Federal Ministry
Republic of Austria
Climate Action, Environment,
Energy, Mobility,
Innovation and Technology

Aviation Strategy 2040+

Climate-friendly and future-oriented aviation – An implementation strategy within the framework of the Mobility Master Plan

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Foreword

Federal Minister
Leonore Gewesler

Aviation is facing major challenges. The climate crisis and the COVID 19 pandemic are challenging the industry's former certainties, and sustainability is becoming increasingly important. Climate protection, the task of the century, remains a defining issue also for aviation.

The mobility system of the future must be convenient, affordable and climate-friendly. It is clear that aviation will continue to be an essential part of international transport, tourism, cultural connections, business and transportation. At the same time, we must realize: with emissions continuing to rise year after year - in 2019, CO2 emissions from flights taking off in Austria were around three times higher than they had been in 1990 - it will hardly be possible to achieve climate-neutral aviation solely with new technologies.

That is why our government program and the Mobility Master Plan 2030 are based on the principle of "avoid, shift, improve". Where trips cannot be avoided, the various modes of transport are to be combined according to their practicality and climate friendliness - along different routes or in a route chain (e.g., "train to flight") - and ultimately all modes of transport are to be decarbonized. We are taking up the challenge and facing up to the upcoming transformation by purposefully intertwining air transport policy and research, technology and innovation policy. As part of the Mobility Master Plan 2030, the BMK has therefore, with the intensive involvement of science and stakeholders, drawn up a strategic guiding document, consisting of two specialized strategies:

- The "Aviation Strategy 2040+" as an overall strategy for the aviation sector
- The "Climate-friendly aviation innovations from Austria 2040+" strategy with a specific focus on research, technology and innovation for the Austrian aviation sector

It is now up to us to join forces to shape the future of aviation in a climate-friendly way. This requires a shared vision as well as clear goals, which my Ministry together with stakeholders from research, industry, interest groups, NGOs and business, formulated in the Austrian Aviation Strategy 2040+ for the Austrian aviation sector. Our common vision for the year 2040 is:

- Aviation in Austria is climate neutral while maintaining its competitiveness,
- Austria is an international pioneer for climate-friendly aviation innovations,
- Austria remains well connected to the world in the interest of a thriving Austrian economy and the population's freedom of travel.

Our motivation behind this is to make aviation green and efficient, future-oriented and competitive, as well as digital and intermodal. Together, we are addressing key issues such as fair and ecological framework conditions and greater integration of the aviation

sector into the overall transport system. The main focus here is on issues of environmental and climate protection, strengthening circularity, and creating a resilient and efficient system. In addition, innovations, the promotion of technological change, and the integration of aviation into a renewable energy system are key elements for safeguarding national value creation, for the benefit of the Austrian economy and population, and for maintaining and expanding high safety standards

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1 Introduction: Background and general conditions

Aviation in Austria is an important element for both the economy and society. Many economic sectors and the population benefit from the connectivity offered by aviation. However, aviation is also caught in a field of tension between ecology, the economy and social aspects. The target picture of aviation 2040+ is based on the Mobility Master Plan for Austria. The decarbonization of aviation is an urgent measure to curb climate change. The Mobility Master Plan also provides for a new version of the Austrian Aviation Strategy.

Therefore, the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK) commissioned the Institute of Airports and Air Transport at the German Aerospace Center (DLR) to evaluate the Roadmap Aviation 2020 and to develop the basis for a new aviation strategy.

The project analyzed developments in Austrian aviation between 2010 and 2021 and presented aviation forecasts and key trends. Stakeholders were involved through a written survey and a workshop. A broad definition of the term "stakeholder" was applied for both the survey and further participation in the development of the aviation strategy. On top of companies from the aviation industry and their associations, non-governmental organizations, authorities and ministries were also included. All these findings were used to develop the overall strategy presented in this document.

In key points the new aviation strategy builds on the Mobility Master Plan 2030 for Austria which was published in 2021. Likewise, the strategy development is based on the prioritization and target achievement of the thematic fields of the previous Roadmap Aviation 2020 as well as the supplementary catalog of measures from 2017. At the same time, new trends that have only emerged in recent years and were therefore not yet represented in the previous aviation strategy were also included.

In aviation, internationality is a constituent element. The objectives and measures of a national aviation strategy must therefore also be oriented to the international context. National scope for action is hence essentially determined by the requirements of the European Union's legislation and international ICAO standards (International Civil Aviation Organization of the United Nations).

