Report

# Do it for the savings:

## How integration drives value in Oil, Gas and Chemical projects

Integration delivers savings in physical footprint, engineering hours, startup and commissioning costs, and ongoing opex.

**In a market with depressed prices and a high level of uncertainty going forward, it is more important than ever that major capital projects come in on time and on budget. Taking an integrated approach, both to the systems being built and the way they are procured, can have a major impact on the success of major capex investments.**

### An industry in "interesting times"

The oil and gas industry has experienced some turbulence in recent years, and the period of depressed prices appears to extend to the horizon. Goldman Sachs sees a continuation of the harsh investment climate with 30 percent less capex sanctioned on the 420 largest projects over the 2015-16 time frame as compared to the average over the previous four years. Their outlook also anticipates floating rig utilization falling to 75 percent this year, down from 87 percent in 2014.

Goldman also points out that if the three main US shale plays continue to improve their output, breakeven points for new wells can fall to $50/bbl. by 2020. That would mean that US shale oil and OPEC alone could meet global demand growth for the next decade. Consequently, up to a trillion dollars' worth of production projects could be rendered uneconomic.

At the same time, BP sees global demand for LNG rising dramatically from 250 Mtpa in 2015 up to 500 Mtpa in 2025—a doubling of demand in just ten years. EIA offers similar projections, calling for LNG demand to grow at 5 percent per year through 2025, outpacing natural gas demand.

Another analyst, BMI Research, does not see lower margins having a significant impact on crude production growth. Instead, the analyst firm expects producers to "recalibrate long-term strategies to maximize output potential, particularly in shale." However, oil producers can't pump indefinitely.

Speaking to the downstream side of the business, Bob Sullivan, managing director with AlixPartners, commented in a recent industry publication that "many companies deferred maintenance [in 2015] in order to keep their refineries humming to capture what [were] then high margins – meaning that 2016 will likely be a 'catch-up' year for maintenance."

Looking more closely at the downstream market, CB&I issued a report noting that low ethane prices are driving petrochemical growth in the US, and that a "second wave of crackers and derivatives" projects is moving forward in North America. NGL production from gas plants in the region is 48 percent higher than in 2009, and "gas-fired additions to electric capacity in the U.S. are expected to approach 300 GW through 2040, or approximately 12 GW per year."

So, while upstream oil and gas continues to struggle against low commodity prices, investment in downstream oil and gas as well as chemicals is expected to continue apace, albeit with some players taking a breather to perform deferred maintenance. But while downstream businesses might be in more of a spending frame of mind, the investment imperatives minimizing cost, schedule and risk still weigh heavily.

**Integration for a new generation of FLNG**

Petronas' PFLNG2 project is one of the first floating LNG facilities to enter commercial operation. It will be built at Samsung Heavy Industries' yard in Geoje, Korea. The vessel is designed to produce 1.5 million tons of LNG annually for at least 20 years, so it is critical that all onboard systems are optimized.

ABB will design, manufacture and deliver transformers, switchboards, motor-control centers and power management system. Critically, the company will also manage the installation of the equipment and ensure the electrical supply is integrated with systems it is powering. The state-of-the art facility will be moored over the deepwater Rotan gas field off the Malaysian coast when it enters service.

## The case for integration

The economics of downstream projects, particularly petrochemical facilities, typically is driven mostly by the cost of the feedstock. EPC management services only account for around a fifth of total installed cost. Still, there are millions of dollars in savings on the table for those companies that complete their projects on schedule and within budget.

The savings continue into operations, too. A recent report on the GCC region by McKinsey estimates that petrochemical producers there could achieve an additional 10 percent in ROI through optimizing every aspect of their operations. "Optimization" is a broad term, but perhaps the most important element of optimizing operations is the integration of formerly disparate systems to increase productivity. For that there is a compelling business case.

Integrating automation, safety and other systems (e.g., power distribution) can yield savings between 15 and 20 percent on both capex and opex investments.

