



ABB for Battery Manufacturing

# Plant Optimization Methodology

Delivering optimized design, project execution excellence, and efficient ongoing operations—right from the start.

## The global demand for batteries is being driven to new heights.

And lithium-ion based battery solutions are beginning to dominate the market. With yearly battery demand accelerating, new giga-sized plant construction will be necessary to match the burgeoning demand.

#### With growth comes inevitable challenges.

New, intelligent production approaches and plant optimization methodologies are crucial to ensuring battery manufacturer success.

Just as nature has adapted, project design, execution, and ongoing operations need to adapt as well.

As battery manufacturers strive for reliable, efficient, and competitive production processes, they must also ensure sustainability-via reduced consumption of energy and raw materials.

To achieve business outcomes, digital transformation of manufacturing methods is essential.

Partnering with ABB at project inception helps overcome these challenges as we help forwardthinking battery manufacturers design, equip, and operationalize their plants. Not only will this improve project execution but it will also enable efficient operations, ensuring safety, efficiency, and flexibility at every stage.

# A fully integrated solution for Battery Manufacturing

ABB's Plant Optimization Methodology can help Battery Manufacturers reduce project changes, complexity, risk, and cost to ensure the fastest time to market.



## **EICD** integration

Combining automation, electrification, instrumentation, project design, system engineering, and digitalization expertise with extensive fabrication knowledge, to provide integrated, comprehensive, fully optimized solutions.



#### Adaptive Execution™

Redefining physical and digital activities to deliver consistent, standardized global projects, while minimizing CAPEX.



#### **Efficient ongoing operations**

Ensuring reliable and productive results, from commissioning throughout the full plant and equipment lifecycle.

PILLARS FOR SUCCESS

# **Right from the start**

To experience the greatest benefits from our Plant Optimization Methodology, begin collaborating with ABB in the earliest stages of project planning.

**FROM START TO FINISH**, our integrated offering provides an evolution in project management—ensuring battery manufacturers achieve effective, efficient project planning, design, and execution for optimized operations at start-up, throughout project execution, and beyond.



ABB combines Electrical, Instrumentation, Control, and Digital (EICD) technology, to minimize risk, reduce interface complexity and leverage synergies to provide integrated, fully optimized solutions that carry through all phases of project execution



ABB Adaptive Execution redefines physical and digital activities, to deliver consistent, standardized global projects, while minimizing CAPEX



This is followed by our ongoing operations support for production and lifecycle management, and more—ensuring reliable, safe, and optimized operations for greater productivity and profitability

## Partnering with ABB delivers value to your project

CAPEX + OPEX savings of 15% to 40%

#### Simplified interfaces

Centralizes interactions across all stakeholders

Schedule compression of 10% to 30%

Virtualized environment

Removes the need for

site access engineering

Fewer start-up hours up to 40%

Superior quality Standardizes designs, tools, and processes

# **EICD integration** An evolution in project design

ABB combines Electrical, Instrumentation, Control, and Digital technology, to reduce interface complexity and leverage synergies to provide integrated, fully optimized solutions.

Blending project design and system engineering expertise with extensive fabrication knowledge, ABB can help you to advance your battery manufacturing production efficiency—right from the start.

As the only EICD supplier with an integrated offering and proven, agile project execution model, we possess the flexibility and expertise needed to overcome unexpected project challenges.



Electrification Integrated, modular power distribution solutions—that are standardized, scalable, and replicable.



#### safety control systems improve engineering efficiency, operator performance, and asset utilization.

#### Instrumentation

Flow, temperature, and pressure measurement solutions and more that help solve difficult quantification challenges.

Efficiency

# **ABB Adaptive Execution** Advancing project execution

ABB applies our Adaptive Execution approach that redefines physical and digital activities to deliver consistent, standardized global projects.

- Consistently delivering optimized projects, processes, and productivity
- Reducing risk, protecting schedules, decreasing engineering hours, and shortening time to start-up
- Demonstrating competence in greenfield sites blending experience and expertise with an advanced model built on years of automation project experience
- Applying a modular approach to project execution that eliminates unexpected delays common to traditional approaches
- Reducing time-to-start-up—recognizing that time is the most constrained resource and ABB's methodology ensures the reduction in time approach

ABB Adaptive Execution evolves the traditional project approach to deliver results faster-even when you are facing complexity and change.

And our comprehensive Plant Optimization Methodology for Battery Manufacturing transforms project execution, ensuring speed and preserving quality through decoupled, parallel tasks.

The earlier we get involved, the more we can help.



