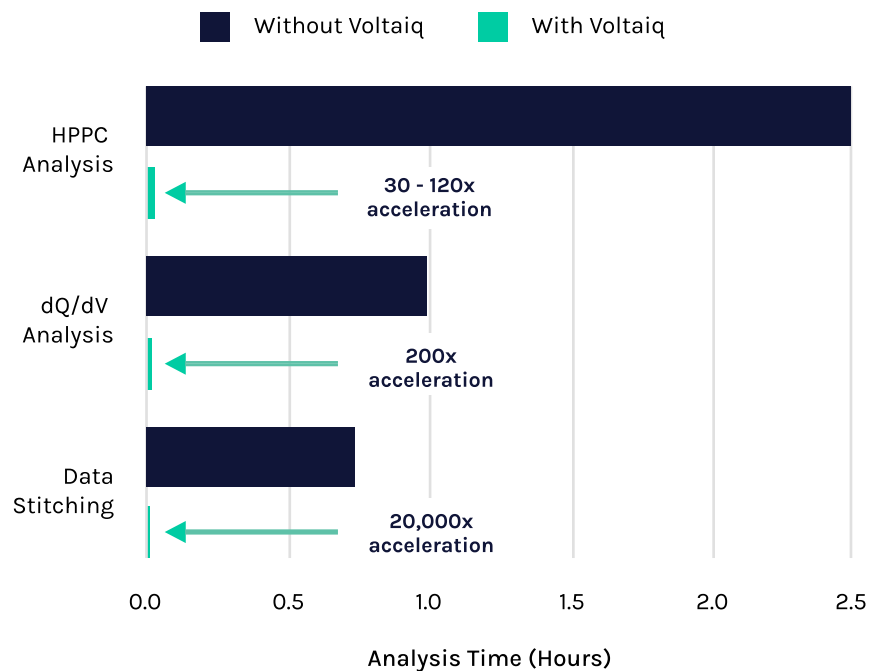CASE STUDY

How Voltaiq is Helping a Top 5 Global Automaker Meet Launch Timelines and Avoid Recalls

> " **Voltaiq is making it possible for all stakeholders of the data to view the live results as they are collected. Even better, the analyses, specific views, and conclusions can be shared instantaneously and dynamically.**
>
> **—System Engineer**

With electrification sweeping across the global automotive industry, a rash of high-profile EV battery fires and recalls have dominated headlines and cost automakers billions. As the EV industry matures, a new and unfamiliar set of challenges confronts the companies making this transition. One top-five global automaker was squandering valuable engineering time and resources on wasteful battery data analysis processes. Moreover, these imperfect processes meant that vehicles risked entering production with defects that could result in significant warranty losses or multibillion-dollar recalls.

Powered by Voltaiq, engineers at the automaker can now monitor program performance and identify problems far earlier in the battery development process. Failure analysis has improved, the automaker has increased data visibility, and as a result they are better fulfilling launch timelines.

Legend: ■ Without Voltaiq ■ With Voltaiq

- HPPC Analysis — 30 - 120x acceleration
- dQ/dV Analysis — 200x acceleration
- Data Stitching — 20,000x acceleration

X-axis: Analysis Time (Hours) (0.0, 0.5, 1.0, 1.5, 2.0, 2.5)

✓ Engineers have reduced the time spent searching for data from seven hours per week to seconds, and have reallocated this bandwidth to high-value analysis.

✓ The Voltaiq system has over 100 users at this OEM, and they are supported by dedicated battery experts from Voltaiq's Customer Experience team.

✓ Engineering teams can now share and collaborate with colleagues and partners across the hall – or around the globe – in real time.

✓ The automaker now has much-improved confidence in their ability to meet launch timelines and avoid recalls.

⚠ The Challenge: Time-Consuming Battery Analytics

Traditional battery data analytics methods waste valuable engineer resources. This Top 5 global automaker was struggling with the same challenges that are typical across the industry: battery engineering workflows were slow and inefficient, wasting hours of time.

When creating a new vehicle battery, hundreds if not thousands of individual battery cells, modules, and packs are thoroughly tested. This process creates massive amounts of charge-discharge data for battery experts to analyze – analysis normally performed manually, with spreadsheets.

As an example, Hybrid Pulse Power Characterization (HPPC) analysis was taking an average of between one and four hours per test, but nonetheless had to be performed thousands of times per vehicle program. This meant extensive analysis took a long time, and projects were taking weeks to finish. Months passed between the request for a test and the final data analysis, the analysis was confined to recent data only, anomalous batteries were not discovered for months, and analyses were commonly duplicated.

According to a survey conducted prior to the Voltaiq roll-out, 91% of respondents identified data management concerns – excessive time spent finding and preparing data for analysis – as a constraint in their current battery workflow.

64% of respondents identified data silos – battery data that exists, but is inaccessible to wider teams – as another obstacle in battery workflows. Moreover, engineers were spending a great deal of time in meetings – which detracted from the time they spent sitting down and crunching numbers.

> " To go from 1 to 4 hours per HPPC test analysis to less than an hour – this is pretty significant for our team. It would take me two weeks to get the work done, but with Voltaiq I'm able to do it all in under an hour without any trouble.
>
> -Systems Engineer

The automaker is now protected from late discovery of potential cell failures. As a result, the automaker has been able to radically streamline development, meet launch deadlines, and increase overall confidence that they can detect bad batteries to prevent safety issues and recalls once their vehicles are in customer garages.

