

A NEW ELECTRIFICATION REVOLUTION



Organizations must adapt to new requirements for energy demand, production and consumption through electrification.

By Rob Harwood, Director Industry Marketing, ANSYS

The science of electricity was pioneered in the 18th and early 19th centuries by luminaries such as Franklin, Faraday, Volta, Ampere, Ohm and Maxwell. They laid the foundation for the second industrial revolution in the late 19th century, which was enabled by the engineering of such resonant names as Edison, Bell, Tesla and Westinghouse, whose inventions spanned from light bulbs to electric railways and industrial electric machines.

In the mid-20th century came the transistor, spawning a revolution in commercial and industrial electronic systems — from the smartphone to the internet and now the Internet of Things and all that that encompasses.

Today, we are in an era of a new energy revolution as deep global trends shape the future of energy demand, its production and consumption. And this revolution is predominantly electrical in nature.

According to the World Economic Foundation (WEF), the industrial-ization and urbanization of emerging economies, cost reductions in core technologies, increased societal and political commitment to the environment, and energy security are driving game-changing developments in the energy industry.

These developments fall into three broad categories:

- **Advanced energy acceleration**
Rapid innovation in the energy industry resulting from new technology, cost reductions and an increased commitment to the environment
- **Mobility revolution**
Spawning autonomous and electric vehicles, and ride-sharing
- **Energy system fragmentation**
Rise of the “prosumer” and behind-the-meter electricity generation that is primarily renewable in nature



In this edition of *Dimensions*, we hear from thought leaders who are embracing these game-changing developments. How does Grundfos, a 70-year-old electric pump company, continue to deliver innovation and produce the world's most energy-efficient systems? By explaining the concept of the more electric aircraft, the Institute for Aerospace Technology demonstrates that electric mobility is not just restricted to ground vehicles. And coming full circle, we hear how TECO-Westinghouse continues to produce groundbreaking electrical machines that operate at new levels of speed and energy efficiency.

Simulation plays a big part in helping engineers meet the challenges of this new electrification revolution. Game-changing technologies demand game-changing solutions. Mark Hindsbo, vice president and general manager,

ANSYS, explains how ANSYS is redefining simulation to enable our customers to meet these challenges head on. Researchers at the High-Performance Computing Center at the University of Stuttgart explain how developments in computational power support innovation at an unprecedented pace.

In the past 150 years, we have gone from a man who experimented with alternating current to a luxury electric car that bears his name. As we embark on the next electrification revolution and leverage all the tools that support it, it is unlikely that it will take 150 years for the next quantum leap in technology to happen. Power up — it is going to be quite a ride. 



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AS DEEP GLOBAL TRENDS SHAPE THE FUTURE