The strategy consolidates the strategic objectives and further measures based thereon, taking into account possible synergies, within the following four thematic areas:

- Environmental/climate protection and introduction of sustainable fuels
- Integration into the overall transport system, new mobility concepts and connectivity
- Aviation competitiveness, employment and restart under fair and ecological conditions after the COVID-19 pandemic
- Digitalization, drones, innovation, and technological change

The objectives and measures in the individual thematic blocks are based on the following premises for the benefit of a transport policy maximizing welfare:

- Consistency with de-carbonization.
- Definition of targets and implementation of measures that will contribute to the acceptance of aviation by society as a whole.
- Aviation policy goals and measures to be evaluated on the basis of their macroeconomic effects.
- Targets and measures that are as effective, efficient, and transparent as possible with maximum consistency between the measures, especially with regard to possible trade-offs and interactions.
- Minimization of competitive distortions between modes of transport wherever possible.
- Ticket prices of all modes of transport should reflect external costs as comprehensively and widely as possible, taking into account the overall economic and social costs.
- Involvement of all stakeholder groups in the development and implementation of goals and measures.

The aviation strategy must face up to the challenges while also finding answers to issues affecting society as a whole. Since the aviation sector is already largely organized and financed by the private sector, the priority for the next decade is to implement measures in the area of internalizing external costs, addressing in particular measures for de-carbonization and a better integration into a user- and climate-friendly overall transport system. In this context, air transport should continue to generate benefits for society as a whole and ensure global air transport connections for Austria as a business location, including its regions.

The Austrian aviation industry is a large scale employer and is also associated with a large number of industries and jobs. Any analysis must also consider the effects of strategic goals and measures in air transport on the entire national economy, on exports and imports, tourism, as well as for Austria as an important location for international companies and organizations[1], from the point of view of the Austrian population as users of air transport, and with regard to health, environmental and climate protection. As an example, the export ratio (share of exports in GDP) rose from 33.5% in 1995 to 52.6% in 2020, giving Austria an above-average level of involvement in international trade compared to the EU average (46.7%).[1] In the important tourism sector, travelers from source markets that are primarily accessed by air transport have particularly high individual expenditures for tourism services. For this reason, any aviation strategy must ensure fair competition between airlines and a demand-driven service design. Good jobs are not only created and secured by airlines based in Austria, but also at airports and in industries dependent on the aviation industry, such as tourism. Even though jobs at airlines based in Austria are an important political argument in the design of strategies and measures, they must not be used as the sole criterion or argument, which could lead to a policy that may reduce prosperity overall.

The BMK therefore advocates rational, evidence-based decisions in future air transport policy true to the maxim of "What is good for Austria?". This also includes the involvement of independent scientific experts and the application of state-of-the-art methods for the political-economic evaluation of measures such as benefit-cost analysis. The benefit and cost categories should be included in the analysis as comprehensively as possible and, in addition to value-creation and job effects, also include the benefits of shorter travel time, as well as noise and climate costs.

1 Data according to Statistics Austria, statistik.at/web_de/services/wirtschaftsatlas_oesterreich/aussenhandel

2 Sustainability, environmental and climate protection

Environmental and, in particular, climate protection are highly relevant to society as a whole and, after the current challenges posed by the COVID 19 pandemic, represent the greatest medium- and long-term challenges for the aviation industry. The fight against climate change requires decarbonizing the aviation sector and reducing its climate-relevant emissions or effects. The air transport industry must play a constructive role in this process.

In the recent past, progress has been made on climate protection in air transport contributing to the fight against the climate crisis. In 2021, as part of the Fit for 55 package, the European Commission proposed a tightening of emissions trading for air transport, the introduction of quotas for sustainable fuel and a tax on kerosene on intra-European flights. In addition, the further development of the Single European Sky is to be brought into line with the objectives of the Green Deal.

The challenge posed by the large number of proposed measures will be to evaluate the interaction of the different effects and to check the mutual compatibility of the measures with each other and e.g. with the EU Emission Trading Scheme to guarantee that climate neutrality in the EU is achieved by 2050. Contradictory, ineffective and inefficient measures must be avoided.

The industry itself, primarily represented by the ACI- Europe airport association and IATA, the airline association, has also set itself ambitious de-carbonization targets. Net zero emissions are to be achieved by 2050 in both airport operations and passenger transport.

