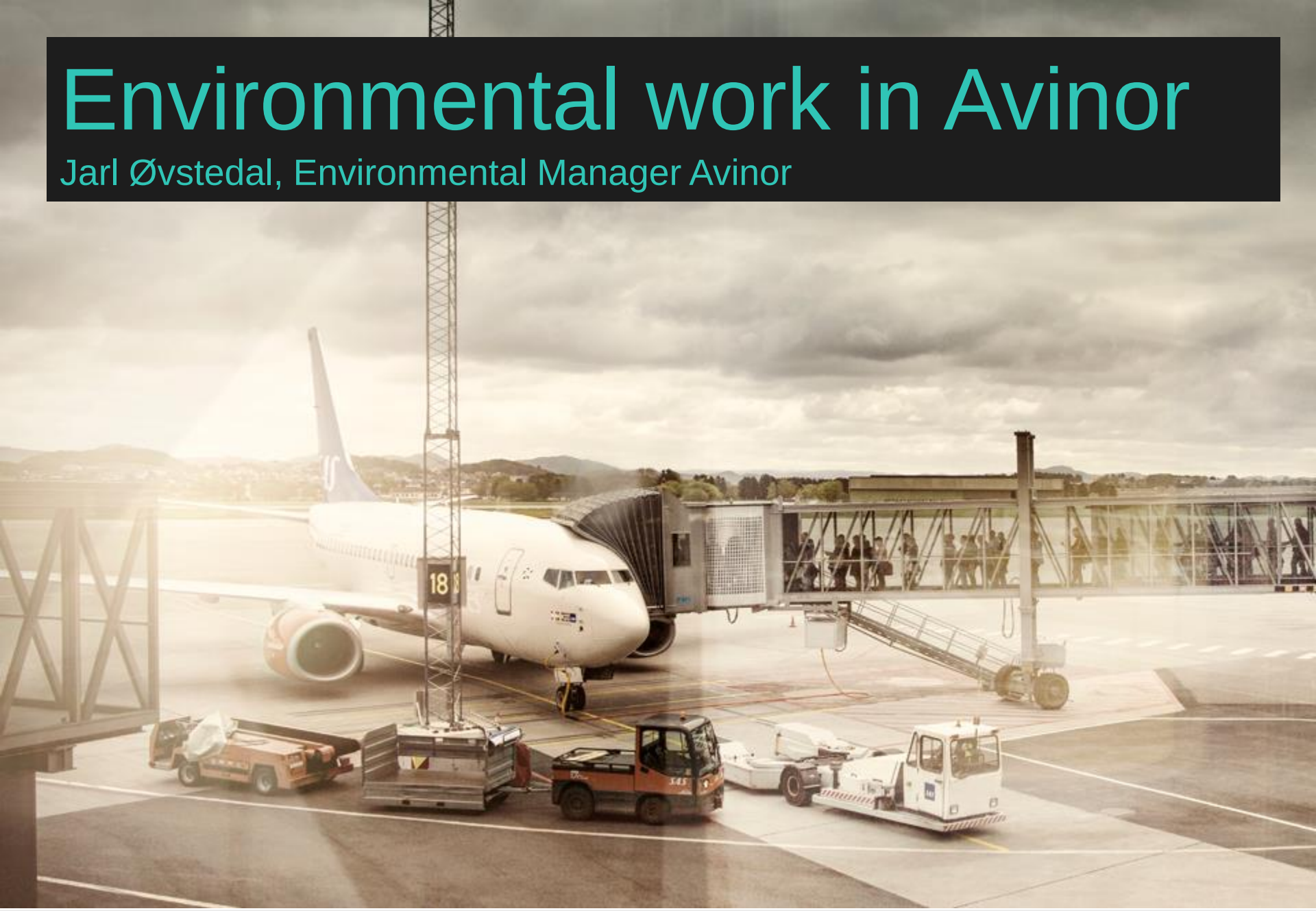
Environmental work in Avinor

Jarl Øvstedal, Environmental Manager Avinor



AVINOR

THIS IS AVINOR

45
AIRPORTS

3200
EMPLOYEES

THIS IS AVINOR

50 **MILLIONS**
passengers per year

47%

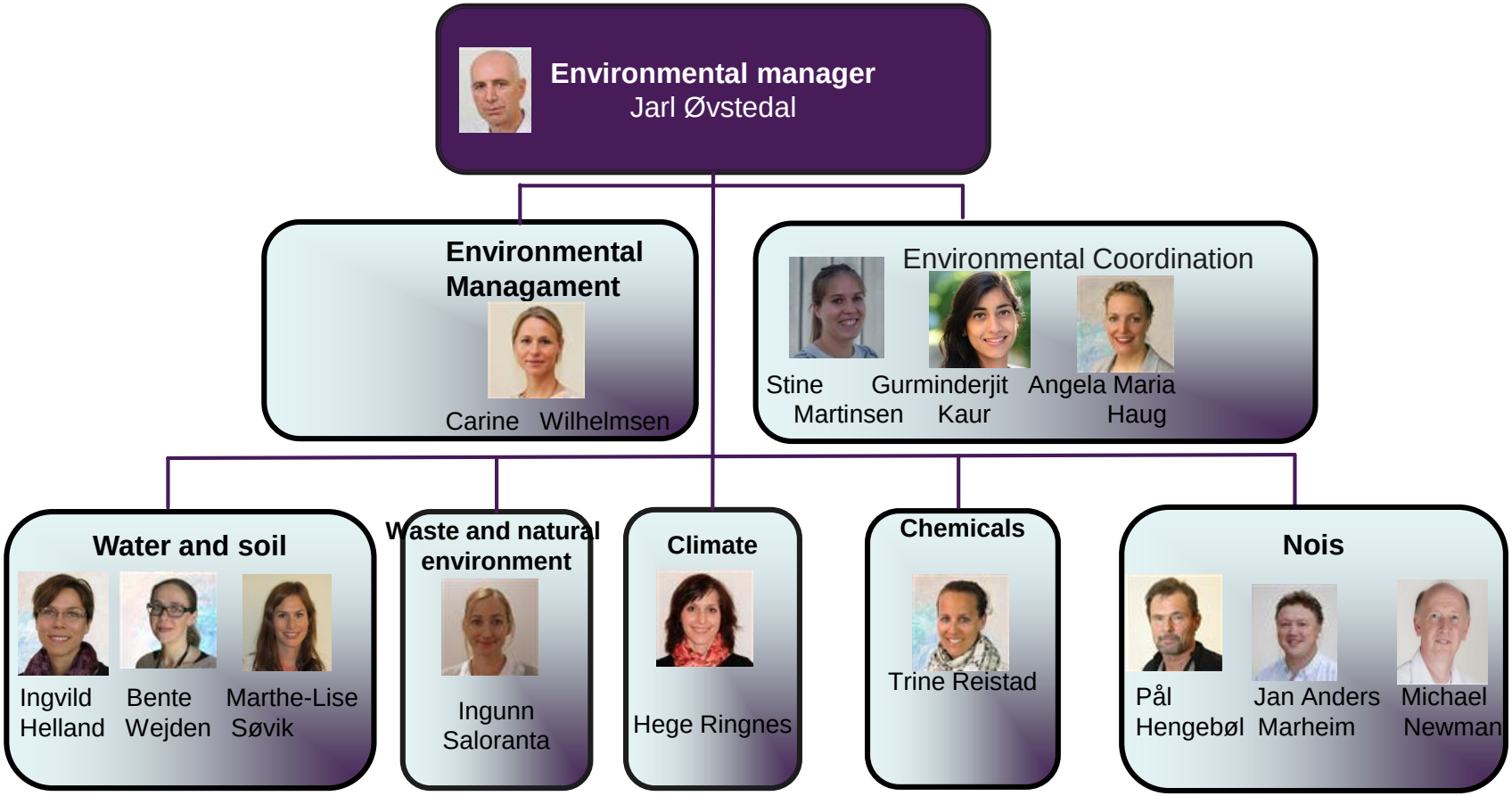
25 **MILLIONS**
through **Oslo Airport**

