

The Push for Eco-friendly Airplanes

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Caveat

- This presentation provides an overview of the subject; the technicalities are contained in the companion paper which takes stock of progress at this point in time with issues, challenges and possibilities.

The Big step

- The adoption of the Treaty of Paris on Climate Change is a major international accomplishment setting a framework for decisive actions at international and national levels engaging all the stake holders in order to counteract the negative effects of climate change which are already widespread

ASUA-WAFUNIF Conference at UNHQ 2016

- This international conference aimed at the international community looked at specific actions underway regarding the implementation of the Treaty of Paris

Automobile industry

- At the Conference, representatives of the automobile industry showed that this industry has been transforming itself in the recent years; question now is the replacement of the old fleet using fossil fuel with a new fleet using eco friendly technologies; Paris is an interesting case in point; ASUA Japan also adopted the EcoDrive Declaration setting ways to make the existing fleet more eco-friendly

Cities

- The Conference also showcased action being taken to transform cities with case studies on Paris, New York and Tokyo

Finance Industry

- The Conference looked at efforts to make the Finance Industry more eo-friendly

Human factors

- The Conference also looked at human factors including illnesses stemming from air pollution

Follow up

- The Conference recommended actions at regional and national levels spanning all sectors of the economy including pushing for a green economy, green technologies and green businesses

UN Climate change Summit 2019

- The UN Secretary General convened a Climate Change Summit at UNHQ Oct 23, 24 and 25 bringing together Heads of States, Prime Ministers, CEOs, Representatives of Youth Movements, NGOs to foster joint action to deal with climate change issues
- Summit deemed a success
- Sustained action: COP 25 in Chile in December 2019

Attention has now to be given to eco-friendly airplanes

- Airplanes mostly use traditional technologies
- The use of air travel has grown significantly in the recent years; the growth is likely to continue and this is a good thing
- Question is to produce eco-friendly airplanes

Serious concern

- An article in The Guardian is sure to get attention as it underscores that climate change is a rising concern for air travel i.e. turbulent times ahead for air travel
- We may get to a point when air travel will no longer be possible
- <https://www.theguardian.com/environment/2018/feb/19/climate-change-spells-turbulent-times-ahead-for-air-travel>
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Airplane engine technologies

- Most commercial airplanes use fuel-based technologies
- Attention given to improving fuel efficiency has been successful

Key question

- **Can jet engines function on electricity?**
- According to The New Scientist, traditional jet engines create thrust by mixing compressed air with fuel and igniting it. The burning mixture expands rapidly and is blasted out of the back of the engine, pushing it forward.
- Answer is technologically yes (case study below)

Airplane engine technologies

- Attention could be given to using hybrid technologies using part fuel and part electricity
- Battery can be lighter than fuel; operating cost will be lower which is an incentive for airlines to make the change; manufacturers have to seize the opportunity

Case study: Air Bus

- This company has been undertaking research and development and is on its way to producing airplane engines which are fully electrical

Air Bus design

- **A complex hybrid-electric flight demonstrator:** the E-Fan X is a complex hybrid-electric aircraft demonstrator. In the test aircraft, one of the four jet engines will be replaced by a 2MW electric motor, which is roughly equivalent to that of 10 medium-sized cars. The electric propulsion unit is powered by a power-generation system and battery. When high power is required—at take-off, for example—the generator and battery supply energy together.

Smarter air travel

- If the aviation industry is to achieve its goal of a 75% reduction in CO₂ in new aircraft by 2050, future technologies in electric mobility must be accelerated. The E-Fan X should achieve significant fuel savings. Our goal is to mature the technology, performance, safety and reliability, thereby accelerating progress on hybrid-electric technology. We also aim to establish the requirements for future certification of electric-powered commercial aircraft.

Air Bus Fly Your Ideas Competition

- A unique opportunity for students worldwide to activate their pioneering spirit and innovate for the future. With support from Airbus, teams will tackle global challenges, harnessing the latest digital tools and technologies to create a safer, cleaner, better connected world.

MIT delivers green airplane designs to NASA

- <https://thefutureofthings.com/4285-mit-delivers-green-airplane-designs-to-nasa/>
-
- <http://news.mit.edu/2010/nplus3-0517>

Hybrid aircrafts

- https://www.bing.com/search?q=hybrid+engine+for+aircraft&form=EDNTHT&mkt=en-us&httpsmsn=1&msnews=1&rec_search=1&plvar=0&refig=c889ee2952cd44fb8247281ae89b69ba&sp=-1&pq=hybrid+engine+for+aircraft&sc=1-26&qs=n&sk=&cvid=c889ee2952cd44fb8247281ae89b69ba

Boeing and partners

- The Embraer E170 is the prototype unveiled by Boeing and its Brazilian manufacturers as part of its ecoDemonstrator programme to develop sustainable solutions and reduce the environmental impact of air travel.

Major issue

- Is for the airlines to replace the existing fleet with a new fleet with eco-friendly engines considering that the existing planes have a rather long life. Conversion is a solution. Government entities could provide incentives for these transformations. Already the gas guzzlers are used less and less

Conclusion

- The stake holders i.e. the airplane manufacturers, the airlines should cooperate to undertake the changes needed with incentives provided by governments; this is a win-win-win situation