Strategic Environmental Assessment for the Civil Aviation Policy Memorandum: Summary

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Summary

This document is a summary of the Strategic Environmental Assessment (SEA) drawn up for the draft Civil Aviation Policy Memorandum. The SEA contains information on the environmental consequences of the Dutch government's new civil aviation policy as set out in the memorandum. The SEA serves two distinct purposes:

1. It ensures the environmental implications are fully taken into account in decisions on the Civil Aviation Policy Memorandum.
2. It informs stakeholders of the environmental implications of the policy choices made in the new civil aviation policy.

The legal basis of the Civil Aviation Policy Memorandum is provided by an instrument in the Environment and Planning Act: the non-compulsory programme. Under this Act, policy relating to the national environment and planning strategy (NOVI), including civil aviation policy, is implemented in part by means of non-compulsory programmes. The Act requires the competent authority to carry out a strategic environmental assessment (SEA) for plans – such as the Civil Aviation Policy Memorandum – that will serve as a framework for decision-making on projects with potentially significant environmental implications.

As explained later in this summary, the SEA uses a broad definition of 'environmental implications' and also looks at the expected economic effects of the new civil aviation policy.

The new civil aviation policy was developed in interaction with the exploratory study into environmental effects, and in consultation with other public authorities and civil society stakeholders. This process is described elsewhere in this summary. The SEA not only summarises the environmental implications that the outcome of this process will have but also provides insight into the interactive process itself.

The consortium of RHDHV, NLR and BCI drafted the SEA for the Civil Aviation Policy Memorandum and assessed the variants (alternatives) independently. As the initiator, the ministry decided on the variants and the preferred approach and, in its capacity as competent authority, approved the SEA.

You can submit your views on the SEA, the appropriate evaluation and the draft Civil Aviation Policy Memorandum when they are made available for inspection.

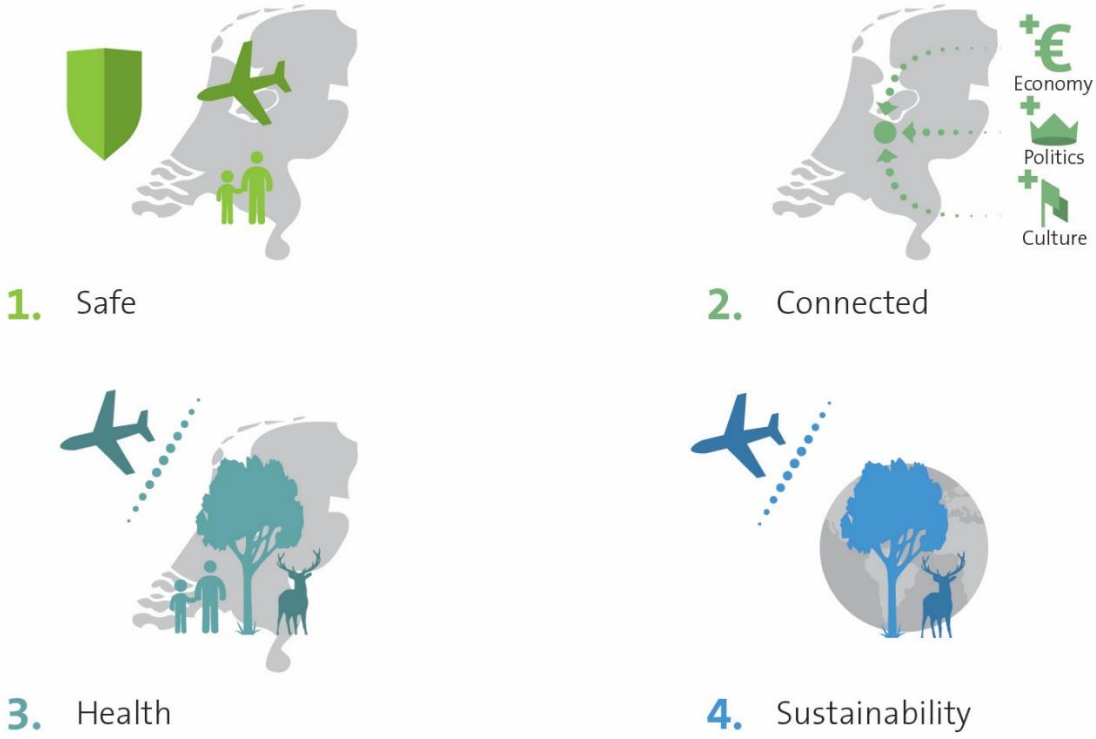
Reasons for a new Civil Aviation Policy Memorandum

The government periodically updates the main points of the Netherlands' civil aviation policy. The current Civil Aviation Policy Memorandum dates from 2008 and focuses on meeting aviation demand in the interests of supporting the economy during a financial crisis. Its goals are expressed chiefly in quantitative terms. Today, in 2019, the limits to growth are in sight. The aviation industry is reaching its limit in terms of capacity both on the ground and in the air. The Paris Agreement requires a transition to clean and sustainable transport. Support for further airport development is waning. At the same time, technology is advancing rapidly and there is a lot of uncertainty about what the civil aviation sector will look like in a generation's time.

Given the limits to growth on the one hand and the need to anticipate an uncertain future on the other, the sector needs decisive new policy outlines. The Civil Aviation Policy Memorandum 2020-2050 was drawn up in response to these developments and aims to initiate a change of course towards a sustainable civil aviation industry that will keep the Netherlands closely connected with the rest of the world.

Instead of controlling the number of flight movements, the government wishes to set qualitative limits based on public interests that it is government's duty to protect. Those interests can be described as follows:

1. Above all, keeping the Netherlands safe, in the air and on the ground. This means ensuring the safety and protection of aircraft passengers and crew, and the safety of people on the ground. Developments in aviation must not come at the expense of safety.
2. Keeping the Netherlands closely connected to the world's main economic, political and cultural centres – both current and emerging. Good connections contribute to our prosperity and wellbeing. Aviation offers unique added value in contributing to that connectivity. The quality, not the quantity, of flights and destinations is important.
3. Ensuring people in the Netherlands live in an attractive and healthy environment. The adverse effects of civil aviation on people and nature, in terms of noise and pollutants, must be reduced. Environmental quality will determine the scope for development for both aviation and the airport region.
4. Making the Netherlands sustainable. The quality of Dutch civil aviation will be improved by measures to reduce its negative impact on the climate, for instance by cutting CO_2 and other emissions.



Protecting these interests in a changing world requires a new balance between the economy and sustainability. It must be struck in many areas of society, not only aviation, and will require some departures from the 'old' civil aviation policy. Under the new policy, the negative effects of aviation on people and the environment must be reduced before further growth of the sector is allowed. This requires a new civil aviation policy memorandum. The new policy is explained later in this summary.

