# BRAYTON ENERGY CANADA

## Adapting jet engine technology for alternative energy uses with SolidWorks



*By selecting SolidWorks Premium 3D CAD software and SolidWorks Composer documentation software, Brayton Energy has been able to maintain its edge as an innovator in gas turbine technology.*

Brayton Energy is a leading developer of innovative energy applications that combine abundant renewable fuels with a gas turbine—the technology used to power jet aircraft engines. The firm has adapted the technology to create new hybrid engines, portable generators, and complete power plants. Although gas turbines have served as the primary aircraft engine for years, the technology also holds great promise for uses ranging from the conversion of biomass and solar energy into electricity to the application of natural-gas-powered hybrid fuel cell/turbine engines for driving large vehicles.

When the company began to develop environmentally responsible energy technologies in 2004, it needed a design platform that would allow engineers to design, analyze, and show innovative gas turbine applications within compressed development cycles, according to Antoine Corbeil, president of Brayton Energy Canada.

"We needed to employ a CAD system that could take us from concept to production in a very streamlined, highly visual way," Corbeil explains. "Because we are breaking new ground for gas turbine technology, we must be able to test and simulate the performance of our systems—as well as document and demonstrate concepts—in software before investing in actual production. Our CAD system needs to be an extension of who we are. We have to move quickly and cannot waste time with a lot of retraining on various software applications from different vendors."

Brayton Energy selected the SolidWorks® Premium integrated 3D design system because it is easy to use; has robust tools for designing large assemblies; offers automated sheet-metal design capabilities; and includes integrated SolidWorks Simulation analysis, SolidWorks Workgroup PDM (product data management), and SolidWorks Composer product documentation applications. Brayton Energy, LLC and Brayton Energy Canada implemented 12 seats of SolidWorks software across their US and Canadian operations, as well as seats of SolidWorks Simulation Professional and SolidWorks Flow Simulation computational fluid dynamics (CFD) analysis applications, plus SolidWorks Composer documentation software.

**Challenge:**
Visualize and develop innovative design concepts for adapting gas turbine technology for alternative energy generation.

**Solution:**
Implement the SolidWorks 3D design platform to leverage SolidWorks design and simulation capabilities, as well as the SolidWorks Composer documentation solution.

**Results:**
- Shortened design cycles
- Improved handling of large assemblies of up to 50,000 parts
- Developed innovations in gas turbine technology
- Cut documentation development time by 25 to 50 percent

**ƷS SOLIDWORKS**

## Gas turbines for buses and trucks

Since implementing SolidWorks, Brayton Energy has developed several gas turbine advances, including a unique hybrid solid oxide fuel cell (SOFC) system that operates in combination with an innovative high-efficiency intercooled recuperated (ICR) gas turbine system for vehicular applications. The lightweight, economical ICR gas turbine design provides exceptional performance while substantially reducing emissions, especially when used with natural gas.

Corbeil says that using SolidWorks on the ICR gas turbine project enabled the company to quickly develop and visualize the system, which will create a viable alternative for powering hybrid-electric buses and long-haul trucks. In this application, the spinning turbine generates electricity that can power the drive train, run electric motors, or recharge a fuel cell.

## Integrated 3D tools accelerate development

By using the fully integrated SolidWorks design platform, Brayton Energy accelerated the pace of its development efforts on the hybrid gas turbine engine project. The company creates its initial designs, which can involve assemblies of as many as 50,000 parts, using SolidWorks 3D CAD software; conducts structural, thermal, and fluid flow analysis using integrated SolidWorks Simulation and SolidWorks Flow Simulation software; and documents the entire process using integrated SolidWorks Composer product documentation software.

"We simply could not have developed this type of system so quickly without an integrated 3D development platform like SolidWorks," Corbeil notes. "It's fantastic to be able to model a design concept and conduct a structural or flow analysis without having to jump through several different pieces of software. With SolidWorks, we remain in our base modeling package as we modify and refine our design."

## Documenting new technologies with SolidWorks Composer

In addition to capturing conceptual designs in CAD and simulating performance using analysis, Brayton Energy uses SolidWorks Workgroup PDM software to manage its design files and SolidWorks Composer software to document the entire process and create demonstration visuals.

"Because our development process is very fluid, with many iterations and design changes, we need a documentation approach that does not slow us down," Corbeil notes. "With SolidWorks Composer software, we can document our products in a professional manner directly from the final CAD model, which allows us to reduce the time it takes to document common designs by about 25 percent and large, complex assembles by 35 to 50 percent. If we make design changes, we do not have to do all the work again. Instead, we can simply update the documentation with the revised model. Our SolidWorks tools enable us to develop concepts from creation through documentation as quickly as possible."

With the SolidWorks suite of products, Brayton has improved handling of large assemblies, developed innovations in gas turbine technology, and even cut documentation development time significantly.

**BraytonEnergy** CANADA

**DS SOLIDWORKS**