

Flawless project execution

ABB is the main automation and electrical contractor for large industrial projects worldwide

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As the pace of technology development increases and the demand for increased plant efficiency and improved power consumption drives the design of industrial facilities, manufacturers and plant operators are turning to automation and electrical product developers like ABB to provide industrial solutions that meet the technical and execution requirements of these complex facilities.

This approach moves the product developers from their traditional role of vendor/equipment supplier – providing equipment to a customer-developed specification – to that of an independent contractor performing the role of an engineering, procurement and construction (EPC) contractor and provider of engineered solutions **1**. ABB defines this role as that of a main automation contractor (MAC) or main electrical contractor (MEC). In making the transition from vendor to contractor, the MAC/MEC is required to adopt a more proactive approach during the execution of the work. This requires close cooperation with the client organization and other contractors and suppliers to develop best-in-class solutions, as well as to implement those solutions across the facilities and manage the interfaces with other participants to ensure effective integration of all components and systems.

This EPC approach is distinguished from the traditional vendor/supplier role in three significant ways:

1. The scope of supply involves services and products, with the emphasis on the ability to provide the services element **2**. The scope of work requires participation of the MAC/MEC throughout the full project lifecycle, from front-end engineering and design (FEED) to completions and startup.
2. The work requires significant coordination and information exchange between multiple project participants.
3. The MAC/MEC is responsible for coordination of the overall systems and manages the interfaces to facilitate integration.

There are also significant differences from a project execution perspective where these types of projects involve multiple participants including process designers, construction contractors, utility providers, regulatory authorities and government agencies.

First, the scope of work is broader than a conventional vendor/supplier scope and is focused on the overall

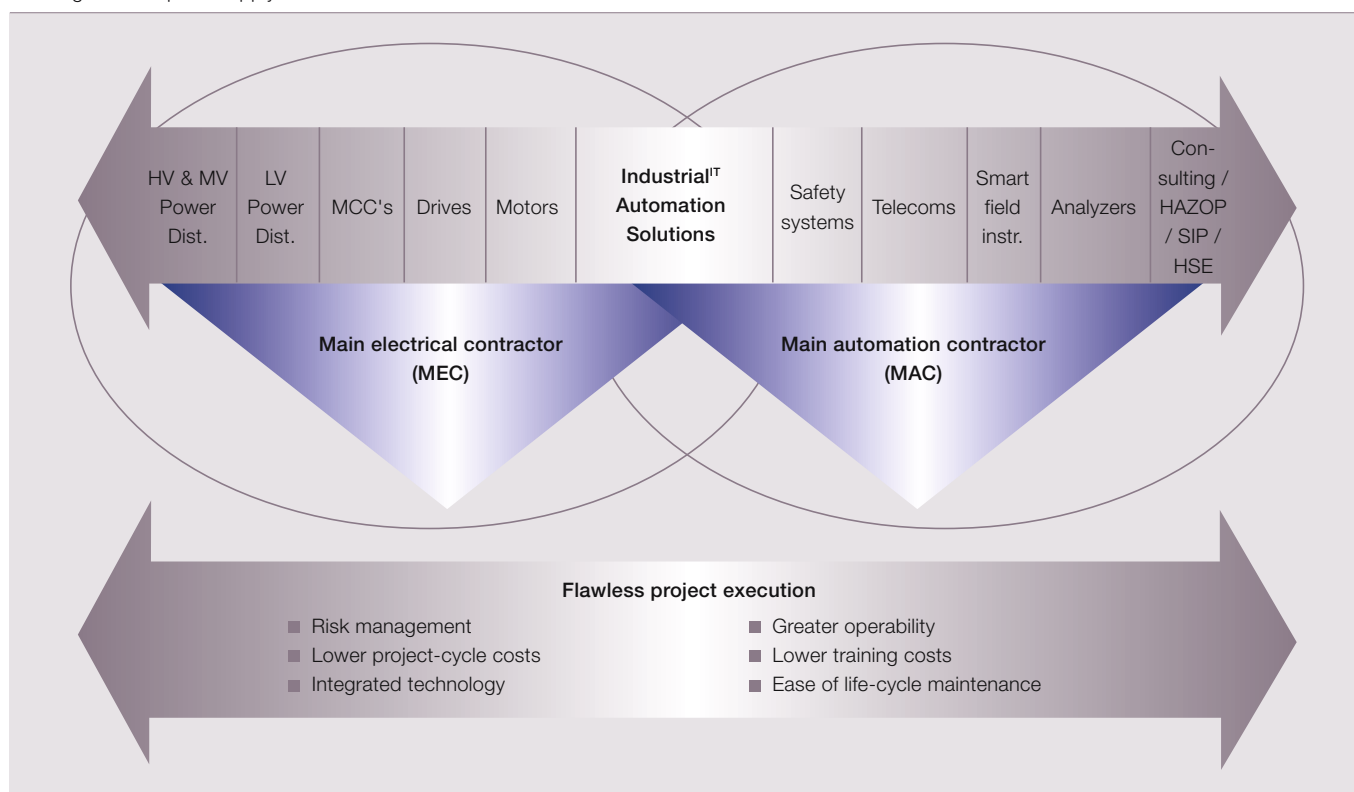
solution and not the products that make up the solution.