The main characteristics of the new Civil Aviation Policy Memorandum are as follows.

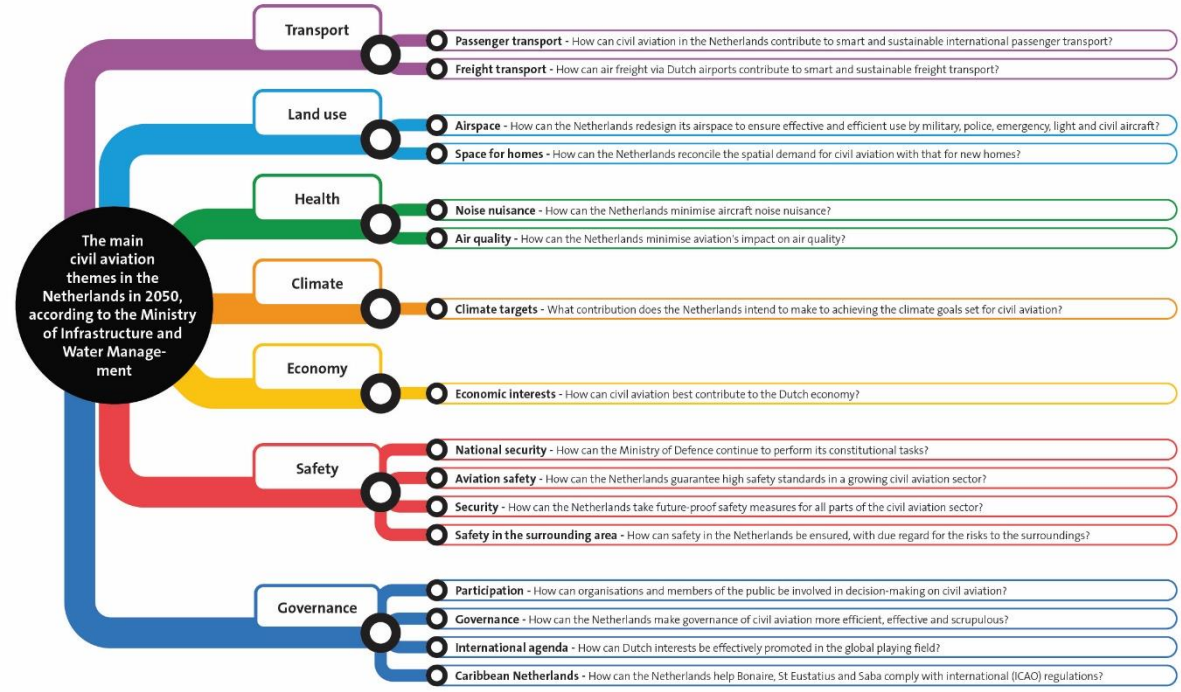
- The Civil Aviation Policy Memorandum and the decisions the minister makes on the basis of that memorandum are binding on central government only. Strictly speaking, other public authorities and civil society organisations are not bound by these decisions. However, central government will develop plans and projects within this new policy framework that are binding on third parties.
- The new policy memorandum sets clear goals for 2050 and maps out a specific and adaptive approach for the period up to 2030.
- The new policy focuses primarily on the development of civil aviation.

- The new policy will aim to ensure that the Netherlands in the Caribbean (Bonaire, Saba and St Eustatius, for which the Dutch government is directly responsible) remain accessible. This means ensuring stable and affordable connections, good infrastructure and good governance in order to comply with national and international safety criteria.[1]

Role of the SEA in preparing the Civil Aviation Policy Memorandum

The first step in preparing the Civil Aviation Policy Memorandum was to determine what questions the new policy should address. These were identified during the exploratory phase through a wide-ranging consultation that included a representative survey to determine the Dutch public's support for the civil aviation sector. Civil society organisations and stakeholders contributed information to that survey.

The survey results are shown in the figure below.



The SEA process proceeded hand in hand with the policy process from this point. The first step began with the realisation that the four principles of the coalition agreement could not all be observed simultaneously. Putting the Dutch economy first, for instance, will not always be good for the environment, but to find out how and when these principles conflict with one another it was necessary, first, to gain insight into what is good for the economy and what is good for the environment, etc.

To answer the policy questions above, sets of potential measures were therefore proposed for each of the four principles.

These sets of measures are not alternatives to the civil aviation policy as the new policy must reflect all the principles. Pointers were therefore sought for the different directions in which policy could develop. Each direction had to respect the principles of the coalition agreement in its own way. Using the environmental information gathered during the exploratory phase, four variants were developed that could each be a potential starting point for future policy. These variants offer four strategic policy alternatives that are explored in this SEA. They are:

[1] As autonomous countries within the Kingdom of the Netherlands, Aruba, Curaçao and St Maarten have their own powers and responsibilities for civil aviation and therefore fall outside the scope of the Civil Aviation Policy Memorandum.

Continuation

In this variant current policy and current legal and administrative agreements continue to apply without alteration. Schiphol retains its role as a hub airport and Lelystad serves as an overflow airport. The spatial structure of the airports and their noise contours remain unchanged. Schiphol will be able to grow in line with any reduction in noise nuisance: half the reduction can be used for growth in flight movements. The latest civil aviation projections suggest that this could result in as many as 717,000-730,000 flight movements annually by 2050.

The SEA uses this variant as a benchmark for the following three variants.

Standardisation

In this variant standards are introduced so that aviation makes an ambitious contribution to the climate target and achieves a substantial reduction in noise nuisance. Civil aviation must pursue the same climate goal as other sectors: a 95% reduction in carbon emissions by 2050 for aircraft departing from the Netherlands, to be achieved without any offsetting with other sectors or countries. This means no compensation will be sought from other countries or sectors (e.g. through a global emissions trading system); the 95% target calls for an actual reduction in civil aviation emissions in the Netherlands. In the longer term, the number of flight movements could increase provided this ambitious target is met. In the short term, climate and environmental standards will lead to fewer flight movements. In this variant rail and road transport are promoted as alternatives to air transport within Europe.

Concentration

This variant seeks to optimise the route network served by Schiphol. The major role of aviation in the Dutch economy is consolidated and even strengthened by meeting aviation demand in so far as possible. Passenger numbers will grow in line with gross domestic product. This variant will require investments, to both increase environmental quality and improve access to Schiphol over land. The runway system will also have to be adapted. The regional airports will continue to fulfil their current roles. It is estimated that these measures will provide for up to 800,000 flight movements per year by 2050.