Agility Ability to change scope on the fly

## A fundamental shift to build the right foundation

ABB Adaptive Execution provides everything you need to thrive on changeensuring the delivery team's ability to achieve more with less.

- Early design involvement—Creates predictable schedules, reduces start-up time, streamlines engineering workflows, and minimizes risk
- Standardized modularity—Leverages standardized, pre-assembled, reusable modules-pre-tested to drive efficiency, speed delivery, and reduce costs
- Flexible workflows—Tech-enabled methodologies help accommodate change and drive effectiveness
- Seamless integration—Project management tools unify disparate systems, provide oversight, and facilitate collaboration



Collaboration Maximizing team performance to achieve the schedule

#### THE ABB ADAPTIVE EXECUTION APPROACH

Ensuring the delivery team's ability to achieve more with less

#### Effectiveness Translating scope into an executable solution

#### Vision

Setting an accurate scope and price; providing a 360° project view

# Ongoing operations

Enabling efficient, reliable, and safe operations for enhanced productivity and profitability through three key capabilities.



Increase production capacity utilization by **~2-5%** 

Improve quality and reduce off-spec materials by up to **5%** 

### ABB Ability<sup>™</sup> Manufacturing Operations Management (MOM)

#### **Revolutionizing operational decision making**

Guiding manufacturers' operations by providing the information and insight needed to obtain competitive advantages, from order intake and production planning through product delivery and quality assurance.

- Empowering real-time, data-driven decisions for safer, smarter operations that maximize resource, asset, and production efficiency
- Improving manufacturing productivity, quality, and flexibility by giving operators, supervisors, production engineers, and plant managers the insights to act and optimize



#### Lifecycle management

#### Maximizing asset life for increased operational efficiency

Ensuring equipment availability and productivity from commissioning throughout the complete project and full equipment lifecycle.

- Employing powerful tools and industry-leading knowledge and experience to optimize performance and extend equipment life
- Providing service and support for all equipment throughout its lifecycle and optimizing service delivery



Reduce energy costs by up to **5%** 

Improve OEE with a digital transformationbacked initiative\*

\*World Economic Forum, Fourth Industrial Revolution Beacons of Technology and Innovation in Manufacturing, 2019)

#### Performance optimization

#### Augmenting quality, production, and process performance

Powerful algorithms, modeling, data analytics, and remote expert assistance help quickly resolve unwanted situations while improving productivity, energy efficiency, quality, and much more.

- Improving outcomes with digital solutions that deliver deep domain expertise from device to edge to cloud to help customers achieve business outcomes
- Reducing energy costs through optimized production, power purchasing, and captive power generation

Our flexible, scalable solutions ensure comprehensive connectivity, optimizing operational performance, and simplifying asset management.

- Enabling higher plant efficiency and productivity, as well as greater flexibility throughout the production processes
- Providing seamless orchestration and synchronization of everyone involved in the manufacturing process, removing silos

- Ensuring a local presence and responsiveness,
- backed by global experience and support

- Increasing yield and product quality while reducing production costs
- Enhancing automation with advanced control strategies for flexible manufacturing and optimized production

## Solutions to enable optimized battery manufacturing—from start to finish

#### **Electrification options**

- Grid connection
- Productized and modular power distribution (low voltage and medium voltage)
- Process electrification

#### Control

- Distributed control system (ABB Ability<sup>™</sup> System 800xA)
- Programmable Logic Controllers (PLCs)
- Battery-specific control applications (Bat-library)
- Electrification control systems (SCADA)
- Energy Management System (Smart Power)

#### Project management engineering and consulting

- Front-End Engineering and Design (FEED)/ EICD studies
- Adaptive Execution project delivery
- Control room design
- Decoupled software and hardware engineering (Select I/O)

#### Instrumentation options

#### Robotics

- Cell manufacturing automation
- Robots for assembly steps of
- the value chain

Service

Training



• ABB Care service agreements • Engineering and consulting • Preventive maintenance • Spares and consumables

#### Automation of transported logistics

- High-speed continuous motion production
- · Fully automated logistics with Automated Guided Vehicles (AGVs)



# Optimize outcomes by partnering with ABB at project inception

To achieve the most desirable production goals and business outcomes we collaborate thoroughly from the start—with our partners, customers, and the entire ecosystem in which we operate to bring the best solutions forward.

This collaboration is reliant upon the collective contributions of people, processes, technology, and infrastructure.

ABB Plant Optimization Methodology for Battery Manufacturing is a fully integrated solution that helps our customers reduce project changes, complexity, risk, and cost—ensuring the fastest possible time to market.



Learn more about ABB Battery Manufacturing solutions at **new.abb.com/battery.** 

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