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Category: Airborne

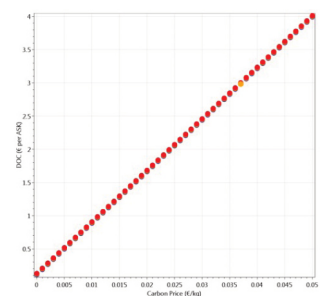
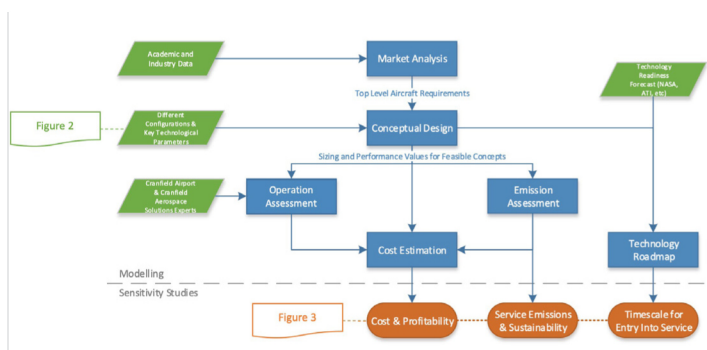
Country: United Kingdom

Research Area 9: Policy and Regulation, Market Efficiency, Competitiveness

Idea Number: 54

# Investigation into the viability of integrated regional air transport based on full electric aircraft

Aviation is presently responsible for 2-3% of global carbon dioxide emissions. However, air traffic growth at current rate could lead to emissions share of 25% by 2050. Consequently, in the last several years, electric aircraft has emerged as an important research topic in academia and industry given the societal aim to significantly reduce industry's carbon footprint. The current technology readiness level does not allow a full-scale implementation of electric aircraft. This could however be feasible in a not so distant future. As a disruptive technology, full electric aircraft is likely to incorporate novel propulsion architectures, airframe configurations, system design and could affect ground infrastructures and operation strategies. Those distinct disciplines need to be dealt with simultaneously to understand the global picture, where the current airline business and operation models could be considerably impacted. Within this context, a novel framework is presented enabling the exploration of potential viability of future aviation. From this, the case of regional air transport has been more specifically studied. To this end, the set-based design methodology has been employed and a roadmap has been established from the juxtaposition of the market analysis with the technical feasibility of concepts. Insights from experts helped assess the integration into the energy and transportation network. Finally, the emphasis has been put on analysing the economic viability and environmental impact as key factors of a future implementation. The established framework allows sensitivity studies to determine external levers that favour the profitability and sustainability of electric aviation.



**Figure 3(c):** Sensitivity study between carbon offset price and fuel price. Changes in carbon offset price are more likely to affect the business model of conventional aircraft than

**Key Characteristics**  
Future aviation • Regional air transport