



Engineering Simulation Solutions for the
energy Industry





With the unequalled depth and unparalleled breadth of engineering simulation solutions from ANSYS, companies in the energy industry are transforming their leading-edge design concepts into innovative products and processes that work. Today, 97 of the top 100 industrial companies on the “*FORTUNE* Global 500” invest in engineering simulation as a key strategy to win in a globally competitive environment. They choose ANSYS as their simulation partner, deploying the world’s most comprehensive multiphysics solutions to solve their complex engineering challenges. The engineered scalability of our solutions delivers the flexibility customers need, within an architecture that is adaptable to the processes and design systems of their choice. No wonder the world’s most successful companies turn to ANSYS — with a track record of almost 40 years as the industry leader — for the best in engineering simulation.



Challenges and Solutions

Technology development and innovation are business-critical for all energy companies dealing with heightened concerns over production, consumption and conservation. Advanced science and engineering — in many disciplines and across many industries — are driving the search for new sources of energy, more efficient products and processes, sustainability, and green engineering to meet demand and answer environmental concerns for generations to come.



Solutions from ANSYS, Inc. are deployed to optimize design and engineering concepts for energy-saving and energy-efficient technologies as well as for energy production. Simulation tools help with challenges such as drilling for oil and gas in deeper water and harsher environments, evaluating new clean coal concepts, reducing pollution, building and retrofitting nuclear and coal power plants, and evaluating and designing renewable energy technology. The fit of solutions from ANSYS to energy industry challenges stems from the company’s unwavering focus on this industry segment and continuous investment in expanding its solutions capabilities.

Sustainability

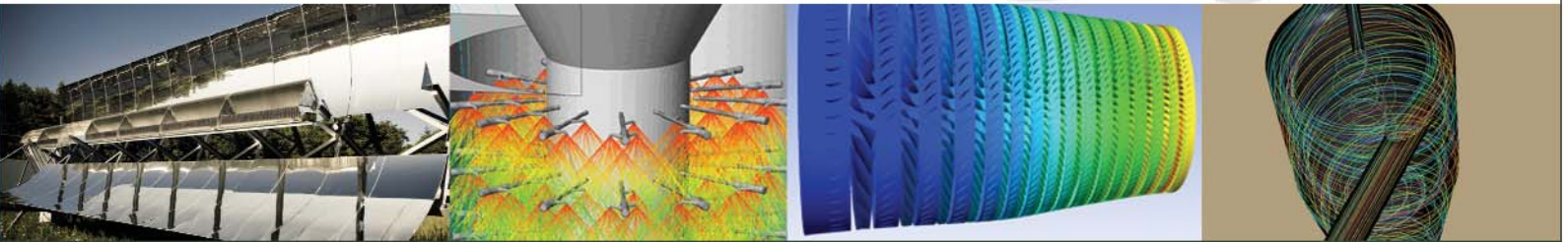
The global demand for energy is increasing in all phases of consumption, including consumer and industrial end-use, electricity and transportation. At the same time, there is an energy revolution under way driving a call for sustainability. High energy costs and the need for economic viability are creating new opportunities for innovative companies to explore new sources of energy to meet this global demand. Engineering simulation provides insight into performance evaluation and design optimization for renewable energy concepts and equipment.



Reliability

Product reliability and near-zero failure tolerances in many energy-related products and processes once required blind over-design, unnecessary shut-downs and costly maintenance. Simulations using ANSYS technology provide detailed and insightful product design knowledge and improve the prediction of forces,

energy



“At USNRC, we are using FLUENT software to analyze potential nuclear plant accidents. While the likelihood that any of these events would ever happen is extremely small, the analyses are an important component of ongoing research in the nuclear industry. Full scale testing of such events would be extremely costly and potentially dangerous. Computational fluid dynamics provides a great way to take a look at these phenomena at a minimal cost and with no risk.”

Chris Boyd
Reactor Engineer
United States Nuclear
Regulatory Commission

stresses, and thermal and catastrophic effects. In addition, the software is ISO-9001 certified and has NQA-1 quality classification for use in nuclear structural analysis.