53%

ORGANISATION

AVINOR

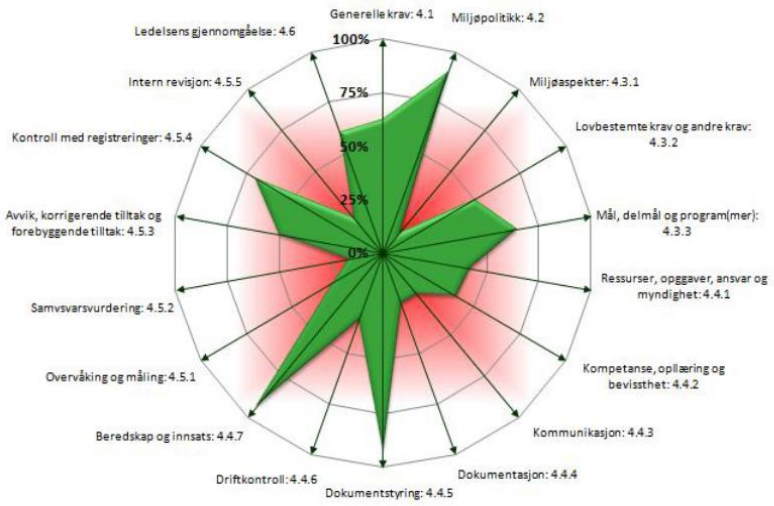
Environmental department



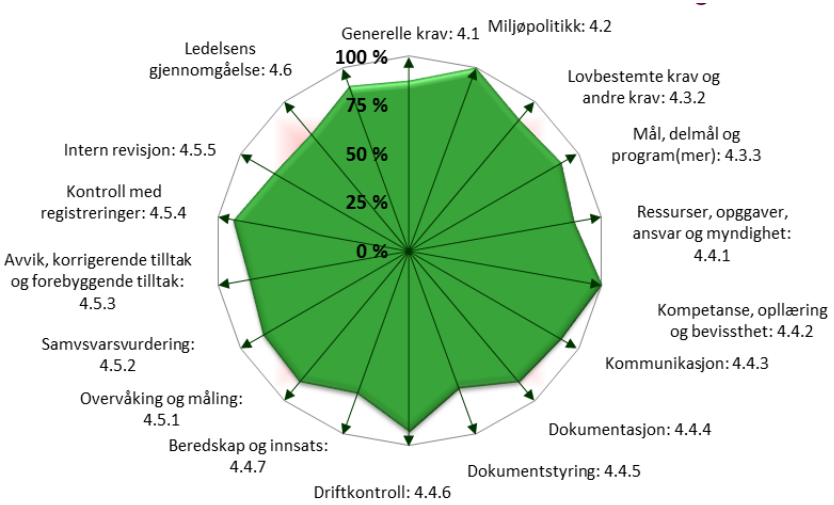
Project new environment managing system in Avinor

