Pratt & Whitney Canada:
Leading in Innovations and Green Solutions

by Nicholas Goubert

PW810

Pratt & Whitney Canada is one of the leading providers of engines to the world aerospace industry. Every two seconds, a Pratt & Whitney Canada powered aircraft takes off or lands somewhere in the world. So why is a company that is obviously making great products so concerned about the environment?

As concerns about aviation's impact on the environment keep growing, some companies choose to bury their heads in the sand, while others act proactively and lead the way. Pratt & Whitney Canada (P&WC) is one company that is at the forefront of innovation, investing significant cash to ensure their solutions are as environmentally friendly as possible.

As part of its general strategy, P&WC is investing over €1 billion ($1.5 billion) in research and development programmes over a five-year period. The total amount of this investment goes into advancing its Green Engine programme, which focuses on testing and implementing innovative technologies that will optimise fuel consumption, emissions, noise levels and weight.

Running simultaneously is P&WC's Green Factory programme in which efforts are made in all production facilities to implement more sustainable processes. Since 1996, water consumption has reduced by a factor 10. Over the same period, air emissions were reduced by 75% – by replacing petrol-based solvents with water-based solvents that are gentler on the environment.

Whole Product Lifecycle

Even though aircraft engines are mostly made of recyclable metals, P&WC remains concerned with its whole product lifecycle. One of the company's goals is to eliminate materials of concern such as cadmium, hexavalent chrome and lead from engine parts, and from the processes used to manufacture the engines. The company hopes to achieve this aim in the near future.

When asked about the main motivations for P&WC to adopt such a proactive attitude toward the environment, Michael Perodeau, Vice President Corporate Aviation and Military Programs, says: "Our parent company, United Technologies Corporation (UTC), has a long standing corporate-wide focus on leading the way in environmental matters, and there is also a strong interest from the market."

As one of the leaders in the design, manufacture and service of aircraft engines, P&WC feels the pressure from its customers worldwide and is willing to answer their demand. P&WC's business partners, the aircraft manufacturers, have similar interests and expect Pratt & Whitney's new engines to surpass the International Civil Aviation Organisation's (ICAO) standards for noise and emissions. The trend is even more pronounced in the European market where the demand for environmentally sustainable products in the business aviation industry has been higher than in other parts of the world for a number of years.

Sustainability Strategy

The commitment of P&WC to protect the planet for future generations is one of the company's core values. The soaring price of oil certainly increases the demand for more fuel-efficient aircraft, but P&WC's environmental concerns started long before the price of fuel began to increase. As Perodeau declares: "We were investing in programmes to develop and test new technologies to improve the environmental impact of our aircraft engines before the relatively recent rise in fuel prices."

As part of its overall sustainability strategy, P&WC aims to reduce NOx and CO emissions and fuel consumption, among the most important contributors to degradation of the environment. "P&WC's goal is to sustain its market leadership in innovation and in green solutions in particular," says Perodeau.

Biofuel Research

In July 2008, Pratt & Whitney announced its participation in an industry-university research project to evaluate the possibility of using "second generation" biofuels to power business aircraft engines. These fuels originate from sources that do not compete with human food supplies, such as jatropha, algae or cellulosic biomass. The project is sponsored by the governments of Canada and India under the framework of a joint research collaboration programme in the field of science and technology.

In Canada, Pratt & Whitney collaborates with four institutions: McGill University, Laval University, Ryerson University and Canada's National Research Council. In India the company works jointly with Infotech Enterprises Ltd, two major Indian oil companies and the Indian Institute of Technology, Science and Petroleum. »

PW308 turbofan

Pratt & Whitney implements more sustainable processes

Jatropha plant

The objective of the four-year research project is to evaluate the use of biofuels in aircraft engines. A gas turbine engine can run on different sorts of fuel but the engine is just one system among the many that are found on an aircraft. Ideally, using a new fuel would not require any modifications to the aircraft or the engine. But in fact, it may require many changes and P&WC are working to understand the impact of burning biofuels on engine components and materials over the short and long term.

At the same time, the company is evaluating the potential impact of the alternate fuels on other aspects of engine operation. During the project, P&WC will benefit from the biofuel expertise of its partners while focusing on developing fuel-flexible engines capable of powering aircraft efficiently and with less impact on the environment.

P&WC will benefit from the biofuel expertise of its partners

Out of This World

P&WC has recently signed an agreement with the Spaceship Company who will power their aircraft with the PW308 turbofan engine. White Knight II will be used to launch the world's first commercial passenger suborbital spaceship, SpaceShipTwo. The Spaceship Company is jointly owned by Virgin Galactic and Scaled Composites. P&WC will also cooperate with Virgin Fuels to evaluate the use of biofuels in the aircraft.

P&WC's interest in developing aircraft engines capable of burning biofuels efficiently and sustainably reflects the worldwide interest in alternative fuel solutions. In Europe, demand for biofuels is big and increasing. This is despite discussions on the potentially harmful impact of biofuels on the environment. In the debate about biofuels, P&WC's position is to dedicate its highly skilled experts to understanding and assessing their impact. Whether biofuels will finally be adopted as a solution is a complex political decision that is beyond the scope of engine manufacturers to decide. As Perodeau says: "At least we will help with the understanding of the technical consequences of substituting regular fuel with biofuels."

Research on biofuels is just one element in P&WC's portfolio of research and development projects and programmes. The company's approach is holistic in the sense that environmental concerns influence each new research project or product development programme. Efforts to test and implement new technologies that could yield environmental benefits are made at every stage of a product's development and production process. This continually demonstrates the company's commitment to lead green technology development.

Demand for turboprops remains solid, especially for short-haul operators. As a leader in the turboprop market, P&WC wants to keep its products at the leading edge of green design. The company is investing resources in research and development projects and adopting an overall approach to improve every step of the engine production process.

PurePower

The PurePower engine development programme illustrates Pratt & Whitney's commitment to develop products that are even more environmentally friendly. The PurePower PW800 engine family was developed as part of this project and is loaded with innovative technologies in every major module. P&WC believes the engine will achieve double-digit reductions in fuel consumption, CO_2 emissions, and engine noise levels.

The new engine family constitutes a breakthrough answer to potential improvements in engines that will yield significant benefits for the environment. It not only meets the current regulation standards but surpasses them by far. P&WC's objective is to meet the regulations that will be in effect ten to fifteen years from now. For example, the PW800 engine, will surpass ICAO's stringent standards for emissions by margins up to 35% for CO emissions and 50% for NOx.

The PurePower PW810C engine was recently selected by Cessna to power the Citation Columbus business jet, which is scheduled to enter service in 2014.

P&WC believes there will be other applications for this new engine. By then the company is certain it it will have achieved new breakthrough developments in its quest for the most environmentally friendly engines and evaluated the consequences and advantages of efficiently burning biofuels in adapted gas turbine engines.

Thanks to P&WC's efforts and attitude, the impact of aviation on the environment might become less of an issue, or at least one with potentially sustainable solutions for improvement. ■