

NET ZERO CARBON 2030



Summary of roadmap. September 2021

The world is facing major and drastic climate change, and all sectors, including aviation, must act to reduce greenhouse gas (GHG) emissions. The IPCC`s sixth assessment report states it is unequivocal that human influence has warmed the atmosphere, ocean and land. Limiting human-induced global warming to a specific level requires limiting cumulative CO₂ emissions, reaching at least net zero CO₂ emissions, along with strong reductions in other GHG emissions .

Since 2007, Avinor has prepared a carbon footprint report in accordance with the GHG Protocol. Our short-term goal is to halve our own GHG emissions in 2022 compared to 2012.

At the ACI Annual General Assembly in 2019 we strengthened the ambition; «Net zero carbon emissions from airport operations fully within own control by 2030».

The technology development in the next decade will largely determine which measures will be implemented by Avinor. Avinor operates 43 airports of varying sizes throughout Norway, and the same measures will not be implemented at all airports. The timeframe of technology development, and implementation of measures will determine the total cost of achieving the climate goal in 2030.

Emissions controlled by Avinor 2020

Vehicles	Svalbard Airport	Business travel
	Runway Deicing	Energy (thermal)
		Firefighting

Emissions controlled by Avinor totalled 9100 tonnes CO₂ in 2020. Scope 2 only included for Svalbard Airport, Longyear.



Vehicles

Avinor's own vehicles constitute about half the GHG emissions. No single energy solution will be able to meet all the challenges associated with Avinor's diverse vehicle fleet. It is expected that different types of energy carriers and technologies will co-exist for several years to come. Avinor's goal is to find the technologies that best suit each segment of the vehicle fleet.

Large-scale electrification of buses, cars and vans has begun, but it is the specialized large and heavy vehicles for winter operations that account for most of the fuel consumption in Avinor. They are hard to decarbonize, due to

a combination of heavy load, intense 24/7 operation pattern during heavy snowfalls and a small and specialized market. The solution so far has been to use advanced biodiesel. Oslo Airport started testing advanced biodiesel in its own vehicle fleet in 2015/2016. After a successful test period, uptake has steadily increased resulting in advanced biodiesel completely replacing fossil fuels on heavy vehicles at Oslo Airport in 2021. Today, seven of Avinor's airports use advanced biodiesel. A new contract for supply of biodiesel will enable increased use of advanced biodiesel at Avinor's 30 largest airports the coming five years.

Svalbard Airport, Longyear

Svalbard Airport receives most of its electricity and all district heating from Longyearbyen Heat and Power Plant, where coal from a local mine is the energy source. This implies high GHG emissions and is also the reason why solar panels have been established at the airport. Avinor is currently designing an

off-grid biogas plant that can supply the airport with both heat and power and thus also contribute to a much-needed energy transition in Longyearbyen. The intention is that such a plant can be built and operational within the next couple of years.

Business travel

Avinor is also working to reduce emission from the air traffic. The Norwegian aviation industry with Avinor, Norwegian, SAS, Widerøe, the Federation of Norwegian Aviation Industries (NHO Luftfart) and the Norwegian Confederation of Trade Unions (LO) aim for the sector to be fossil-free by 2050. New energy carriers on short-haul flights (electrification

and hydrogen) and increased production and uptake of sustainable aviation fuel (SAF) will be crucial to achieve this goal. Avinor employee's business travel can be controlled by the company and is therefore included in the carbon disclosure. Procuring SAF is a way to mitigate these emissions in the near term.

Thermal energy/Backup generators

Thermal energy includes both the use of backup generators and heating oil. Avinor has, prior to and in accordance with national legislation, phased out fossil fuels for heating purposes except for two small airports.

However, backup generators still operate on fossil fuel but may undergo a remodeling to be able to use advanced biodiesel. Other energy solutions considered are batteries, or batteries combined with a fuel cell.

