The challenge of ultrafine particles

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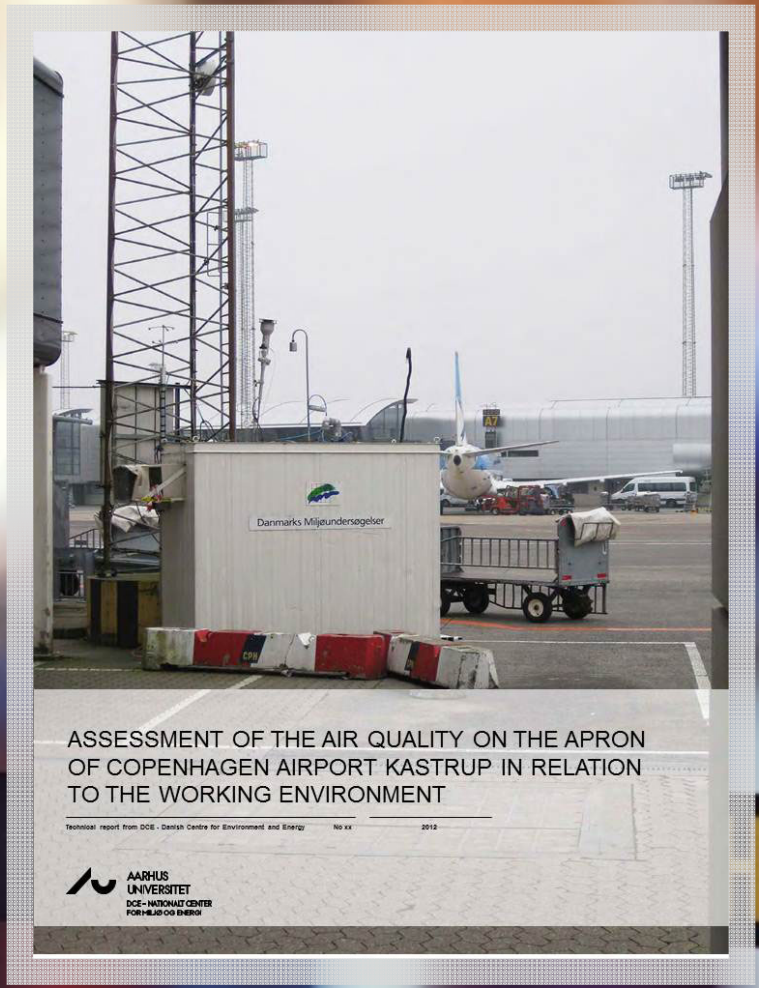
- High amounts of ultrafine particles
- Also spreading outside the airport
- Handling personnel with cancer diagnosis related to the work at the airport due to exhaust from engines
- No accept criteria for ultrafine particles