GAP- analysis 2014

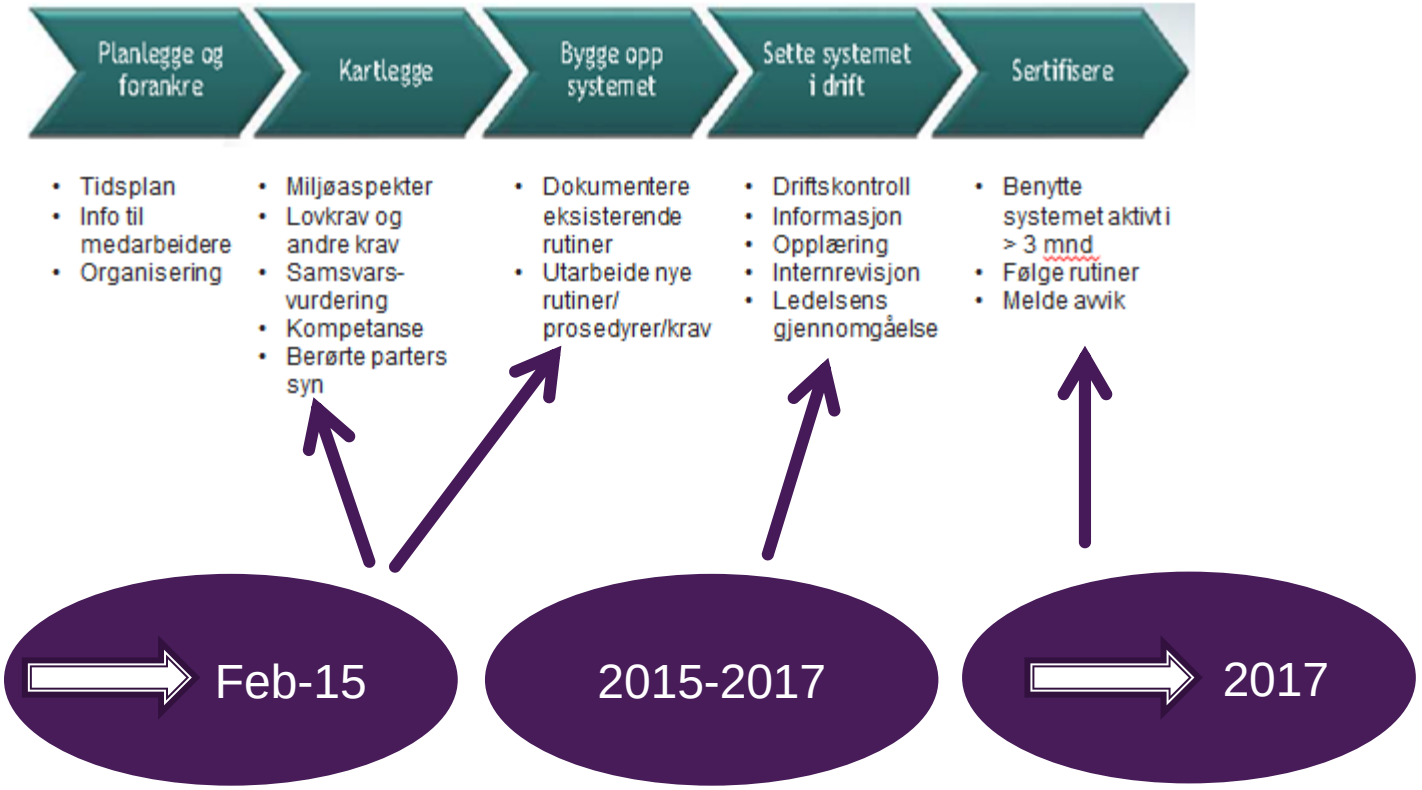
January 2014



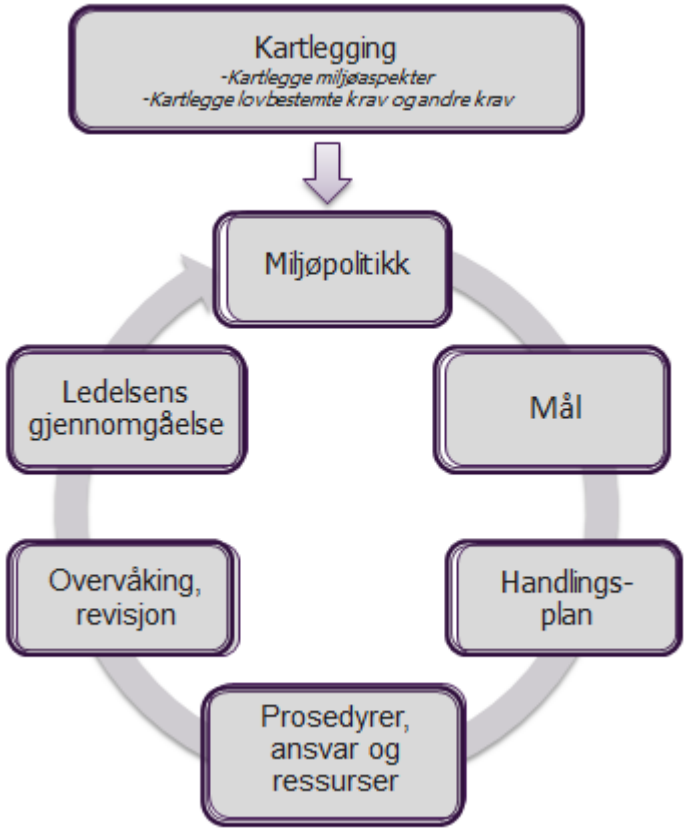
March 2015



Project: New Environmental Management

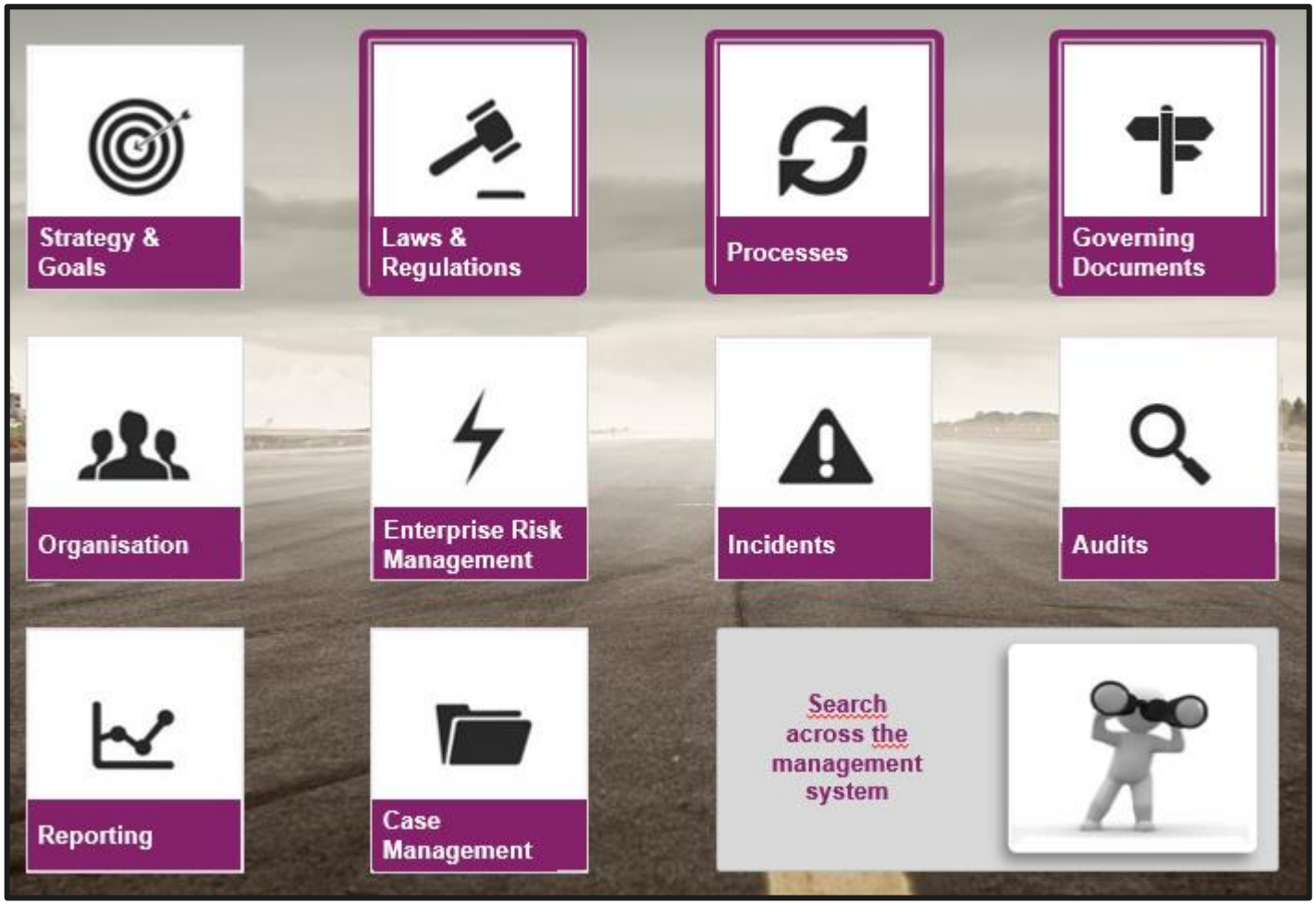


Continous execution and management – based on the PDCA-cycle

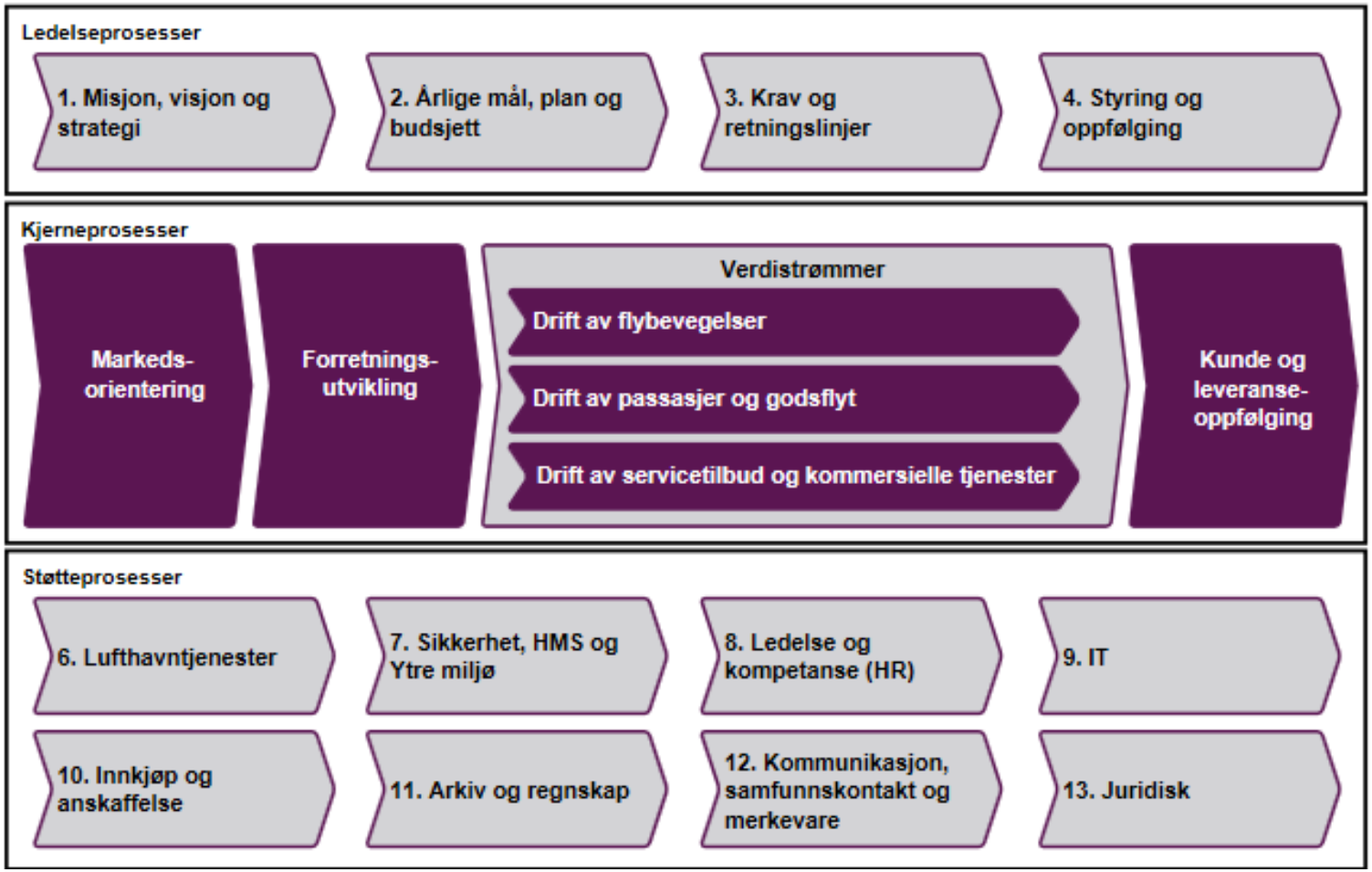


- Planning (aspects, compliance obligations)
- Leadership (policy strategy)
- Environmental objectives
- Planning actions to achieve environmental objectives
- Operational planning and control + emergency preparedness and response + performance evaluation
