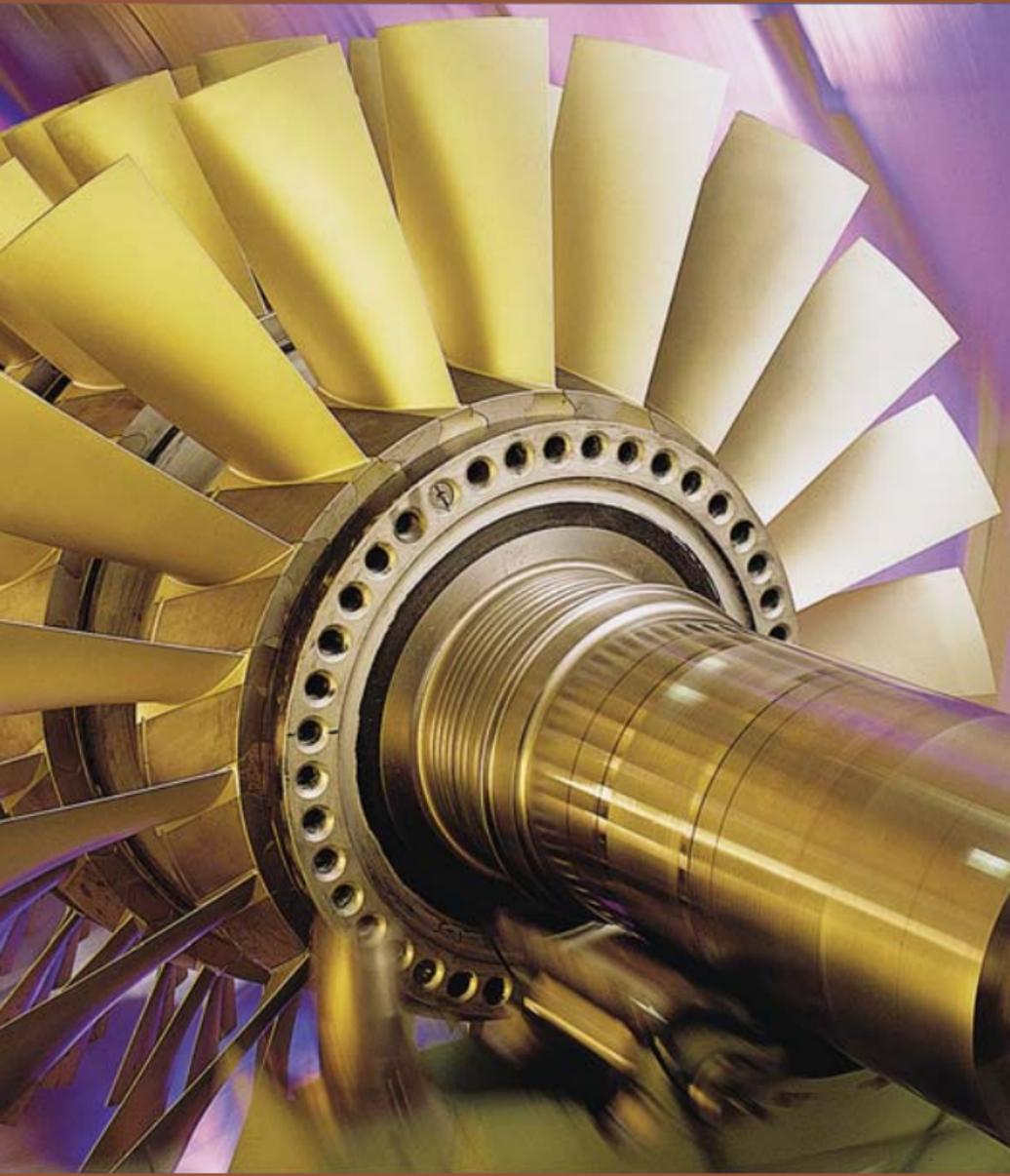
