

# Dassault Systèmes Solutions for the Booming Energy Industry

By Rolf Gibbels

As countries diversify their energy sources and extend the life of existing plants, robust solutions are needed to address the challenges facing the energy industry. Dassault Systèmes (DS) is in a unique position with respect to its competitors because its comprehensive energy offering comprises engineering solutions for design, enterprise solutions for program, data and workflow management, and virtual construction and operations planning solutions.

**D**assault Systèmes delivers Energy and Process PLM Solutions to accelerate the development of innovative plants and support their maintenance throughout their long lifecycle. Based on CATIA for designing the virtual plant and equipment, SIMULIA for FEA and Multiphysics virtual testing, DELMIA for virtual construction and fabrication planning, ENOVIA for collaboration and business process management, and 3DVA for operator experience, the DS Energy offering promotes innovation by integrating business process management with cutting-edge tools for design, engineering and construction planning.

## REFURBISHING PROJECTS ON THE RISE

DS has identified four trends in the Energy industry, sector characterized by vast growth and increasingly complex projects, upon which it has based its Energy offering. One trend is the necessity to extend, modernize and refurbish existing power plants. To reduce costly downtime, plant operators must plan maintenance and revamp operations as well as complex removal, placement and installation of major equipment. They also need to manage safety requirements in order to avoid disasters and emergencies.

DS customers already use our technology to help plan Nuclear and Hydro plant refurbishments and extensions in a safe way and in less time than before. Our PLM technology puts like-like experience at customers' fingertips that brings considerable value when planning and performing maintenance or installation sequences. Technicians can be virtually trained and come to work prepared to perform tasks that they simulate using our virtual operations and maintenance solutions. This reduces shutdown time and risks, which can cost \$1 million/day in Nuclear, \$7 million/day in Oil & Gas for NPT (Non-Productive Time).

## NUCLEAR POWER PLANTS: LARGE-SCALE COMPLEX PROJECTS

A second trend is a renaissance in Nuclear Power Plant construction with more than 76 new plants planned and over 160 proposed worldwide. Highly complex and costly (anywhere from \$3-5 billion), plant construction involves efficiently managing multi-disciplinary projects in order to meet budget and delivery obligations. Equally important is managing the handover process, which requires a mature and scalable collaboration platform and powerful simulation tools to minimize dysfunctions and evaluate impact. Engineering, Procurement and Construction firms rely on DS's fully integrated PLM environment

because it supports a design-to-construction approach. This helps optimize concurrently both design and construction and maximize the use of available resources. The DS PLM virtual construction portfolio offers capabilities early and throughout the design process for plant construction planning, scheduling, and sequencing that are virtually defined and simulated resulting in a reduction in construction delays and improved collaboration amongst all key stakeholder – Owner Operator, EPC and suppliers. In contrast to traditional engineering and PDM systems, in-work product structures, digital mockups and Engineering BOMs can be made available to construction planners or customers before a design release, providing valuable early insights to on-going project development and giving construction planning a head start.

## GLOBALIZATION REQUIRES STRUCTURED COLLABORATION

A third trend is an increase in project complexity and globalization with massive projects that involve many stakeholders. To gain global collaborative efficiency, companies need to develop a centralized and structured approach to manage documents, data and visual representations. They also need to deal with interoperability issues that arise when using multiple tools and effectively collaborate with many different partners in a fragmented environment.

The DS PLM Solutions provide collaborative tools that manage all the suppliers that participate in the different portions of a plant. Actors can collaborate more effectively and expedite the resolution of problems that can occur during project development. The DS Solutions handle both engineering and the coordination tasks associated with it throughout the development


process. DS PLM provides a single repository for all information, from product specification to construction and fabrication requirements, so that data can be securely accessed in real-time by all stakeholders. For example, project data coming from various disciplines – mechanical, fluid, electrical, concrete and steel structure, etc. – is captured within a unified product definition for rapid access, concurrent engineering, and design validation. Another example is the use of DELMIA's powerful planning and construction sequencing simulation tools, which enable all stakeholders to visualize a project and coordinate efforts for optimal efficiency.

## DIVERSIFYING ENERGY SOURCES

Finally, an increase in environmental awareness (reduce CO<sub>2</sub> emissions), the drive of various countries to be "energy independent," fluctuations in oil and gas prices, and the rapid increase in worldwide energy usage has prompted the energy industry to develop more cost-effective, reliable, and sustainable technologies such as hydro, wind, solar, wave and geothermal. Companies need to innovate, develop, manage and replicate projects, as well as manage a vast growing network of new plants and renewable energy constructions with complex requirements. For example, energy generated by wave farms has the potential to be one of the most cost effective energy options over time. Each machine must be designed to resist unpredictable and powerful forces such as collisions with passing ships. One DS customer, Pelamis Wave Power, has already used SIMULIA to perform "what if" scenarios of nonlinear behavior that are then used to reinforce the design where necessary.

Another example is the ITER project (see related article in this issue) whose goal is to harness

nuclear fusion as a new energy source. It relies on the DS PLM Solutions to manage the different aspects related to design and construction of the new plant.

Vestas Wind Systems, the world leader in wind technology and a driving force in the development of the wind power industry, manufactures wind turbines for both land and offshore wind farms. DELMIA's Process Engineer and QUEST helped Vestas to structure their data and to evaluate various proposed optimization suggestions prior to factory reorganization. Kaj Föhns, Production Engineer at Vestas, said: "We believe we have discovered a tool which will help us test ideas and choose the best ones" 

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