



Climate aspects in environmental assessments according to Chapter 6 of the Environmental Code

Climate impact, climate adaptation and energy management

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Swedish SEA and EIA context

European Union (EU) member states have implemented the Strategic Environmental Assessment (SEA)¹ and Environmental Impact Assessment (EIA)² directives in many different ways. Sweden chose to create a chapter in the Environmental Code for the rules on environmental assessment under the EIA directive. When the Environmental Code was created, Chapter 6 established the rules on environmental assessment. With the subsequent introduction of the SEA directive into Swedish law, it became natural to merge the new rules with those relating to the EIA directives as this seemed to have many advantages. Swedish implementation of these two directives has been characterised by difficulties in integrating the rules on environmental assessment with Sweden's planning system and by a clear approach to not over-implement the directives.

When the amending directive³ was to be implemented in 2014, it became clear that the rules in Chapter 6 needed to be reviewed and that it might be a good idea to better coordinate the rules on environmental assessment in the sixth chapter of the Environmental Code.

The purpose of the new chapter on environmental assessments is partly to include the latest amendments in the amending directive in Swedish law and to meet the requirements arising from Sweden's EU legal and international commitments. In part, the purpose was to make environmental code provisions more effective for environmental assessments for plans, programmes, activities and measures. More effective provisions make it possible to increase the overall environmental protection while reducing the time demands and administrative burden of environmental assessment.

When officials updated the rules, they also clarified which activities are always to require an environmental assessment and which never require it. Expertise requirements were introduced for the implementation and review of environmental assessments for activities and measures.

In general, much of Swedish legislation relies on strong self-monitoring, and in Sweden there is a high level of trust that the enforcement and implementing parties (both regulatory authorities and consultants) will fulfil requirements of the Environmental Assessment Regulation. Compliance with requirements is partly

¹ Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of effects of certain plans and programmes on the environment.

² Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the effects of certain public and private projects on the environment.

³ Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

based on the fact that much of the responsibility for supervision and review has been delegated to the local level and Swedish municipalities have a high degree of self-determination.

In connection with these changes, the Swedish Environmental Protection Agency has developed guidance on the new rules about environmental assessment. In this context, the agency has also issued an additional guide on how climate aspects should be addressed in environmental assessments. Climate aspects refer to both emission reduction measures (such as the EU Emissions Trading Scheme, emission reduction measures, resource management, energy efficiency, and traffic planning) and climate adaptation (choice of climate scenario and time aspects, adaptation measures, and relevant planning documents), and how they link to specific and strategic environmental assessment (EIA and SEA)⁴.

Since the new legislation and the development of national guidelines have been implemented only recently (2018 and 2019, respectively), it is still impossible to review the full extent of their impact. However, an analysis of Swedish juridical praxis has shown several examples of environmental assessments of large infrastructure projects that have taken the long-term effects of climate change into account⁵.

⁴ Climate aspects in environmental assessments according to Chapter 6. The Environmental Code – climate impact, climate adaptation and energy management. 2019.

⁵ Climate aspects in environmental assessments according to Chapter 6. The Environmental Code – climate impact, climate adaptation and energy management. 2019.

1 Introduction

This document resulted from the workshop organised in the spring of 2018 by the Swedish Environmental Protection Agency along with the Swedish Meteorological and Hydrological Institute; the Swedish Agency for Marine and Water Management; the Swedish Civil Contingencies Agency; the National Board of Housing, Building and Planning; Environmental Cooperation Sweden; the Geological Survey of Sweden; the Swedish Transport Administration; and the Swedish Geotechnical Institute. The presentations and discussions from the workshop have been compiled here. In addition, legal wording, preparatory work, case law, and supporting documents from investigative reports, guides, and other relevant literature on climate and environmental assessments have been used. This documentation aims to support integrating climate aspects into planning and decision-making linked to plans, programmes, activities, and measures covered by the rules in Chapter 6 of the Environmental Code.

This document describes the different parts of climate aspects, climate impact, climate adaptation, and energy management. This includes descriptions of climate objectives, climate scenarios, risks, and accidents connected with environmental assessment.

Climate aspects cover both what climate impact involves and what climate adaptation means. There are several strong links between climate impact and climate adaptation. An environmental assessment describes and considers both synergies and counteracting effects among them. For this reason, this document covers both climate impact and adaptation.

You can benefit from reading the document together with the guidance available on the Swedish Environmental Protection Agency's website regarding climate aspects in environmental assessments. This document will be updated over time, so it differs from a report in our report series.

2 Climate aspects in environmental assessments

2.1 Environmental assessments in Chapter 6 of the Environmental Code

Background

Climate change and its consequences present one of the greatest challenges of our time. This complex and wide-ranging issue affects almost all human and natural activity. Environmental assessments in Chapter 6 of the Environmental Code serve as an important tool for transforming the climate in a more sustainable direction.

The consequences of a changing climate are and may become far-reaching. This underscores the importance of identifying, assessing, and describing both the climate impact (such as greenhouse gas emissions) from activities and measures or the implementation of plans and programmes. Equally important is identifying, assessing, and describing their vulnerability to climate change. We also need to understand the relationship between climate change and climate adaptation. Some climate adaptation measures may limit greenhouse gas emissions, while others may have the opposite effect. Similarly, measures to reduce emissions can also constitute strong climate adaptation measures. For example, a wetland can both mitigate high water flows and act as a carbon sink. From 1 January 2018, climate-related issues in environmental assessments are more clearly supported by the definition of environmental impacts in Chapter 6, Section 2, of the Environmental Code. These rule changes are partly based on amendments to Article 3 of the environmental impact statement that came about through the amending directive.⁶

Process

An environmental assessment according to Chapter 6 of the Environmental Code means that environmental effects are identified, described, and assessed when planning and deciding on plans and programmes or activities and measures. The concept of strategic environmental assessment applies to plans and programmes and specific environmental assessment for activities and measures. Read more at www.naturvardsverket.se/miljobedomningar. Climate aspects need to be integrated into the entire environmental assessment process both for plans and programmes and for activities and measures. Sections 3 and 4 describe how this can be done.

The relationship between strategic and specific environmental assessment

⁶ Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

The strategic environmental assessments serve as a basis for the specific environmental assessments and provide a context for them (Figure 1). In strategic environmental assessment of, for example, a comprehensive plan, it is particularly important to assess overall environmental impacts and cumulative effects that can be difficult to deal with in detailed development plans and for individual activities and measures. The strategic environmental assessment should serve as a starting point and a source of information on climate change and other aspects to be considered in subsequent planning, specific environmental assessments, and examination of permit applications.