Dispersal

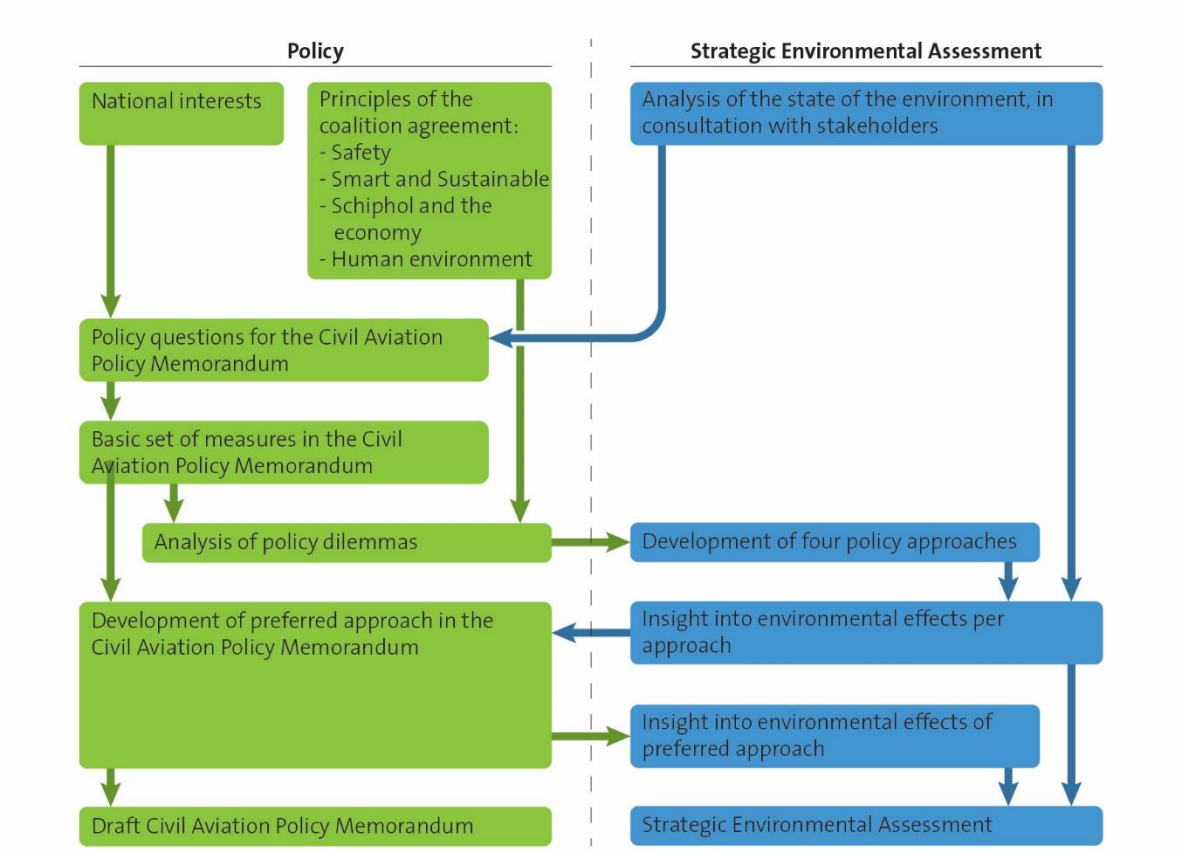
This variant responds to the opportunities for regional development and regional aviation demand. Growth in the number of flight movements in Dutch airspace is distributed across the Netherlands. There is no further expansion at Schiphol or Lelystad. The regional airports' capacity will be doubled, mainly by investing in their accessibility over land, in environmental quality and in innovative responses to specific regional aviation needs, such as the use of drones. This will ensure better use of the distinctive characteristics of the regional airports.

The measures accompanying each of these four variants uphold the four principles of the coalition agreement in one way or another. Four different answers are thus given to the policy questions, shown in the figure below. It should be noted, however, that safety underpins all of the variants.

It should also be noted that the variants entail radical choices and are therefore somewhat one-dimensional. This was done deliberately in order to gain insight into the full extent of the new policy's potential effects. The SEA systematically assesses the environmental and economic effects of the four variants using the assessment framework, described in detail and explained in chapter 7.

The outcome of this assessment was then used to make choices regarding the new civil aviation policy. The new policy (or 'preferred approach' in SEA terms) combines several elements from each of the four variants, and thus falls within the bandwidth outlined by the four variants. The following section, entitled 'What is in the Civil Aviation Policy Memorandum?', presents an outline of the new policy. The effects of this policy are summarised in 'The effects of the policy set out in the Civil Aviation Policy Memorandum'.

The figure below shows the interaction between the SEA process and the policy process.



What is in the Civil Aviation Policy Memorandum?

More than in the past, government's role in this policy field is to take the lead in protecting the public interests of safety, connectivity, health and sustainability in a transparent manner and with the involvement of stakeholders. Government's more pronounced role in the Civil Aviation Policy Memorandum is in line with the following principles set out in the coalition agreement:

- safety first;
- smart and sustainable;
- a high-quality airport at Schiphol is of major importance to the Dutch economy;
- a better human environment and better air quality.

The policy seeks a new balance that promotes as many interests as possible. To strike this balance, the government is aiming for conditional and manageable growth, especially at Schiphol. This growth is possible through innovation, enabling the sector to stay within limits for safety, environmental quality and climate impact. These limits are considered separately in the Civil Aviation Policy Memorandum. In brief:

1. Safety has the highest priority in aviation. Growth must not compromise safety. Anticipatory risk management and collaborative, integrated safety management must therefore be raised to an even higher level. Important government decisions on the future of civil aviation must be based on an comprehensive safety assessment.
2. The climate targets laid down in the draft Sustainable Aviation Agreement, which will be incorporated in the new policy in so far as possible, will have the biggest impact on the sector. The actual reduction in CO_2 emissions by aircraft departing from the Netherlands will partly determine Dutch airports' growth potential. The timeline is as follows: by 2030 aviation emissions must be equal to 2005 levels; by 2050 they must be halved compared to 2005 levels; and by 2070 emissions must have been reduced to zero. The pathway to 2030, the consequences for each airport and the avoidance of disincentives still have to be worked out. Both changes in CO_2 emissions and developments in civil aviation must be taken into account when translating the policy into specific legislation (such as the Airports Decree).
3. Regional support for the airports' development stands or falls on a lasting improvement in environmental quality, which can probably be achieved through moderate growth of a quieter and cleaner fleet. The aim is to reduce the harm to human health and nature, with particular attention being paid to restricting night flights.

The above preconditions allow only for moderate growth in civil aviation. Air traffic passenger demand at Schiphol is projected to increase by 1.6 to 3.4% between now and 2030, depending on economic conditions. This will lead to scarcity on the supply side. With Schiphol still the linchpin in the Netherlands' international connectivity, smart measures will be needed to monitor and overcome the scarcity and to adapt policy where necessary.

