

Emerson Project Services

Reducing Risk Through All Phases of Your Project Execution





“ Among 61 surveyed executives from 21 countries responsible for projects of \$1 billion or more, only 34% said they had delivered to within 25% of their approved budget for all projects, and fewer than a third (32%) said they delivered to the approved schedule. ”

“Capital Project Delays and Budget Overruns Could Cost Oil and Gas and Utility Industries Trillions of Dollars”
Accenture
July 2012



To compete globally, you look for investments that will improve your operations and maximize profitability. At the same time, you want to lower capital project and ongoing operating costs.

Unfortunately, most capital projects do not come in within 25% of their approved budget, nor of the approved schedule. On top of that, many of these projects fall short of anticipated production or quality expectations, and the technologies implemented may leave no path forward for future improvement or expansion.



With so much riding on your projects, how do you reduce the risks to your project's success and ongoing performance?

Meet project budget projections

Today's larger, more integrated manufacturing complexes often involve many interfaces to manage such as multiple owners, engineering contractors, and suppliers. Pressure to be first to market adds project risk. If you could more accurately forecast capital project costs, reduce risks, and provide more predictable project results, you could reduce the risk of budget overruns.

Achieve operational expectations

Designs that don't meet operational key performance indicators (KPIs), higher-than-expected equipment failure rates, expensive spare parts stocking and high maintenance costs can increase total cost of ownership (TCO). The result can be unmet operational and financial performance expectations. With collaboration of knowledgeable experts to determine the most cost-effective automation solutions, you can ensure a solution that meets cost projections and long-term operational objectives.

Reduce project schedule risks

Underestimating task times due to insufficient, inaccurate or late data causes late change orders, rework, and multiple

schedules extensions.

Other risk factors can include insufficient or unqualified implementation resources, and no contingency plans. Early collaboration with experts can put mitigating measures in place to avert these pitfalls later.



Expert help for every project phase

These and other considerations represent a potential challenge to your ability to reach your project objectives. Find out in the following pages why investing up front in comprehensive project planning can greatly reduce the risks you face in bringing your project to successful completion for the best return on your investment, and how Emerson can help at every phase—from planning and design, to implementing and building, to operating and maintaining, to improving and modernizing, to education and training.

PLAN & DESIGN

IMPLEMENT & BUILD

OPERATE & MAINTAIN

IMPROVE & MODERNIZE

TRAIN & DEVELOP

Emerson will collaborate with you from the earliest concept through ongoing support and optimization.

ASSESS FOR SUCCESS



Align your project plan with business priorities

Whether you're considering developing a new facility or making improvements to an existing one, you're challenged to create a vision to get you from where you are today, to where you want to be tomorrow. To consider that vision, management must clearly see how your plans align with the company's strategic vision, how your plans will take advantage of new technologies, and how they'll justify the capital investment. Consideration of your vision can be tempered—or rejected altogether—if it's clouded by too many subjective claims, no baseline for reference, or a lack of industry benchmarks to corroborate the claims.

Create value in the vision

Regardless of its purpose, size or scope, initiating a project without an established vision increases the risks to its successful completion. These risks can include missed optimization opportunities, investing in projects that don't align with your business strategy, cost overruns during project execution, failure to meet performance expectations and an operation that falls further behind the competition.

Find untapped opportunities

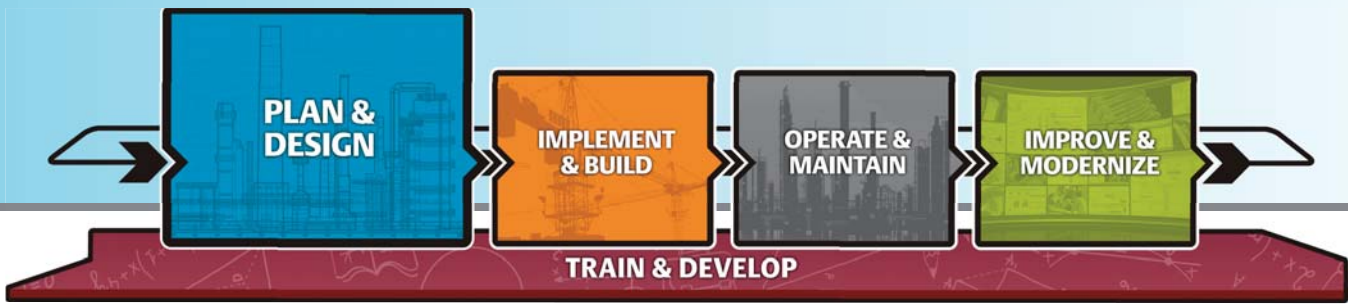
To help you create your vision, identify and maximize opportunities, Emerson Process Management can provide you with experts to collaborate with your team. The vision we develop collaboratively for your facility will drive organizational consensus, so each of your key stakeholders moves forward with an “ownership” commitment. Focusing on the financial as well as the technical aspects of your project, these experts can help you demonstrate quantifiable business results and financial return in the vision they create with your team. Many customers have seen their engagement with Emerson consultants result in

“ Good front end planning leads to as much as 20% cost savings and 39% schedule reduction for total project design and construction. ”

**Construction Industry Institute:
Adding Value Through Front End
Planning, CII Special Publication 268-3**

successful, high-return projects. Since automation is Emerson Process Management's core business, you'll work with consultants who bring extensive automation expertise to your project. In fact, your Emerson team members will include experts with experience specific to your industry and process. From that experience, they can provide insights into your unique plant processes, business drivers, and market dynamics to develop the vision and business cases that can make the crucial difference in





your project's success and maximize return on investment.

