

SmartPlant® Enterprise

Reducing CAPEX and Improving ROCE

The Intergraph logo, featuring the word "INTERGRAPH" in a bold, white, sans-serif font. Above the letters "I" and "N" is a white, curved line that arches over the text.

INTERGRAPH

→ INDUSTRY PRESSURES

Significant growth – especially in economic hot-spots such as China and India – will continue to drive global demand for commodities, energy, and chemical materials. The globalization of production and fabrication lines continues to fuel worldwide transportation and logistics markets. Aging populations in the world's leading economies represent a substantial business opportunity for pharmaceutical leaders and providers of consumer goods.

These macro-economic factors define substantial opportunities for companies in the chemical, oil and gas, power generation, marine, pharmaceutical, metal and mining, and consumer goods markets. But these factors also present major challenges for those who must fulfill these growing demands – for example:

- Fossil energy reserves are increasingly difficult to explore and require more complex and more expensive exploration facilities.
- Refining capacity has already become a bottleneck, bringing the speed of capacity extension into focus.
- Growing demand for marine transportation is affected by high steel prices, creating new challenges for ship manufacturers and shipping companies.
- International protocols, national laws, insurance requirements, and local authorities all require growing volumes of more detailed technical documentation. Non-compliance at best results in significant cost, and at worst results in stopping production.

Within this challenging macro-economic environment, company owners/stockholders still demand improving return on capital employed (ROCE).

SOLUTION STRATEGIES

One obviously very important aspect of facility owners' strategy to improve ROCE is to minimize initial capital expenditure (CAPEX). This translates into the growing challenge to "squeeze" the cost, schedule, and risk balance during the engineering, procurement, and construction phases of facility creation and/or upgrade projects.

Every project that creates or upgrades a physical asset is different in terms of scope, location, and timeline. Therefore, the key to minimizing CAPEX during a project's engineering, procurement, and construction phases is to identify the best supply network, define appropriate contracting strategies, and put in place the appropriate mechanisms for reporting and risk mitigation.

This leaves a basic challenge for project contractors and suppliers, whether they are internal or external. How can they deliver capital projects faster and cheaper, while many of their main experts are retiring in the meantime?

One integral solution cornerstone will be the evolution from the isolated, discipline-centric business execution model towards an integrated, project-centric business execution model.

True inter-disciplinary communication and collaboration will replace "silo thinking" and "not my responsibility" habits and behaviors.

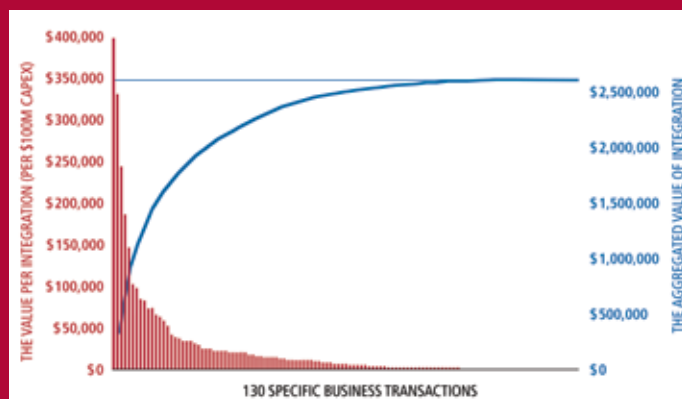
Another cornerstone will be the intelligent capture of specific solutions, work processes, and detailed engineering knowledge. For instance, new project teams, employees, and partners will be able to deliver projects more efficiently, consistently, and quickly.

This same detailed engineering knowledge will help owner/operators (O/Os) fight plant downtime due to maintenance work or non-compliance issues, and optimize their production processes. Other strategies to improve ROCE include the continuous optimization of the production and generation processes, the reduction of plant downtime due to non-compliance cases, and the reduction of plant downtime due to maintenance work.

A SERIOUS OPPORTUNITY – ROI FROM INTEGRATION

INDUSTRY SURVEY

To measure the potential impact of true interdisciplinary integration, Intergraph identified the multiple business transactions and specific integration points for 12



key business processes encompassing more than 100 transactions in a typical US\$100 million project. It then surveyed the industry to cost those processes in a traditional, non-integrated environment and compared the two. The results show that SmartPlant Enterprise's integration can cut CAPEX by up to 2.6 percent.

THE WAY FORWARD

Supported by the latest enabling technology, the good news is that the industry can now take steps to optimize its response capability.