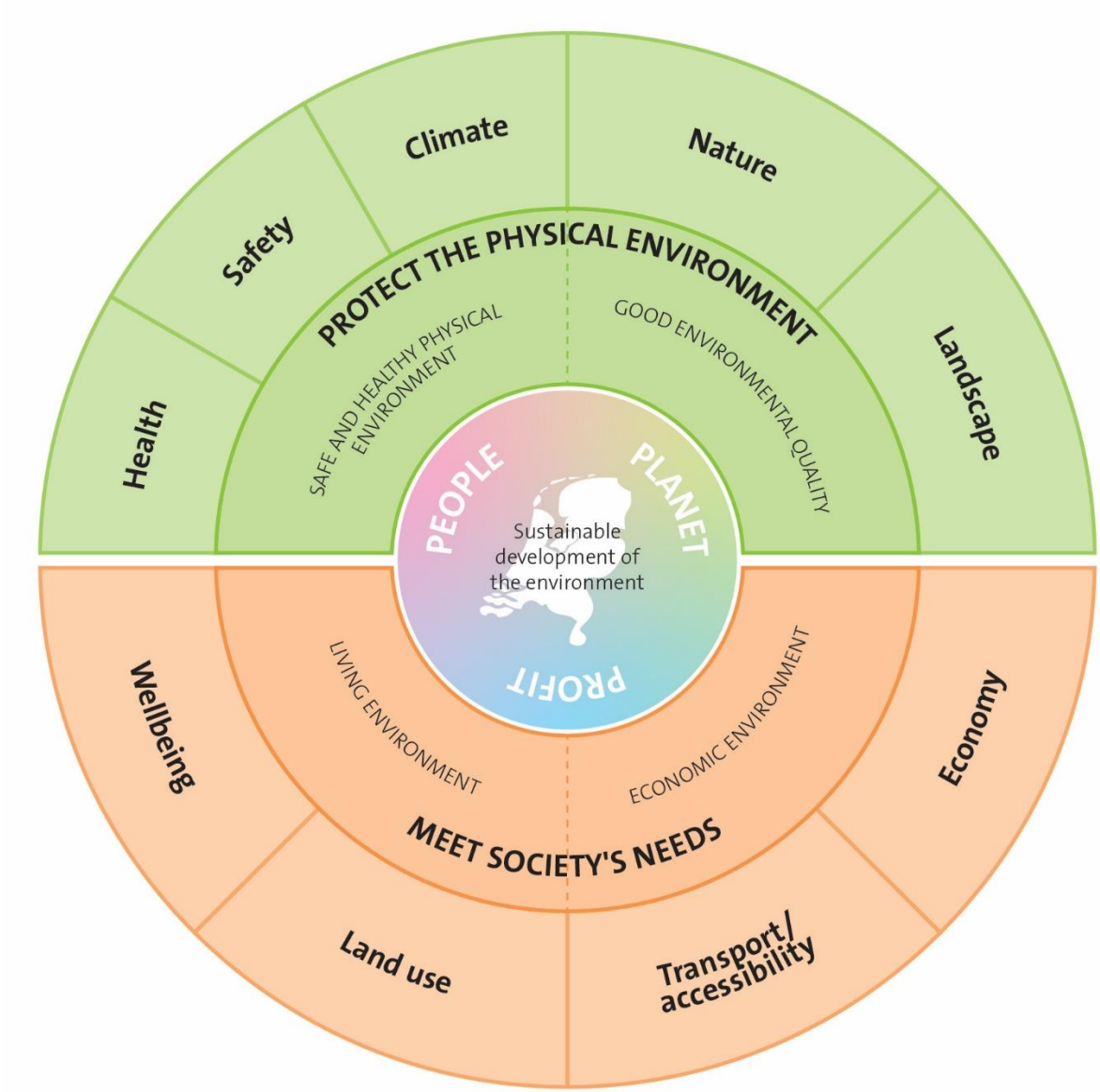
One such measure is to make better use of capacity on the ground and in the air. On the ground, this means using road and rail transport as substitutes for short-haul flights wherever realistic. By 2030, for instance, trains could substitute aircraft for 1.9 to 3.7 million passenger movements to the 13 most popular destinations within 800 km of Schiphol. In order to make more efficient use of the available airspace capacity, appropriate control instruments need to be developed.

Finally, an appropriate form of cooperation and a fitting allocation of roles are needed to rise to any new challenge. As noted above, the government will take the lead. This is made clear through a series of policy statements in the Civil Aviation Policy Memorandum.

How did the SEA assess the policy in the Civil Aviation Policy Memorandum?

The effects of the variants and the preferred approach (i.e. the policy set out in the Civil Aviation Policy Memorandum) were assessed in the spirit of the forthcoming Environment and Planning Act. Sustainable development and a good balance between people, planet and profit were key. The Environment Wheel is a suitable tool to assess government policy at an abstract level. It brings together the themes that are relevant to a wider understanding of the environment. It was also used in the SEA for the national environment and planning strategy.

The Environment Wheel is depicted in the figure below.



The top half of the wheel relates to a safe and healthy physical environment and to good environmental quality. In essence, these are the traditional issues considered in a SEA. The bottom half is concerned with the needs of society: the economic environment and the environment where people live ('living environment'). These issues reflect the broad-based approach of the Environment and Planning Act.

Moving from the centre to the perimeter, the issues in the Wheel become more concrete. The SEA describes anticipated effects for the nine themes that form the wheel's outer ring. They were broken down into 20 indicators so that systematic forecasts – and comparisons – could be made of the variants' general environmental effects.

In order to forecast these effects, a benchmark first had to be defined for each theme, consisting of a description of the current situation and a best estimate of future developments if existing plans were implemented. The Continuation variant serves as benchmark for each theme in the Wheel.[2] The effects of implementing each of the other three variants and of the preferred approach were then determined for each theme. A distinction was made between effects in the short term (2030) and the long term (2050). The future

[2] The variants do not include concrete, verifiable statements on civil aviation in the Netherlands in the Caribbean. The SEA accordingly does not consider the environmental impact in that part of the Kingdom.

is always uncertain but it goes without saying that forecasts about 2050 are more uncertain than forecasts about 2030. Furthermore, civil aviation policy is relatively abstract regardless of the timeframe. It consists of strategic choices that subsequently have to be fleshed out in concrete decisions. The precise scope of the effects described in the SEA depends on how those decisions are designed and implemented, but the SEA can indicate the direction of an effect and indicate whether this direction represents a risk or an opportunity.