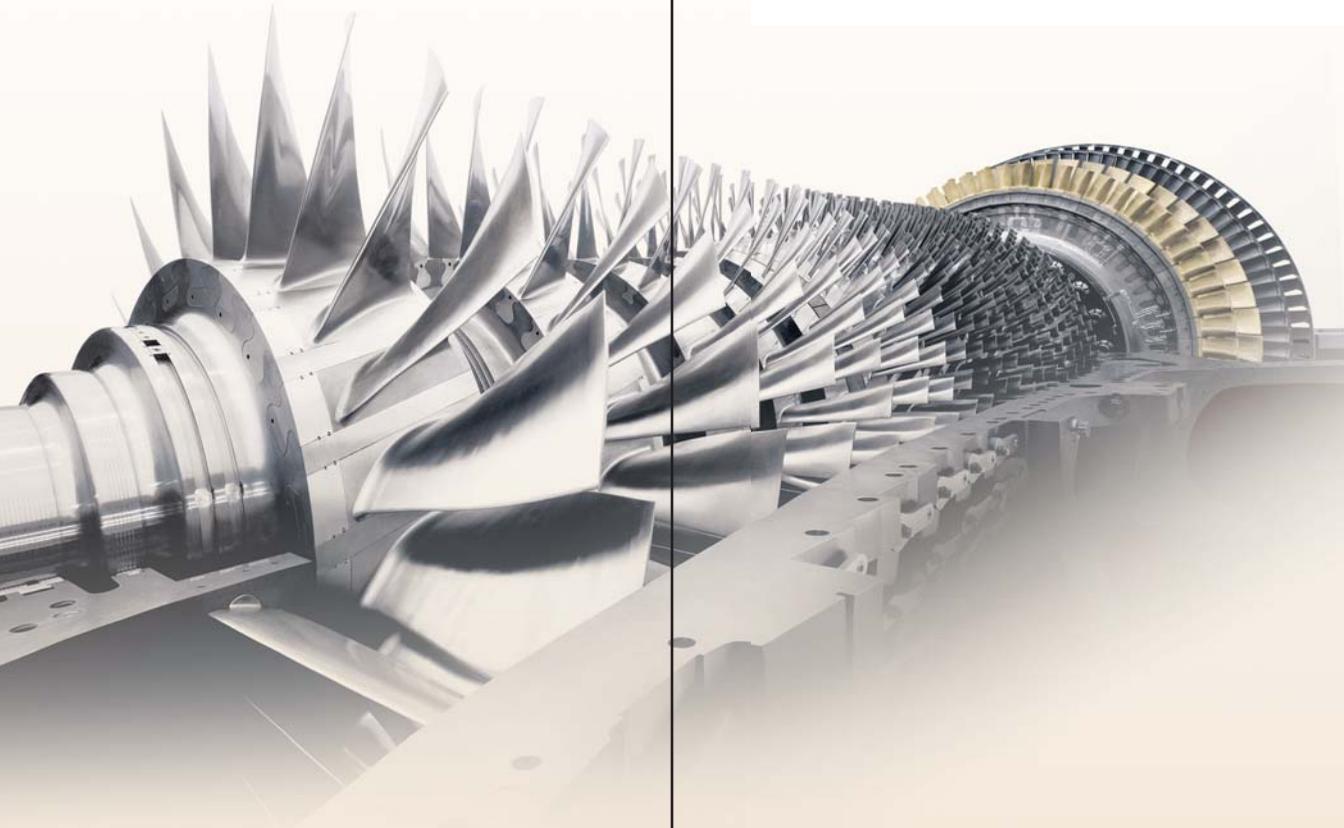


