, unlock revenue, and achieve cost savings.

THE CUSTOMER

The customer is an established coal producer operating multiple mines in Australia, specializing in metallurgical coal. Their operation utilizes both trucks and trains to deliver coal to a shared port where central blending and vessel loading occurs. Efficient coordination across these logistics and transport modes presented as a vital requirement to meet demand, increase output, better capitalize on sales opportunities, and maintain product quality.

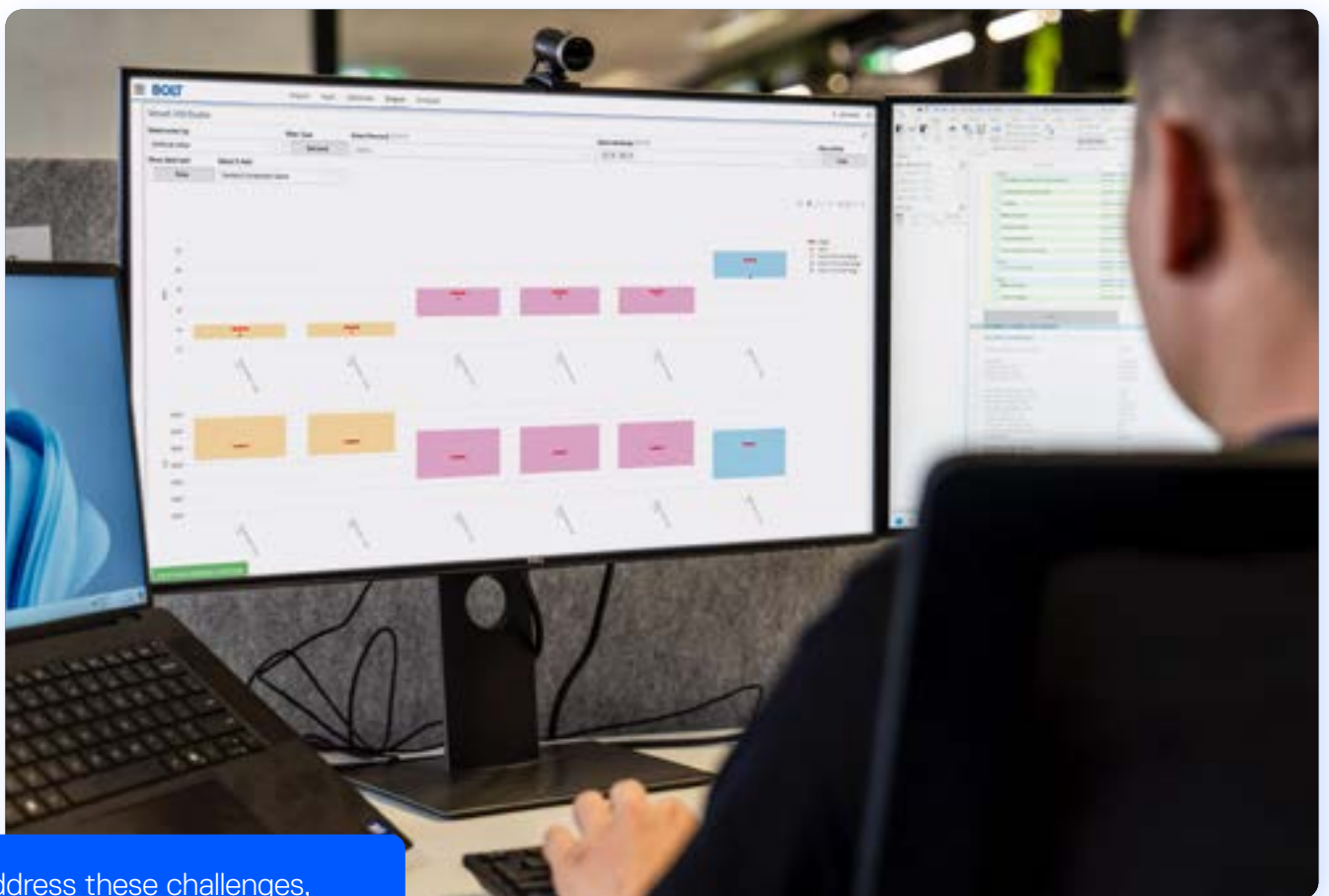
THE CHALLENGE

The customer faced operational hurdles, primarily from fragmented planning reliant on outdated technology and disconnected Excel spreadsheets. These issues spanned across multiple critical areas:

- **Multi-Horizon Planning Complexities:** Without a unified system, the company struggled to synchronize plans across short-, mid-, and long-term horizons. The tactical and operational plans, which govern weekly and daily activities, often diverged from the long-term strategic outlook, destroying value.
- **Logistics and Coordination Bottlenecks:** Managing two distinct modes of transport (trucking and rail) for multiple sites and coordinating them at a port for blending and export was complex and error-prone. The lack of cohesive planning tools increased the likelihood of missed shipments, suboptimal blending, and unmet product specifications.
- **Limited Decision-Making Insights:** A reliance on siloed planning in Excel spreadsheets restricted visibility into potential sales opportunities and flexible responses to demand shifts. Decision-makers could only evaluate a limited number of prospective sales, resulting in lost revenue opportunities and inventory management issues.

- **Washery (CHPP) Decisions:** Manual planning kept the washery in a fixed configuration for months, significantly limiting agility. This rigidity prevented the company from making valuable yield and quality trade-offs, further hampering operational efficiency.
- **Blending Decisions:** Predetermined recipes focused solely on typical ash values without accounting for variations in block qualities or critical factors like moisture and sulfur content. This resulted in contract compliance issues and lost value due to inflexible and overly standardized blending methods.

These challenges collectively impacted operational efficiency, increased costs, and constrained the company's ability to capitalize on sales opportunities, making a comprehensive and integrated solution essential to enhance productivity.



To address these challenges, BOLT, a comprehensive supply chain optimization software, was deployed.

THE SOLUTION

As part of Deswik's solution, three planning modules were used—Strategic, Tactical, Operational, and a historic tracking module—Live.

Designed to streamline decision support and modeling, BOLT provided crucial insights into production, stockpiling, blending, processing and logistics coordination, ensuring that each planning level was precisely aligned with the company's operational and market needs. In particular, BOLT effectively addressed the complex washery and blending challenges across all planning horizons.



These modules allowed the company to optimize production and adapt rapidly to fluctuating demands.

Washery Optimization: BOLT dynamically optimized washery settings, allowing the company to explore and implement valuable yield and quality trade-offs. This agility ensured that the washery could adapt to varying demands and improve operational outcomes.

Blending Optimization: BOLT transformed blending decisions by incorporating specific quality targets, tolerance ranges, and financial considerations into its algorithms. This approach replaced rigid, standardized recipes with mathematically optimized ones tailored to block qualities, ensuring contract compliance while capturing previously lost value.

The Strategic Module became invaluable for guiding long-term planning and capitalizing on both contracted and opportunistic sales, while supporting flexibility in supply through third-party options when beneficial.

Strategic Module: Used by the customer to plan the next five years in monthly periods, this module allowed the team to assess future production capabilities and align these with anticipated market demand. This module's monthly planning intervals ensured that decisions made at the strategic level effectively informed tactical and operational plans. Key capabilities include:

- **Fulfillment of Contracted Sales:** The Strategic Module helps the company determine how coal should be stockpiled, transported, processed, and blended to meet contracted sales. By setting a clear path from production to fulfillment, this module ensures that sales commitments are met efficiently and in alignment with customer specifications.
- **Identifying Opportunistic Sales:** BOLT identifies potential sales opportunities based on projected production capacity. By analyzing future supply and market conditions, the module determines which sales would add the most value, helping the company maximize revenue from untapped opportunities.
- **Third-Party Coal Supply Decisions:** The Strategic Module assists in evaluating the potential need for third-party coal purchases to supplement internal production. This capability includes assessing both raw and processed third-party coal options. For example, in one study, BOLT assessed whether purchasing raw coal from an external supplier, to be processed within the company's network, would be financially viable and logistically feasible. The results showed that this option would effectively support production during a period of low internal supply, proving it to be a worthwhile investment.



