



# THE FUTURE OF AVIATION

Nordic EV Summit  
Oslo, 02 FEB 2018

*Dag Falk-Petersen, CEO*



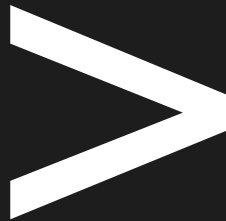
**45** airports



Norway's Air Navigation Service  
Provider



Traffic-  
growth %



Emission  
reductions %

## **ENVIRONMENTAL GOALS:**

- 1) REDUCE AVINOR'S ENVIRONMENTAL IMPACT**
- 2) BE A DRIVING FORCE IN REDUCING GHG EMISSIONS FROM THE NORWEGIAN AVIATION INDUSTRY**



# AVINOR'S GREEN HOUSE GAS EMISSIONS

2020 target:

Reduce own emissions by 50%  
(2012 baseline)

- Sustainable biodiesel
- Electric vehicles
- Energy efficiency initiatives





A photograph taken from the perspective of someone inside an airplane, looking out the window. The wing of the aircraft is visible in the lower-left foreground, and a large engine is mounted on the wing in the lower-right foreground. The sky is a mix of blue and orange, indicating a sunset or sunrise. A thick layer of white clouds is visible below the aircraft, illuminated by the low sun. The text "AIRCRAFT CARBON EMISSIONS" is overlaid in white, bold, sans-serif font in the bottom-left corner.

# **AIRCRAFT CARBON EMISSIONS**

# JAN 2016: OSL #1 HUB TO OFFER JET BIOFUEL TO ALL AIRLINES ON A COMMERCIAL BASIS

- Cooperation with aviation industry
- Dropped into the main fuel farm
- Distributed in the hydrant and dispenser system
- Premium cost split between the project partners
- Works very well!
- Aug 2017: Program expanded to Bergen!



Lufthansa





# **SUSTAINABLE JET BIOFUEL IS AN IMPORTANT PART OF THE FUTURE OF AVIATION**

Avinor 2030 goal: 30 % of aviation fuel in Norway should be sustainable jet biofuel