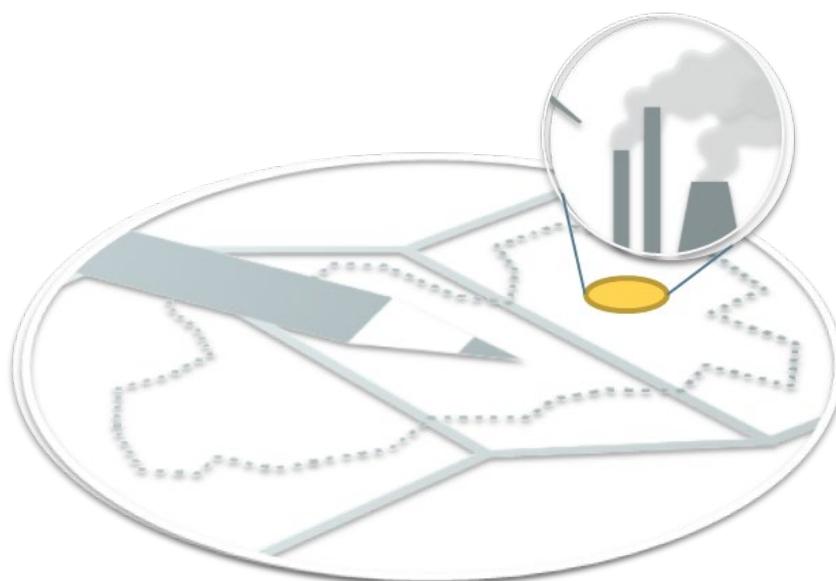


Figure 1. The relationship between the strategic and the specific environmental assessments.

Climate aspects have many components, both in terms of impact and adaptation, that need to be highlighted in the strategic environmental assessment because it is difficult to have the overview required in each specific environmental assessment. For example, this could include minimising risks linked to floods by identifying risk areas in a strategic plan and related environmental assessment. This could also involve proposing land use that can increase the water-retention capacity of the soil through the construction of wetlands, for example. The knowledge and proposals contained in the plan and the strategic environmental assessment can then be captured in the specific environmental assessment for an activity or measure. Subsequent decisions on permit applications may include certain terms and conditions, and the activities in question may be adapted to local circumstances. Decisions on permit applications and terms and conditions can in turn affect what can be implemented in future plans.

Challenges

Dealing with climate change in the context of an environmental assessment involves several challenges related to some of the characteristics of climate aspects. These include:⁷

- the long-term and cumulative nature of climate effects;
- the complexity and difficulty of assessing cause-and-effect relationships; and
- uncertainty about future climatic conditions.

One challenge is that climate aspects have a long-term horizon, both in terms of the effects arising from emissions and the impacts of climate change. Though considerable uncertainty about future climatic conditions prevails, this still needs to be addressed in an environmental assessment. Increasing emissions contribute to higher levels of global emissions, even if they do not always have significant short-term consequences locally. On the other hand, increased emissions in one place can result in climate changes somewhere else. Rising temperatures in the northern hemisphere, which exceed the global average, increase its vulnerability. This is due to the large land area of the northern hemisphere and the fact that large areas are covered by snow and ice in winter.

The effects of climate change often also have an impact on other parts of the environment. For example, there is a strong correlation between the effects of climate change and the effects on biodiversity. Direct and indirect effects on biodiversity arising from climate change may result in the loss of species or habitats. There is another clear link with health and population, where the risks of adverse effects due to a changing climate are significant and increasing. Droughts, long periods of heat, torrential rains, and forest fires have already emerged, with consequences not only for ecosystems but also in the form of increased mortality and illness in populations.

Objectives and motivating forces

The Paris Agreement, enacted in November 2016, represents an important international milestone in efforts to reduce climate emissions. Through the agreement, countries of the world have pledged to keep increases in global temperature this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the increase even further to 1.5 degrees. Moreover, Sweden reached an important national milestone in 2017 through its new climate policy framework. The framework consists of three parts: climate law, new objectives, and a climate policy council. The Swedish Parliament has established current national objectives for climate policy in the environmental quality objective Reduced Climate Impact and related specifications and milestone targets. The aim of an environmental assessment is to integrate environmental aspects into planning and decision-making to promote sustainable development. This is achieved by presenting alternatives that meet the environmental objectives and reporting

⁷ Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessments, European Commission, p. 17.

in the Environmental Impact Assessment on how the 16 environmental quality objectives adopted by Parliament⁸ can be achieved, among other measures.

The environmental quality objective Reduced Climate Impact states:

“In accordance with the UN Framework Convention on Climate Change, concentrations of greenhouse gases in the atmosphere must be stabilised at a level that will prevent dangerous anthropogenic interference with the climate system. This goal must be achieved in such a way and at such a pace that biological diversity is preserved, food production is assured, and other goals of sustainable development are not jeopardized. Sweden, together with other countries, must assume responsibility for achieving this global objective.”

The Swedish Parliament has established a specification for the environmental quality objective Reduced Climate Impact⁹:

“The increase in global average temperature is to be limited well below 2 °C above pre-industrial levels, and efforts are to be pursued to limit the increase to 1.5 °C above pre-industrial levels. Sweden will press internationally for global efforts to be directed towards achieving this target.”

The milestones targets are:

Emissions of greenhouse gases by 2020

By 2020, emissions of greenhouse gases in Sweden from activities not included in the EU Emissions Trading Scheme (ETS) should be reduced by 40 per cent compared with 1990. This means that, by 2020, greenhouse gas emissions from the non-trading sector are to be around 20 million tonnes of carbon dioxide equivalent lower than in 1990. The decrease will be achieved by emission reductions in Sweden and by means of investments in other EU member states or flexible mechanisms such as the Clean Development Mechanism (CDM¹⁰).

Emissions of greenhouse gases by 2030

⁸ Govt. bill 2004/05:150, p. 375.

⁹ <http://www.swedishepa.se/Environmental-objectives-and-cooperation/Swedens-environmental-objectives/The-national-environmental-objectives/Reduced-Climate-Impact/Specification-for-Reduced-Climate-Impact/>

¹⁰ CDM - Clean Development Mechanism. CDM is designed to give developing countries increased opportunities for environmentally compliant development. Countries with high emissions can pay for measures that reduce emissions in another country while contributing to sustainable development. Read more on the Swedish Energy Agency’s website: <http://www.energimyndigheten.se/en/cooperation/international-climate-cooperation/flexible-mechanisms---cdm-ji--et/the-swedish-cdm-and-ji-programme/>

By 2030, greenhouse gas emissions in Sweden in the EU ETS¹¹ should be at least 63 per cent lower than emissions in 1990. No more than eight percentage points of emission reductions may occur through supplementary measures.

Emissions of greenhouse gases by 2040

By 2040, greenhouse gas emissions in Sweden in the ETS should be at least 75 per cent lower than emissions in 1990. No more than two percentage points of emission reductions may occur through supplementary measures.

Emissions of greenhouse gases by 2045

By 2045, Sweden is to have no net greenhouse gas emissions into the atmosphere and should thereafter achieve negative emissions. To achieve net-zero emissions, supplementary measures may be counted. Emissions from activities within Swedish territory are to be at least 85 per cent lower than emissions in 1990.

Greenhouse gas emissions from domestic transport

By 2030, greenhouse gas emissions from domestic transport (excluding domestic aviation included in the EU's Emissions Trading Scheme) are to be reduced by at least 70 per cent compared with 2010.

Additional environmental quality objectives may be taken into consideration in climate work, such as A Good Built Environment, Clean Air, and A Rich Diversity of Plant and Animal Life.