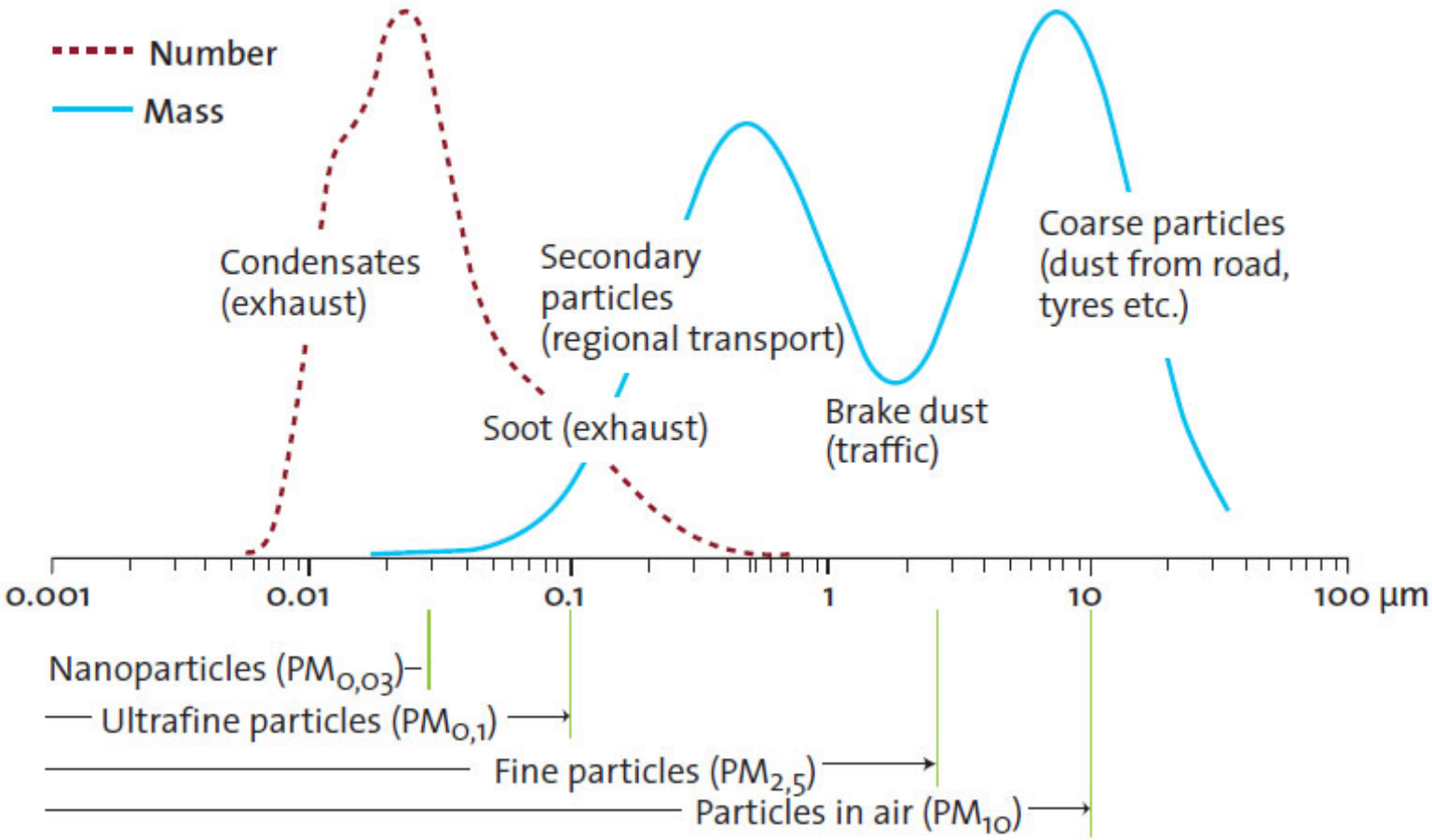
CHALLENGE

Research and analysis

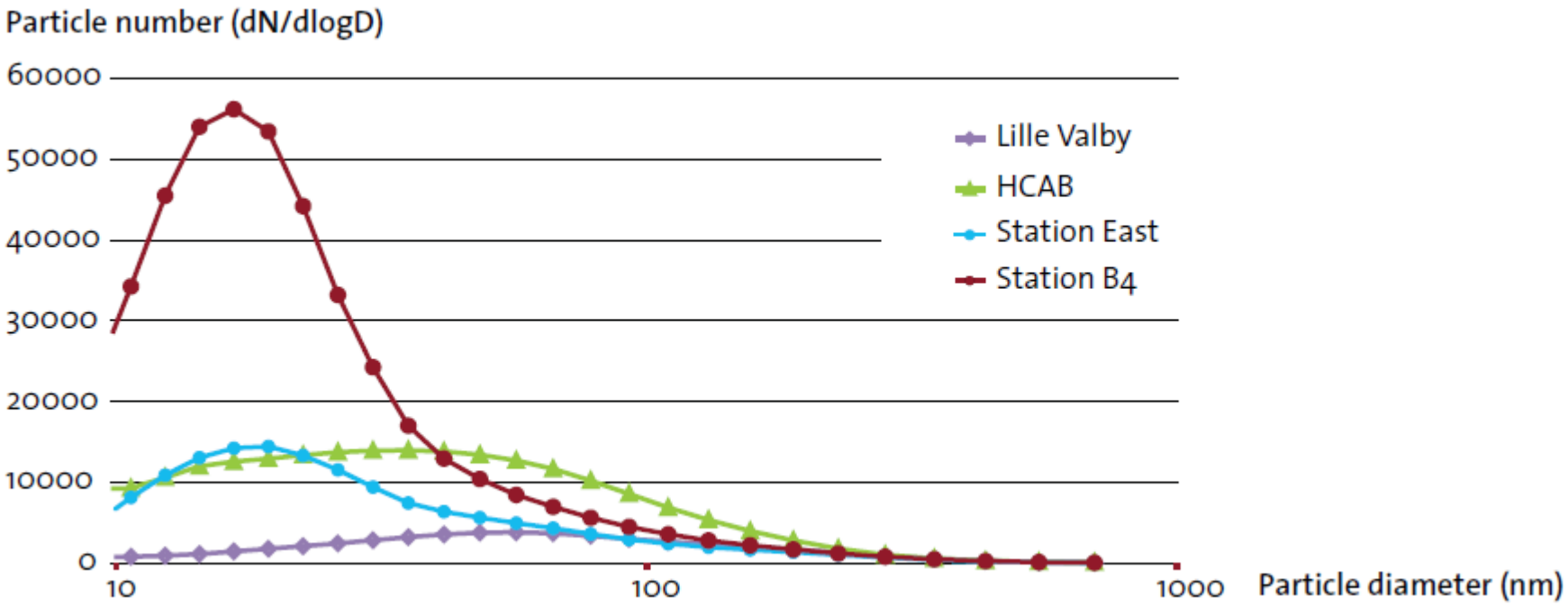
2007	Air Quality on the Apron project
2010	First monitoring station for UFP
2011	Final report – Air Quality
2012	Two monitoring stations