Draw from expertise and broad solution set

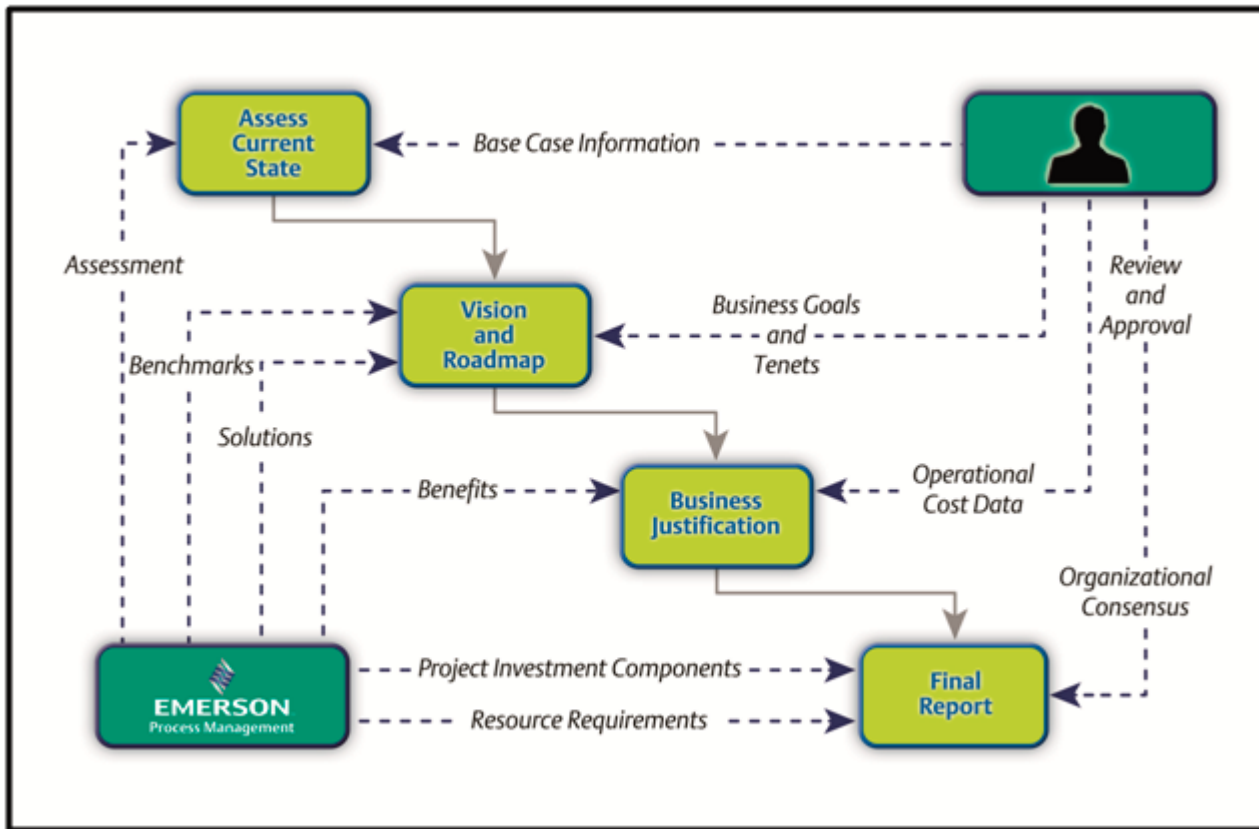
To keep its process automation leadership edge, Emerson invests in developing technologies to solve complex customer problems. These investments result in proven products, services, and solutions—and a broader array of tools from which your project team can draw and

apply, guided by our experts' practical experience and proven methodologies.

Collaborate for results

Emerson's consultants work with your key stakeholders to ensure your project is aligned with your business objectives, and that project risks are identified early in the project, with plans in place to mitigate those challenges. Emerson's capabilities and experience are especially

valuable when time is at a premium. This collaborative effort ensures a well-defined project scope. The results can be lower project cost, faster implementation, and quicker start-up—thus realizing profitability sooner.



Developing your vision is a collaborative process between you and Emerson consultants.

ASSURE END RESULTS WITH UP FRONT PLANNING AND DESIGN

Align Your Project and Business Objectives

Develop a controllable and profitable project

Understanding your current environment, recognizing advantages in the latest technologies and how best to integrate them into a plan that meets your business objectives are critical steps in preparing for a successful project. But taking these steps can be a challenge when up-front requirements are poorly-defined, incomplete or inaccurate data is applied, important project parameters are omitted, or if unrealistic

expectations are set from the beginning. The results can include a project that's misaligned with your business objectives, missed budget and schedule.

Unexpected cultural, resource, or contractual conflicts can add to delayed start-up and unidentified or unmitigated project risks. Planning for and taking steps to address or mitigate the above challenges can dramatically reduce the risks to your project.