- Performance evaluation (internal audit) + improvement
- Management review + improvement

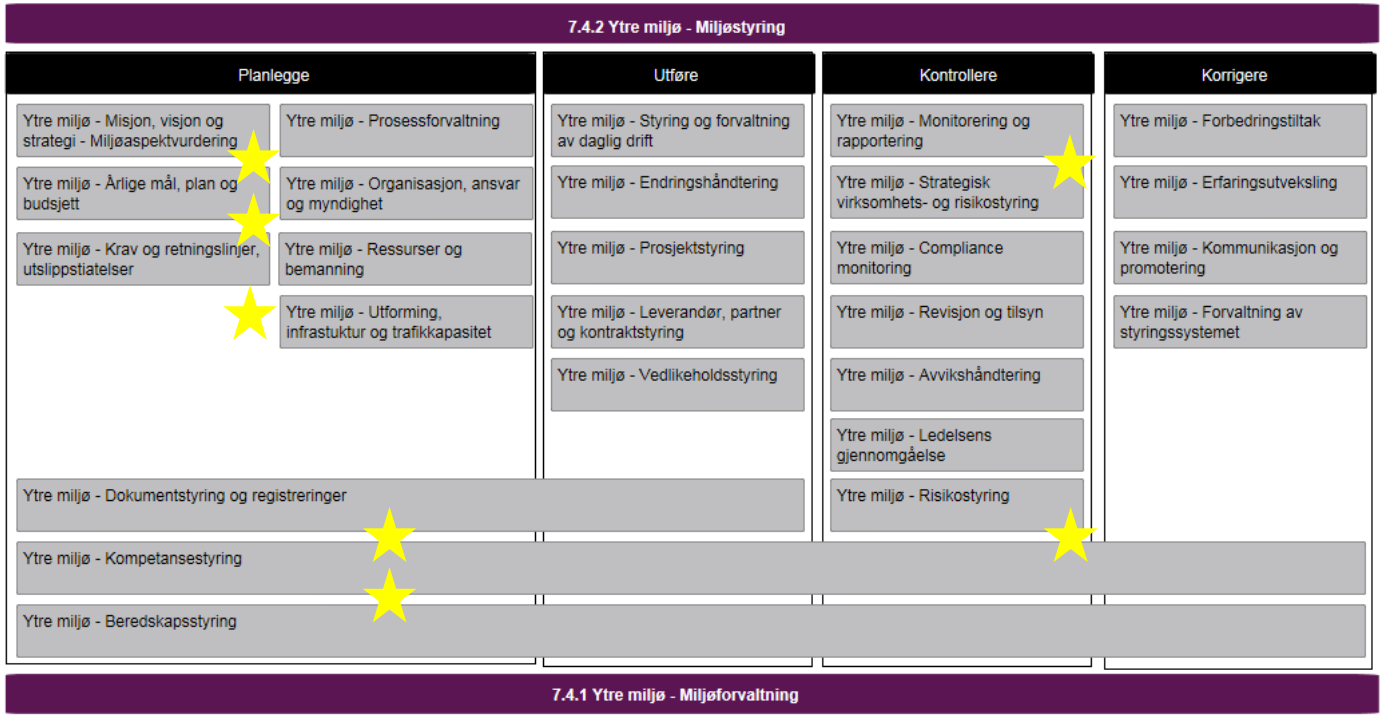
Avinor's Management System
SMART – From strategy to operations – through process orientation



Process landscape

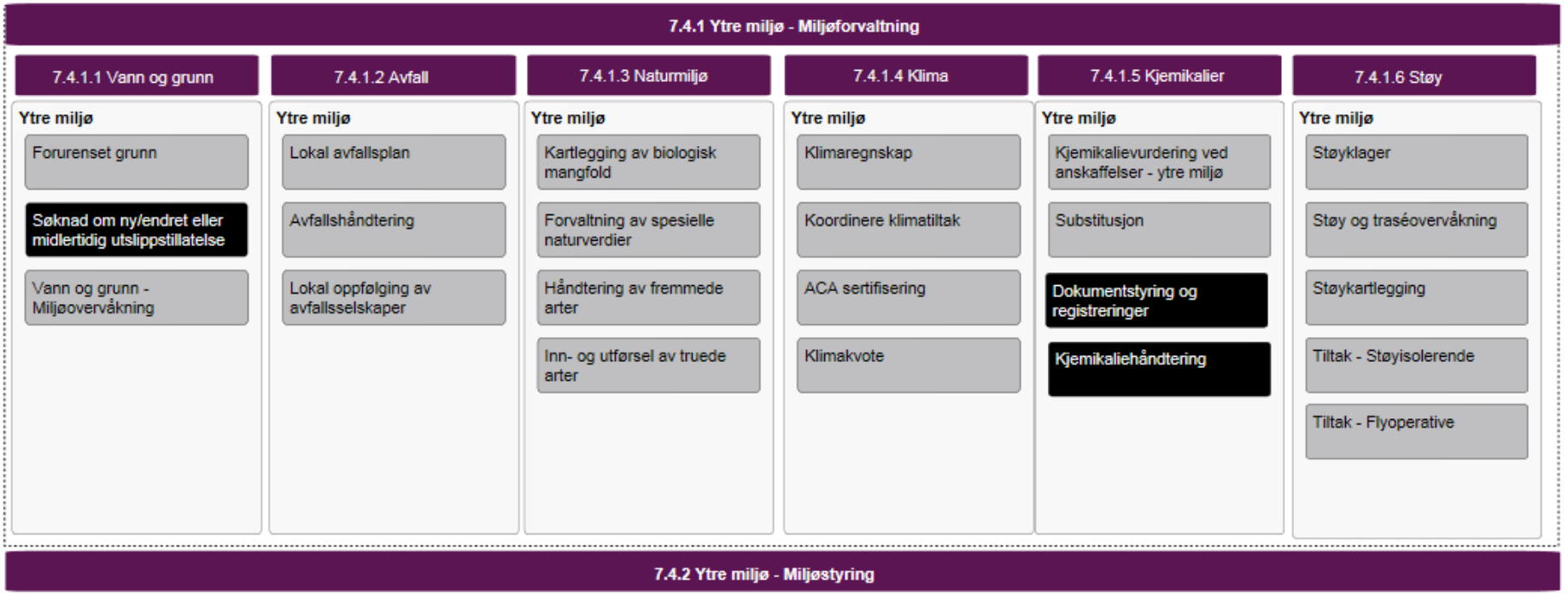


7.4.2 Environmental management



1. Policy, strategy, environmental aspects
2. Goals and objectives and how we operationalize them
3. Legal requirements
4. Monitoring & reporting
5. Registration
6. Risk management
7. Competence and awareness