Airbus E-Fan 1.1  
Crossed the English Channel  
in 2015



ZERO Conference NOV 2016



Pipistrel Alpha Electro  
Delivery: Q2 2018  
Range: 130 km



Project partners:  AVINOR



ZERO 



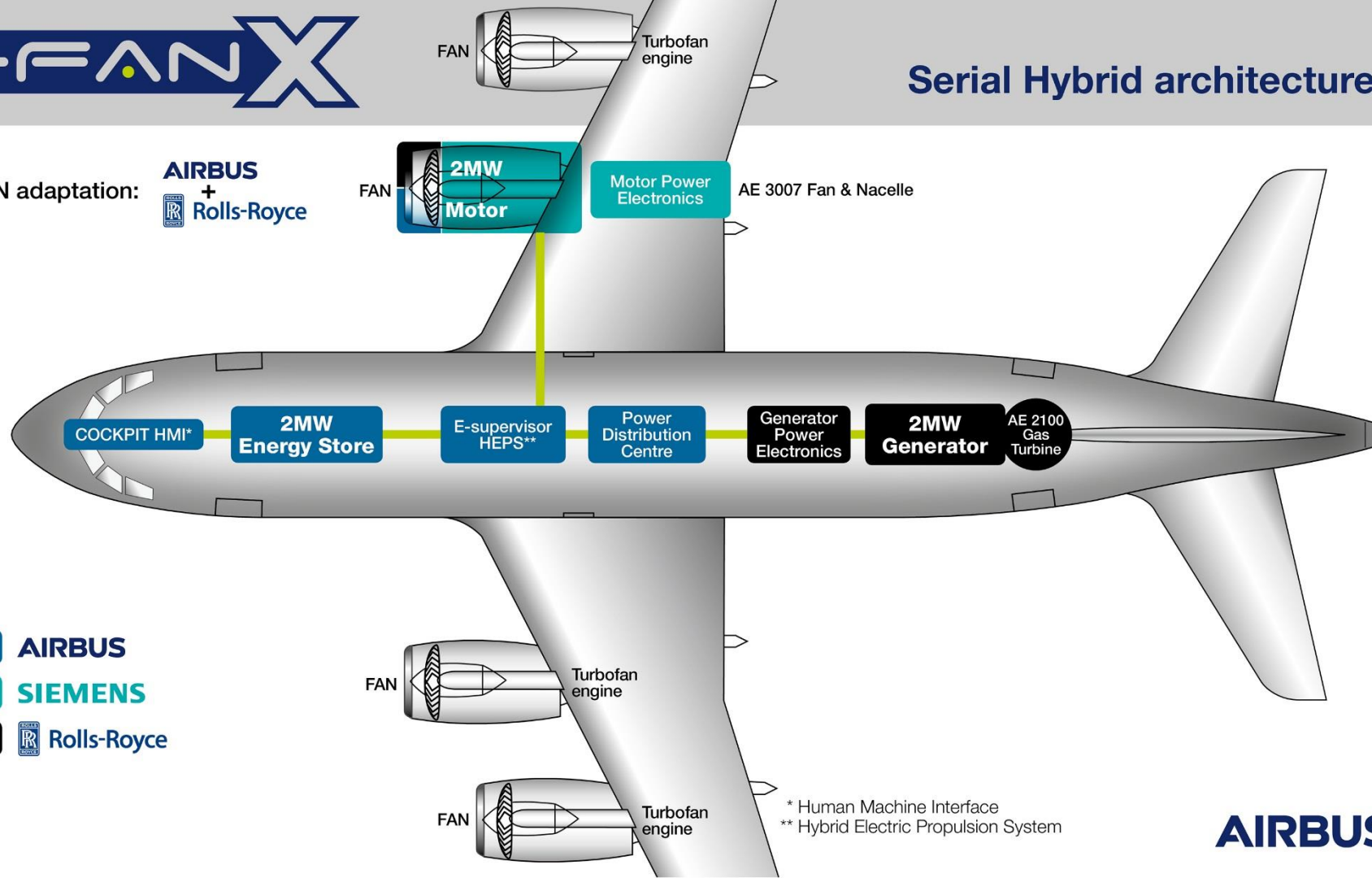
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FAN adaptation:  
**AIRBUS**  
 +  
**Rolls-Royce**



\* Human Machine Interface  
 \*\* Hybrid Electric Propulsion System





Wright Electric and EasyJet



# Hybrid electric aircraft

## Range from Oslo in 2030: 100 pax 1000 km

**SIEMENS**  
*Ingenuity for life*



**SAFETY**

distributed electric propulsion system



**SAFETY**





# RANGE ANXIETY

A blue-tinted photograph of an airplane wing, likely a jet, flying through a sky with wispy clouds. The wing is the central focus, curving from the bottom left towards the top right. The sky is a deep blue, and the clouds are lighter, creating a sense of depth and movement.

Oslo – Bergen

Alternate: Haugesund

+ 30 minutes





# AVINOR's ELECTRIC AIRCRAFT ACTIVITIES Q1 AND Q2 2018

- Mapping electric aircraft producers and technologies
- Demonstration and testing of Norway's first electric aircraft during summer 2018
- «The Government will task Avinor with developing a program for introduction of electric aircraft in commercial aviation in Norway»

# CONSEQUENCES FOR AVINOR'S INFRASTRUCTURE?



- Mapping surplus electricity capacity on Avinor's airports
- Looking into innovative and flexible charging solutions



# NORWAY FIRST?

- Unique network of airports
  - An established market for short flights with small aircraft (incl PSO routes)
  - Broad support in Government, Parliament and other stakeholders
  - 100% renewable electricity
- Aircraft producers are looking for a market and a customer – we have both



The background of the entire slide is an aerial photograph showing a vast, undulating landscape covered in a dense layer of bright blue, cloud-like or snow-like material. The horizon is visible in the upper third of the image, where the bright landscape meets a clear, light blue sky.

**VISION:**

**ALL DOMESTIC TRAFFIC  
ELECTRIFIED BY 2040**

**AIR TRAVEL:  
THE MOST ENVIRONMENTALLY FRIENDLY MODE OF  
TRANSPORT > 300 KM**





## CONCLUDING REMARKS

- Norway is totally dependent on aviation
- Green House Gas emissions must be mitigated
- Sustainable aviation fuels are an important part of the solution
- Electric passenger aircraft will be a reality