Plan for success

Front End Engineering Design (FEED) is the process of developing sufficient strategic information from which you can assess risk and calculate resource commitment to maximize the chance for project success¹. The goal FEED is to define the project's scope of work in order to meet expectations with factors like budget, time, quality, and safety, while aligning key players early to mitigate change orders later. The Construction Industry Institute (CII) identifies this critical phase as one of its best practices for successful project execution². Your investment in this front-end work can produce benefits throughout the project including:

Lower costs

Completion of a FEED results in a well-defined scope for the rest of the project, which in turn results in a more accurate estimate, lower contingency, and typically lower overall project costs. The effort and upfront cost of the FEED delivers major returns, as this work would otherwise be done in the first 10-25% of detailed engineering. The resulting functional specification is further refined during the detailed design phase of the project.





Implement faster

The sooner you can start up the project, the sooner you can begin realizing the cost benefits of the improvements. Early identification of potential problem areas and/or necessary changes allows for early resolution, resulting in less impact to the project. Faster implementation and improved project performance are key benefits to performing a FEED, with cost reductions of up to 30%.³

Identify and minimize project risk

With project staff alignment, business drivers and constraints defined, project risks are identified and minimized. Business management can proceed with full disclosure of opportunities to mitigate risk and/or project alternatives.

Ensure design consistency; clarify responsibilities

Developing specifications and providing a definitive estimate is a typical FEED activity. Another important activity is developing a roles and responsibilities matrix to define relationships between owner, MAC, and EPCs. This phase enables the MAC as a solution provider. It also establishes standards, rules, and conventions to ensure design consistency

“ For the validation project, the front-end work performed by Emerson was quite important as we needed to have accurate cost estimates. It is the ultimate goal of every project. ”

John Wilson
Project Manager, Dow AgroSciences

across the project. Operations and maintenance personnel are engaged throughout the design for their input into specifications.

Increase user involvement and management support

Studies show that projects lacking operations and maintenance involvement perform poorly. Conversely, early planning, project definition and goal setting are major factors in gaining user involvement and management support. These factors greatly increase the opportunity to meet project schedules, budget and operability requirements.⁴

Plan from a proven process

Emerson’s proven FEED work process is built on the recommended best practices of authorities such as Construction Industry Institute, Project Management Institute (PMI), and Independent Project Analysis (IPA) methodologies.

Improve project performance

According to a CII study of 53 large projects, those that spent the most effort on pre-project planning (another term used for FEED) averaged:

- 20% lower costs
- 39% schedule reduction
- 15% utilization/capacity increase

when compared to the groups that spent the least effort on pre-project planning.



¹Construction Industry Institute (CII). (1995). “Pre-project planning handbook.” Publication No. 39-2, Construction Industry Institute, Austin, Tex.
²Construction Industry Institute (CII). (2007). “CII best practices.” (http://www.construction-institute.org/scriptcontent/bp.cfm?section_Order) (February 14, 2007)
³Hwang, Bon-Gang and Ho, Jia Wei (2012). “Front-End Planning Implementation in Singapore: Status, Importance, and Impact” Journal of Construction Engineering and Management, 138(4), 567
⁴(2010) CHAOS MANIFESTO: The Laws of CHAOS and the CHAOS 100 Best PM Practices, The Standish Group

REDUCE PROJECT RISK WITH SINGLE SOURCE ACCOUNTABILITY

“ 65% of mega projects (\$1B) around the world fail. * 35% of projects under \$500M fail. * ”

“Speed Kills”, Klaver, Ali. 2012
Project Manager Magazine

Market demands challenge your project performance

Accurately forecasting capital project costs, reducing risks, and providing predictability is more challenging than ever. A key factor adding to the challenge is the growing trend among companies toward larger, more integrated manufacturing complexes. Concurrent to this upsizing and integration, a worldwide shortage of skilled workers relative to demand adds new challenges to securing the resources you need to execute a project or to operate and maintain a plant.

Broad technology and services portfolio

As a partner on your project team, Emerson is committed to learning and understanding your requirements in order to develop a solution that uses the best technologies and practices to meet those requirements. During detail design, Emerson ensures that pre-FEED and FEED design concepts and considerations are maintained.

Emerson offers a broad portfolio of technology and services for field instrumentation and valves, control and safety instrumented systems, operations management and asset management software, advanced control, prefabricated buildings and skids, and operator training solutions.

To reduce your project risks, Emerson Process Management provides full scope automation technology and services including front-end engineering expertise, detailed engineering and design, configuration, installation, start-up, and lifecycle support. In the pursuit of project execution excellence, Emerson helps you reduce the risks to your project schedule and costs, while ensuring you meet your project's operability requirements.

Single source accountability advantages

Meeting your project's automation needs can be a complex task. Emerson can simplify that task by providing single source accountability under one contract, reducing

your project management burden and the number of suppliers you deal with.

As your project Main Automation Contractor (MAC), Emerson identifies and manages the risks associated with sourcing Emerson and third-party content through design, implementation, installation, testing, commissioning, startup, and the lifecycle of your facility. Emerson is responsible for all automation and will work with your EPC and can co-locate engineers with plant personnel, EPCs, and suppliers to integrate processes, coordinate communications, and establish standards, rules and conventions.