7.4.1 Environmental management – support processes



1. Water & Soil
2. Wastemanagement
3. Biodiversity
4. Climate management
5. Chemical management
6. Noise management

The ISO14001 certifikat

- The ISO 14001 certificate is much more than a certificate
- The main tool for ensuring proper environmental work at the headquarters and locally at the airports.
- There is limited resources and it is necessary to standardize
- Ensures compliance with environmental requirements and fulfillment of environmental goals
- In order to succeed, it is important to make it easy so that it is possible to gain a profit with available resources

CERTIFIKAT

ISO 14001

CERTIFICATE nr/no.5806 M

Härmed intygas att:/*This is to certify that:*

Avinor AS

har ett miljöledningssystem som uppfyller kraven enligt SS-EN ISO 14001 vad gäller:
has an environmental management system that fulfils the requirements of SS-EN ISO 14001 with respect to:

Drift av lufthavner
Operation of airports

SP Sveriges Tekniska Forskningsinstitut/*SP Technical Research Institute of Sweden*
Certifiering - *Certification*

Lennart Månsson

SP är ett av SWEDAC ackrediterat organ för certifiering av miljöledningssystem
SP is a Certification Body, accredited by SWEDAC, for certification of environmental management systems

Sida/*page* 1 (3)

Giltigheten verifieras på www.sp.se/certifiering
The validity is verified at www.sp.se/certifiering

Ackred. nr 1002
Certifiering
ISO/IEC 17021

SP Sveriges Tekniska Forskningsinstitut
Box 857, 501 15 Borås
Tfn: 010-516 50 00
E-post, internet: info@sp.se, www.sp.se

AVINOR

5 airports are ACA setificated

(Oslo, Bergen, Trondheim, Stavanger og Kristiansand)

Significant environmental aspects

– our environmental impact

Transport

- Diesel own vehicles
- Business travel
- Air traffic (indirect)
- Feeder network (Indirect)

Energy

- Electricity supply

Chemicals

- De-icing (usage)
- PFAS - leakage

Natural environment

- Operation of large areas with a vulnerable environment

Aircraft and helicopter noise

- Air traffic
- Helicopter traffic

Purchase and construction projects

- Construction projects
-

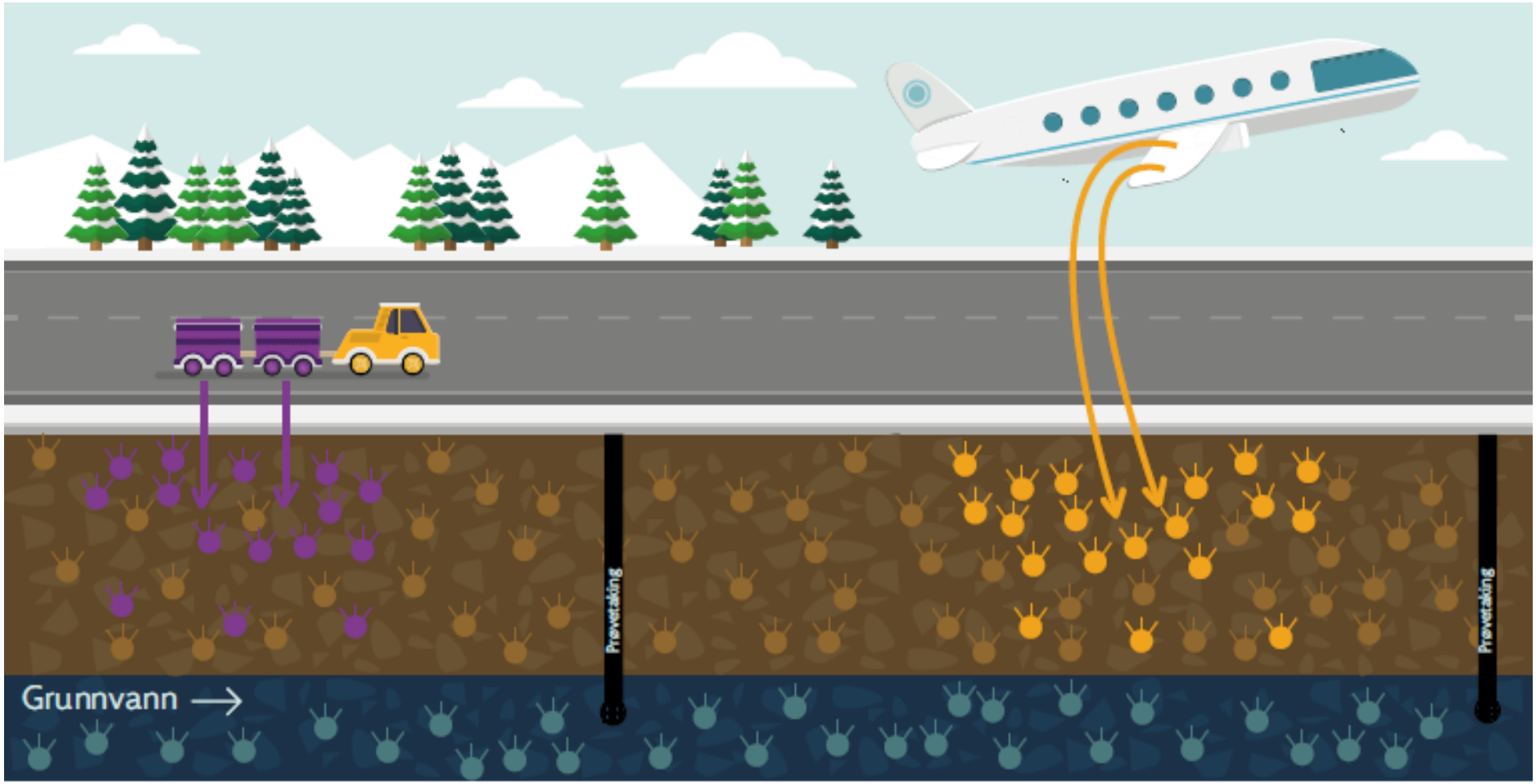
Climate

- Own controllable emissions
-

AVINOR

Avinor goal - No new soil or water pollution

Chemicals – aircraft and runway de-icing

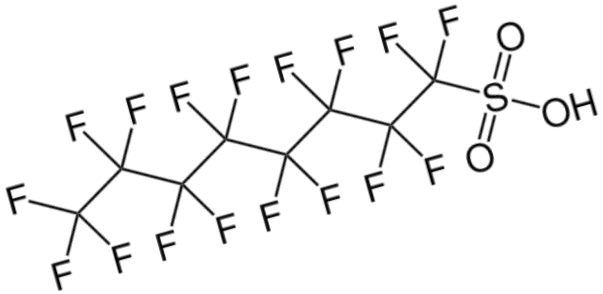


Avinor - Fire practice and PFAS

Fire drills at Avinor's airports:

- Avinor has 14 airports with operative fire drills areas where exercises are carried out
- There are closed drills areas at all 45 airports
- It is polluting PFAS, especially PFOS at all 45 airports

Chemicals - PFAS – leakage (Per- & polyfluoralkryl substances)



- What is PFAS / PFOS?
  - Persistent, bio-accumulating, toxic – several are classified as environmental poisons
  - Minimal acutely poisonous but poisonous with long term exposure
  - Increasing concentrations through the food chain
  - Animal trials: Liver damage, affects the immune system, reproductive damage
  - Affects birth weight (MoBa)

- Why has Avinor focus on this?
  - Avinor has used fire extinguishing foam containing PFOS until 2001
  - 2001-2011 fire extinguishing foam containing other fluorine combinations was in use

Dispersion

- Not all practice areas have satisfactory collection systems → dispersion into the ground
- PFOS is transported by the ground water, in trenches and streams and then to fish or other biota. In that way it is incorporated in the ecosystem and spreads to humans
- Avinor has investigated the distribution, residual quantities and transport of PFAS, as well as conducted risk assessments at all airports
- Fortunately, the results show that PFAS does not pose a high risk of damage to ecosystems and human health

PFAS at Avinors Airport?