The Austrian Mobility Master Plan 2030 contains a number of objectives for air transport that are intended to contribute to the de-carbonization of air transport. First, the free allocation of emission rights in the EU ETS is to be abolished. This objective is in line with the proposals of the European Commission's Fit for 55 package, which envisages a phasing out of free allowances by 2027.

Secondly, further measures to achieve greater cost truth in air transport are to be implemented or expanded. In addition to the national initiative on the subject of "passing on taxes and charges", this also includes Austria's commitment at European level to a corresponding initiative. In line with the Mobility Master Plan, the BMK also supports the introduction of a kerosene tax in the EU. In this context, existing instruments and initial situations such as the air traffic tax and the total private and economic costs in a comparison of the different modes of transport must be taken into account.

A third proposal regards the introduction of sustainable fuels and alternative energy sources or propulsion systems (hydrogen, battery). While the latter will probably have to go through a relatively long development phase until they are ready for the market, the introduction of sustainable fuels is seen as a measure that can be implemented realistically and gradually by almost all stakeholders and the scientific community. This is also reflected in the European Commission's Fit for 55 package and IATA's Net Zero strategy, which envisage a long-term increase to 63% (Fit for 55 package) and 65% (IATA) by 2050, starting from blending rates of 2% fuel from sustainable production processes in 2025.

Fourthly, a reduction of the non-CO2 effects of aviation is stated as a goal. This target is positively correlated with the introduction of sustainable fuels, as these produce fewer soot particles and possibly also nitrogen oxides in the combustion process, which contribute to the non-CO2 effects. Additionally, air traffic control can also have a positive effect here by avoiding contrails. The reduction of non-CO2 effects is currently not yet reflected in the proposals by the European Commission (e.g. Fit for 55 package), but based on the current state of knowledge of atmospheric research, it can make a significant contribution to reducing the impact of aviation on the climate.

In light of the overarching goals of the 2030 Mobility Master Plan, the BMK sets the following strategic goals and actions:

- Creation of a roadmap for the introduction of sustainable fuels for air transport in Austria
- Promoting the large-scale production of sustainable fuels for air transport
- Use of proceeds from a kerosene tax and the auctioning of emission rights for the promotion of sustainable fuels
- Commitment to fair and wherever possible uniform taxation of air traffic
- Commitment to phasing out the free allocation of emission allowances in the EU ETS
- Advocate for the inclusion of all airlines and destination airports in sustainable fuel blending obligations
- Commitment to the further development of CORSIA
- Commitment to stricter climate protection measures at global level and in bilateral relations with third countries
- Supporting stakeholders in the realization of CO2-neutral airports
- Promotion of low-emission or zero-emission aviation concepts
- Further commitment to a reduction in aircraft noise
- Commitment to the further development of certification standards for aircraft and engines
- Commitment to reducing the non-CO2 effects of aviation
- Commitment to increasing efficiency in air traffic control

3 Air transport in the overall transport system and connectivity

The Mobility Master Plan 2030 identifies ways to avoid, shift and improve traffic - which includes use of climate-friendly modes of transport wherever possible on distances where this is possible. In addition to shifting short distance flights within Austria, considerable progress has been made in Austria in recent years in linking rail and air traffic. Important contributions have been made by both infrastructural measures (including upgrading the main railway line leading west and construction of Vienna's Central Station) and product and timetable optimizations (high number of transfer-free connections on the Innsbruck-Salzburg-Linz-Vienna Airport axis, AIRail Rail&Fly / Rail&Fly Austria). These trends will continue in the coming years as a result of the new infrastructures currently being implemented (Semmering Base Tunnel, Koralm Tunnel). These measures will significantly reduce travel times between Klagenfurt, Graz and Vienna Airport.

In principle, a switch of travelers to rail can contribute to a reduction of operational emissions in the long term. This requires a high level of acceptance among users, which can only be achieved by creating attractive offers that must be at least as good as those for air or car transport. Concrete measures in this sector should be based on this premise.