In 2015, UN member states adopted the 2030 Agenda for Sustainable Development¹² and 17 new Global Sustainable Development Goals (SDGs). Combating climate change is one of the goals. This goal, in turn, has milestones, one of which is integrating climate measures into policies, strategies, and planning at the national level. Strategic and specific environmental assessments are an important tool for integrating climate measures into planning and decision-making.

2.2 Climate impact

The environmental assessment needs to help limit the impact on the climate. To do this, the potential climate impact of the plan, programme, activity, or measure needs to be identified. A plan/programme, activity, or measure may result in:

- An increase or decrease in demand for products, services, raw materials, or input goods, leading to indirect changes in greenhouse gas emissions;

11 The ETS Greenhouse Gas Emissions can mainly be divided into those covered by the EU Emissions Trading Scheme (EU-ETS) and those that will be covered by the EU Effort Sharing Regulation, COM (2016) 482, abbreviated as ESR.

¹² <https://www.government.se/government-policy/the-global-goals-and-the-2030-Agenda-for-sustainable-development/>

- Changes in greenhouse gas emissions due to increased or reduced energy use, such as in material production and transport, both before and during a construction phase and when an activity is in ongoing;
- Loss or creation of environments that serve as carbon sinks, such as when construction occurs on forest land or a wetland is restored;
- Indirect impact through implementing climate adaptation measures that lead to changes in emissions.

Climate impact is a global issue, but it may still be relevant to describe changes in greenhouse gas emissions from a particular region or industry in Sweden and relate these to regional or industry-specific objectives, for example. It may also be relevant to identify the local, regional, or national ramifications of the loss or creation of environments that contribute to carbon sinks and that result from the change in land use caused by the plan, programme, activity, or measure.

When describing environmental effects from climate impacts, we need to identify, assess, and describe the effects produced by the emissions. Environmental effects of climate change should be assessed within the geographical area affected by the plan/programme/activity or measure. Assessing cumulative effects is part of environmental impact assessment. This means, for example, that the effects of climate change on biodiversity need to be assessed along with the effects of other impacts¹³ that the plan or activity may have on biodiversity in combination with other ongoing or planned land use in the countryside.

The impact of emissions affects climate change globally with such consequences as changing precipitation patterns and rising sea levels. This in turn may lead in some places to floods, which may result in additional environmental effects on various parts of the environment and affect human health, for example (Figure 2).

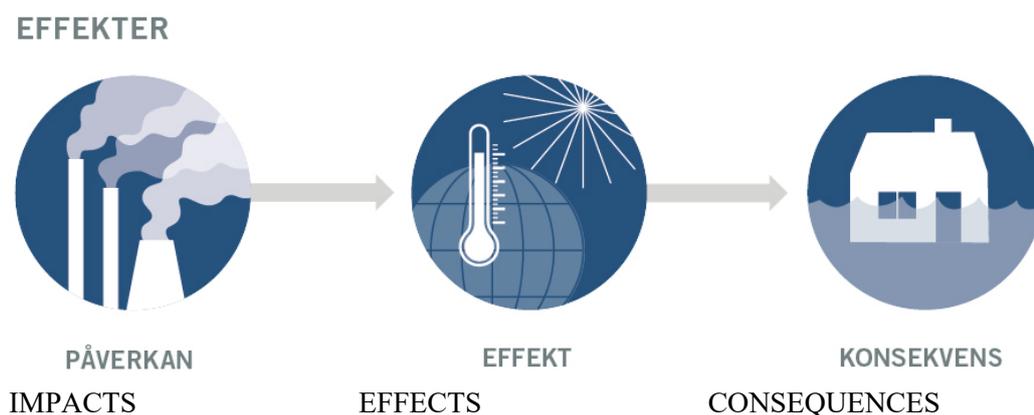


Figure 2. Chain of events resulting from greenhouse gas emissions

¹³ Other impacts in this context may include factors such as intrusion or deterioration of quality in natural environments through disturbances, pollution, creation of barrier effects, changes in management or land use, and more.

Rules on emission trading, limits on emissions, and the link to environmental assessment

Within the EU, 45 per cent of greenhouse gas emissions from activities and measures are regulated through emission trading rights. In Sweden, the corresponding figure is just under 40 per cent of greenhouse gas emissions. The emissions trading scheme covers about 750 Swedish facilities involved in industrial and energy production in Sweden.

The emissions trading scheme and the Environmental Code's regulations are parallel. However, to obtain a permit under the Emissions Trading Act (2004:1199), necessary permits for the operation of the activity under the Environmental Code are required; see Chapter 2, Section 5, of the Commercial Code. Most of the activities covered by the emissions trading scheme require a permit under Chapter 9 of the Environmental Code. There are also many activities covered by the trading scheme and subject to mandatory authorisation, known as C Activities. These mainly involve smaller incineration facilities referred to in item 2 of activity description 1 of annex 2 to the regulation on emissions trading (2004:1205), referred to as opt-in facilities.

For the activities that require a permit under the Emissions Trading Act due to greenhouse gas emissions, there are limitations in the Environmental Code on the conditions that may be prescribed for the operation. Chapter 16, Section 2c states that conditions for limiting emissions or conditions aimed at limit CO₂ emissions by regulating the amount of fossil fuel used may not be imposed. Some exceptions apply to activities involving geological storage of CO₂ and activities requiring nitrous oxide or perfluorocarbon to prevent significant local pollution.

Corresponding provisions for activities covered by existing permits under the Environmental Code or older legislation were also introduced in connection with the introduction of Chapter 16, Section 2c. Chapter 24, Section 20 of the Environmental Code states that activities covered by the trading scheme may emit greenhouse gases as permitted under the Act, notwithstanding the decision on certain conditions of the Environmental Code. As a result, the possible conditions contained in the authorisation do not impose any restriction on the activities. Corresponding restrictions are also found in Chapter 26, Section 9 of the Environmental Code regarding the possibility for regulatory authorities to issue injunctions.

The emissions trading scheme and the Environmental Code regulations are two parallel systems with some areas of application that differ. One example is airports that require a permit under the Environmental Code if they are of a certain size; see Chapter 24, Sections 3-4 of the Ordinance on Environmental Impact Assessments (2013:251). Air traffic considered part of airport operations or regarded as associated with them is reviewed and assessed according to Chapter 9 of the Environmental Code as an activity harmful to the environment. Since emissions from aircraft within the European Economic Area (EEA) are covered by the emissions trading scheme, restrictions apply to the conditions that may be prescribed in a permit.

The environmental assessment always focuses on promoting sustainable development. This means that an environmental assessment also needs to identify, describe, and

assess the environmental impacts that may arise from activities covered by the emission trading rules. Environmental assessment is to help decision-makers understand the actual consequences of a decision on a permit application. The environmental assessment also serves as an important tool to help reduce the risk of environmental impact in every way while contributing to achieving environmental and climate objectives. Data in the Environmental Impact Assessment provides an important basis for determining if an activity is permitted, although the EIA cannot be used to prescribe conditions on emission limits.