*25% schedule slip or project overspend, 50% longer than planned execution time, or severe and continuing operational problems into year two.



Global resources

To take on new construction or modernization projects of any size, anywhere in the world, Emerson has invested in a large, global project engineering organization. Drawing on thousands of highly-skilled resources, the organization can deploy the resources you need, anywhere—to engineer, procure, and manage instrumentation, control systems, safety instrumented systems, and associated interfaces for all project components and facilities. This aggregation reduces your risks associated with reliance on subcontractors. And by combining on-site and remote engineering center activities, these resources can often accelerate your project schedule.

This expansive knowledge and geographic location allows Emerson to assign the best people for your project. And with thousands of successful digital plant projects completed Emerson has amassed the knowledge and experience to help unlock more value from your automation infrastructure investment.



Project management practitioners

How often do you undertake a greenfield, expansion, upgrade, or modernization project?

Chances are it's not very often. And while you're managing this project, who's managing your day-to-day responsibilities? Your answers to these questions also answer why Emerson has invested in hundreds of project managers. These dedicated professionals apply the science of project management as a core competency that most process companies cannot afford to staff full time.

Through a comprehensive development program, these project managers, key technical

lead engineers, and other project resources are trained and kept current with the latest in standard processes, tools and best practices in project management. With these ongoing skills they can help you reduce risk and achieve faster results in achieving your project objectives.

“ We selected Emerson Process Management as our main automation contractor because of really two things. One was proven previous experience with project management, and then secondly their intimacy with the technology we selected. ”

Dan Yoder
Technology Management
Motiva Norco

EXECUTE WITH GLOBAL STANDARDS

Define the terms of your project's performance

As the person trusted with an automation project at your facility, you're held accountable to bring that project in on time and on budget, and to ensure that it's up and running as expected once handed over to operations.

You face many challenges to achieve those performance objectives—from ambiguous contractor roles and responsibilities, to imprecise project visibility with team members unclear on what stage the project they're in, to procurement and delivery issues, to creeping project scope and its associated costs.



If you're operating multiple facilities in various parts of the world, you face the additional challenges of language and technical terminology, different measurement standards, government regulations and even personnel holiday schedules.

Deliver quality project results anywhere

We live in a global community, and many manufacturers build and operate facilities throughout the world. Consistent design and operations is a key objective in building and operating capital investment projects—regardless of where they're located. As process automation provider to those facilities, Emerson invests in providing those consistent standards and processes in every project we undertake.

This investment is embodied in Emerson's Global Project Management Office (PMO)—a group of project experts who collaborate to develop and deploy global project processes, standards and tools. These are designed to enable predictable and consistent project delivery by our global project engineering organization. These standards encompass project proposal, management, engineering, and associated operational support processes. PMO processes and tools are aligned to the Project Management Institute (PMI), the world's leading project management organization. The objective of these investments is to ensure you receive consistent, efficient and robust process automation project solutions—no matter where your project is located.



Plan and schedule

Project execution excellence is all about achieving a goal, meeting a requirement or completing a task in minimal time and effort, doing it right the first time, with a zero defect mentality. The results of doing many things very well include minimized project risks, met schedules and contained costs. Emerson starts each project with studied planning and scheduling—employing engineering estimation models developed and refined through standard processes, tools and global experience. The result is better work breakdown structures for more precise scheduling and planning.

Project activities and tasks are assigned to the best-qualified resource, and activities analyzed for on-site or remote engineering.



Engage global teams

In forming a project team, the project manager develops a resource plan that carefully defines roles and responsibilities and matches capabilities with project task requirements.

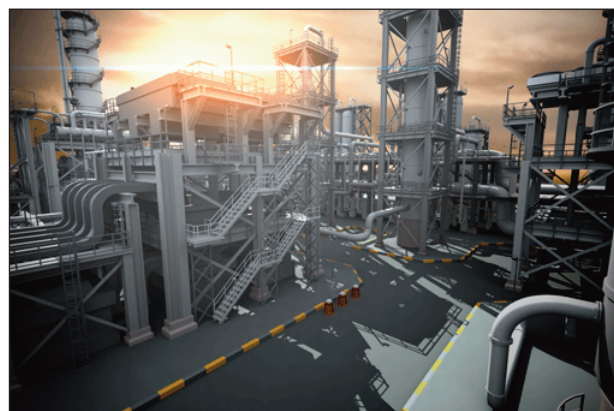
To effectively engage these resources regardless of location, Emerson has invested in a globally-distributed engineering solution called the Remote Virtual Office (RVO). It is a dedicated, secure engineering environment accessible by Emerson and its customers to collaborate on projects. Using virtualization technology, RVO eliminates physical hardware dependency and provides faster project initiation, allowing configuration and prototyping. It also allows for remote factory acceptance tests (FAT) and prototyping and testing or integration tests with sub-systems or equipment skids.

This remote “one team” approach and virtual infrastructure has proven effective in reducing overall project risk and minimizing any negative impacts on project schedules.

Manage Interfaces

Emerson has long-standing relationships and work process alignment agreements with many of the world’s most prominent EPC organizations. These relationships help to reduce schedule and cost risks. We also offer support in the design and application of digital instrumentation, control and information technologies for optimized performance within capital budgets.