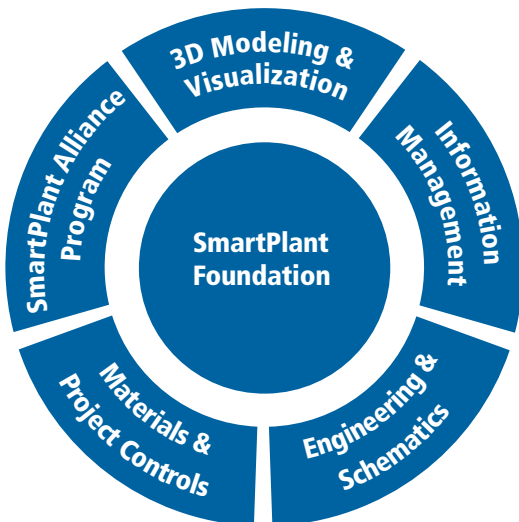
One of industry's most important objectives will be to better help their team members working day-to-day in plant operations, maintenance, and creation to improve their workflows, collaborate more efficiently, and to ultimately generate more value for the business owners.

To ensure these operational changes occur smoothly and profitably, a robust and proven solution is needed that can be rapidly deployed for projects and facilities of any size, any scope, anywhere.

SMARTPLANT® ENTERPRISE

Long-term strategic engineering opportunities should be addressed at the enterprise level. Intergraph has developed a low-risk, modular implementation path through the SmartPlant Enterprise, which includes the following components:

- 3D Modeling & Visualization
- Information Management
- Engineering & Schematics
- Materials Management & Project Controls
- SmartPlant Alliance Program



Scalability

Intergraph's SmartPlant Enterprise solution offers a powerful portfolio of best-in-class applications, which may be deployed individually or as a flexible, integrated enterprise solution – allowing an organization to successfully unleash the untapped value that is often restricted by silo-centric communication and execution.

This modular architecture provides scalability, enabling clients to start small and later grow in harmony with their specific business needs to create substantial return on investment while reducing risk.

Integration Across the Workflow

SmartPlant Enterprise leverages success-critical project information and knowledge to improve and automate work processes, from the very early project phases through operations and maintenance up to decommissioning. By tackling this major “pain point,” SmartPlant Enterprise helps the industry to gain multiple hidden benefits – for example, it improves engineering efficiency by up to 30 percent.

With today's technology, openness is critical. To achieve this goal, Intergraph offers the SmartPlant Alliance Program to easily integrate with other products and solutions. Third-party developers can access schema and development licenses, plus support and training services.

SMARTPLANT ENTERPRISE COMPONENTS

SmartPlant Enterprise enables incremental discipline integration. Clients can choose any of the powerful products in SmartPlant Enterprise, knowing that in the future, they can choose any of the other products once they are ready.

Product-supported integrations are continually being developed for the solution. These integrations offer significant opportunities for increased productivity, and are being

enhanced constantly through Intergraph's research and development efforts.

3D Modeling & Visualization

Intergraph's 3D Modeling & Visualization applications reduce project execution schedules through automation and production efficiencies. Making changes can be time-consuming and tedious. Head-to-head studies have shown that by using Intergraph's 3D Modeling & Visualization solutions, 3D modeling effort can be reduced by 30 percent relative to conventional applications. This productivity is delivered through design automation and automated deliverables production.

The modern, specification- and rule-driven applications "understand" the many object relationships that exist within the plant model. As modern applications, the training time is much shorter than that for older applications.

With the ability to develop and input your own design rules, you can take advantage of the opportunity for increasing:

- Economies of knowledge
- Quality of design

- Consistency of design
- Ability of organization to leverage best practices globally

The solution includes the powerful SmartPlant 3D and PDS® applications.

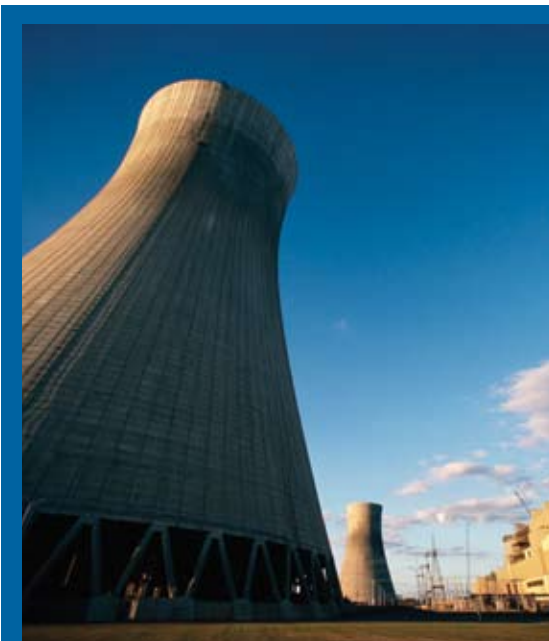
"After evaluation of competitive products, Rosneft selected Intergraph's SmartPlant Enterprise because of its superior productivity and functionality as well as Intergraph's long local presence and proven reputation in Russia."