Resource management and energy efficiency in environmental assessment

The Environmental Code imposes requirements on resource management and energy efficiency according to the general rules of consideration (Chapter 2), which may have an indirect connection with the climate impact of activities and measures. As such, the Swedish Environmental Protection Agency would like to point out that, based on the resource management principle in Chapter 2, Section 5, requirements and conditions can be imposed on the management of energy, regardless of whether or not the activity is regulated under the Emissions Trading Scheme. This also regulates the use of renewable energy sources in the first place. It is also possible to impose requirements based on Chapter 2, Section 3, for example, for using the best possible technology to prevent, inhibit, or counteract the activity or measure from harming or impairing human health or the environment, which includes conserving resources and energy. A starting point for resource management is the initial paragraph of the Environmental Code (Chapter 1, Section 1), which specifies that the code should be applied to promote the reuse, recycling, and other conservation of materials, raw materials, and energy to achieve a natural cycle. In an environmental assessment and the EIA, it is important to clarify how an activity or measure conserves resources and energy and how energy-efficient it is.

The following are two examples of cases in the Land and Environment Court of Appeal (MÖD), where issues of energy management and energy efficiency have been considered. Since these are rapidly evolving areas, practices may also evolve.

In MÖD 2015:27, an environmental committee had ordered an operator to change the heat source for heating a number of buildings on a property from burning oil to a heat source with little or no reliance on non-renewable energy sources. MÖD ruled that the resource management principle expressed in Chapter 2, Section 5 of the Environmental Code means that all activities carried out and all measures taken are to use raw materials and energy as efficiently as possible and minimise consumption. The principle also applies to smaller activities, such as the one in question. Regarding the reasonableness standard to be applied according to Chapter 2, Section 7 of the Environmental Code, it is clear that the requirements of Chapter 2, Section 5 apply to the extent that complying with them cannot be considered unreasonable and that the assessment is to give special consideration to the benefits of protective measures and other precautions compared with the costs of such measures. According to MÖD, the assessment of whether an activity is compatible with the principle of resource management and whether an injunction is reasonable or not must be made on a case-by-case basis, taking into account the circumstances of the individual case. The size of the activity is one of

several factors influencing this assessment. The size of the activity affects the environmental benefits in the individual case of different heating options¹⁴, for example. In this case, there was no claim that the oil boiler in question gave rise to local health or environmental problems. Instead, the injunction to change the heat source was based on a general need to reduce the use of oil as a heating method. Continued burning of oil, a non-renewable fossil fuel, contributes to greenhouse gas emissions, which is not compatible with the principle of resource management. The preparatory work for the Environmental Code clearly states that the supervisory authority can act not only in the event of direct violations affecting the environment but also when the resource management principle is not observed. MÖD found that the injunction could not be regarded as unreasonable. Among other things, that assessment made note of the fact that the change of heat source would mean a reduction in the cost of heat over a period of time and that changing the source of heat posed no particular difficulties for the operator nor did it cause any complications for the activity.

In a case concerning permits under the Environmental Code (Rönnskärsverken), the Land and Environment Court of Appeal held that it was appropriate to regulate conservation of energy in special terms and conditions in the case of a large, electricity-intensive process industry with high potential for resource management and efficiency in individual parts of the process. (Judgement of the Land and Environment Court of Appeal, 27 June 2017 in Case No. M 7429–13, p. 53).

The climate impact and risks of traffic

Many plans, programmes, activities, and measures impact future traffic demand and the resulting traffic volumes generated in different modes of transport. It is relevant to assess the climate impact of traffic in many environmental assessments.

The four-stage principle applies when planning actual transport infrastructure. The principle involves first considering measures that may affect transport and travel demand and the choice of modes of transport. The second stage considers implementing measures that make more efficient use of the existing infrastructure. In cities and urban areas, stage two might mean reallocating lanes from passenger cars to other, more sustainable modes of transport. Only in stage three would measures involving limited rebuilding be explored if the need cannot be met by stages one or two. The fourth stage involves investment in transport infrastructure and/or major rebuilding measures. The environmental assessment of a road plan for a rebuilding or new construction, for example, is to clearly indicate alternative means of meeting the needs/purpose of the measure that have been identified and the reasons these alternatives have not been selected. The four-stage principle provides important support in this work.

An impact assessment of road plans includes verifying that the general rules of consideration in Chapter 2 of the Environmental Code are fulfilled. In verifying the general rules of consideration, the climate impact of road traffic should be considered. The environmental impact of a road project under Chapter 6 of the Environmental Code cannot be described accurately without considering the impact of traffic, and the impact of traffic is a relevant basis for the choice of alternative locations.

¹⁴ cf. Govt. bill 1997/98:45 Part 2, p. 20.

The design of a road also has an impact on how the project affects traffic demand and how this demand is distributed among different modes of transport and therefore also on the climate impact. This can involve such factors as the choice of road standards, where speed limits for car traffic have a direct impact on the climate-impacting emissions from traffic,¹⁵ and the priority given to capacity in traffic infrastructure for public transport, walking, and cycling.

Since about 70 to 80 per cent of all hazardous goods are petroleum products, they account for a large part of the environmental impact in terms of risk posed by a road or railway. Future transition to other fuels may lead to a different risk scenario, with both increased and reduced risk, and may be a relevant parameter to describe both in the choice of location and in the choice of design.

In municipal comprehensive planning, the municipality can reduce traffic and lower emissions through the location of companies and activities.

A traffic impact assessment may be necessary to better understand how development can affect traffic. By showing how traffic will evolve, the share of passengers in different modes of transport, and the resulting climate impact, this can provide a basis for assessing the consequences of plans and for environmental assessment. The Swedish Transport Administration's publicly available traffic generation tool can be used to assess traffic impact¹⁶.

When the assessment of traffic impact shows that a plan can lead to increased traffic, especially by car and lorry, which would be counter to climate goals (and/or other environmental objectives), an environmental assessment needs to present alternatives that contribute to achieving the environmental objectives. This could involve such measures as alternative locations, alternative land use, and prioritising building and traffic solutions that discourage increased traffic and promote sustainable travel and transport.

2.3 Climate adaptation

Even if greenhouse gas emissions ceased today, climate changes would continue for a long time to come due to past emissions. As a result, measures will be needed to adapt society to the climate changes we are already seeing today and those we will not be able to prevent in the future. The environmental assessment also needs to include climate adaptation of proposed activities and measures or what a plan or programme allows.

¹⁵ Jägerbrand, A. et al. (2014) Rebound effects of energy efficiency measures in the transport sector in Sweden. VTI Report 827A.

¹⁶

What does a changing climate mean for Sweden?