# TURBINE PROGRAM



*Enabling Near-Zero Emission  
Coal-Based Power Generation*





***In the 1990s, U.S. Department of Energy partnerships with industry and academia spurred advances in utility-scale, natural gas-fueled turbines to levels of performance seemingly unachievable at the time.***

***Now, these turbines are bringing unprecedented efficiency and low-emissions performance into the marketplace.***

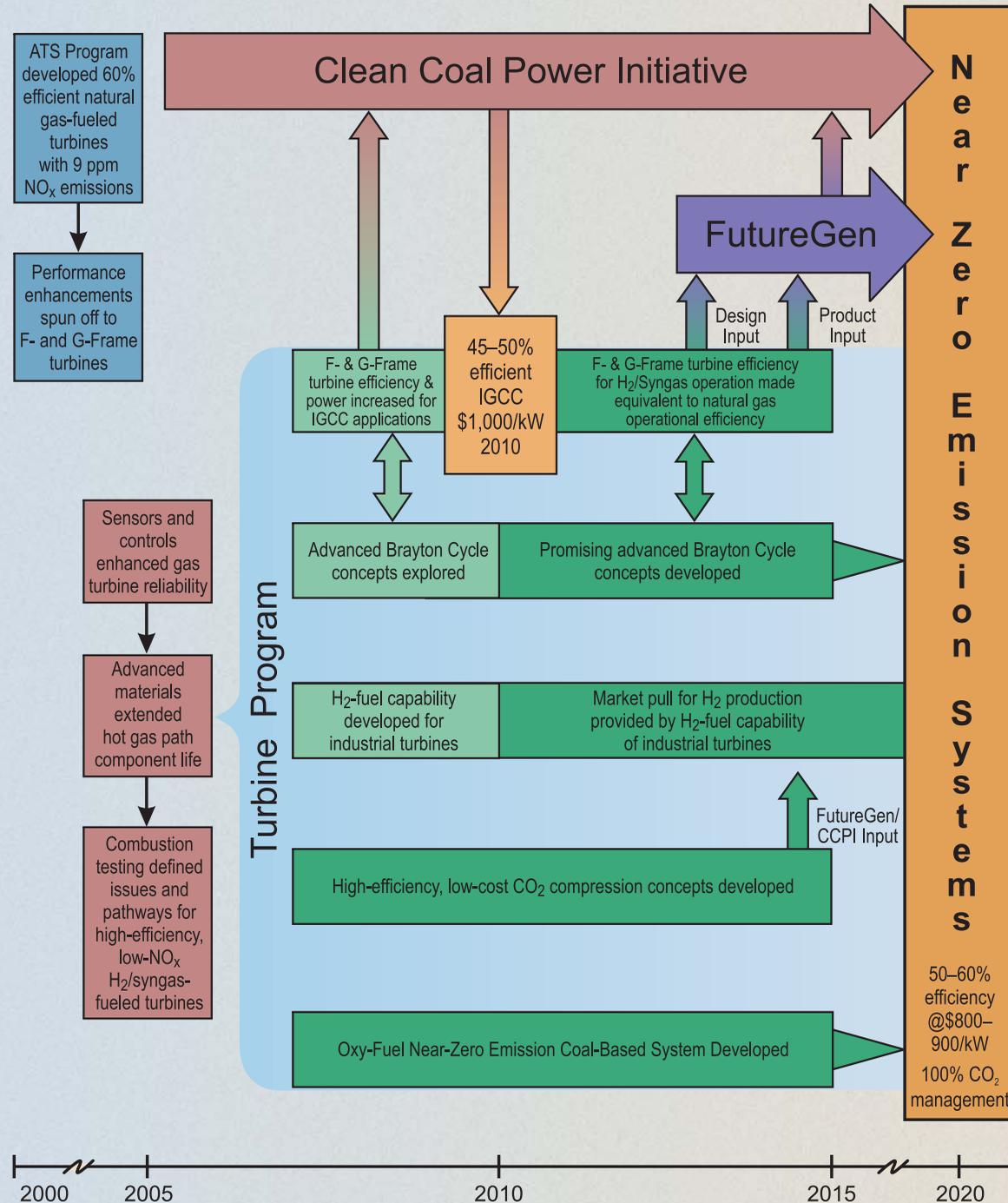
***Today, the Department is embarking on a mission to move turbine technology to a new age of energy security and environmental protection.***

***The new Turbine Program will leverage the knowledge base gained previously to develop hydrogen-fueled and oxygen-fired turbines enabling near-zero emission, coal-based power plants.***

The goal of the Turbine Program is to develop:

- The capability to operate today's advanced natural gas – fueled gas turbines on hydrogen fuels while minimizing carbon dioxide (CO<sub>2</sub>) emissions, and reducing nitrogen oxide (NO<sub>x</sub>) emissions to negligible levels without compromising operational performance.
- Oxygen-fired (oxy-fuel) steam generators and turbines that offer high efficiency through the application of ultra-high temperatures and that enable carbon sequestration while producing electricity and hydrogen.
- MW-scale gas turbines that can utilize hydrogen from coal efficiently and minimize or eliminate emissions of CO<sub>2</sub> and NO<sub>x</sub> and create the end-use technology for a hydrogen-based infrastructure.

## TECHNOLOGY ROADMAP



*The DOE Turbine Program is an essential element in enhancing the nation's energy security and environmental well-being by enabling near-zero emission power and hydrogen co-production plants, and shifting from current reliance on natural gas to abundant domestic coals.*



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Customer Service:  
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Printed in the United States with  
soy ink on recycled paper

October 2005