One example of integration in practice can be found in equipment optimization. Proper sizing and system topology allow the buyer to choose the most efficient equipment mix, and it can simplify equipment selection. It can also drastically reduce the required footprint, which in turn means less civil work, construction, engineering services and materials, such as conduit.

One project encompassing e-houses and automation cabinets reduced space requirements by 60 percent thanks to up-front equipment optimization.

ABB has documented several other cases where integration has delivered outstanding savings. For example, one super major realized 20 percent capex savings on a gas processing facility through the integration of control, safety and power systems along with motor and drive packages. Another offshore project in the North Sea shortened its schedule by 20 percent with a similar integrated approach, and yet another realized a 48 percent reduction in labor hours associated with startup and commissioning.

Integration yields cost savings in a variety of ways. It streamlines procurement, but project startups are also faster and less likely to reveal issues requiring rework, reducing both engineering costs and schedule risk. Systems accountability is offloaded to a supplier working under contract, and risk/reward structures can be put in place to incentivize meeting project milestones and penalize sub-par performance.

On the opex side, benefits from integration accrue to increased availability, improved safety, reduced lifecycle costs, enhanced

energy management and improved operator productivity thanks to having a single interface for multiple systems.

### Three keys to integration

Systems integration in oil and gas projects can take many forms, but the principle remains the same. Accordingly, there are a few rules of thumb that should guide any integration effort.

First, and most importantly, the focus should be on enterprise-level objectives. Many integration projects grow out of a desire to simplify operations and data flows associated with field devices, but starting from such a position puts larger strategic concerns at the mercy of technical issues. Integration will solve many of those operational challenges, but only if the organization approaches the problem from the top down.

“How will the system work in 10 years?”

That may seem like a long time, especially when applied to IT and software systems that have much shorter lifespans than capital equipment in the field. It’s also important to note that for many in the industry, a top-down approach to integration may not have been possible the last time they shopped for a platform. So, organizations may need to update the processes by which they evaluate integration technology in order to keep the focus on long-term objectives.

The second rule of integration is standardization. Interoperability of equipment is essential and there is an increasing trend toward using standard protocols that allow equipment from different vendors to be combined in one system. Indeed, the


Field devices like flowmeters are more robust and use standardized communication protocols, making integration easier.

value of an integration project should not be dependent on using any one supplier’s products. Standardizing on a protocol such as IEC 61850 also means that over time system capability increases as new standard-compliant technology becomes available. This in turn lowers maintenance costs since system additions or changes can be made more easily.

This brings us to the third integration imperative: measuring cost on a total cost-of-ownership basis. To get an accurate picture of the value of integration, the long-term O&M savings must be included. Integration will cost more up front, but it will cost less in factory acceptance testing, commissioning and startup. Over time, the payback continues in the form of easier upkeep and system expansions. If making updates is a matter of configuration rather than programming, then there is markedly lower risk of a process disruption.

### Equipment trends

While integration has more to do with methodology than any particular component, it’s worth noting that industry suppliers are working to produce a new generation of field equipment. These devices are smaller, more modularized, more robust, and able to withstand harshest environments on the planet. They provide for more remote monitoring and control capability and require a smaller footprint (e.g., subsea separation and compression reduces topside space requirements).

Control systems in the future will be integrated across process, safety, production and electrical systems, giving operators greater visibility across the facility. Safety in particular will be enhanced, for example with pipelines that self-report potential for failures before an incident occurs. All of these enhanced capabilities will likely also offer more opportunities for integration between different systems.

9AKK106713A4904

Automation and safety systems are already being integrated behind a single user interface. The next step is to incorporate more operational systems and workstation features to enhance operator effectiveness.

## Looking ahead

In other words, automation has its limits. Its real value lies in allowing people to focus on the tasks that people are good at, which tend to be higher value-added activities like analysis and design. Robotics and other technologies should be applied where they make sense, like improving safety, quality and productivity. That is the essence of advanced manufacturing.

For more information visit:

ABB Oil, Gas and Chemicals
**www.abb.com/oilandgas**



Power and productivity
for a better world™