Tactical Module: Used by the customer to plan for the next six months in weekly periods, this module enabled the company to break down high-level strategic goals into actionable steps. Key functions include:

- **Laycan Selection:** Using sales targets set in the Strategic Module, BOLT determines the optimal timing for each vessel's laycan (scheduled arrival window). This ensures shipping schedules align with demand and product availability, allowing precise coordination with shipping companies.
- **Assignment of Third-Party Material to Cargoes:** BOLT identifies which vessels require third-party material to meet demand and schedules orders accordingly. This ensures that additional supply, arriving by train, is timed perfectly to integrate with weekly operations.

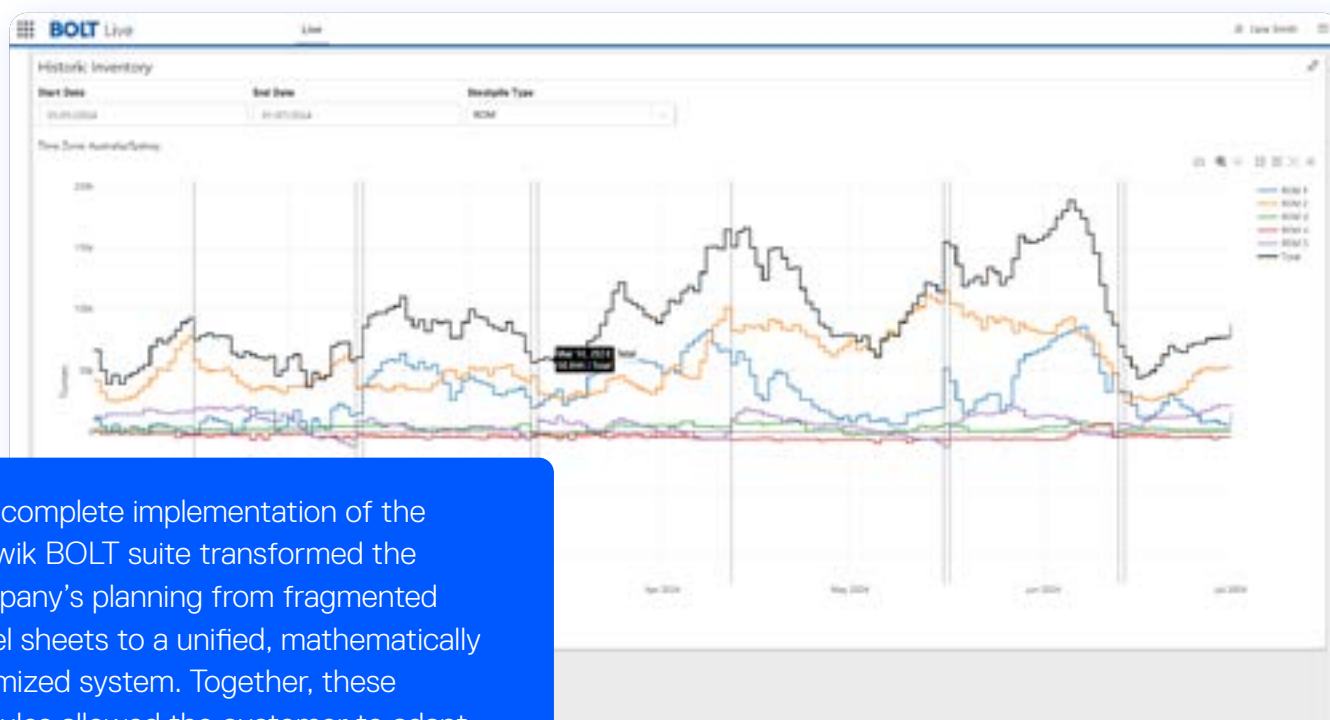
By knowing laycan schedules and third-party requirements, the company was able to proactively arrange shipments and supply orders, which would be less precise with monthly planning alone. BOLT's optimization capabilities ensured that all supply chain constraints are adhered to while maximizing operational efficiency across the entire planning period.