Emerson conforms to industry standards that further our partnerships with EPCs. One of these standards is CII’s PEpC



process for major project contracting. PEpC encompasses procurement of strategic suppliers, engineer and design, procure balance of plant, and construction. Using this process early in the project facilitates better strategic decision making and has proven to produce time and cost savings of 10-15% and 4-8% respectively, when compared with traditional project processes.

“Emerson’s Remote Virtual Office allowed us to collaborate with experts and resources from multiple sites to conduct our Factory Acceptance Test (FAT). The result was less travel and site disturbance to our operations. Also, more operators could participate remotely which improved the new automation system adoption.”

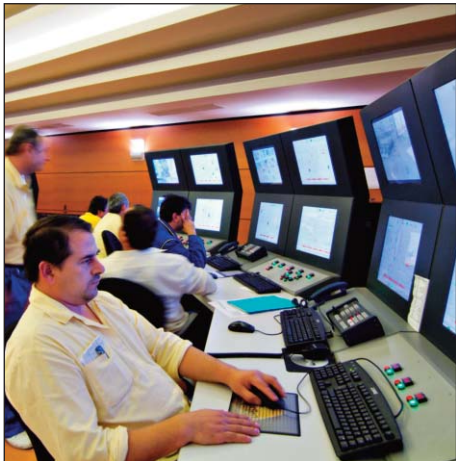
François Davin

Instrumentation, Electrical and Automation Manager–
Engineering Service
Sanofi

OPTIMIZE PROJECT VALUE BY LEVERAGING TECHNOLOGY

Maximize project performance solutions

Your expertise is in managing your operations and production processes. You know what results you want from your automation project. But you may not know what tools are available to most cost-effectively accomplish those results and sustain your facility through future expansions or modernizations. Staying abreast of today's automation technologies and how to best apply them to your operations is a full time job—either for an employee you don't have, for a consultant you can't afford, or for a vendor whose



advice you may not trust as unbiased. In short, you're not sure you're getting the best technological solution for your project because you simply don't know what you don't know. As a result, your project may not provide capabilities you need—not only for your existing needs, but also for continuous improvement.

Improve project execution with DeltaV system functionality

Emerson consultants can demonstrate—and even help you quantify—how technologies like wireless, electronic marshalling and characterization modules (CHARMs) can dramatically improve project execution efficiency.

The DeltaV system's unique flexible field architecture delivers I/O on demand—providing the I/O you want, when you want it, where you want it. This flexibility lets you decouple process design from the I/O infrastructure design to easily incorporate late process changes into the automation system.

Any input value can be read by any DeltaV controller regardless of where the wiring is landed. Troubleshooting of installation issues is easier because problems can be isolated to a channel-by-channel diagnosis.

Emerson provides technology that not only improves day-to-day operational performance but also addresses your capital project costs.

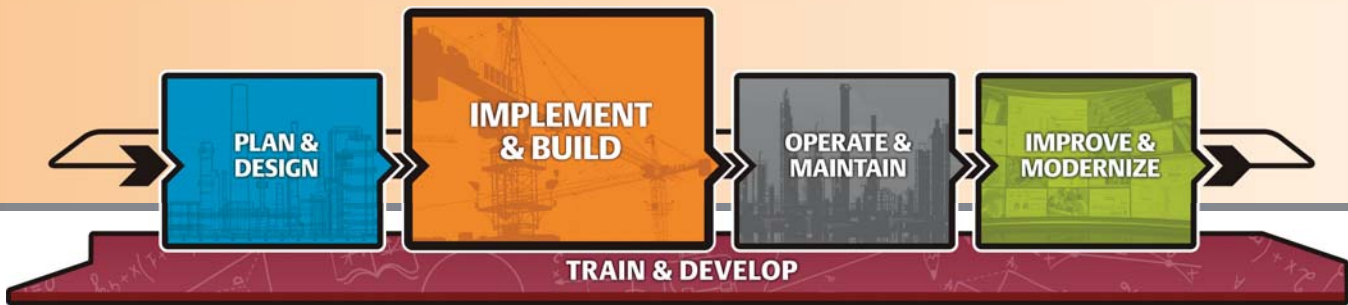
Efficiency and operational benefits are designed into DeltaV system functionality including configuration library modules, dynamos, auto-sensing and self-configuring technology for greater efficiency and reduced work as your automation system evolves.

Wireless technologies reduce installation costs while enabling added process information from formerly inaccessible or economically prohibitive places.

Simulation technologies which integrate with the DeltaV system, make factory acceptance testing (FAT) easier by reducing man hours to test software.

Reduce project time, cost, and risk with AMS Suite

Another product functionality that delivers project benefits in your facility is Emerson's AMS Suite™. This application helps you turn the wealth of intelligent field device diagnostic data into focused, actionable information. Using the AMS Suite's Intelligent Device Manager with the DeltaV system can decrease wireless network planning and reduce the time and effort for instrument and valve configuration, documentation, commissioning, calibration, interlock validation, and SIS verification. These tools continue to add value with day-to-day information on the health of assets for a condition-based maintenance culture.