Airpollution - particles

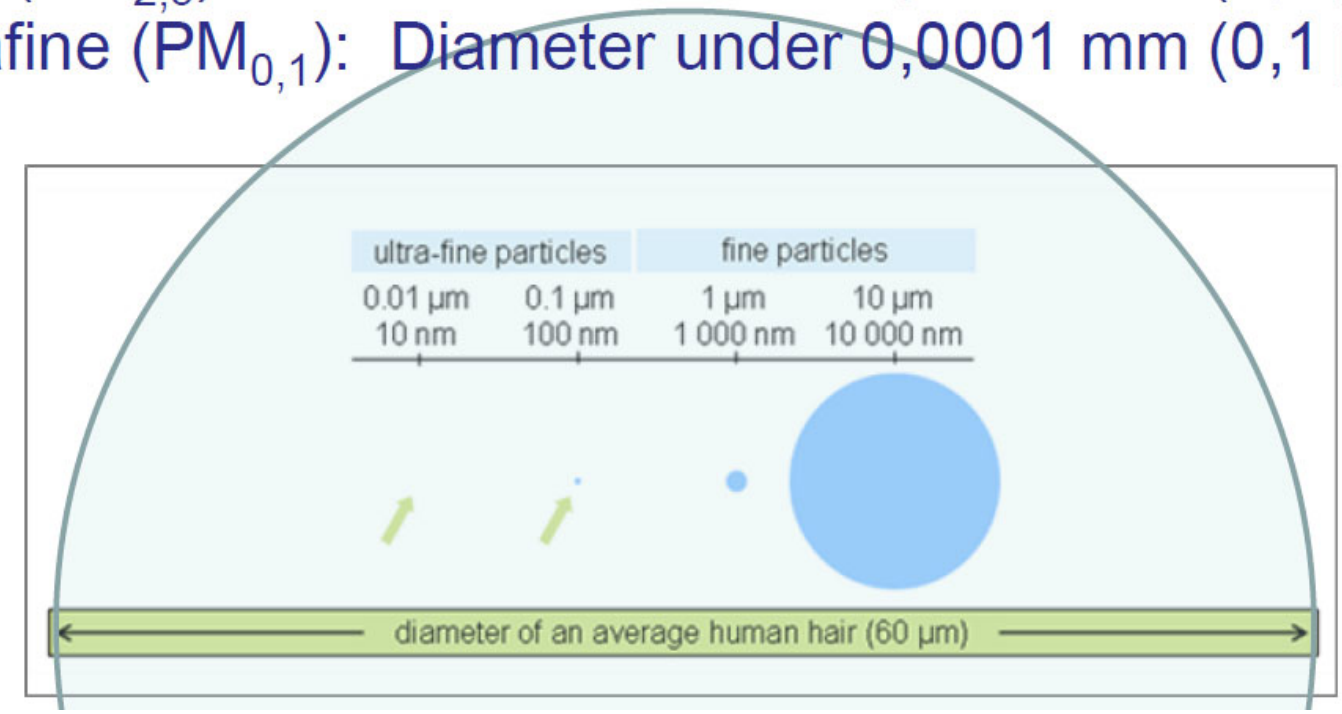


Particles in airport



Particles

Grove (PM_{10}): Diameter under 0,01 mm (10 µm)
Fine ($PM_{2,5}$): Diameter under 0,0025 mm (2,5 µm)
Ultrafine ($PM_{0,1}$): Diameter under 0,0001 mm (0,1 µm)