- Replaced foam with fluorine free, though environmental requirements in the purchasing process
- Ask the Norwegian Food Safety Authority to assess the results from the biota to see if dietary advice is necessary (2013)
- For OSL and Harstad/Narvik airports, Avinor is duty bound to carry out measures. The measures at OSL are being carried out.
- Socioeconomic kost/benefit analysis shall be carried out to improve the basis for the implementation of the measures

Clean-up measures at OSL

1. Four treatment plants were established to deal with PFOS-polluted water

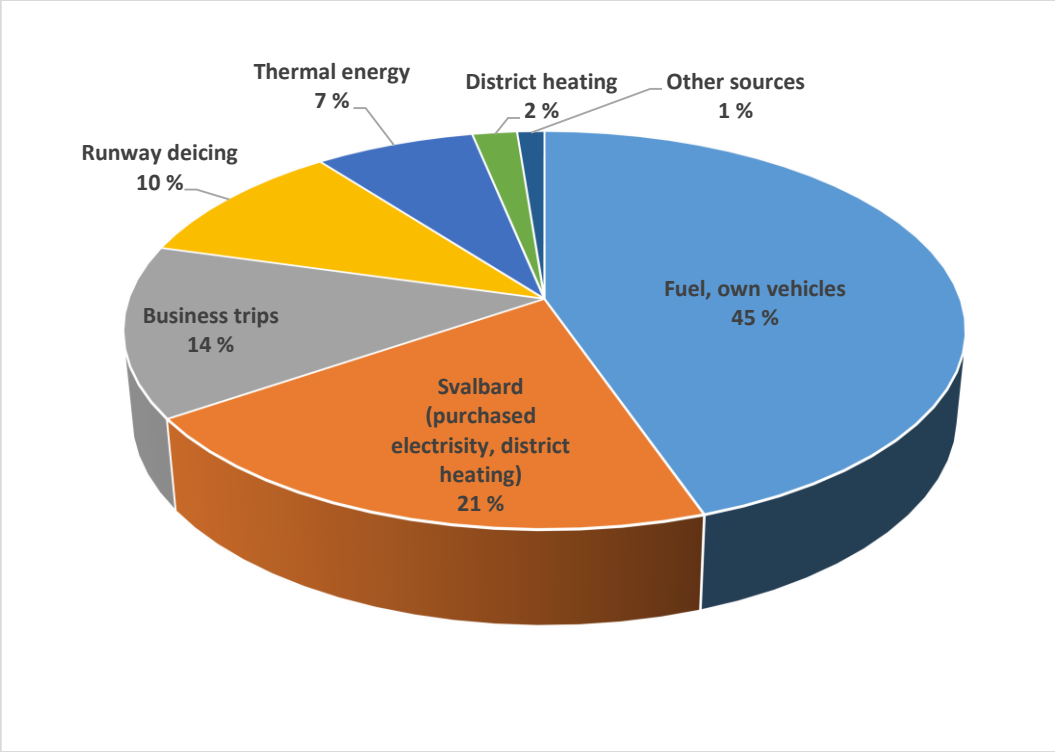
2. Dig up and deposit polluted earth

3. Wash polluted soil

4. Establish a watertight covering over lightly polluted soil to hinder PFOS from leaking

Climate goal

- By 2020, the company's own controllable greenhouse gas emissions will be halved compared with 2012



Driving force in the industry

Avinor shall be a driving force for climate friendly activities in the air transport industry

Biofuel in air transport

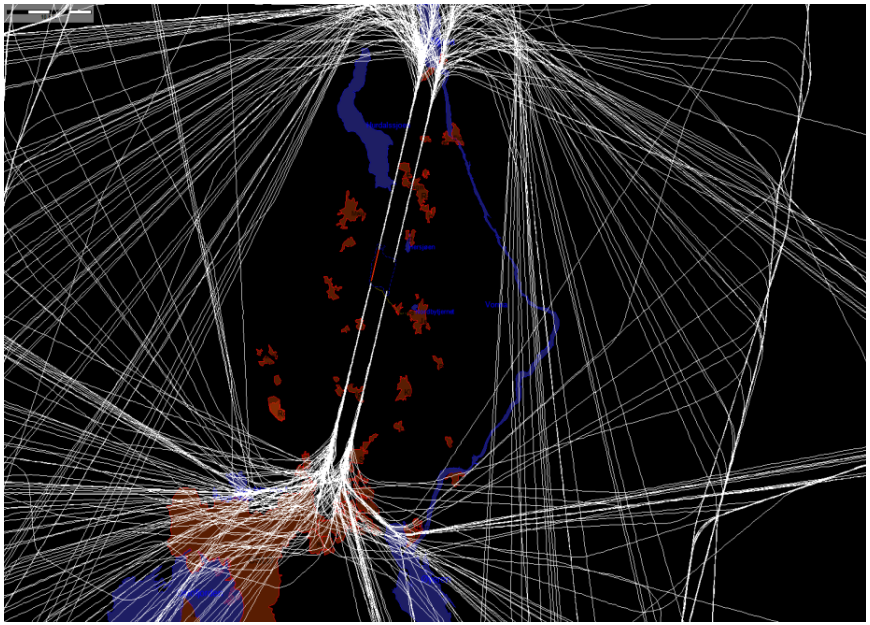
- January 2016: Oslo airport is the worlds first hub to offer bio-jet fuel to all airlines
- August 2017: The offer is extended to Bergen airport
- Extension to further airports is under evaluation
- Avinor has budgeted 100 MNOK towards the implementation
- Analysis in cooperation with the whole industry of what is necessary to phase in 400 million liters in 2030