Climate change will affect society as a whole and have an impact on both human and natural systems. Sweden's climate already has become warmer and the incidence of floods has increased due to milder winters and a trend towards increased precipitation. Most scenarios show that precipitation will continue to increase in all seasons, with the greatest increase in northern Sweden and during the winter. On the other hand, a decrease in rainfall can be expected during the summer in southern Sweden. For all seasons and throughout Sweden, we expect torrential rainfall to become more common. Pronounced and extreme heat waves also will become more common in Sweden in the future. Temperatures will continue to rise, with the biggest changes in the far north

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Below are a number of expected effects:

- **Increased precipitation:** A general increase in precipitation is expected throughout Sweden. The number of extremely heavy precipitation incidents is also expected to increase. Precipitation is expected to increase the most in the northern and western parts of the Sweden. In the mountains precipitation may increase by up to 25 per cent. This means a large addition of water in an area that already has an abundance of precipitation.
- **Increased risk of flooding:** Rising sea levels, increased precipitation, and more intense rainfall increase the risk of flooding.
- **Increased risk of avalanches, landslides, and erosion:** Changes in water levels, water flows, sea-wave power, droughts, groundwater levels, pore pressure, groundwater flows, ground run-off/cloudbursts, air temperature, snow cover, frozen ground, and days with temperatures both above and below freezing affect soil conditions.
- **Increased risk of water scarcity and drought:** Changes in precipitation and increased evaporation can lead to increased summer drought and low groundwater levels in southern Sweden. This can entail an increased risk of fire in forests and on land.
- **Climate zones move north:** Estimates indicate that the length of the growing season could expand by between one and two months throughout Sweden, except in the far south, where the increase could exceed three months.
- **Smaller proportion of precipitation falling as snow:** with reduced snow cover as a result.
- **Changes in the number of days with temperatures both above and below freezing:** In southern Sweden, there are fewer days with temperatures both above and below freezing while there are more such days in the north of the country.

Why is climate adaptation needed?

¹⁷ <https://www.naturvardsverket.se/Sa-mar-miljon/Klimat-och-luft/Klimat/Klimatet-i-framtiden/Effekter-i-Sverige/>

¹⁸ <https://www.smhi.se/kunskapsbanken/vad-betyder-2-c-global-temperaturokning-for-sveriges-klimat-1.92072>

¹⁹ <http://www.klimatanpassning.se/hur-forandras-klimatet>

Climate adaptation refers to measures aimed at preventing damage to the environment and people's lives, health, and property by adapting society to the consequences of a changing climate.

Climate adaptation is needed because:

- today's society is adapted and planned based on a certain climate that is now changing;
- climate change brings new risks, vulnerabilities, and opportunities;
- we need to be prepared for unprecedented weather events;
- proactive decisions reduce the need for crisis management and enable synergies in investments, because preventive investments usually are cheaper than absorbing the costs of adverse climate effects afterwards;
- to be sustainable in the long term, society needs to make plans that account for the prevailing climate and especially that of the future.

The initial paragraph in Chapter 1, Section 1 of the Environmental Code states that the Environmental Code is to be applied in such a way that human health and the environment are protected against damage and detriment. In addition to meeting this requirement, climate adaptation measures also benefit society, which creates a need to think about current and future climate change and its effects in the planning of society.

National climate adaptation strategy

The National Strategy for Climate Adaptation²⁰, which was adopted in 2018, brought about two legislative changes to the Planning and Building Act (2010:900). According to the changes, municipalities are to include climate-related risk factors on the built environment (avalanches, landslides, erosion, and flooding) in their comprehensive plan and propose mitigation measures. Municipalities are also mandated to stipulate in the zoning plan that land permits are required for land measures that may decrease the permeability of soils. These changes to legislation went into effect on 1 August 2018. Work on national adaptation by public authorities is governed by the Climate Adaptation Ordinance (2018:1428). The ordinance went into effect on 1 January 2019 and applies to all 21 county administrative boards and 32 national authorities. It obligates the authorities to initiate, support, and evaluate work on climate adaptation based on the authority's operational area.

2.4 Accidents and risks

A changing climate can result in a variety of risks and accidents. This means that, when identifying, describing, and assessing environmental impacts, an environmental assessment should highlight the climate-related risks of accidents that could have serious consequences for human health and the environment. This is specifically regulated for activities and measures where a specific environmental assessment is to be carried out (see Chapter 6, Section 2 and Chapter 35, Section 4), but also relates to the strategic environmental assessment, particularly in view of the requirements to account for such risks in a comprehensive plan (see Chapter 3, sections 5 and 7 of the Planning and Building Act). The clarification for specific environmental assessments in Chapter

²⁰ Govt. bill 2017/18:163, National Strategy for Climate Adaptation

6, sections 29 and 35 of the Environmental Code are based on Article 3.1 and Recitals 13 and 15 to the amending directive.²¹

A specific environmental assessment is to identify, assess, and describe the environmental impacts likely to arise as a result of external events. Section 18 of the Environmental Assessment Regulation also specifies that an Environmental Impact Assessment is to cover the climate impact of the activity and the vulnerability of the activity to climate change or other external events.

The amending directive points to Recital 15 as reason to highlight external events affecting the activity. This Recital states that ensuring a high level of protection of the environment requires that precautions be taken for projects likely to have a significant environmental impact due to their sensitivity to serious accidents or natural disasters (such as floods, vegetation fires, rising sea levels, avalanches, landslides, and erosion). Since climate change can lead to an increased risk of floods and fires in forests and on land, it is important to assess the risks associated with such events:

- Vulnerability (exposure and resilience) of an activity to effects that could cause serious accidents or disasters;
- The likelihood of such accidents or disasters occurring;
- Consequences if an accident occurs and results in negative environmental effects.

Annex 4 to the amending directive specifies what information is to be included in the Environmental Impact Assessment. Read more about the content of the Environmental Impact Assessment here. [LINK](#) to page

The Civil Protection Act (2003:778) requires an operator to be prepared to avoid accidents and fires when engaged in activities that can be dangerous. Being prepared means the operator can or has purchased the ability to carry out rescue operations/prevent harm to people and the environment. Read more about this here: <https://www.msb.se/en/about-msb/legislative-areas/>

The risk assessment within specific environmental assessments can also be linked to what is known as the Seveso Directive. This concerns preventing and limiting the consequences of serious chemical accidents for people and the environment. In Sweden, the directive has been introduced through the Seveso legislation, which covers the act (1999:381), ordinance (2015:236) and regulations (MSBFS 2015:8) on measures to prevent and mitigate the consequences of serious chemical accidents. The Seveso rules apply to certain designated activities involving large quantities of hazardous substances. The operator is obligated to take preventive measures for risks and consequences of serious chemical accidents to people and the environment. Since a change in the climate may increase the risk of accidents, it becomes particularly important for operators covered by the Seveso legislation to describe such climate-related risks. Operators subject to requirements of Seveso legislation are also covered

²¹ Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

by other legislation, including the general rules of consideration in Chapter 2 of the Environmental Code. Seveso activities that require a permit under Chapter 9, Section 6 of the Environmental Code are exempt from the requirement for notification according to the Seveso legislation, Section 5 of the Seveso Directive. For activities where environmental code consultation has taken place, the consultation obligation under the Seveso legislation Section 10 of MSBFS 2015:8 does not apply. Instead, the environmental code consultation is also to cover the requirements of section 13 of the Seveso legislation. The operator is to investigate and consult on external factors (events) that may affect the safety of the activity.

2.5 Scenarios for calculating future climate trends

A climate scenario describes possible future climate trends from a meteorological standpoint and can be expressed in terms of a specific climate index, such as the expected annual average temperature or precipitation amount. The simulated climate in a climate scenario combines the choice of emission scenario, choice of climate model, and the time period to be studied. Climate scenarios are usually denoted by the global climate model and the radiative force scenario used for the projections (such as RCP4.5 described below).