“ *The start-up schedule was met by taking advantage of the characterization modules’ flexibility when field I/O changes were implemented during construction.* ”

Bryan Beyer
 Southern States
 A Charming New Facility, CONTROL Magazine

Similarly, Emerson consultants and engineers can demonstrate how a DeltaV automation system integrated with online machinery health monitoring lets you predict, protect, and monitor rotating equipment performance with pre-engineered automatic sensors and synchronized alarm limits.

Maintain data integrity

The SmartPlant Instrumentation® (SPI) software, a popular instrument database tool from Intergraph Corporation is used by many engineers for instrumentation design. The DeltaV system’s bi-directional interface with SPI provides seamless exchange of I/O and instrumentation information between the two databases.

This information transfer spans conventional I/O, including HART, Fieldbus I/O and CHARMs I/O systems—reducing engineering hours and eliminating errors caused by manual data conversion or transfer.

During project delivery, Emerson resources apply their knowledge to leverage both product and service technologies to realize value in your project’s quality, efficiency and operational benefits.

Dramatic Savings

Southern States Chemical was North America’s first startup operation to implement Emerson’s Electronic Marshalling and characterization module (CHARM) technologies with the DeltaV process automation system. The implementation produced dramatic engineering, construction, startup and ongoing operations savings in its green field sulfuric acid plant in Wilmington, North Carolina.

Some of the benefits realized:

- 50% wiring and installation labor savings
- Faster plant start-up
- Labor and space savings
- Easier, flexible changes
- Reduced risk to schedule
- Increased reliability and uptime

ACHIEVE ONGOING OPERATIONAL RESULTS

Realize your project's full operational value

Total cost of ownership extends far beyond your project's completion. It may meet your performance expectations and deliver design capabilities. But if those deliverables come at the cost of stocking expensive parts, or paying high maintenance costs, your return on investment (ROI) can quickly slip into the negative column. If resolving incidents takes too long, costs too much, or you lack local support and proper documentation, keeping your system and assets running at peak performance can become a costly challenge.

Project lifespan support services

Emerson delivers automation system services through a worldwide service network of certified facilities and personnel, and factory service resources. These ensure the right resources, skills, and experience are in place to deliver the highest quality support services throughout the life of your plant.

Project-to-operations transition support

Emerson's local field service organizations collaborate to support installation, commissioning, and startup activities on projects like yours. New technologies and work practices can be a challenge to your site personnel and policies. Emerson can help ensure timely, positive automation installations by providing your people with the technical support and technology familiarization they need to help ensure system uptime by minimizing the learning cycle during this critical project transition phase.

Lifecycle services

Emerson helps you maximize your project's business and operational value over the plant lifecycle through a portfolio of reliability, performance, and sustainability services. The Emerson global network of local and factory specialists can help deliver the improved competitive advantage and bottom line business results



you expected from project inception. Because every customer has different support needs, Emerson created its Lifecycle Services program to be flexible, allowing you to choose the coverage that meets your facility, personnel, and business needs. We understand that our

“By 2016, shortage of experienced petrotechnical professionals will reach 20% of talent pool.”

Schlumberger Business Consulting (SBC) O&G
Benchmark 2012, World Energy Outlook 2012



service and support must match your goals, your values and your vision.

Reliability services keep your plant operating safely, reliably and economically. Activities are designed to help you achieve desired levels of certainty for system uptime.

Performance services are those that are necessary for achieving ongoing, predictable, proven and measurable operational results—with no surprise—and an end goal of performance improvement over time.

Sustainability services offer the full advantage of a trusted partner working with you to preserve your investment. These include identifying, assessing, planning and implementing technology updates and upgrades to minimize system down time, prevent system offsets and minimize total cost of ownership.

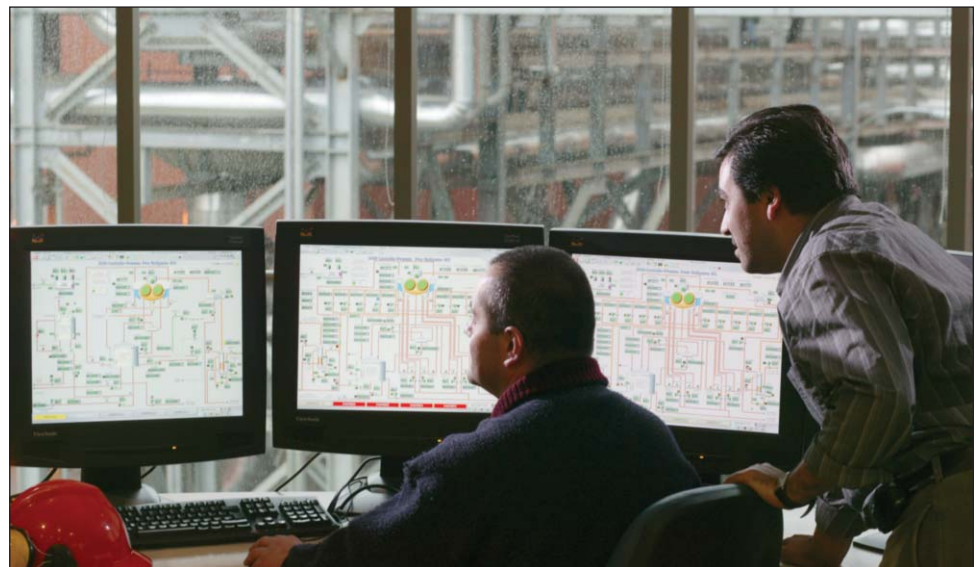
Emerson can customize a program for your project, based on your plant’s unique operating history, maintenance requirements, control system configuration, performance improvement needs, staff experience, manpower levels, budgetary constraints and operational goals.

