

Clean energy

Maria Fiskerud

Cluster manager for the Swedish innovation cluster Fossil-free aviation 2045 – Research Institute of Sweden







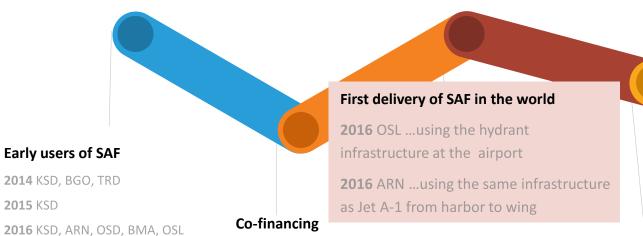
Creativity
Collaboration

STOCKTAKING 2020

ICA0

Some examples from our

Pioneering for CO₂ reduction



2015 Fly Green Fund

2016 Swedavia do all their business travel with SAF

2016-2018 Co-financing between Avinor, AirBP, SAS, KLM and Lufthansa at OSL

2018-ff Public procurement started for SAF by Swedavia, Energy company (Jämtkraft) and Kalmar municipality

2019 Airliners offers travelers to buy SAF for their trip - SAS, BRA

Goals

Fossil-free aviation

2030 Domestic

2045 International

Government support

2018 Swedish Roadmap towards fossil free aviation

2019 BioJet investigation in Sweden

2020 Electric aviation investigation in Sweden

2020 Fossil free aviation investigation Nordic Ministry Council

2020 Norway introduces a SAF drop-in mandate

2020 Nordic ministry discuss Nordic solutions for SAF and Electric aviation

Electric aviation

2018 Electric aviation in Sweden (Sweden's innovation agency project)

2018 Avinor and the Norwegian Civila Aviation Authority to develop a program for introduction of electrified aircraft

2019 Nordic Network for Electric Aviation (Nordic Innovation project)

2020 Infrastructure for electric aviation introduced at airports

2025 HEART Aerospace airplane Heart ES-19 will fly

Hydrogen aviation

2019 Enable H2 (CleanSky project) GKN and Chalmers

SAF Collaborations

KLR, VXO, HAD

VXO, HAD, OSL, BGO

2015 KSD

2013 Nordic Initative Sustainable Aviation

2017 KSD, GOT, MMX, KLR, OSL, BGO

2018 ARN, BMA, GOT, VBY, LLA, KLR,

2019 ARN, MMX, OSD, UME, GOT,

2018 Fossil-free aviation 2045

Together with our CO₂ reduction friends!

Fossil free aviation 2045 KSDarprt. Svenskt ÖSTERSUNDS KOMMUN STAAREN TJÜELTE (A) SÖDRA COWI CORTUS BRA WESTANDER LINEA TORROGALA (A) AFRY KLW Royal Dutch Airlines (4) BIOMENERGY BUSHARE flygresor.se

FOSSILFRITT FLYG 2045

Energimyndigheten



































We want to be CO₂ reduction pioneers!

- The Nordic countries are the 12th economy in the world if we combine our economies
- We have sustainable feedstock, for example forest residue that we don't use today
- We have clean electricity that could be used for Power-2-X, hydrogen and electric aviation
- 16 airports have used SAF
- Infrastructure and test areas are implemented for electric aviation



Innovation cluster Fossil-free aviation 2045

Aviation Fuels

Feedstock type	Conversion process
Forestry residue	Any ASTM certified process

Founded by **SAS**, **Swedavia** and **RISE** to **support action** to reach the Swedish aviation industries goals: Fossil-free domestic flights 2030 and all flights, both domestic and international fossil-free 2045. The cluster is the meeting place and network for **collaboration** and increased **consensus**, to **accelerate the transition**. We want to be a cluster that leads to **action**. Innovations projects lead by the cluster are both **technical and market driven**. Technical driven - hydrogen, SAF bio and power-2-X and electric aviation. Market driven - co-financing, policy, green investments. **A diversity of stakeholders**: Authorities, academia, the aviation, process, and tourism industry, business- and leisure travelers. https://www.fossilfreeaviation.com/







CO₂ reductions per flight

>80 %



Level of finance required

8,5/17 M SEK



Timeframe

2045



Main challenges

Get everyone to work towards the same goal

Nordic Network for Electric Aviation (NEA)

Technology

NEA is a platform where Nordic stakeholders come together to accelerate the introduction of electric aviation in the Nordic countries. Consortium of 6 countries/15 project members.

Work packages:

(1) Standardize electric air infrastructure in the Nordic countries (2) Develop business models for regional point-to-point connectivity between Nordic countries (3) Develop aircraft technology for Nordic weather conditions

(4) Create a platform for European and global collaboration https://youtu.be/pPQ5AmD1YjI







CO₂ reductions per flight

100%



Level of finance required

4/12 M SEK



Timeframe

2025



Main challenges

Certification
Global standard
Policy



Thank You

ICAO Headquarters Montréal European and North Atlantic (EUR/NAT) Office Paris

> Middle East (MID) Office Cairo

Western and Central African (WACAF) Office Dakar Asia and Pacific (APAC) Sub-office Beijing

Asia and Pacific (APAC) Office Bangkok

North American
Central American
and Caribbean
(NACC) Office
Mexico City

South American (SAM) Office Eastern and
Southern African
(ESAF) Office
Nairobi