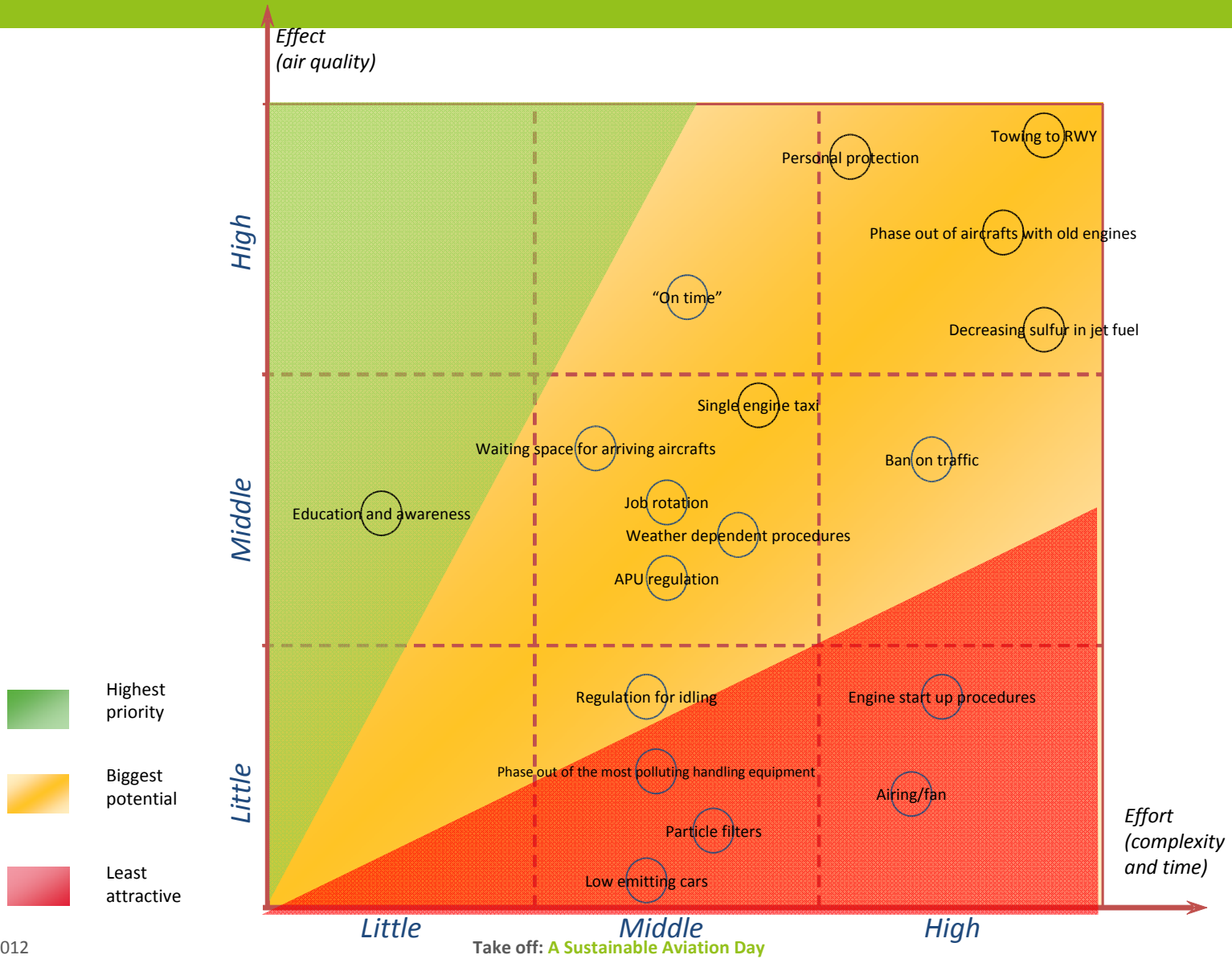
- Aircraft Engines
- Auxiliary Power Units
- Diesel powered engines

SOURCES FOR ULTRAFINE PARTICLES

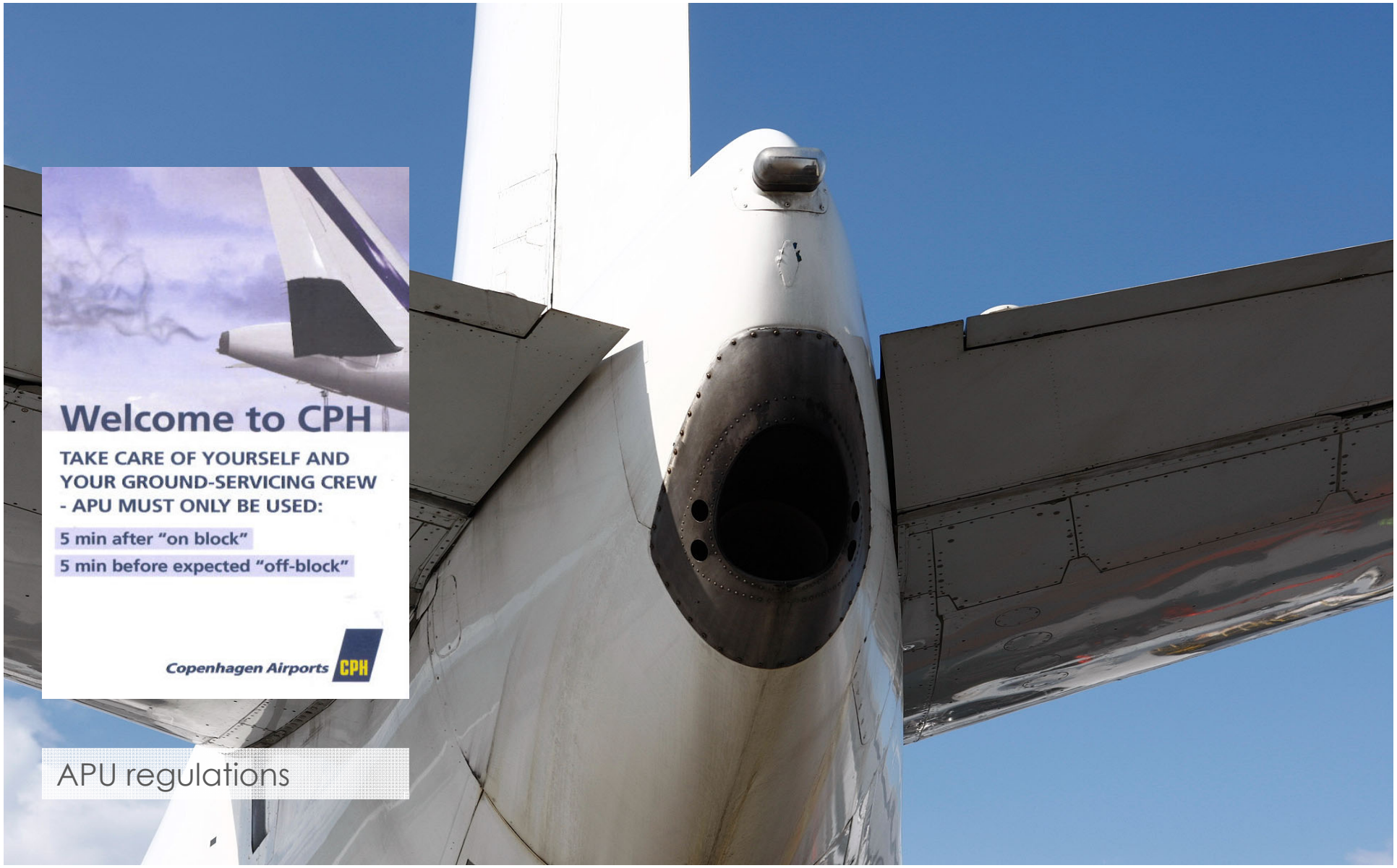
- Surveys to enhance knowledge
- Actions to minimize the amount of particles
  - Short term (Better compliance to existing rules)
  - long term (Changes in technology and operations)