De-icing chemicals

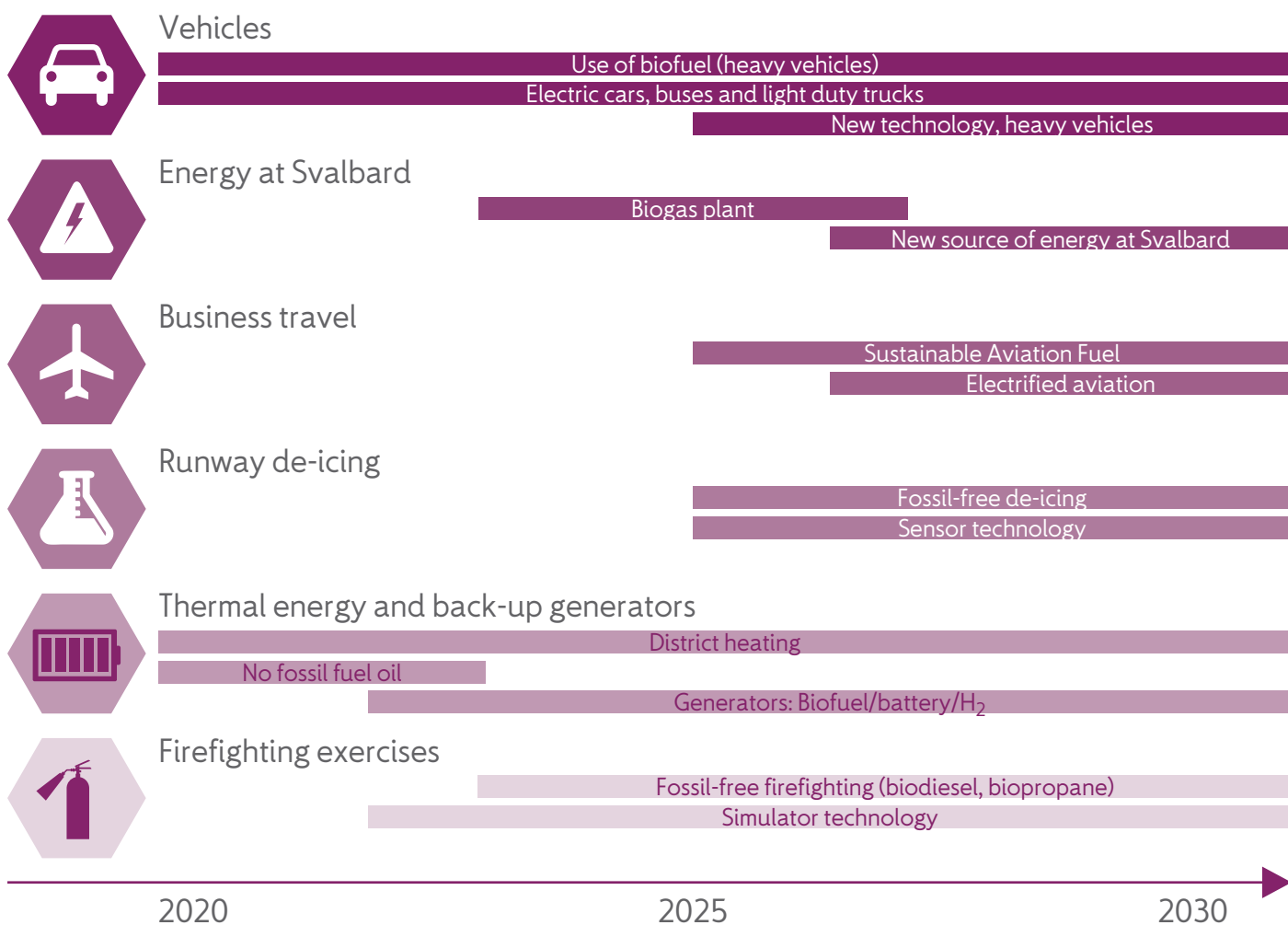
Runway de-icing chemicals is accounted for in the carbon footprint report of Avinor. Sufficient friction for safe landings on the runway is the responsibility of Avinor, and during winter use of de-icing substances at the runways and taxiways are essential. The volume of de-icing chemicals has increased over the last years due to change in weather conditions. Emissions of CO₂ result from the biological degradation of

de-icing substances, which originates from fossil sources. Biogenic de-icing chemicals may be used in the future if they comply with quality criteria. Avinor, in collaboration with research communities, develops tools to predict the weather situation, and new sensor technology to minimize the use of chemicals.

Firefighting exercises

Fossil fuels are currently used in Avinor's firefighting exercises. An increasing share of exercises can be simulated, but some exercises must still be real. It is possible to replace fossil

diesel and propane used in firefighting with advanced bio-diesel and bio propane.



Avinor's indicative roadmap to net zero emissions in 2030. May be modified due to legislative measures, technology development et cetera.

Energy and Indirect Emissions

When it comes to energy consumption in Avinor, Norway has the highest proportion of renewable electricity production in Europe. Hydropower accounts for most of the power produced, in addition to an increasing share of wind power.

Avinor focuses on reducing energy consumption at airports through energy management and energy measures. Avinor is also increasing the share of self-produced energy.