In 2013 and 2014, the UN's Intergovernmental Panel on Climate Change (IPCC) published its fifth assessment report on the state of knowledge concerning climate change. The IPCC assessment reveals four possible scenarios for the global temperature increase. The scenarios, called Representative Concentration Pathways, are abbreviated as RCP. The RCPs, which measure the level of radiative forces generated by the various scenarios through 2100, are not the same as the direct temperature increase. However, with increased radiative force, the global temperature increases. The four RCPs are 2.6, 4.5, 6.0 and 8.5. Read more about what these scenarios mean in the Swedish Environmental Protection Agency's and the Swedish Meteorological and Hydrological Institute's Quick Guide to the IPCC's RCP 2014 scenarios²².

The four RCP scenarios depend on how quickly the world succeeds in slowing emissions of greenhouse gases. The current trend is for increasing greenhouse gas concentrations in the atmosphere, and the latest research from the IPCC shows that Earth's global average temperature has already risen by about one degree compared with pre-industrial times.²¹ From a global point of view, the most important sources of this increase are the burning of fossil fuels, deforestation in the tropics, and agriculture. The current trend corresponds to RCP 8.5. None of the climate scenarios presented above (RCP 2.4, 4.5, 6.0, 8.5) are compatible with the Paris Agreement's goal of limiting the global average temperature increase to 1.5 degrees Celsius. To limit the negative consequences of climate change, the global temperature increase needs to be kept as far below two degrees Celsius as possible. The current size and rate of increase in emissions coincide with an estimated global average temperature increase of about

²²

https://www.smhi.se/polopoly_fs/1.140001!/Snabbguide%20till%20IPCCs%20RCP%20Scenarier.pdf (in Swedish)

four degrees towards the end of the 21st century. Calculations from the Swedish Meteorological and Hydrological Institute (SMHI) and IPCC show that the temperature increase will not be evenly distributed over the globe. It will be more pronounced in northern latitudes, including in Sweden. It should be emphasised that climate scenarios, models, and methods for projecting a future climate are constantly evolving. The IPCC will present its sixth assessment of the scientific state of knowledge in 2022. This is why it is important to subject the basic data underlying calculations to a reality test in connection with new knowledge being presented by IPCC and SMHI.

Choice of climate scenario in environmental assessment

To understand which climate-related risk needs to be taken into account in a strategic or specific environmental assessment, one has to choose which climate scenario to use as a starting point. Global climate scenarios work well to study the overall change in climate throughout the world, but more detailed studies require regional climate scenarios. The choice of climate scenario itself is crucial because different climate scenarios entail a variation in the extent of different climate effects. For example, a certain sea level rise is calculated at RCP4.5 and a higher one if RCP8.5 is assumed. An impact study can also facilitate an analysis. Here, the impact of a sector from the various climate indices as deduced from a climate scenario (such as expected precipitation) is compared to a specific sector that is not of a meteorological nature, such as a drainage system²³. All in all, this means that an analysis needs to consider which future possible climate change should be included in an environmental assessment. Risk assessment becomes a major factor because risk itself is a function of probability and consequence²⁴. For example, if a major consequence is involved, the activity should be adjusted so that the probability of the event is low.

There currently are no national guidelines for which climate scenario should guide long-term investments and decisions. The National Strategy for Climate Adaptation has decided it is inappropriate or may be directly counterproductive to determine which climate scenario and time perspective should apply to all parties in society.²⁵ From the above RCP scenarios, we can deduce that the choice of emission scenario has very little significance for the next few decades, but that this will change around the middle of the century. That means the time perspective becomes particularly important for long-term

²³ <https://www.smhi.se/klimat/framtidens-klimat/vagledning-klimatscenarioer/vad-ar-effektstudier-1.80291>

²⁴ https://www.smhi.se/polopoly_fs/1.85315!/Menu/general/extGroup/attachmentColHold/mainCol1/file/klimatologi_11.pdf

²⁵ National Strategy for Climate Adaptation, 2018.

investments such as buildings, water systems, or extensive transport infrastructure projects, but even within the selected RCP, a range of probability for different outcomes needs to be considered. For shorter periods of time, such as 10 years, climate scenarios play less of a role because the natural variability of the climate is too great to make a distinction between the effects of climate change and naturally occurring variations in the weather system. The precautionary principle in the Environmental Code's rules of consideration (Chapter 2, Section 3) can serve as a starting point by stipulating that anyone who engages in or intends to carry out an activity or take action is to take the protective measures, observe the limitations, and take the necessary precautions to prevent, inhibit, or counteract the activity or measure from harming or impairing human health or the environment.²⁶

Consequently, a scenario appropriate to use for each occasion cannot be specified. Depending on the time horizon and the risk that may arise if a particular scenario occurs, a case-by-case assessment needs to be made. Since we cannot predict in detail how climate and weather will evolve in the future, decision-making methods need to take this into account. In the Environmental Impact Assessment, it is important to describe the basis for choosing the climate scenario. It is also important to base investigations and environmental assessments on the latest supporting documents of the UN's Panel on Climate Change and SMHI since scientific evaluation of climate change is a research field rapidly developing.

Projected changes in the current situation

The projected changes in the current situation describes how the current state of the environment is expected to change in the future (in Chapter 6, Section 11, p. 3 and Section 35, p. 3). This is used for comparison with alternatives in an environmental assessment. The projected change in the current situation is crucial for assessing the impact of the proposed activity or plan on the surroundings. For projects extending more than 20 years into the future, modelled data and trends to describe the no-action taken alternative should be used.²⁷ It may also be relevant to include trends in, for example, air quality data in peri-urban areas to assess emission levels. In other words, based on trends in air quality data, projections can be made of how the current situation will change. Geographic information systems (GIS) are helpful in analysing and describing a projected change to the current situation.

It is important to describe the uncertainties of the scenarios used in the preparation of the projected change in current situation with which the plan or project is to be compared. The scenarios depend on assumptions about future trends, the natural variability of the climate, the climate models' description of processes in the climate system, and its spatial resolution and chosen time perspective. During the next few decades, natural variation will account for most of the total uncertainty.

²⁶ Environmental Cooperation Sweden and the County Administrative Boards, Klimatanpassning i prövning och tillsyn av miljöfarliga verksamheter och förorenade områden ("Climate adaptation in the inspection and enforcement of environmentally hazardous activities and contaminated areas").

²⁷ Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessments, p. 33

Climate scenarios for a single geographical location in 50 to 100 years will involve some uncertainty. The more delimited the geographical area, the greater the uncertainty. Regardless of which climate scenario or scenarios are chosen as a starting point, it is important to state reasons for the choice.

3 Continuing challenges with integrating climate aspects into environmental assessments

The Swedish Environmental Protection Agency has called attention to the great need to improve integration of climate aspects into environmental assessments. Since climate change caused by greenhouse gas emissions is a global issue, dealing with it in an environmental assessment at local level can be particularly complex. Adaptation to climate change mostly occurs locally, but measures or lack of measures can have consequences for a larger geographic area. The connection between the activity, the measure/plan, and the climate impact of the programme and the need for climate adaptation to reduce vulnerability to the effects of a changing climate is not always easy to clarify.