Based on these considerations, we propose the following strategic goals and measures:

- Optimization of the overall transport system according to the strengths of the respective modes of transport
- Supporting the further development of the airline and destination portfolio at the airports
- Evaluation of the ecological, economic and traffic effects of intermodal offers
- Advocating a better integration of the regional airports into the region's public transportation system
- Supporting the transport industry in the further development of intermodal services
- Support for the further development of regional airports and smaller airfields
- Support for infrastructural measures with a cross-border focus to improve access to Vienna International Airport
- Commitment to improving consumer protection in air transport and intermodal services

4 Competitiveness of the aviation location

Air traffic networks from hubs such as Vienna are complex entities fed both by direct local passengers (to and from Austria) and transfer passengers (via Austria). A good international offer of direct flights makes it possible to fill part of the capacity with transfer passengers and thus achieve economies of scale and network effects; at the same time, transfer passengers help stepping up the capacity/sead load factors of international flights. This especially applies to long-haul routes where transport demand tends to be lower. Without its hub status, Vienna would have fewer destinations and frequencies, especially in the long-haul segment. Its attractiveness for the importing and exporting economy, for incoming and outgoing tourism and, finally, for attracting corporate and organization branches would decline. In many cases, traffic flows from Austria could then only be offered indirectly, e.g. by connecting flights in Frankfurt, London, Munich or Paris.

From the aviation perspective, the past few years have underscored the role of Austria and Vienna Airport in particular as an attractive location - both on the supply and demand side as well as in terms of the administrative framework conditions. In addition to Austrian Airlines's growing hub activities, this was also reflected by the establishment of the headquarters of easyJet Europe and Eurowings Europe as well as of the cargo airline DHL Air Austria.

Regarding overall connectivity provided by airlines based in Austria, home carrier Austrian Airlines is of great importance including the connectivity of the provincial airports to the global air transport system as well as the medium- and long-haul services from Vienna and the importance of Vienna as a hub. In a European comparison, in 2019 Vienna Airport ranked 14th in terms of the number of transfer passengers and 10th in terms of connectivity, according to ACI-Europe.[2] The airline and the airport are closely linked and interdependent in terms of the functioning of the hub. The hub function and the associated volume of transfer passengers is also significant for Vienna as a business location, since the economic viability of many flight routes depends on transfer passengers.

Air traffic also has an impact on the economy as a whole. In addition to the manufacturing economy, this also affects the services sector, especially tourism, and also enables Austria to participate in a world based on the global division of labor.

2 aci-europe.org/air-connectivity

The COVID 19 pandemic also led to a sharp drop in air traffic volumes in Austria since March 2020. Different national regulations and entry restrictions hampered the operation of aviation, travel, and the planning options of customers. Apart from publicly bookable scheduled air travel and package tourism, the large area of business aviation in Austria enables flexible, ad-hoc connections, even from the provincial airports and airfields to destinations that are difficult to reach.

In addition, Austria supports the EASA GA Roadmap 2.0 to enable the most favorable and uniform framework conditions throughout Europe.

Based on these considerations and developments, the BMK has set the following strategic goals and measures to ensure and expand Austria's competitive position in the long term:

- Safeguarding the air transport system for its users and the Austrian economy
- Ensuring Vienna as a hub and the provision of adequate capacities under social and environmental conditions
- Negotiating liberal traffic rights with high social and environmental standards and heeding holistic economic considerations
- Further increase in the efficiency of air traffic control
- High social standards in the liberalized European aviation market
- Promoting the attractiveness of jobs in aviation and the development and recognition of existing and new job profiles
- Offering a platform in the area of facilitation across the individual areas of responsibility
- Advocating for a more coordinated approach to travel restrictions and hygiene rules in the EU
- Consideration of the importance of air cargo
- Deepening structured and transparent exchanges between ministries, authorities and stakeholders

5 Digitization and technological change

Aviation experiences continuous technological change. In recent years, this has mainly been driven by new aircraft types with lower noise levels, emission values, and operating cost benefits, as well as the digitization of processes throughout the aviation industry. While this fundamental trend is intended to make aviation safer and more efficient, it poses significant challenges to stakeholders in terms of competitiveness and employment.

One current trend with major implications is the development and introduction of drones. While on the one hand great potentials are seen in this technology, on the other hand enormous technical, regulatory and economic challenges have to be solved before application in transport use.

In addition to the expected introduction of drones for passenger and cargo transport, several "enabling technologies" exist that have the potential to significantly impact the air transport industry in the future. These include artificial intelligence, storage of data in block chain applications, and the use of quantum computing. All these technologies will, in perspective, lead to a transformation of the aviation industry and related employment fields over the next ten years.