Second, it requires participation in the FEED phase where the MAC/MEC works closely with the customer and overall plant designers to develop the system concept and basic operational specifications.

Third, once the project moves into the full execution phase, the MAC/MEC has the responsibility, in addition to providing the product solution, to provide coordination and interfaces between the major EPC contractors. This ensures that the concepts and requirements developed during the FEED phase are implemented effectively and that design standardization is achieved across the facilities.

Fourth, the MAC/MEC provides the product solution utilizing its own products in combination with third-party products, integrates these with the process and utility equipment provided by the EPC contractors, and as-

1 ABB's comprehensive product and systems offering in power and automation technologies covers the entire spectrum of an integrated scope of supply



Project design

sists with the installation of the completed systems under the direction of the EPC contractors.

Finally, the MAC/MEC has responsibility to work under the direction of the EPC contractors at the construction sites to achieve final commissioning and startup of the facilities.

ABB has developed a robust project execution methodology that provides customers with a level of service not available from the traditional EPC contractors.

As a global leader in the design and supply of process automation and power systems for a broad range of industries, ABB has easily made this transition from main product vendor to overall solutions provider. Leveraging its expertise around the globe, ABB has developed the “Book of MAC/MEC,” a robust project execution methodology that, combined with extensive product and industry knowledge, provides customers with a level of service not available from the traditional EPC contractors.

Project execution

ABB’s execution methodology is based on modern project management techniques supported by well-trained and qualified professional resources and proven systems and tools. The focus of the approach is ensuring that the project scope is well defined at the outset, that the work is planned well in advance of execution activities, that execution responsibilities are identified and agreed upon between all participants, and that detailed project-specific plans covering all aspects of the work are established, implemented and followed.

To support the project management process, ABB has developed the MAC/MEC Project Execution Map. The map outlines the structure and scope of a typical automation or electrification project from the FEED phase through to completions and acceptance. The map provides information on the primary execution processes and the various project plans needed to support flawless execution during the various project phases. The map portrays the relationships between the internal execution processes of the customer, MAC/MEC and the EPC contractors, and how these processes interact and integrate in order to achieve a common approach for project execution. The map also indicates the high-level technical interface points that exist

between the MAC/MEC and the EPC contractors during each major project phase. The map depicts the four main project phases:

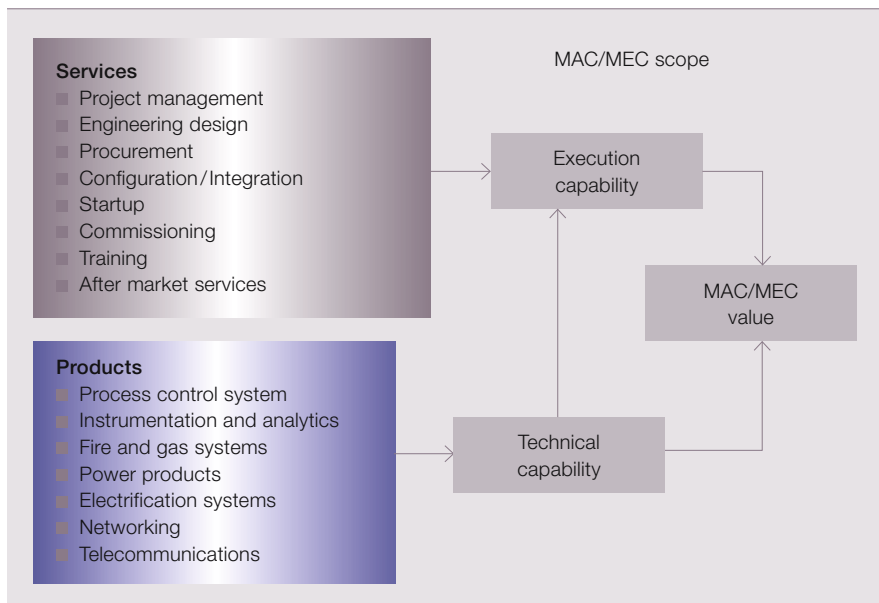
- FEED
- Detailed design, engineering and manufacture
- Construction/installation
- Completions and closeout

FEED participation

Early involvement in the development stage of a project has a tremendous impact on the overall effectiveness of the final solutions selected. The long-term benefits achieved by “getting it right” early in the project yield results in total cost of ownership savings.