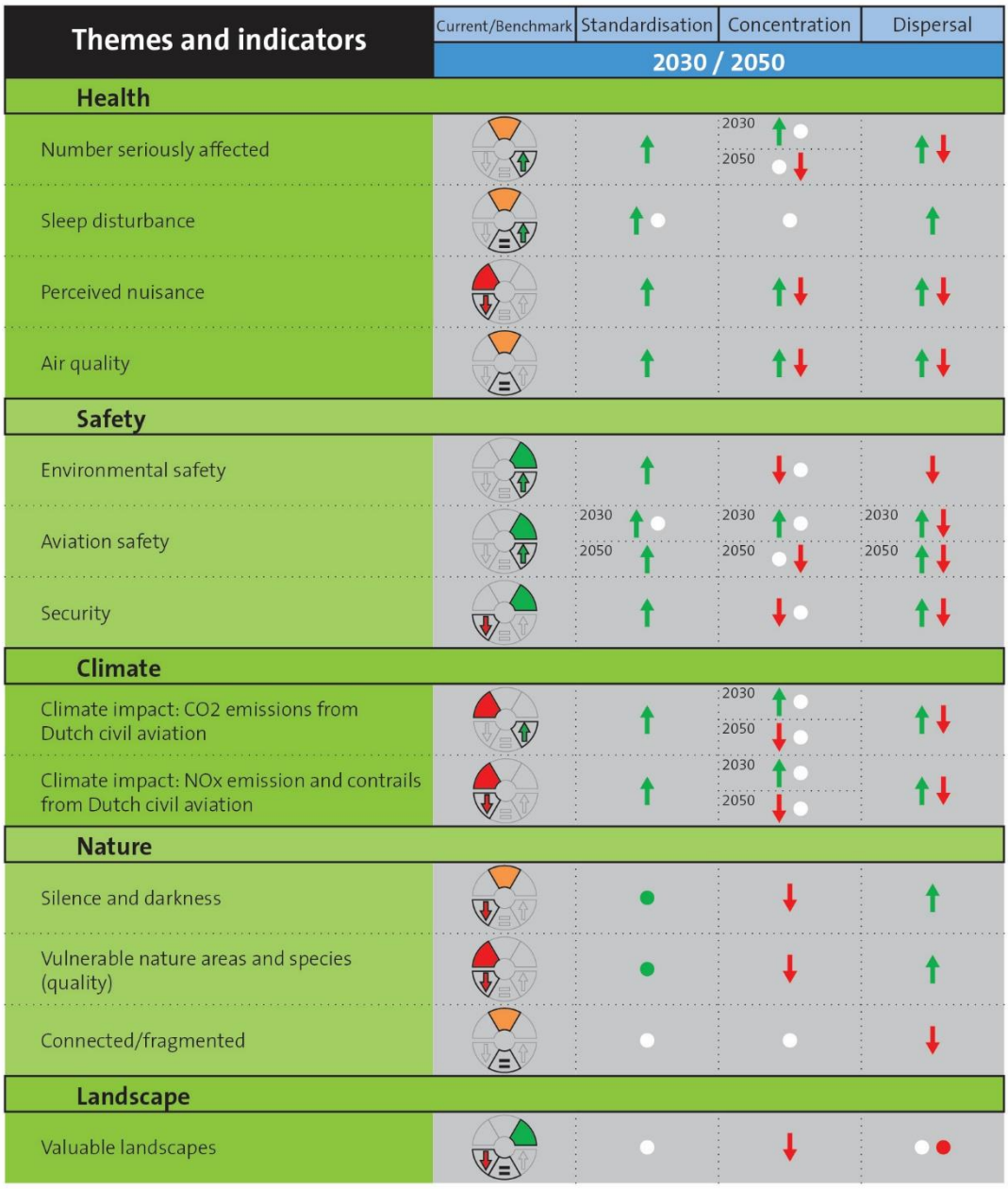
This has two consequences. Firstly, there is no point modelling this strategic policy in order to calculate the effects. Where modelling has added value (for instance in the case of noise nuisance), the SEA presents the results of existing models to describe, for instance, the impact of more or fewer flight movements. In the main, however, the description of effects is based on qualitative estimates made by experts in the relevant field. Secondly, an important function of an SEA is to set hard conditions or make soft recommendations so that decisions can be taken in the follow-up phase. This largely determines the nature and scope of the effects described here.

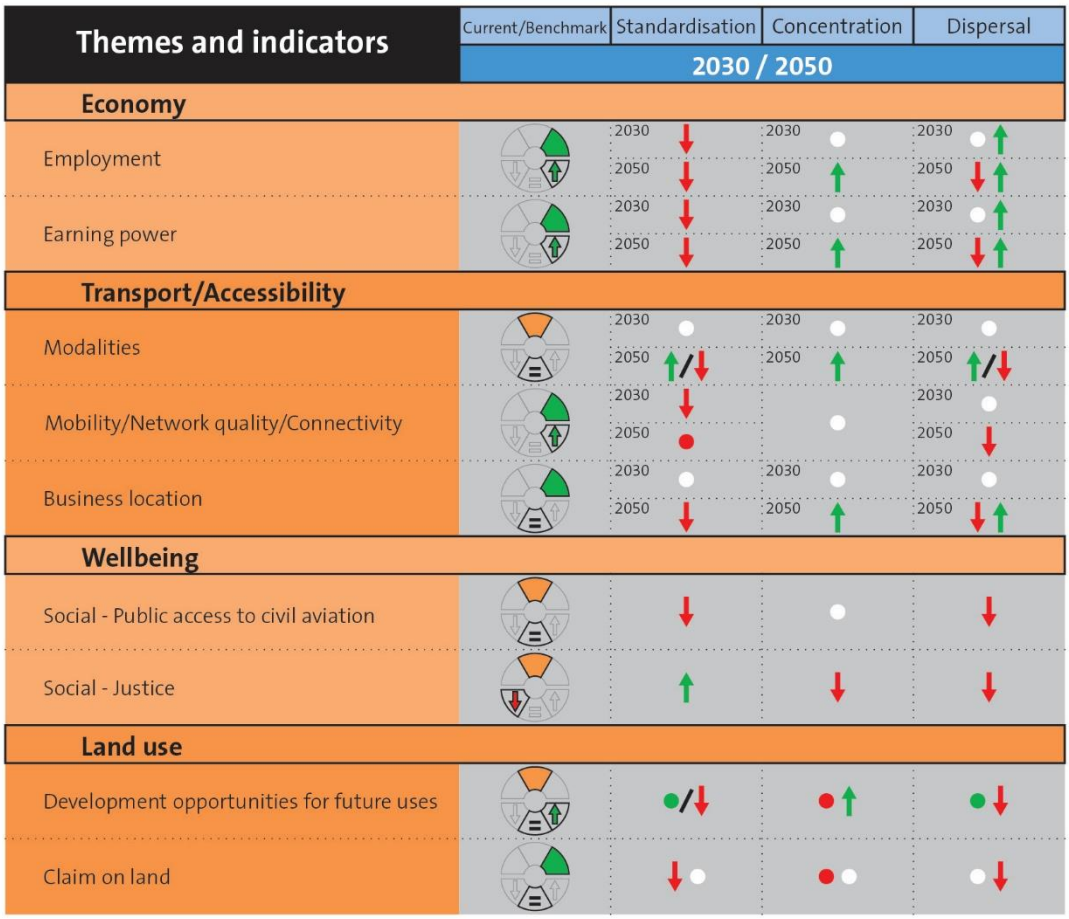
What is the relationship between the effects of the new policy, the preferred approach, and the effects of the four variants? The variants – Continuation, Standardisation, Concentration and Dispersal – represent four extreme policy directions. Their effects, albeit on different themes in the Wheel, will also be extreme. Taken together, the effects of the variants on each theme define a bandwidth within which the effects of the preferred approach will fall. The effects of the preferred approach therefore cannot be better or worse than those of the four variants. However, it has been decided not to calculate the effects of the preferred approach in greater detail, the main reason being that the preferred approach is even more abstract than the four variants. Exact comparisons between each of the four variants and the preferred approach is therefore surrounded by a great deal of uncertainty.