ACTION PLAN

Action plan to reduce UFP

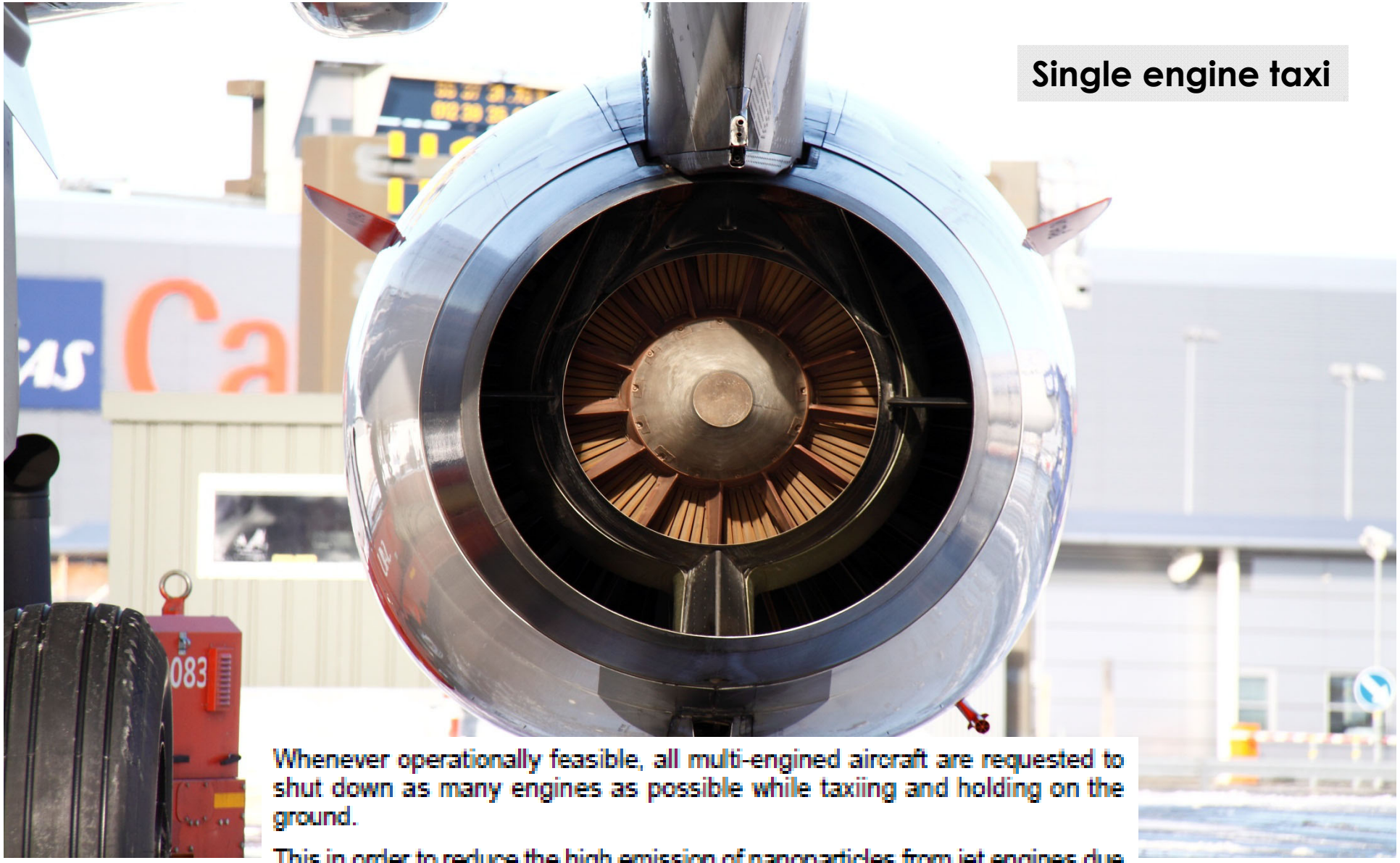


Behaviour



APU regulations

Stand technology and operations

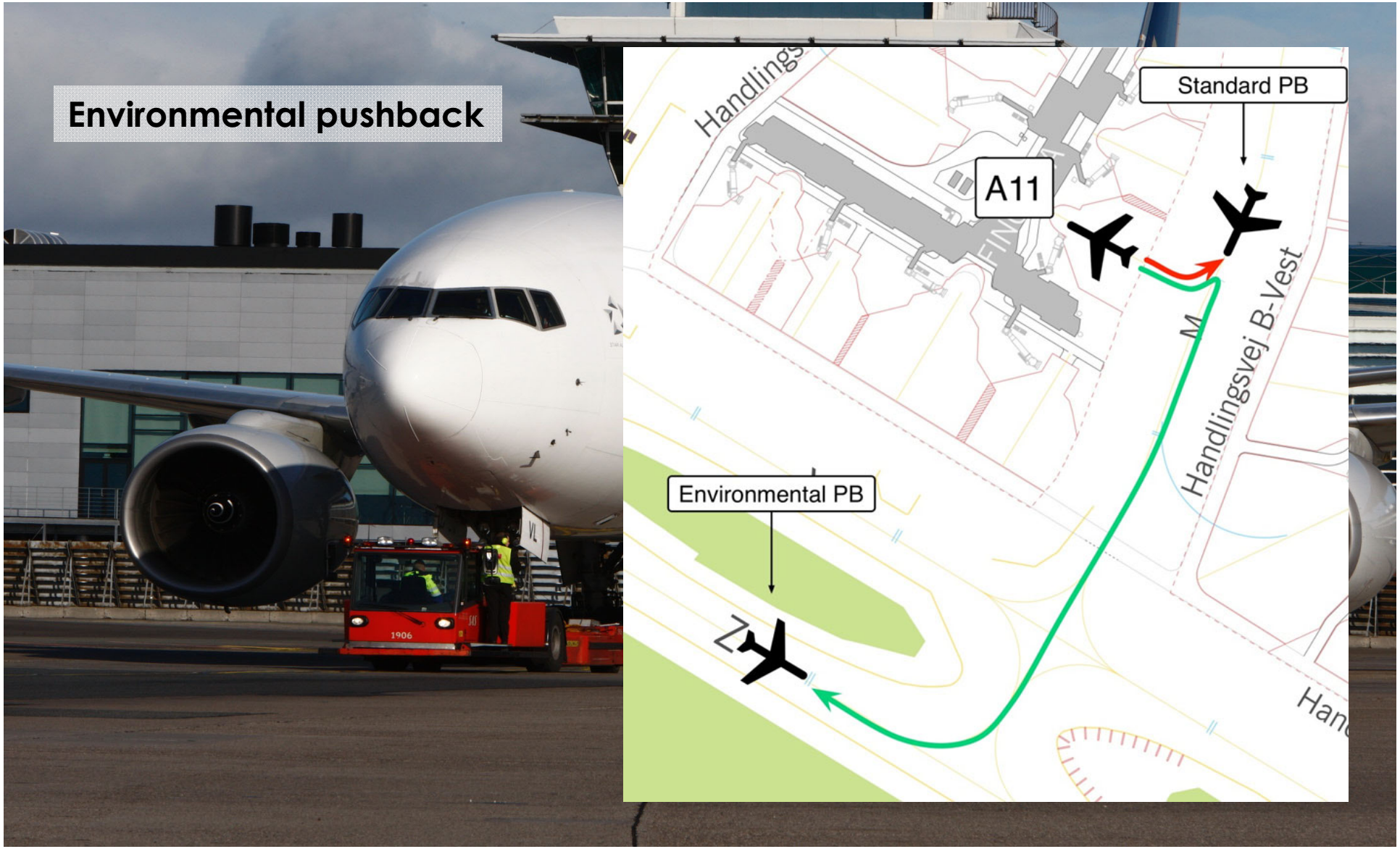


Single engine taxi

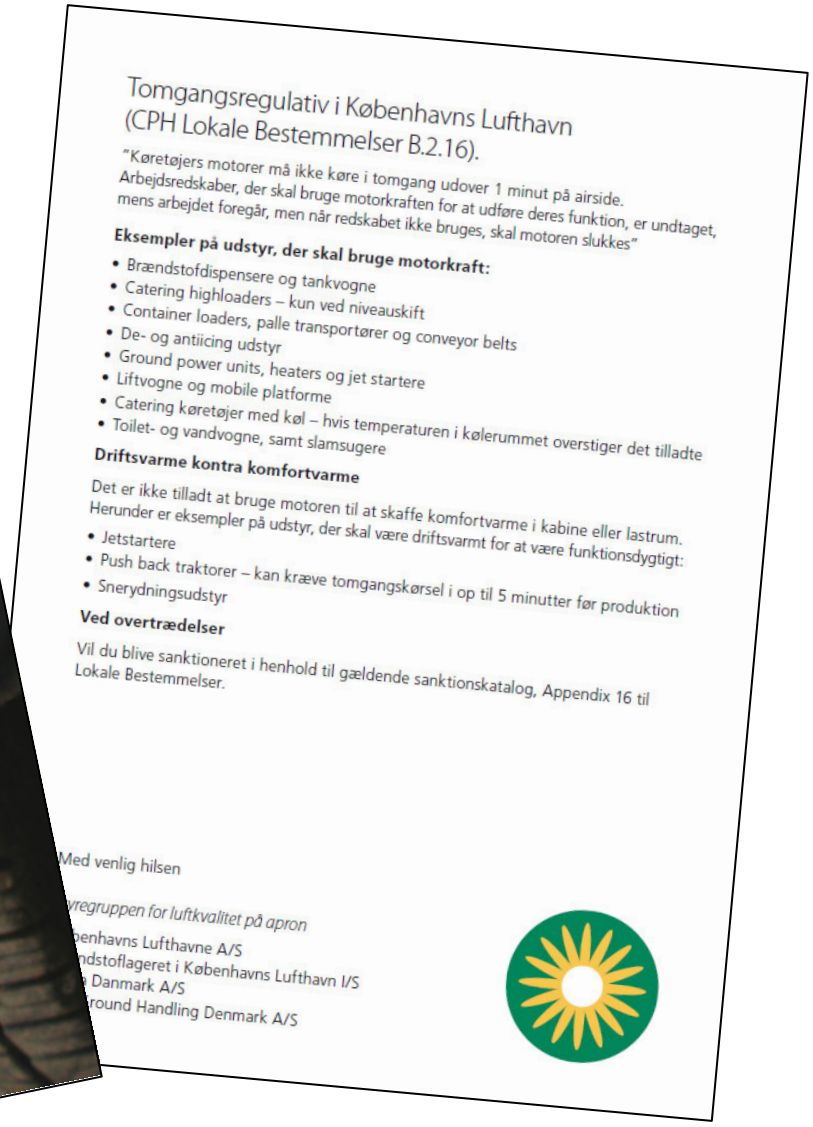
Whenever operationally feasible, all multi-engined aircraft are requested to shut down as many engines as possible while taxiing and holding on the ground.

This in order to reduce the high emission of nanoparticles from jet engines due to combustion of fossil fuel. The active cooperation of the flight crews involved is appreciated.

Stand technology and operations



Employee awareness



Tomgangsregulativ i Københavns Lufthavn
(CPH Lokale Bestemmelser B.2.16).

"Køretøjers motorer må ikke køre i tomgang udover 1 minut på airside. Arbejdsredskaber, der skal bruge motorkraften for at udføre deres funktion, er undtaget, mens arbejdet foregår, men når redskabet ikke bruges, skal motoren slukkes"

Eksempler på udstyr, der skal bruge motorkraft:

- Brændstofdispensere og tankvogne
- Catering highloaders – kun ved niveauskift
- Container loaders, palle transportører og conveyor belts
- De- og antiicing udstyr
- Ground power units, heaters og jet startere
- Liftvogne og mobile platforme
- Catering køretøjer med køl – hvis temperaturen i kølerummet overstiger det tilladte
- Toilet- og vandvogne, samt slamsugere

Driftsvarme kontra komfortvarme

Det er ikke tilladt at bruge motoren til at skaffe komfortvarme i kabine eller lastrum. Herunder er eksempler på udstyr, der skal være driftsvarmt for at være funktionsdygtigt:

- Jetstartere
- Push back traktorer – kan kræve tomgangskørsel i op til 5 minutter før produktion
- Snerydningsudstyr