It is necessary to address these topics at an early stage in order to ascertain potentials and prevent or mitigate critical developments in dialogue with stakeholders. Therefore, the BMK sets the following strategic goals and measures in digitization and innovation:

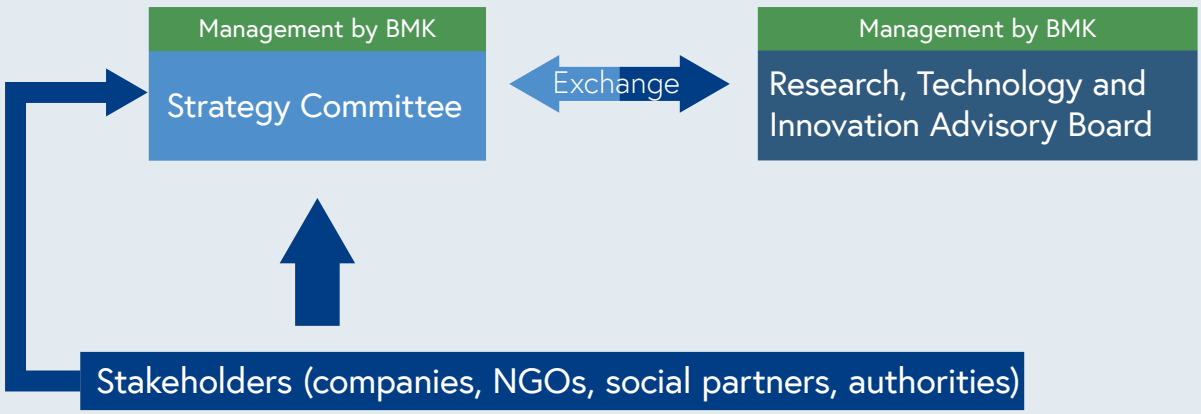
- Coordination of the measures of the aviation strategy and the research, technology and innovation strategy
- Advocate the sustainable use of drones for transportation and other civilian purposes
- Advocate the design of regulations for the operation of drones for their transportation use
- Promoting cooperation among all stakeholders to integrate drones into the existing aviation system
- Promoting the participation of the public in the implementation of drone projects
- Preparing the economic regulation of the passenger drone market
- Advocate the further development of drone detection and drone defense
- Further consideration of domestic industry in research funding and the implementation of measures
- Promotion of a positive-critical approach to new technology potentials
- Promotion of innovation projects that relate to the optimization of the transport system

6 Organizational structure

Successful medium and long term implementation of the aviation strategy requires intensive dialog among the stakeholders and with the ministries and authorities involved. Continuous sharpening and adjustment of the goals and development of concrete measures to achieve them are also essential.

In order to promote the process of continuous stakeholder participation and dialogue with the authorities, a new organizational structure for implementing the aviation strategy has been developed.

Organizational structure for implementing the strategy



Organizational structure, own illustration

The core element of the organizational structure is the Strategy Committee. In this committee, the annual priorities and topics will be determined by the BMK in consultation with the stakeholders, the strategy committee may appoint project-related working groups or teams. The Strategy Committee will also be used to present and discuss commissioned studies or papers produced by appointed working groups. The Strategy Committee will include staff from senior stakeholder management. At this level, the topics to be worked on are to be defined and the progress of the work is to be compared with the objectives. The aim is to have a representative ratio of stakeholders from different areas around aviation in order to define the topics and objectives in a balanced manner. The strategy committee is organized by the BMK.

In the thematic or project-related working groups or project teams set up by the Strategy Committee, representatives of stakeholders from the relevant areas (companies, NGOs, social partners, authorities, ministries) are to cooperate at working level and develop concrete measures and, if necessary, strategy adjustments. The working groups are chaired by BMK staff. The number of participants depends on the topic, but should be limited to about 20 people to ensure an efficient working structure. In order to keep the discussion in the working groups lively and to benefit from external know-how, external experts can also be brought in for thematically appropriate impulse lectures or the presentation of studies carried out. The working groups present their findings to the Strategy Committee.

Furthermore, there is a regular exchange between the Strategy Committee and the RTI Advisory Board on common topics. The results of the strategy committee can be presented to the interested public and are to be regularly brought to the attention of the Civil Aviation Advisory Board.

Abbreviations

ACI	Airports Council International
BMK	Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology
CO2	Carbon Dioxide
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
DLR	German Aerospace Center e.V.
EASA	European Union Aviation Safety Agency
ECAC	European Civil Aviation Conference
ETS	Emission Trading Scheme
EU	European Union
EUROCONTROL	European Organisation for the Safety of Air Navigation
RTI	Research, Technology and Innovation
GA	General Aviation
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
NGO	Non-governmental organization
NOx	Nitrogen oxides
SAF	Sustainable Aviation Fuels