The MAC/MEC participation in the FEED phase of the project lays the foundation for the development of a best-in-class solution for the project. The FEED phase has two basic elements: a technical aspect and a work process aspect. Working in cooperation with the plant owner and process designers, ABB utilizes its unique combination of technical expertise and detailed product knowledge to provide the technical concept definition, project standards, common functional design criteria and generic equipment specifications. The FEED phase is also the period when the management systems and specific project plans to be employed during

2 A MAC/MEC approach provides value to the owner/operator in all phases of a project



Factbox ABB MAC/MEC projects

ABB has implemented numerous projects as the main electrical and automation contractor on behalf of many of the world's leading hydrocarbon companies in onshore and offshore locations all over the world. Applications include gas distribution pipelines, gas processing plants, offshore oil and gas platforms, onshore oil production facilities, and oil refineries.

ABB is a leading supplier of power and automation products, systems and solutions to the oil and gas industry, with a complete and integrated scope of supply capability that ranges from plant electrification to control, optimization and safety systems, smart field instrumentation, analyzers and telecommunications systems.

project execution are defined and developed. Each organization (owner, designers and ABB) has its own internal standards and requirements for executing its work. These internal processes reflect the basic tenets of the respective organizations and are the foundation for how each of them approaches the various execution phases. A balance between the project-specific requirements and the basic work processes of each of the participants must be achieved. Basic integration of the respective work processes is necessary to make the transfer of critical engineering data and documentation possible. This integration of work processes and establishing a common approach to execution are key elements in achieving flawless execution. To facilitate this, ABB utilizes the Interface management¹⁾ process.

Interface management

Interface management is one of the most critical processes in achieving flawless project execution. It involves identifying and controlling the flow of critical information between major project participants. For complex industrial projects there are multiple project participants, each of whom will require data (technical, schedules, etc.) from other participants in order to perform their work. The timely identification, development and exchange of this data are crucial to project success. The interface management process facilitates this through early identification of the data required and by establishing formal agreements between the supplier and receiver on the required data and when it is to be delivered.

The process utilizes formal, documented interface agreements created between ABB and the other project participants. Agreements are also created internally within the various units of the ABB organization to provide visibility of critical data and information. Each interface agreement has an information owner (the sender) and an information recipient (the receiver), and lists the specific information required and the delivery requirements for it. Each interface agreement is given a unique identification number and is logged in the interface da-



tabase. The status of all agreements is monitored and reports produced on a regular basis indicating the overall status. Constant monitoring highlights areas of criticality that can be quickly addressed and brought under control.

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Interface management is just one of a complete suite of processes employed by ABB in the overall execution model. The processes have been developed as a result of participation in major projects around the globe covering a wide variety of customers and industrial sectors. These processes are the foundation of flawless execution. They are based on the premise that the work to be performed is fully defined and responsibilities for execution are agreed and allocated. Goals and objectives for success are established and strategies developed to achieve success. The strategies form the guidelines for action planning. Creation of the detailed plans, implementation of the plans and constant monitoring of actual performance towards achieving the defined objectives are the keys to successful execution.

The ABB execution model has been developed using project management best practices and is implemented

globally. The model structure is very flexible, allowing its elements to be tailored to reflect local practices, local regulations and regional variations in approach while maintaining a common execution framework. This provides ABB with the ability to execute on a truly global basis making full use of its regional centers of excellence, high value engineering centers and global execution centers. It also provides a common execution language, allowing ABB to make full use of its global resource pool to match the “on demand” resource requirements of complex projects.

The ABB execution capability, coupled with ABB’s broad products portfolio, technical expertise and global manufacturing facilities, offers customers a range of project services that provide predictable and consistent results and help customers deliver their business objectives.

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Footnote

¹⁾ See “Information exchange” on page 70 of this issue of *ABB Review Special Report*.