Climate aspects differ from several other environmental aspects because the local impact is not always perceived as connected with a particular emission. It can be difficult to make this comprehensible in the Environmental Impact Assessment. Risks, uncertainties, long-term horizons, and complex relationships place high demands on all parties in really coming to terms with climate aspects in an environmental assessment. The design and starting points of the Environmental Code, such as defining the concept of environmentally hazardous activities based on fixed emission sources, also can result in legislation not fully adapted to deal with climate problems.

Several challenges and relevant issues need to be further highlighted in the future to enable good climate-related assessments in environmental assessments:

- Developing appropriate assessment criteria for assessing the effects of an activity, measure/plan, and programme so that different alternatives can be compared, and a reasonable balance can be struck on safeguards.
- Determining how an environmental assessment should address risks related to a changing climate.

Several challenges in the climate objectives need to be addressed in the plan or decision/judgement. Climate aspects connect with several of our social and environmental quality goals. Sometimes they contribute to each other, and at other times one goal must take precedence over another.

- What approach should be taken if no local climate objectives have been established? Can local/regional/national/global objectives be used?
- Can local/regional/national climate action plans be used?

Both the strategic and the specific environmental assessment need to deal with several difficulties in connection with climate aspects, in particular. Several laws apply in parallel, depending on the circumstances involved. For the specific environmental assessment, for example, activities covered by emissions trading related to greenhouse gas emissions cannot be regulated in the same way as other activities under the Environmental Code. Several difficult boundaries also have been drawn in which the

general rules of consideration have a major impact on how the permits of activities are designed in terms of energy efficiency and climate impact. The strategic environmental assessment has parallel laws in the Planning and Building Act and other legislation. This points to the need for a common approach on guidance for how climate aspects should be addressed in environmental assessments based on both laws.

While we note that several challenges exist, it is important to emphasise that environmental assessments are a central and powerful tool for the long-term management of the climate issue. There is great potential in using this tool for environmental assessments to build a sustainable society. For this reason, the Swedish Environmental Protection Agency continues to see a need for developing ways of dealing with climate aspects in environmental assessments and a great need of collaboration among public authorities.

4 Integrating climate aspects into specific environmental assessment

Guidance

We have brought together climate-related issues here that can serve as support during a specific environmental assessment process.

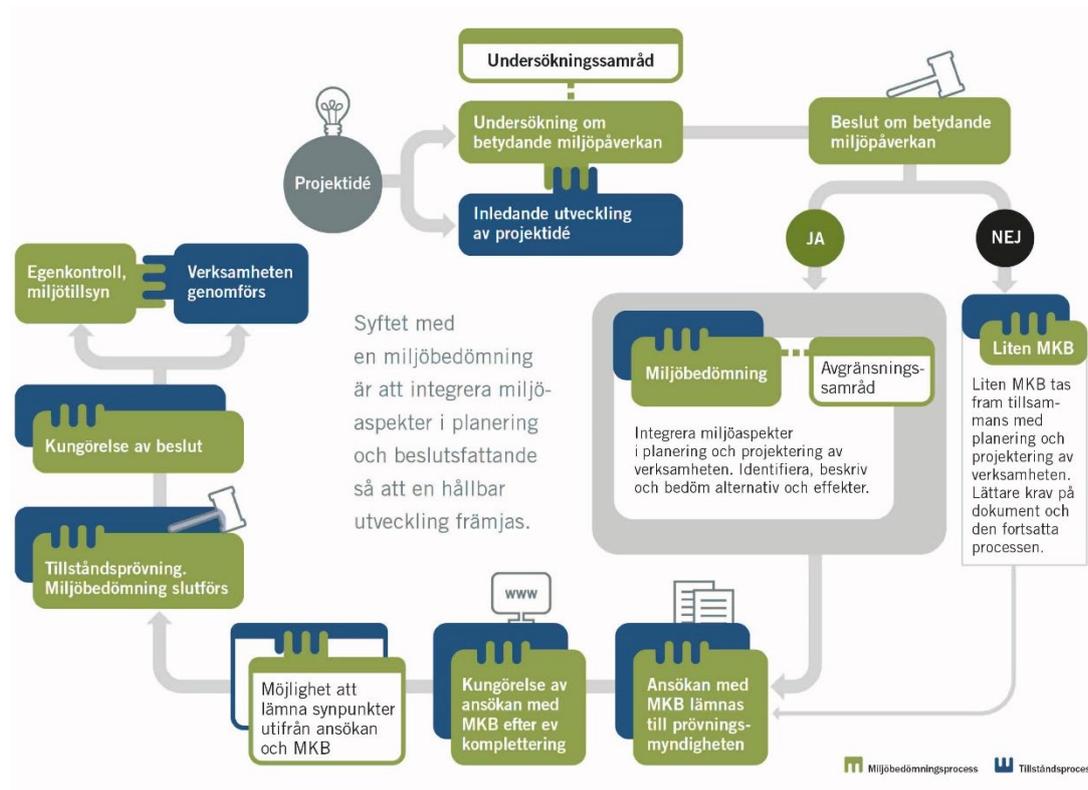


Figure 3. This is a simplified illustration of a specific environmental assessment process. Climate aspects need to be integrated during the entire process.

Below we describe when and how climate aspects are used in an environmental assessment of activities and measures. We also include questions that may be relevant to ask at the different stages. This list of questions should be considered examples and is not exhaustive.

4.1 Investigating climate aspects

Both greenhouse gas emissions and climate adaptation should be highlighted at a general level based on existing evidence early in the process when an activity or measure is designed. Climate aspects can be decisive in determining whether the activity has significant environmental impacts.²⁸ For example, this may involve how the location of the activity affects the emissions that arise when the activity is under

²⁸ Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessments, European Commission, p. x

way at the same time as the activity may be affected by future climate change. Certain activities and measures are regulated by emissions trading scheme provisions. This should then be noted and described at the investigation stage.

During work on an environmental assessment for all types of activities and measures, there needs to be significant effort to reduce climate impacts and the risk of significant environmental impacts. This can be done primarily through ongoing alternative efforts to ensure that the climate objectives can be achieved and that Chapter 2 of the Environmental Code is met. Risks to human health or the likelihood of serious accidents are among the aspects that deserve special attention when assessing whether an activity or measure has a significant impact on the environment, according to sections 10–13 of the Environmental Assessment Regulation.

Risk assessments in environmental assessments can also be linked to the Seveso Directive. This concerns preventing and limiting the consequences of serious chemical accidents for people and the environment.

The documentation for the investigation consultation is to indicate whether it is a Seveso activity and what external events may affect the safety of the activity.

Examples of questions to ask in the investigation:

Conditions

- What documentation is available regarding regional/local effects/risks linked to climate change and with support of existing background data, such as flood risk areas?
- What are the appropriate assessment criteria for assessing the effects of an activity, measure/plan, and programme so that different alternatives can be compared, and a reasonable balance can be struck on safeguards?
- Is there a risk of serious accidents resulting from a change in climate that is relevant for the activity or measure and for future changes? This could include, for example, landslides or flood risk. Is there a risk of accidents affecting human health? (See Chapter 11, sections 6-7 of the Environmental Assessment Regulation.)
- How can an environmental assessment adequately manage risks associated with a changing climate?
- Is this an activity covered by the emission trading scheme?
- Is this a Seveso facility? If so, what external events can affect the safety of the activity?

