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Ever since the Industrial Revolution the emission of green house gasses has been affecting the planet at an ever increasing pace. Over the past decades, commercial aviation has more than done their part to aid in this. In recent years however, while more and more industries are taking steps towards a more sustainable future, the aviation industry seems to be lagging behind. Current developments and solutions provide only incremental improvements while it has become clear that these 'evolutions' will not suffice. A revolution is necessary. In the midst of these developments, 'sustainability' has evolved to be a buzzword that has been misused by marketing campaigns in various industries. It is therefore important to define sustainability as the sum of three pillars; social, economical and environmental.

Mission Objective

AirEco was tasked with finding the revolutionary solution that the commercial aviation industry had been lacking. To come up with a solution that would finally have an answer to the global outcry for sustainability. Revolution to achieve sustainability. The objective was to design a 150-250 pax commercial aircraft with a range of 5000 kilometers and a propulsion system based on renewable energy sources. Major aircraft manufacturers have already proposed futuristic designs that certainly look revolutionary, but how do they fare on all three pillars of sustainability? Are these exotic configurations actually significantly more sustainable or are they yet another marketing trick? These were some of the questions the AirEco team set out to answer.

System Design

At the core of AirEco's solution lies an adaptable power and propulsion concept. An aircraft that is able to enter in to service by 2035, running on a hybrid mix of biofuel and hydrogen. By 2050, when the green production of hydrogen is more widespread, airliners will be able to make small modifications to the aircraft, allowing it to run fully on hydrogen. With this adaptability AirEco aims to facilitate and accelerate commercial aviation's transition to hydrogen powered flight. The configuration used to accommodate for this revolutionary adaptability concept is a conventional one. It was found that the efficiency gains from an exotic configuration did not outweigh the losses these configurations had in other aspects of sustainability, namely social and economical. Furthermore, cutting-edge noise reduction techniques are employed to make the design more socially sustainable. A shark-skin-like riblet film is used to increase aerodynamic efficiency and with that the environmental and

economical sustainability. Lastly, a T-tail was needed to ensure stability and controllability, giving the final design a slightly less conventional (and more revolutionary) look. In conclusion AirEco found that when taking into account all pillars of sustainability, it is a revolutionary propulsion system rather than a revolutionary configuration that will make for the most sustainable design.