air bp SkyNRG Lufthansa KLM SAS AVINOR

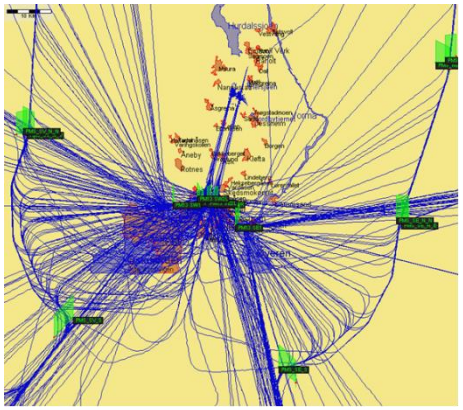
Aircraft and helicopter noise

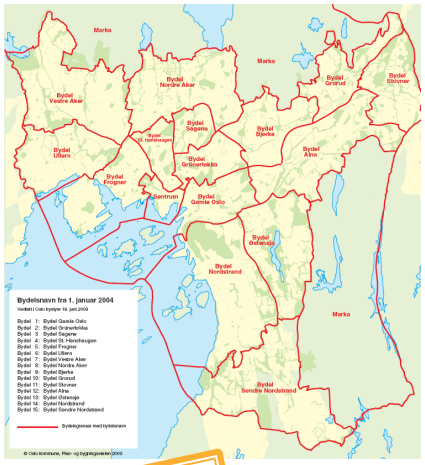
AVINOR

Experience with RNAV visual/RNP AR fixed-wing



Test approach flights at Gardermoen



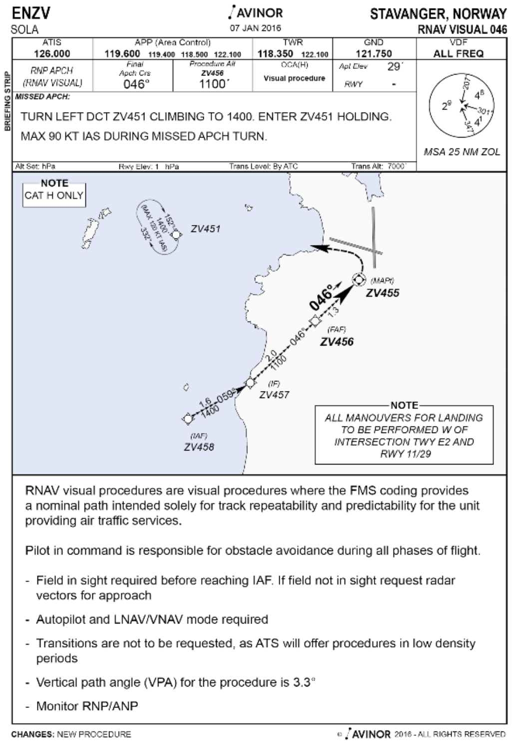


13700 approaches
1000 tonne fuel saved
= **3200** tonne CO^2 +
reduction in the number
of noise exposed

Area	Population
Stovner	31 300
Grorud	27 000
Bjerke	30 300
Alna	48 300
Nordre Aker	49 000
SUM	185 900

Noise reduction measures heli. SVG RWY29

RNAV visual 082/046



ENZV AVINOR **STAVANGER, NORWAY**
SOLA 07 JAN 2016 **RNAV VISUAL 046**

ATIS	APP (Area Control)		TWR	GND	VDF
126.000	**119.600** 119.400 118.500 122.100		**118.350** 122.100	**121.750**	**ALL FREQ**
RNP APCH (RNAV VISUAL)	*Final Apch Crs* 046°	*Procedure Alt* ***ZV456*** 1100´	OCA(H) **Visual procedure**	*Apt Elev* 29´ *RWY* -	

BRIEFING STRIP

MISSED APCH:

TURN LEFT DCT ZV451 CLIMBING TO 1400. ENTER ZV451 HOLDING.
MAX 90 KT IAS DURING MISSED APCH TURN.

MSA 25 NM ZOL

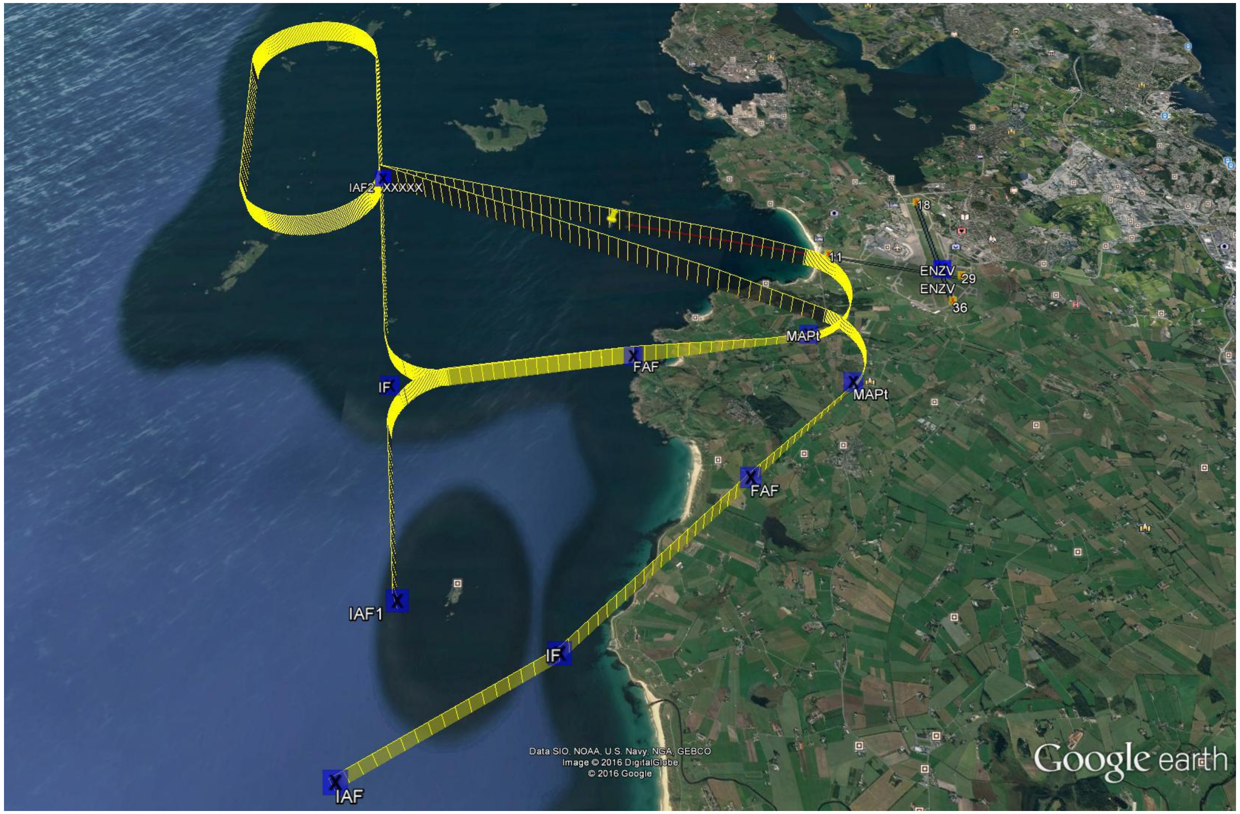
Alt Set: hPa Rwy Elev: 1 hPa Trans Level: By ATC Trans Alt: 7000´

RNAV visual procedures are visual procedures where the FMS coding provides a nominal path intended solely for track repeatability and predictability for the unit providing air traffic services.

Pilot in command is responsible for obstacle avoidance during all phases of flight.

- Field in sight required before reaching IAF. If field not in sight request radar vectors for approach
- Autopilot and LNAV/VNAV mode required
- Transitions are not to be requested, as ATS will offer procedures in low density periods
- Vertical path angle (VPA) for the procedure is 3.3°
- Monitor RNP/ANP

CHANGES: NEW PROCEDURE



AVINOR

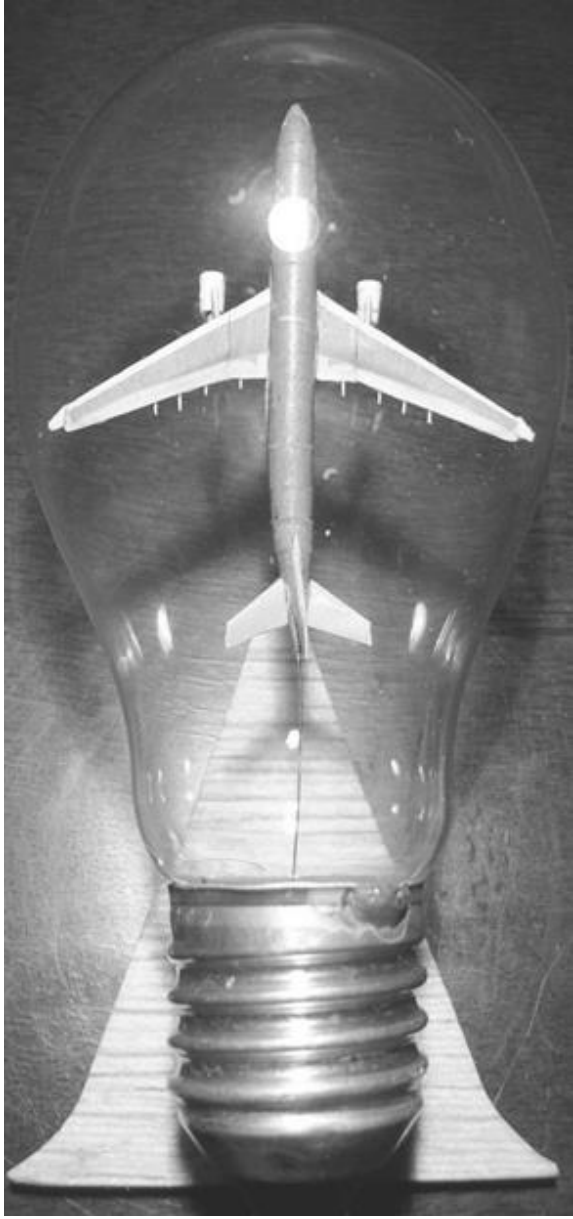
Energy usage

Energy goal:

- Reduce energy usage by 25 % by 2020 in comparison with energy usage for buildings and runway systems in 2012.