Time Savings Summary

	Without Voltaiq	With Voltaiq	Total Time Saved
HPPC Advanced Analytic	40-200 hours	1.33 hours	30-150x time savings per engineer
dQ/dV Advanced Analytic	1 hour	0.3 minutes	200x time savings per engineer
Stitching Advanced Analytic	0.8 hour	0.002 minute	24,000x time savings per engineer

Contact us and experience the Voltaiq difference today.

About Voltaiq

Voltaiq has built the industry's first Enterprise Battery Intelligence (EBI) software platform, helping its customers optimize battery performance, reliability and financing, while avoiding costly recalls and catastrophic battery fires. Founded in 2012 by veteran battery and software entrepreneurs, Voltaiq's global customer base includes industry leaders in transportation, consumer electronics, energy storage, and the full battery supply chain. For more information, please visit www.voltaiq.com.

# The Impact: Slowed EV Development and Missed Launches

These delays were adding up, and having a serious impact. The slowness was compounded by data access concerns. Existing file servers were disorganized, and valuable hours were often wasted simply looking for data. In fact, engineers often had to default to going into the lab to manually extract data from test equipment, either by downloading it on a thumb drive or sending it over the network.

The automaker's slow and cumbersome battery data analysis practices delivered limited insight leading to cell failures late in qualification. Cell failures at this stage are bad news, if a battery design issue requires significant revision, it will take several months, if not years, to qualify a revised battery design.

Scenario 1: Pack fails qualification, vehicle misses launch
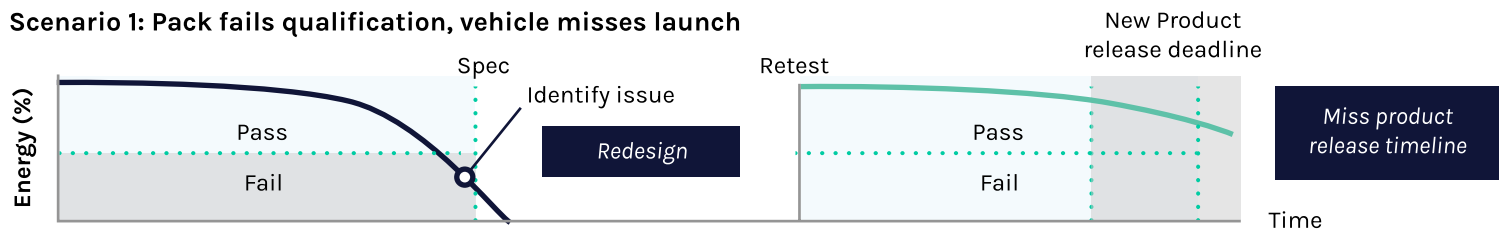
Scenario 2: Voltaiq detects qualification failure early, vehicle launches on time
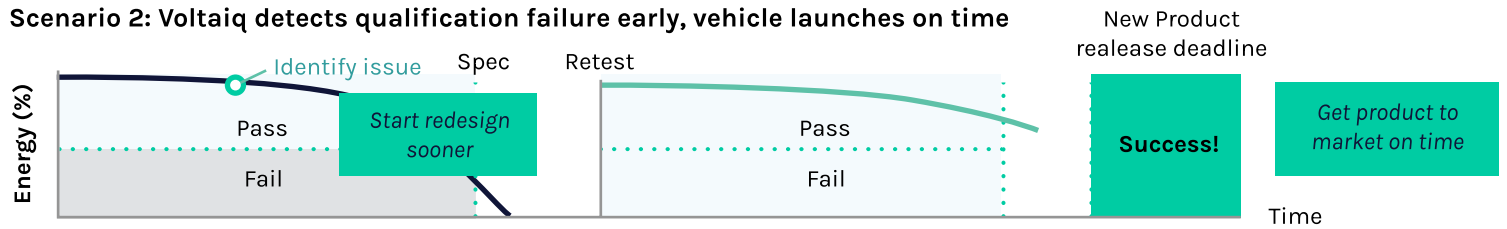
The painful result of this battery workflow approach was that launch deadlines were being missed – sometimes by as much as 18 months – due to late-stage detection of battery problems, and vehicles risked going into production with issues that could potentially lead to large warranty losses or multibillion dollar recalls.

The Resolution: No More Delays, No More Recall Risk

> "Bottom line, Voltaiq took a one-hour task and turned it into ten minutes and allowed us to expand the analysis to five times the number of batteries and four times the number of cycles. So 20x the analysis in let's say 1/10th the time, faster, better quality, more rigorous. Quite amazing.

-Systems Engineer

The automaker turned to Voltaiq to improve battery analysis and development workflows. First, the Voltaiq team performed a pre-implementation survey to learn more about the battery team's data challenges. The team then moved toward configuring the Voltaiq system to the automaker's specific needs, and began training users.

Powered by the fully automated Voltaiq data platform, engineers can now plot metrics in real time by using interactive charting with 30+ time-series data fields and 70+ per-cycle statistics. With this new process and technology, the engineers can easily manage and draw powerful insights from large datasets. This includes metadata specifying the properties of a cell, module, or pack, which can be evaluated alongside battery performance.

Overall, Voltaiq saves hundreds of hours per program by automating vital analysis tasks, such as assembling a battery's full performance history from many large data files, accelerating workflows by 24,000x. (As an example, Voltaiq's battery history tool processes over 500 data files per minute, vs. 4 hours to process 5 data files manually.)