Environmental Protection and Pollution Control

Around the world, there is increasing scrutiny of emissions from power plants, refineries and process plants as well as fuel production in environmentally sensitive areas. As greenhouse gases in the atmosphere increase and concerns over energy security intensify, the political trend toward carbon dioxide emission control is gaining momentum. Simulation tools from ANSYS allow the investigation of various retrofit options, new risk-reducing design scenarios, environmental cleanup, and upfront cost estimations for decision-making. Optimized combustion can often provide the largest payoff in reducing emissions from furnaces, while further reductions usually require scrubbers and capture systems in which mixing and flow distribution are critical to performance. Structural integrity of oil production equipment must be assured to avoid spills and costly downtime in the harshest of environments.

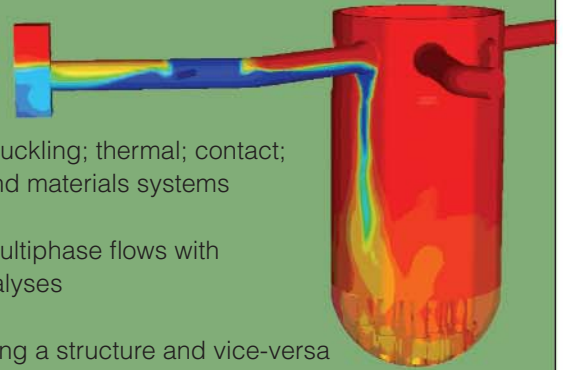


Safety

Safety is a primary concern in the energy field — from avoidance of steam explosions in coal plants and combustible gas buildup on offshore platforms to plant-wide safety concerns for nuclear facilities. The finite element solver from ANSYS has roots in safety analysis, having been used in the nuclear industry in the 1970s. Technology from ANSYS is being used increasingly in this area. State-of-the-art physics and recent advances in computer hardware and high-performance computing capabilities allow for more detailed and accurate models, enabling gains in profitability without compromising safety.

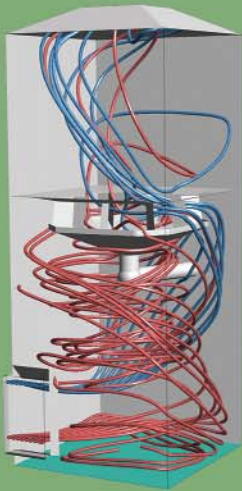


Capabilities



- ▶ **Structural Solutions:** static; dynamic; explicit; vibration; deflection; buckling; thermal; contact; rotor dynamics; creep; other analysis capabilities for mechanical and materials systems
- ▶ **Fluid Simulation Tools:** thermal and fluid flow analysis; single and multiphase flows with chemical reactions; multi-fluid interaction; solid-fluid interaction analyses
- ▶ **Fluid Structure Interaction:** analyzes change in fluid behavior affecting a structure and vice-versa
- ▶ **Specialized Solutions:** explicit analysis; analysis associated with hydrodynamics of offshore structures such as spars and mooring systems; structural analysis to address the specific construction, transport and installation needs of offshore engineers

wind turbines, towers and farms • solar panels • bio-fuels •
hydropower • dam design • power transmission • gasification •
carbon sequestration • combustion • nuclear power
plants • oil production • green buildings • **energy**
industrial scale-up analysis • nuclear waste storage and
processing • low NOx burners • emission and pollution
control system optimization • pressure vessels •
liquid fuel production • appliance design • offshore drilling •
automotive drag reduction • boiler and furnace design •



About ANSYS, Inc.

ANSYS, Inc., founded in 1970, develops and globally markets engineering simulation software and technologies widely used by engineers and designers across a broad spectrum of industries. The Company focuses on the development of open and flexible solutions that enable users to analyze designs directly on the desktop, providing a common platform for fast, efficient and cost-effective product development, from design concept to final-stage testing, validation and production. The Company and its global network of channel partners provide sales, support and training for customers. Headquartered in Canonsburg, Pennsylvania, U.S.A., with more than 60 strategic sales locations throughout the world, ANSYS, Inc. and its subsidiaries employ approximately 1,700 people and distribute ANSYS products through a network of channel partners in over 40 countries.

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