Guardian Support

The core element of the Emerson support program is Guardian Support. The Guardian service module is designed to help you proactively achieve peak availability, sustainability and performance on your system investment through critical service and support information. Guardian consolidates and securely delivers personalized, real-time service intelligence tailored specifically to your system architecture, assets and use. It provides a single-point source of critical services and system information to help you effectively manage projects built around the Emerson DeltaV automation system throughout its lifecycle.

Evergreen upgrades

In order to keep your system current, Emerson’s Evergreen Upgrades program was designed to ensure a successful upgrade every time. Emerson treats control system software upgrades as a project. Accordingly, research, planning, testing, mitigation, and implementation are considered to minimize risk. Certified service engineers equipped with the right tools, expertise and training ensure that nothing is missed and your upgrade goes smoothly so you can get back to producing product.



GAIN COMPETITIVE EDGE WITH OPTIMIZATION AND MODERNIZATION

“Average impact of unscheduled downtime: \$20B or almost 5% of process industries.”

ARC Strategies: “The Control System Migration Survival Manual”

March, 2010

Reduce risk in the path forward

If your facility is like many throughout the world, it is operating with outdated process automation assets that make it increasingly difficult to compete in global markets and keep up with present and future production demands.

Aging automation systems limit your operational capabilities and increase the risk of upsets, shutdowns and other costly reliability problems. Inability to expand due to I/O and processor capacity constraints, complex software for advanced functionality, and lack of experienced personnel to build or



enhance existing applications can make your facility less agile in response to increasing business demands.

Continuous improvement and flexibility in your process is an appealing goal, but achieving it can be difficult while sustaining production with dwindling availability of control hardware spare parts and process control expertise.

Plan for sustained productivity

Emerson industry and automation consultants can help you develop a pathway forward for your facility. They'll identify and assess modernization opportunities for operational improvement and sustained or accelerated competitive edge. From this assessment, they can collaborate with you to develop a detailed implementation plan specific to your plant parameters and business objectives. With this plan they can furnish you with a rigorous business case defining future automation investment, projected production economics, and long-term return on investment.



Automation planning expertise

Executed as a collaborative effort between you and Emerson consultants, an automation modernization study will be tailored to your facility. Emerson's modernization experts are



familiar with the technical and operational aspects of Emerson and non-Emerson legacy systems. They'll apply best practices in developing a customized modernization plan for your plant.

These studies will give you capital budgeting information for future automation investment options. They'll also provide a detailed implementation plan describing the scope of engineering work and installation tasks. You can use this plan to set the requirements for the front end engineering and implementation phases.

Minimize production loss in modernization

To minimize disruption to your facility during your modernization project, Emerson's consultants deliver the digital technologies and expertise to safely cut over plant control loops, instruments and systems. This hot cutover expertise can mitigate risk, reduce downtime, enhance performance, and improve your business returns.

If a hot cutover is planned, it begins with a detailed audit of existing instrumentation. Emerson specialists can help you select the right hardware for the application; safely and properly install the equipment; and commission the instruments for optimal performance, without sacrificing reliability or safety.

The proven "one-loop-at-a-time" strategic approach makes online cutovers more manageable than commissioning an entire unit after a shutdown or turnaround. It also reduces cost by minimizing shutdown and turnaround periods for critical instruments and safety system changeovers.

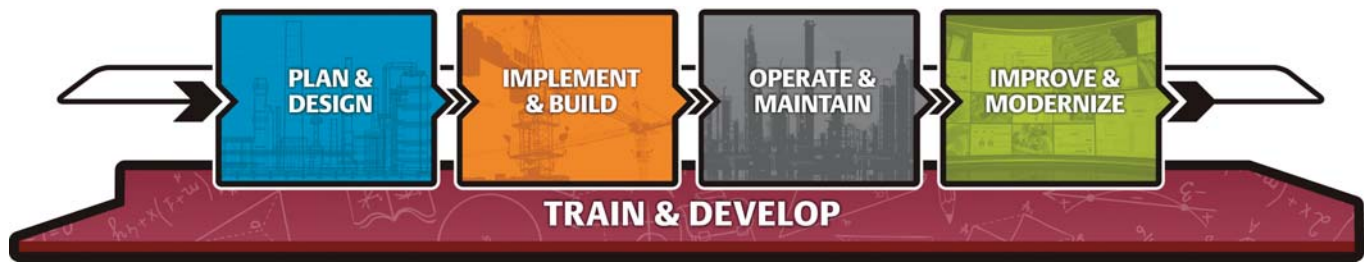
Control performance improvement

Emerson consultants provide expertise, tools and training to optimize the performance of individual control loops and to coordinate the response of all process unit loops. Control Performance Improvement consultants can quickly determine root causes and solutions for loop performance problems such as cycling and slow response. They can tune all loops in a unit for a coordinated response to load disturbances and setpoint changes. The resulting reduction in process variability can help you minimize consumption of raw materials and energy while yielding product quality improvements. Additionally, these consultants can help you determine the causes of and solutions for process upsets, trips, and operator intervention on key control loops, reducing unplanned events and lowering maintenance costs for your process equipment.