Valery A. Borisenko
Vice President
Rosneft

Information Management

Intergraph's Information Management solution offers a comprehensive, electronic approach to the integration, sharing, storage, and management of engineering information throughout the asset's life cycle, from plant concept and design through to operations, maintenance, and decommissioning.

Information Management applications ensure that engineering information is consistently and highly accurate on three fronts: the physical asset (what is there); logical and functional



"We looked at many competitive systems, but ultimately chose SmartPlant Enterprise, particularly SmartPlant 3D, because no other enterprise system provided us the productivity gains possible with the Intergraph system."

Stephen Yu
General Manager, Advanced CANDU
Reactors Product Development
Atomic Energy of Canada Limited

information (what was designed to be there); and regulatory and safety imperatives (what is required to be there). These are the pivotal tenets of engineering integrity.

The Information Management solution features SmartPlant Foundation to ensure that valid, consistent, and high-quality engineering data is shared between applications and users when and where they need it.

Engineering & Schematics

Intergraph's Engineering & Schematics solution covers the plant front-end and detailed schematics design for plant configuration, control systems, and power distribution. The solution is rule- and specification-driven to ensure data quality and consistency across the tasks, while improving design productivity. The design of the plant asset and its expansion and relationships through the design and operations phases form the heart of the solution.

Engineering disciplines are intelligent and fully integrated – an engineering change in one area automatically updates all associated objects, no matter where they are located, while the rule-driven environment prevents engineering errors.

Integration with upstream and downstream design disciplines increases enterprise productivity even further through the SmartPlant Enterprise.

The solution includes SmartPlant P&ID, SmartPlant Electrical, SmartPlant Instrumentation, and SmartPlant Process Safety.

Materials Management & Project Controls

Intergraph's Materials Management & Project Controls solution provides efficient and accurate project cost/performance and material control for plant owner/operators and engineering, procurement, and construction (EPC) companies.

The solution combines better estimating; detailed tracking of material and costs; and smarter, budget-driven purchasing to ensure “right price, right time, right place” on-site delivery of materials. It enables effective construction planning by identifying a continuous material status, such as purchasing, shipping, and arrival-on-site dates. It supports collaboration between all disciplines and partners, such as the client, suppliers, freight forwarders, and subcontractors.



“SmartPlant P&ID’s worksharing capability gives us great success in our processes and helps us save time in engineering coordination.”

Marcin Sliwinski
Designer, Power Plants
Engineering Division
ALSTOM Power Sp. z o.o.

The solution spans the complete project execution life cycle:

- Estimating, budgeting, and cost tracking
- Engineering – Materials specification and quantifications with change management
- Procurement, expediting, and shipping
- Construction – Receiving, inventories, forecasts, reservations, and material issuing

The solution features SmartPlant Materials, powered by MARIAN®, the global market-leading industry solution for integrated materials management in plant design, revamp operations, and maintenance projects.

SmartPlant Alliance Program

The primary goal of the SmartPlant Alliance Program is to increase the value of SmartPlant Enterprise for our clients by growing into neighboring and complementary business areas.

Benefiting from SmartPlant Enterprise’s open architecture, the SmartPlant Alliance Program encourages complementary solution providers to offer more extensive and valuable solutions for SmartPlant Enterprise clients.

SmartPlant Alliance members can leverage the strong value proposition of SmartPlant Enterprise for their own business. There are three types of SmartPlant Alliance Members:

- **SmartPlant Alliance Technology members** – Software and solution providers who integrate their products with SmartPlant Enterprise technology
- **SmartPlant Alliance Services members** – Consultants and service providers who offer service-centric solutions around SmartPlant Enterprise
- **SmartPlant Alliance Content members** – Companies who develop content for SmartPlant Enterprise products – for example, suppliers provide their electronic catalogs in a SmartPlant Enterprise-readable format

About Intergraph

Intergraph Corporation is the leading global provider of spatial information management (SIM) software. Security organizations, businesses, and governments in more than 60 countries rely on the company’s spatial technology and services to make better and faster operational decisions.

Intergraph’s customers organize vast amounts of complex data into understandable visual representations, creating intelligent maps, managing assets, building and operating better plants and ships, and protecting critical infrastructure and millions of people around the world.



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For more information about Intergraph
Process, Power & Marine solutions,
visit our Web site at www.intergraph.com.