- Environmental strategy 2016-2020

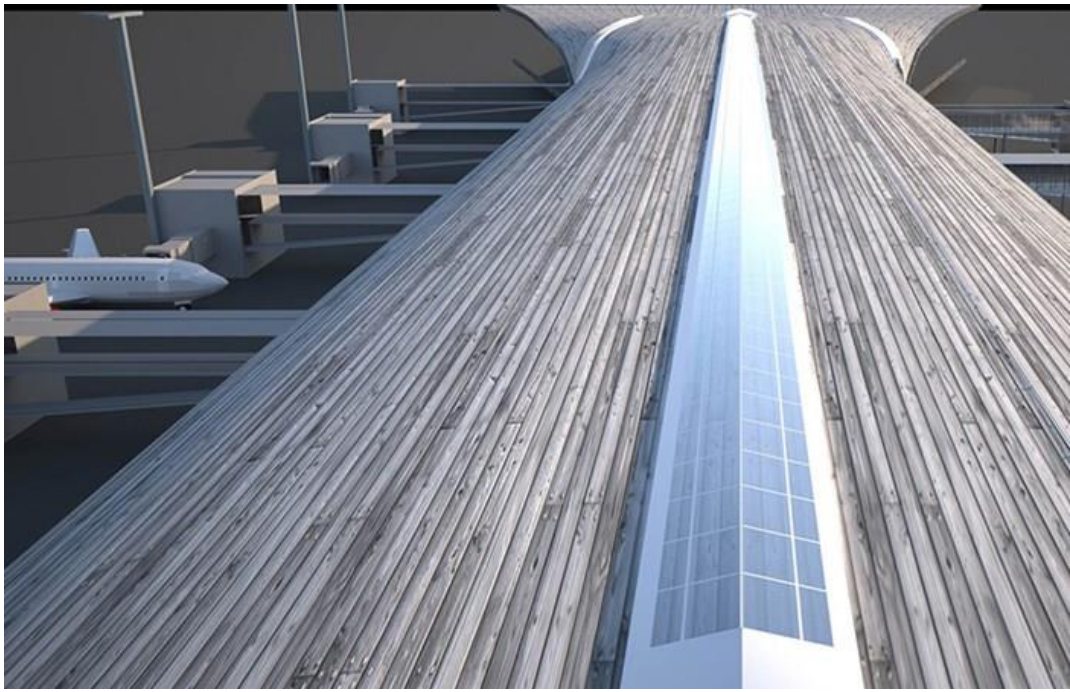
  - Reduce electricity consumption
  - Introduce energy management
  - Phase out fossil energy sources
  - Work continually with power saving



Building projects – example new terminal (T2)

T2 – new terminal at Oslo airport

- Wooden roof and to the passive house standard
- BREEAM certified to «Excellent»
- Promote public transport
- Sewage and snow as energy sources



Oslo airport – The worlds first airport with snow cooling

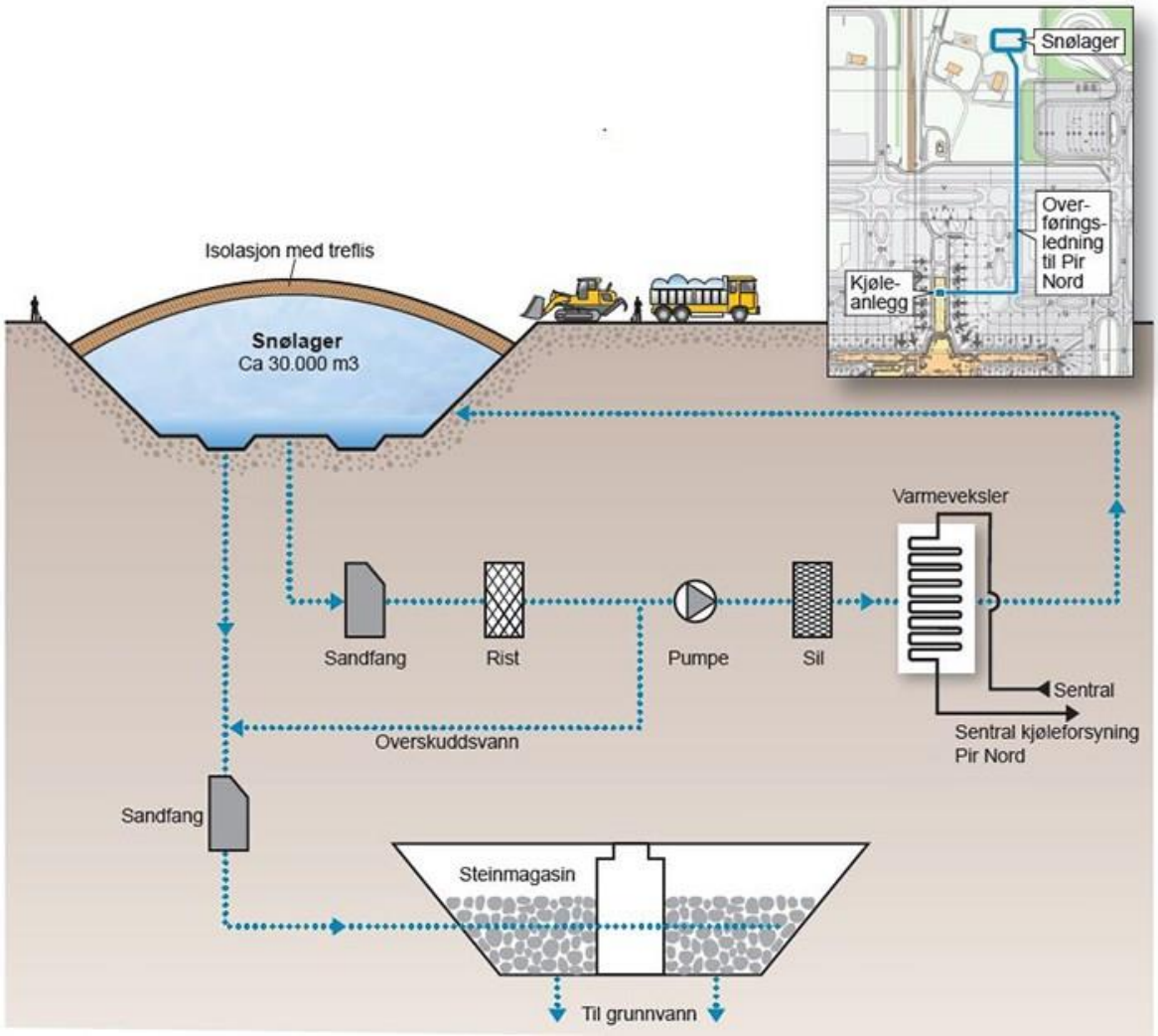


Figure by Kent Ekström

AVINOR

Thank you for listening

AVINOR