The effects of the Civil Aviation Policy Memorandum

As noted above, the SEA first described the effects of the four variants. The insight gained from this first step provided input for the preferred approach, i.e. the new civil aviation policy set out in the memorandum. The effects of this preferred approach were then explored and compared with the bandwidth of the four variants' effects.

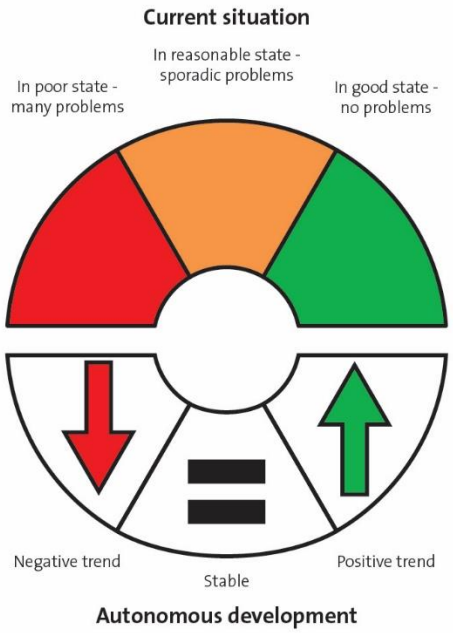
The tables and explanatory notes below summarise the variants' effects in terms of indicators that can be used to clarify the anticipated effects of the new civil aviation policy set out in the memorandum. The first table focuses on the themes relating to a safe and healthy physical environment and environmental quality. The second table looks at themes relevant to the economic and living environment.


Themes and indicators
Current/Benchmark
Standardisation
Concentration
Dispersal
2030 / 2050
Health
Number seriously affected
2030
2050
Sleep disturbance
Perceived nuisance
Air quality
Safety
Environmental safety
Aviation safety
2030
2050
Security
Climate
Climate impact: CO2 emissions from Dutch civil aviation
Climate impact: NOx emission and contrails from Dutch civil aviation
Nature
Silence and darkness
Vulnerable nature areas and species (quality)
Connected/fragmented
Landscape
Valuable landscapes



In the tables, symbols are used to illustrate the anticipated policy effects. The figure below explains the meaning of the symbols in the column headed Current/Benchmark (the Continuation variant). The top three sections of each circle show the current status of each indicator in three colours (good/reasonable/poor). The bottom three show the expected trend of each indicator if the Continuation variant were followed.

The columns to the right of Current/Benchmark use symbols to explain the effects of the Standardisation, Concentration and Dispersal variant, respectively, on each indicator relative to the benchmark.



Legend:	Appraisal
Positive effect probable	●
Potentially positive effect, depending on subsequent decisions	↑
No or virtually no consequences	○
Potentially negative effect, depending on subsequent decisions	↓
Negative effect probable	●
Schiphol versus regional airports	↑↓
Subindicator A potentially positive effect. Subindicator B potentially negative effect.	↑/↓

The variants' effects can be summarised as follows.

- In the Continuation variant (the benchmark for the other three variants) the overall status of health and nature indicators is reasonable to poor (with negative trends for perceived nuisance and vulnerable nature areas and species). The current poor state of nature is not due directly to civil aviation, and civil aviation is only a minor factor in the negative trend for nature areas and species. The state of climate indicators is poor and the trends diverge. The state of safety and landscape indicators is good but some trends are positive and others are negative. Both the current state of and the trend for the economy and transport indicators are favourable, but there may be some problems for certain modalities. There are also some unresolvable problems regarding wellbeing and scope for development for future uses.
- The Standardisation variant will have a more positive impact on the physical environment and environmental quality indicators than the benchmark. Negative effects, however, are more likely regarding the economic and living environments. By way of exception, positive effects are projected for scope for development for future uses and, potentially, social justice. Negative economic effects in 2030 and 2050 relate to high surplus demand, resulting in displacement and threatening Schiphol's role as a hub airport. The size of these effects will also depend on how the global level playing field will develop, which is currently uncertain. In this variant, the capacity for intercontinental and European connections (further than 500 km) is so limited that a deterioration in international connectivity is inevitable. The effects will be felt in both the short term (2030) and the long term (2050).
- Concentration will have a wide range of effects. In the short term (2030) there may be positive effects in terms of serious noise nuisance, aviation safety, climate indicators and NO_x emissions. In the long term (2050), however, these opportunities will become risks, leading to negative effects. In both the short and the long term this variant will have more negative effects than the benchmark on security, silence and darkness, and on vulnerable nature areas and species. The picture is mixed for the other physical environment and environmental quality indicators (some opportunities, some risks) and in some cases is the same as the benchmark (sleep disturbance and fragmented nature areas). Relative to the benchmark the effects on economic and transport indicators are positive in the long term and comparable in the short term. The outlook on the wellbeing and land use indicators is mixed: some positive, some negative and some equal to the benchmark.
- Dispersal will have mixed effects on the living environment and environmental quality: in places where growth is less than the benchmark (Schiphol) a positive effect is more likely. In places with higher growth than the benchmark (regional airports), negative effects are more likely in comparison

with the benchmark. There is no difference between the short and the long term. This applies especially to the health and safety indicators. The trend for nature is much more favourable relative to the benchmark and for landscape less favourable. For the economy and transport themes, the short-term (2030) effects are limited or non-existent relative to the benchmark. In the long term, however, there may be negative effects on several indicators. With regard to wellbeing and land use, dispersal is generally projected to have a more negative effect than the benchmark. Regarding land use, the variant will deliver more opportunities to develop civil aviation at Schiphol than the benchmark because of fewer restrictions on the development of land-based uses.