“ Emerson’s experience really made a difference in the planning and implementation of the hot cutover to our new control system. Their digital technology was also critical as they worked with us to install and commission 1100 new instruments. This project was under budget with no OSHA or environment incidents. You cannot get much better than that! ”

Bob Sherven
Project Manager
Shell Deer Park Refinery

PREPARE YOUR ORGANIZATION



Plan for a successful project transition

Education is crucial to the ongoing operation of your project—and ultimately to its success. Your operators and management are focused principally on keeping operations up and running, so scheduling training can be one challenge, while paying for it is another. If your most experienced people are nearing retirement age, and turnover of competent personnel is an ongoing problem, then continual training of new personnel can be costly.

Emerson has devoted, over several decades, an entire department and substantial resources to training your operators, engineers, technicians, and maintenance personnel to safely operate your plant. This training is a critical part of running a better, more profitable facility. It can also contribute to greater personnel stability, while helping you to fill the knowledge resource gap.

Whether for a new project, or for ongoing operations and maintenance, Emerson can provide consulting services, skills assessments and the right training solutions at the right time. We make sure your staff is

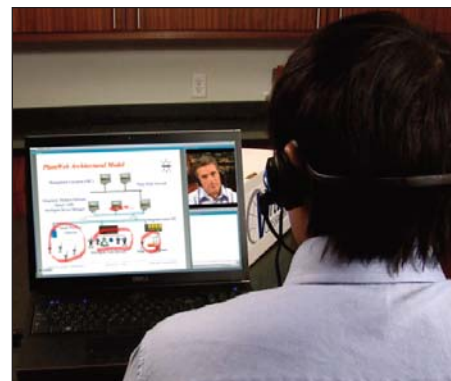
“ Over 170,000 oil and gas professionals surveyed in over 50 countries, 32% of respondents said skills shortage was among the largest threats particularly in subsea and LNG where the shortage is felt in terms of project costs and delays. ”

Oil and Gas Workforce Report
Oilcareers.com and Air Energi 2013

prepared when your project comes on line. Project consultants can identify targeted business results where training solutions can improve plant operations. Next, a skills assessment can identify skills gaps that can be addressed with training and can prescribe the proper training solution. These solutions can range from standard or customized courses to large scale training programs, with a variety of delivery methods including e-learning, virtual learning, instructor-led or on-site training. Additionally, training for plant operators is offered through a suite of simulated operator training solutions.

Emerson’s Educational Services stay at the cutting edge of evolving technologies. Today Emerson has over 60 certified

training locations in 43 countries. Instructors, courseware and training hardware are certified and adhere to education standards set by the International Association for Continuing Education & Training (IACET). Adherence to these standards ensure you of knowledgeable and skilled trainers delivering current information on state-of-the-art technology.



MAXIMIZE YOUR INVESTMENTS

Emerson. Consider it solved.

Depth of automation experience

Automation projects within your enterprise are not an everyday part of your job; their occurrence is infrequent. But since so much can ride on how well you plan and implement your project when circumstances dictate, you want to make sure you maximize every opportunity, every asset. To accomplish this, it's not a cost-efficient investment of your time to start from scratch and re-invent the wheel with each project. That's where collaboration with Emerson can bring you the most value. Your relationship with Emerson can dramatically reduce your planning and implementation time, reduce your capital costs, and ensure your business goals are met.

Single source accountability

Whether your project is large or small, brand new or an upgrade of an older facility, Emerson can work with you from the earliest concept and design stages through solution implementation, and ongoing support and optimization. Emerson project services' depth of industry, technology, project management and service expertise is proven in successful projects delivered around the globe.

Emerson can draw on a broad portfolio of technology and services, and customize them to meet your automation project needs—all delivered with single source accountability to simplify your resource management and scheduling. And Emerson will be there for you long-term with a complete set of plant automation lifecycle support and optimization services.

It all adds up to a continuing effort to identify and reduce risks to your project's scope, schedule, and resources through planning, scheduling, and project team management.

Strength and stability

It's important to know that your project execution partner will be around in the years to come; that your project plan will be successfully executed; and that you can build on the gains you make today into the future. In short, Emerson is a partner with long-running strength and stability.

For over 100 years, Emerson has provided innovative process automation solutions with a commitment to total quality, plant safety, and meeting customer's expectations. We bring together technology and engineering to produce a world of



solutions, backed by people with hundreds of thousands of hours of project experience to keep your operation running efficiently throughout its lifecycle.

Emerson's financial strength and organizational depth helps ensure delivery of your project, large or small—on time and on budget.

As a trusted advisor to some of the world's most successful companies, Emerson has collaborated in bringing the most complex projects to successful implementation. We look forward to collaborating with you, too.



For more information, visit:
www.EmersonProcess.com/ProjectServices

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