Together, these capabilities allowed the company to align its daily operations with broader tactical plans, ensuring efficient use of resources, adherence to schedules, and cost-effective logistics.

Operational Module: Used by the customer for shift- and daily-level planning within a four-week period, the Operational Module streamlined day-to-day decision-making. This provided a bridge from the tactical plan to the immediate tasks required to meet short-term logistical needs, blending requirements, and vessel loading.

- **Cargo Assembly**
Cargoes are assembled in stockpiles at the port prior to the vessel arriving. It is important that these stockpiles are built to the correct quality specifications prior to vessel loading to ensure the sale is filled and that no penalties occur.
- **Truck Utilisation**
Ensuring that trucks adhere to fleet requirements and restrictions.
- **Loading Vessels within Laycans:**
BOLT manages vessel loading within designated laycan periods to minimize demurrage costs, coordinating timing to align with port and transport schedules.

Live Module: Serving as a near real-time stockpile tracking system, the Live Module ingests and reconciles data from multiple sources to establish an accurate, unified view of material quality and quantity across all stockpiles. The Live Module focuses on providing a reliable “current state” snapshot, enabling operational and tactical decisions to reflect the most up-to-date stockpile data. This ensures that short-term plans are fully aligned with actual stockpile conditions.



The complete implementation of the Deswik BOLT suite transformed the company's planning from fragmented Excel sheets to a unified, mathematically optimized system. Together, these modules allowed the customer to adapt quickly to new opportunities and demands, empowering data-driven, profitable decision-making.

\$28m

Additional Annual Sales

\$400k

Annual Cost Savings

THE BENEFITS

BOLT's implementation delivered measurable improvements across the board:

- **Enhanced Sales Opportunities:** By leveraging BOLT's scenario analysis and decision-support tools, the customer achieved a sizeable increase in sales options, identifying approximately \$28 million in additional annual sales opportunities. The ability to evaluate opportunistic sales allowed their teams to target a broader range of customers, greatly enhancing revenue potential.
- **Cost Savings and Operational Efficiency:** Within the first six months, the company gained up to an estimated \$400,000 in annual cost savings. These savings stemmed from optimized logistics and efficient stockpile management, reducing material handling costs and minimizing bottlenecks.
- **Improved Communication and Planning Cohesion:** By providing a single source of truth, BOLT eliminated conflicting data across planning horizons. This reduced misalignment in logistics, improved communication across teams, and allowed personnel responsible for various timeframes to coordinate seamlessly.
- **Stockpile Accuracy and Quality Assurance:** Using the Live Module enabled the company to reliably track and manage stockpile volumes and quality across its network. This accurate, unified view of current stockpile states enabled more precise blending decisions and ensured that all products met contractual specifications, thereby reinforcing the company's reputation for quality and reliability.
- **Strategic Flexibility:** The scenario analysis capabilities within BOLT enabled the customer to evaluate various logistics and sales options while mitigating risk. The company explored options such as third-party coal purchases and optimized transport choices, providing a robust basis for future strategic decisions.



Learn how to maximize supply chain efficiencies with the power of industrial mathematics.

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DECISION SUPPORT QUESTIONS

- How can stockpile levels be managed to optimize blending processes and ensure product specifications?
- What settings and operating modes should be used when operating washery?
- How can we improve communication and planning between teams?
- What material should I load / blend onto each train / truck?
- Which sales opportunities can be met based on current stockpile quality and availability?
- Does purchasing third-party coal improve the company's ability to meet contracted sales?
- Should I incur demurrage and on which vessel, given demurrage changes for each vessel?