The preferred approach

The findings described above led to policy decisions that together form the preferred approach. This approach is the policy proposed in the draft Civil Aviation Policy Memorandum. The variants provided input for the policy decisions. This is why the preferred approach's impact falls within the bandwidths described above. In view of the abstract nature of the preferred approach, its anticipated effects are described in a slightly different way:

- the anticipated effects are compared with the current situation, which is relatively certain, and not with a relatively uncertain future situation if current policy were continued;
- the anticipated effects are described in general terms at thematic level (i.e. not at indicator level).

The assessment of the variants in the SEA informed the ministry's policy choice (the preferred approach) for the new Civil Aviation Policy Memorandum. This choice is for the Standardisation variant, which will be adopted as the preferred approach. This means clear conditions will be set to achieve growth that is in harmony with the public interest. The outcome will be more capacity in the air and on the ground, gained principally through innovation. Growth will be conditional and gradual.

Safety: the assessment of the variants showed that safety in the air and on the ground must come first. This comprises both the safety and security of passengers and crew and the safety of people on the ground. Any increase in the number of flights makes the operation more complex and comes at a risk. Developments in civil aviation must not compromise safety. A comprehensive safety analysis must therefore be carried out before any decisions are made.

Climate: climate action is a relatively new theme and there are many uncertainties about both the possible courses of action and their potential effects. The assessment of the variants found that implementation of the draft Sustainable Aviation Agreement is feasible but will require a concerted public/private effort, as is the case in other sectors. In an optimistic scenario, this will create opportunities for moderate growth of civil aviation.

Connectivity: in view of developments, it can no longer be taken for granted that all aviation demand can be met. If the number of flight movements stabilises or contracts, the risk of network degradation could have consequences for Schiphol's role as a hub. Whether this will create scarcity in the route network will depend in part on the space for expansion at hub airports in neighbouring countries. As connectivity is important, the impact of scarcity must be closely monitored. To gain sufficient expansion potential, aircraft fuels must contain at least 14% bio kerosene by 2030. Sustainable technology, such as hybrid or electric aircraft, must also contribute to this goal. There are opportunities here for Dutch industry. An international approach will be a key success factor.

Environment: cleaner and quieter aircraft and sustainable technologies will also benefit the environment. The variant assessment showed that aircraft are becoming 1% quieter every year. A reduction in adverse health effects is a precondition for future growth in civil aviation. The assessment also looked at the perceived nuisance in each of the variants. The findings underline the importance of better aligning noise measurements and modelling.

Capacity: the projected growth can be accommodated in part by better dovetailing capacity at the various airports. Regional support for the region's contribution to the overall capacity must be constantly monitored. It would also be advisable, given the scarcity of airspace, to make better use of long-distance train and bus transport, in part by ensuring better connections between these modes and aviation. Investments will have to be made in airport development and in road and rail networks. Redesigning the airspace can lead to more efficient use by civil and military aircraft, emergency services and small aircraft. Airspace redesign would also enable the use of remotely piloted aircraft for passenger and freight transport.

The preferred approach would have the following general impact on the different themes.

Health

- The number of people affected by noise at Schiphol will decline despite the increased number of flight movements, owing to the use of quieter aircraft and electric aircraft and a reduction in the number of flight movements at night.
- The number of people affected by noise at Lelystad and Groningen will increase. The advantages of technological advances will not be offset by the disadvantages of growth in the number of flight movements. The number affected by aircraft noise at the other regional airports will remain unchanged or be lower owing to relatively small increases, or even a decline, in flight movements.
- Restrictions on night flights will reduce sleep disturbance, especially around Schiphol.
- There will be an increase in the number of quiet periods around Schiphol. At the regional airports there will be an increase in silent periods at the beginning and the end of the night but a decline during the day if the number of flight movements were to increase.
- NOx and PM_{10} emissions may increase as the preferred approach does not include specific measures to reduce them.

Safety

- The current safety level will be maintained in 2030 and 2050 due to technological advances in civil aviation, despite the higher number of flight movements.

Climate

- The preferred approach will have a positive impact on climate indicators compared to the current situation. There will be reduction in total CO_2 emissions. The target for 2030 in the draft National Climate Agreement and the ICAO target for 2050 will be met. The Paris Agreement target for 2050 will not be met.

Nature

- An appropriate evaluation has been made of the preferred approach in the Civil Aviation Policy Memorandum. It cannot be definitely ruled out that the new policy will not affect the current status of the Natura 2000 areas. The impact of civil aviation policy on the Natura 2000 conservation goals is determined by the number of flight movements, their routing through airspace and the time at which they take place. All three of these factors contribute to noise nuisance. The first two also cause nitrogen emissions and nitrogen deposition. The appropriate evaluation found that the proposed Civil Aviation Policy Memorandum does indeed entail the risk of significant adverse effects on Natura 2000 areas. The excessive noise and nitrogen deposition in many of these areas is already making it difficult to achieve the conservation targets. If it is not possible to avoid significant negative effects, an ADC check will have to be carried out, showing that there are no other alternatives and that the project or plan is necessary for imperative reasons of overriding public interest, and introducing compensatory measures. The projected growth of Schiphol, Lelystad and Groningen airports will increase the pressure on Natura 2000 areas, particularly those around the airports. On the other hand, the policy also includes elements (such as faster ascent and descent procedures, promoting the use of cleaner and quieter aircraft, more transport by train) that could reduce the impact on Natura 2000 areas. There is, however, much uncertainty about the projected short-term and long-term effects on Natura 2000 areas. The type and scale of these adverse effects will depend chiefly on the preconditions attached to specific plans and projects to implement the policy. These preconditions were considered in the appropriate evaluation. The recently issued Advisory Report on the Civil Aviation Sector[3] is also relevant in this context.
- Depending on its spatial design, new infrastructure to improve access to regional airports could also lead to fragmentation of nature areas.

Landscape

- Construction of additional infrastructure could have adverse effects on the landscape in 2050. The preferred approach would have only a limited effect on the landscape in 2030.

Economy

- The added value and employment created both directly and indirectly by an airport could increase in 2030 and 2050 more or less proportionally to the increase in flight movements.
- Only a limited increase in passenger numbers is projected at Schiphol in 2030 and 2050 as capacity will not be able to meet all demand (surplus demand). Capacity at the regional airports (with the exception of Eindhoven) is adequate to meet all the demand.
- It is uncertain how the air freight volume will develop. In any case it will come under further pressure relative to the current situation.