Ved overtrædelser

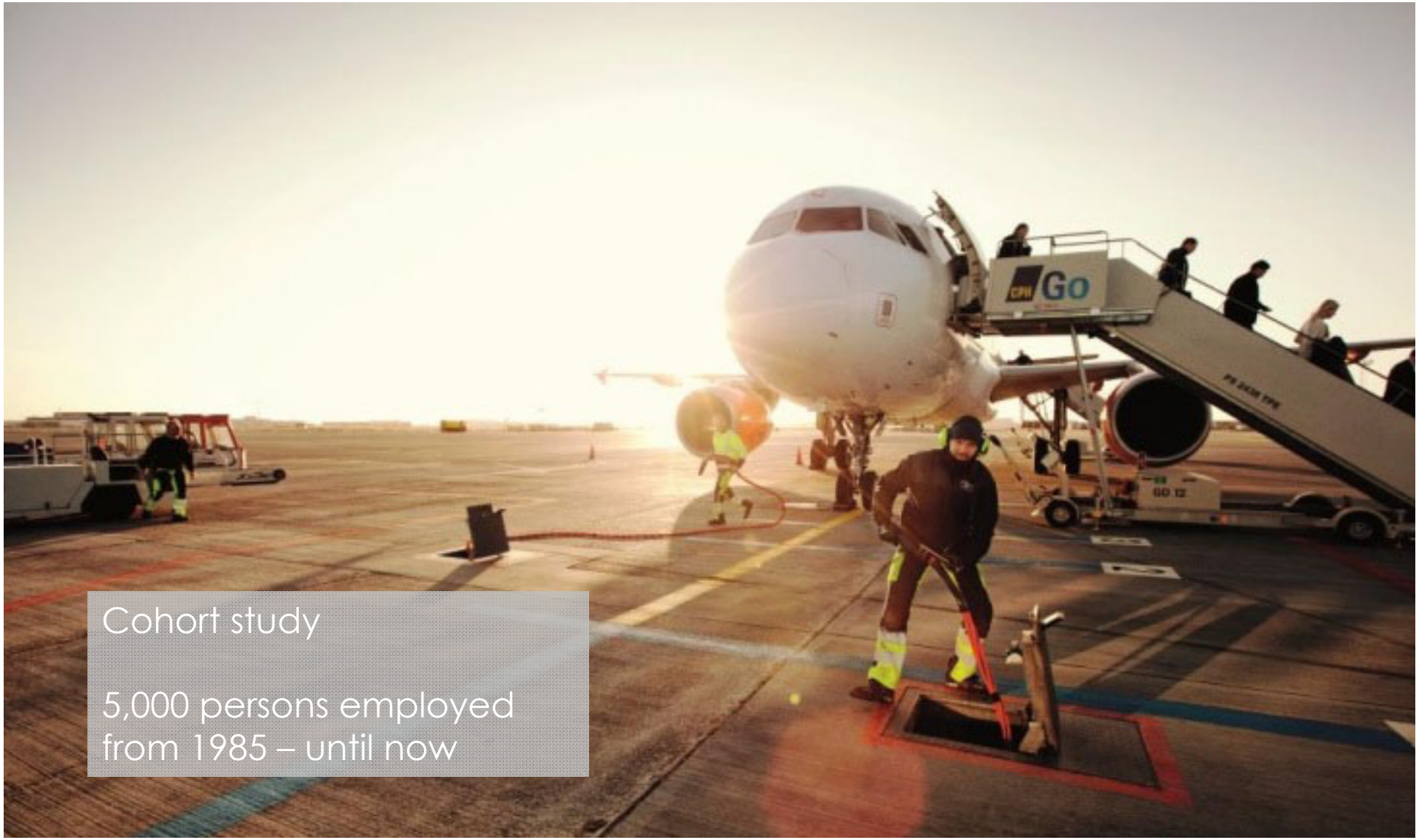
Vil du blive sanktioneret i henhold til gældende sanktionskatalog, Appendix 16 til Lokale Bestemmelser.

Med venlig hilsen

vregruppen for luftkvalitet på apron

penhavns Lufthavne A/S
ndstoflageret i Københavns Lufthavn I/S
Danmark A/S
round Handling Denmark A/S

Research and analysis



Cohort study

5,000 persons employed from 1985 – until now

One long term action is to investigate the effect on ultrafine particulates from reducing sulphur content in jet fuel

How does kerosene with a biofuel blend affect the emission of ultrafine particulates?

LONG TERM ACTION

Emissions from biofuels in diesel

The Danish Transport Authority has published a report with following conclusions:

- The mass of particulates are reduced
- Increasing NOx
- The number of ultrafine and Nano particles are increasing

Reducing emissions by fuel savings does decrease local air pollution

Emissions from biofuels and the impact on local air quality are not fully understood

Be sure not to create a new challenge by mitigating one

ALTERNATIVE FUEL CHALLENGE

Do’s and don'ts for Biofuels

Do’s	Don't
•Investigate impact on local air quality from different biofuels •Emission data – Remember also to count particles	•Create local air quality problems by reducing CO_2 emissions •Give up – just update Sustainability Criteria to include emissions that affect local air quality

Airport Collaborative Decision Making

Airport Collaborative Decision Making

About Ultrafine particles Particulate matter (PM), or simply particles, are solid matter in air. Further classification of particles can be done by size into coarse, fine, ultrafine and nanoparticles. Measured in micrometers the size of the coarse particles < 10 PM10 , fine particles < 2.5 PM, ultrafine particles < 0.1 PM0.1 and nanoparticles < 0.03 PM. An investigation into air quality at the ramp area at Kastrup-Copenhagen Airport was conducted by the Danish Centre for Environment and Energy (DCE) in 2010. DCE's report states that the majority of the studied compounds, including most particles, are below the limits. The exception is the ultrafine particles for which pollution is at a high level. Sources are identified as engines that use different types of fuel such as the engines and auxiliary power unit on aircraft or diesel engines on all kinds of vehicles at the airport. It is not known how ultra-fine particles impact health in the absence of scientific studies or investigations, which means that there are no established national or international limits. It is however known that exposure to larger particles can mean increased risk of serious diseases. Therefore, it is important to find ways to reduce the number of particles in daily operations. Ground handling companies' including SAS, employee representatives and external expertise and the airport owner work together in a working group with the aim to reduce the amount of particles at the airport. During fiscal year 2012, key activities have been to introduce more electrical vehicles and electrically powered equipment, introduce remote engine start-up of aircraft, increase the amount of one-engine taxiing and higher awareness among employees. Ultra fine particles are naturally not only an issue for Copenhagen- Kastrup. The issue is addressed in such international forums as IATA, ACI (Airport Council International) and N-ALM. In the future, international cooperation will be important to identify how the occurrence of ultra-fine particles can be reduced in the further development of jet fuel's sulfur content and the extensive work that is in progress to commercialize sustainable alternative jet fuels.