Transport and accessibility

- The government-wide investment strategy for Schiphol will probably safeguard access to Schiphol over land in 2030 and 2050, even with an increase in passenger numbers.
- The trend towards people taking the train instead of travelling by air will continue in 2030 and 2050.
- Actual additional capacity at Schiphol in 2030 and 2050 will put it in a positive position for retaining its role as a hub in the international and European civil aviation networks.
- The development of the air freight network is uncertain and possibly negative.
- Regional airports will be able to retain their networks and may, with moderate growth, even increase the number of destinations/frequencies.

[3] Advisory Committee on Nitrogen Pollution, Advisory Report on the Civil Aviation Sector, 15 January 2020.

- Where there is a causal relationship with Schiphol's international network, the Amsterdam metropolitan region (and the wider Schiphol region) will probably retain its attraction as a location for businesses/clusters of businesses that have many direct international contacts.

Wellbeing

- The risk that advantages and disadvantages will be distributed unfairly is small. The projected scarcity will increase ticket prices and thus make aviation less accessible.

Land use

- Smaller noise and safety contours will increase the land available for development around Schiphol.
- Additional infrastructure will be built to improve access to the regional airports of Maastricht, Lelystad and Groningen, which might go at the expense of other land-based uses.

What next for the Civil Aviation Policy Memorandum?

The opportunities and risks identified in the SEA are currently surrounded by a great deal of uncertainty. The main reasons for this are:

1. The Civil Aviation Policy Memorandum provides frameworks for future plans and projects. Precisely how they are elaborated and implemented will largely determine the opportunities and risks. A significant added value of a SEA for policy plans such as the Civil Aviation Policy Memorandum is that the recommendations made can be used to elaborate plans and projects in order to limit risks and increase opportunities. The SEA's main recommendations have been incorporated in the Civil Aviation Policy Memorandum.
2. How transport (including civil aviation) will develop globally is uncertain. The margins in which it can develop are worked out in the WLO scenarios[4] of the Netherlands Bureau for Economic Policy Analysis, which have the same planning horizon as the SEA (2030 and 2050). The SEA is based on the low demographic and economic growth scenario with a moderate increase in civil aviation. A sensitivity analysis was carried out to determine the validity of the SEA results in a scenario with stronger growth. The main finding was that the increased number of flight movements associated with higher autonomous growth of civil aviation is not compatible with the principles set out in the Civil Aviation Policy Memorandum. As a result, some of the increase would have to take place in countries outside the Netherlands. Both the potential negative effects on the living environment and the potential benefits would then fall to our neighbouring countries. Flight movements will be displaced, however, only if airports in neighbouring countries are not experiencing scarcity. Within international civil aviation, agreements are being made on implementing the Paris Agreement. As Germany and France are also introducing stringent climate policies that cover civil aviation, the likelihood of displacement actually occurring is uncertain.
3. The SEA makes assumptions on the autonomous development of the living environment in the most general sense, taking the current situation as its starting point. The current situation can be determined objectively but the assumptions are inherently uncertain. By monitoring developments in the quality of the living environment and the effects of civil aviation policy, the impact of civil aviation policy can be evaluated periodically and amended where necessary. The Minister of Infrastructure and Water Management will carry out the periodic monitoring and report to the House of Representatives.
4. The new civil aviation policy is not cast in stone but will respond where necessary to unforeseen events. An effective monitoring system will be set up to that end. The results will be used to adapt the policy during its implementation (and in any event during the first 5 to 10 years) in order to achieve the 2050 targets.

[4] Scenarios developed in the context of a study into wellbeing and the living environment by the Netherlands Bureau for Economic Policy Analysis and the Netherlands Environmental Assessment Agency (2015).

Annexe 1 Transboundary effects

The effects of civil aviation transcend national borders. Any transboundary effects of a plan or decision must be identified and the countries concerned must be informed. The transboundary effects of civil aviation policy as set out in the Memorandum include the effects of and on competing airports and the environmental effects of emissions, greenhouse gases, etc. The SEA can consider transboundary environmental effects only to a limited extent and at a relatively high level of abstraction. Only the transboundary effects of CO_2 emissions are known. Issues that the government can influence are described here; those that it cannot influence are not considered.

Effects of and on competing airports
The SEA provides only a limited overview of the effects of and on competing airports. Many factors are at play in these dual effects that were not regarded as fixed in the four variants. The wide range of potential developments in the international civil aviation sector, and policy and developments in other EU and/or ICAO member states produce an enormous number of scenarios that would have different effects in each of the four variants. The international effects are therefore based on the current economic situation (2019), with the SEA describing effects relating to the displacement of transfer and origin-destination passengers to countries outside the Netherlands (mainly in the Standardisation and Dispersal variants), substitution by international trains (mainly in the Standardisation variant) and deterioration of Schiphol's competitive position (mainly in the Standardisation and Dispersal variants).

Transboundary environmental effects
Maastricht Aachen Airport is the only airport in the Netherlands located near a border. The noise contours in the benchmark scenario and the Dispersal variant would reach beyond the German and Belgian borders in 2030 and 2050. None of the other airports in the Netherlands have a direct transboundary environmental effect in any of the variants. None of the preferred approach's noise contours cross national borders.

NO_x and sensitive nature areas
According to the National Institute for Public Health and the Environment (RIVM), aircraft taking off or landing in the Netherlands, including those at Schiphol, are responsible for 0.1% of the nitrogen deposition in sensitive nature areas. This figure does not include emissions from all aircraft flying through Dutch airspace –, only the nitrogen deposition of aircraft flying below an altitude of 3,000 feet (about one kilometre) and taking off and landing in the Netherlands. International rules require aircraft emissions to be measured in this way (reference). Furthermore, these are the only aircraft emissions that contribute to the national nitrogen emission. The higher an aircraft flies, the higher the nitrogen is emitted and the smaller the impact on a particular area. A recent study by the Advisory Committee on Nitrogen Pollution, published in 2020, found that the aviation sector's total contribution to nitrogen deposition was between 0.7% and 1.1% of the aggregate national total for NH_3 and NO_x (above and below 3,000 feet).

Aircraft that only pass over the Netherlands at high altitudes also contribute to nitrogen deposition in sensitive nature areas. The source of this nitrogen cannot be identified and is therefore classified as 'unexplained'. Around 10% of nitrogen deposition in sensitive nature areas is 'unexplained'. This includes nitrogen from passing aircraft and from other sources.

Greenhouse gas emissions
In the current situation (2017) the Dutch aviation sector emits more than 13 billion kilograms of CO_2, including emissions in foreign airspace but excluding emissions by foreign airlines flying to the Netherlands. The aviation sector has been responsible for about 6.5% of aggregate CO_2 emissions by Dutch trade and industry in recent years. It is closely associated with the number of flight movements at Dutch airports, which is in turn associated with the state of the economy.