Risk of impact

- How can climate change affect the activity or measure and what effects resulting from climate change may be significant for the activity/measure over the short, medium, and long term?
- How does this affect the risk assessment of significant environmental impacts?
- Can the implementation of the activity or measure have a significant impact on the environment due to increasing emissions?

Need for adaptation

- Identify the most important factors in need of climate adaptation.

4.2 Delimitation of climate aspects

The delimitation consultation in the specific environmental assessment is to be carried out prior to the work on the Environmental Impact Assessment and is to address the content and design of the EIA. The delimitation consultation involves the party intending to carry out the activity or take the action consulting on the location, scope, and design of the activity or measure and on the environmental effects the activity or measure is likely to have in itself or as a result of external events. The concept of ‘external event’ includes both climate change and serious accidents. Examples of ‘external events’ can be power outages, natural disasters, or serious accidents.

It can often be difficult to define the extent and degree of detail for risk management in an environmental assessment. Not all risk assessments from the investigation need to be summarised in an environmental assessment. Rather, the risks related to environmental effects should be described. This should be highlighted in the delimitation consultation and an appropriate delimitation should be defined based on the supporting documentation.

If the consultation concerns an activity or measure covered by the Seveso legislation, the consultation also is to indicate how serious chemical accidents resulting from the activity or measure can be prevented and limited (Chapter 6, Section 29 of the Environmental Code).

The delimitation of the plan/programme or activity/measure plays a major role in how the effects on climate aspects can be environmentally assessed.

Examples of questions to ask in the delimitation consultation:**Conditions**

- Who are the main owners and public authorities to involve based on the possible effects on different parts of the environment as a result of the activity’s or measure’s climate impact or need for climate adaptation? What documentation do they need prior to the delimitation consultation so that their knowledge can be best utilised?

- What methods are appropriate for describing and assessing the impact on climate and climate adaptation?
- What effects of a changing climate do we need to consider?
- What aspect of the activity or measure generates the most climate impact? What are the motivating factors?
- In which phases will the climate impact be greatest? At the construction stage, during operation, or in the decommissioning phase?
- What are reasonable assumptions about the future, including decided/needed instruments?

Objectives:

- What international, national, regional, and local climate impact and adaptation objectives are relevant (see “Objectives and motivating forces” under section 2.1)?

Risk of impact:

- What is an appropriate delimitation for risk management for accidents? Is this a Seveso facility where no investigation consultation has taken place? Are there external events linked to a changing climate that may affect the safety of the activities?
- What is the limit for cumulative effects in terms of climate impact?
- How is the current situation description to be formulated and what documentation should be used? Which climate scenarios are relevant (see “Climate scenarios” under Section X.X)?
- What climate-impacting measures need to be included?
- What assumptions are appropriate to make regarding such factors as social development, fuels, and technology development? How should we regard the projected change to the current situation in that case?

4.3 Climate aspects with alternative description

Preparing alternatives is important in environmental assessment. The Environmental Code requires that alternatives be included in an environmental assessment so that the party planning an activity or measure can see how the choices during the process can result in different environmental effects and can identify the need for measures to prevent, mitigate, or remedy significant negative environmental effects and help achieve objectives. This increases transparency and enables those who are to decide on permits for an activity or measure to make an informed decision that leads to sustainability.

During an environmental assessment process, developing alternatives revolves around asking questions to clarify how climate impact, a changing climate, and the need for climate adaptation can affect and be influenced by different proposed solutions and locations, and describing the effects and consequences they result in. The following are suggested questions that can help clarify how the climate defines parameters for different proposed solutions. These questions need to be asked during the process of applying for the permit for the activity or measure.

Alternatives:

- How can we manage resources and energy through the design and location of the planned activities?
- What location alternatives may be available that pose lower risks in view of the effects of future climate change (landslides, avalanches, heat, fire, drought, floods, etc.)?
- What location and design alternatives will reduce greenhouse gas emissions?
- How does the activity or measure help achieve climate and climate adaptation objectives?

4.4 Climate aspects when developing the Environmental Impact Assessment (EIA) and protection measures

Requirements for the content of the EIA for activities and measures can be found in Chapter 6, Section 35 of the Environmental Code and are specified through sections 16–19 of the Environmental Assessment Regulation. Section 18 of the Environmental Assessment Regulation states that the environmental effects that the activity or measure is likely to have in itself or as a result of external events, such as climate impact, are to be identified, described, and assessed. An Environmental Impact Assessment is to also include information on measures to prevent, inhibit, mitigate, and remedy adverse environmental impacts of the activities.

The description and assessment of environmental effects should consider the environmental objectives set at EU or member state level related to the project. It may also be relevant to relate to regional or local climate objectives when describing effects.

An environmental assessment is to include anticipated environmental effects that can result from major accidents or disasters and that are associated with the vulnerability of the activity or measure to external events. The clarification is included in Article 3.1 and in Recitals 13 and 15 to the amending directive and in Chapters 6 and 35, Section 4 of the Environmental Code. As a result, an environmental assessment and impact assessment are required to account for risks posed by climate change for individual activities, what environmental effects can be expected from these risks, and how such environmental effects can be prevented, inhibited, or mitigated.²⁹

²⁹ Govt. bill 2016/17:200 p. 128–129.

In many cases detailed risk assessments are needed to provide a basis for determining if proposed land use is appropriate from an accident risk perspective. This means that the risk management process component of risk analysis and risk assessment needs to be done as part of the location assessment conducted within an environmental assessment. Risk management also provides a basis for assessing whether there is a need for risk mitigation measures. In an environmental assessment, risk levels with or without risk mitigation measures should be reported for all alternatives that are relevant from a climate-change perspective.³⁰

Examples of questions to ask when developing the Environmental Impact Assessment:

Impact:

- What is the climate impact of the activity or measure? Section 2.2 on climate impact provides some guidance on how climate impact can be described in relation to goals and local or regional conditions.

Protective measures, etc.:

- What measures are needed to prevent, inhibit, mitigate, or remedy the climate impact or effects of a changing climate?
- How are risks arising from climate change to be prevented, inhibited, or mitigated? What protective and other precautionary measures can be taken?

Resource management:

- Are measures needed to ensure that the general rules of consideration regarding resource management, energy efficiency, and/or best possible technologies are considered?

4.5 Following up climate aspects

It is important to follow up environmental impacts during activities to avoid negative environmental effects and create positive effects. Activities and actions can be followed up through the activity's internal self-monitoring and supervision, as specified in Chapter 26 of the Environmental Code. Follow-up often needs to focus on different things during construction, operation, and decommissioning, but it may be relevant to monitor the environmental impact at all stages.

An important part of the follow-up is drawing on experience and research for future development. In case of new knowledge acquired or pivotal changes in circumstances, it may be possible to amend the permit and conditions by reviewing the activity or

measure. Future climate change could lead to an increase in floods, droughts, heat waves, and other events that we have not been able to predict.

Examples of questions to ask during follow-up:

- How will impact on the climate and adaptation of activities as a result of climate change be monitored?
- How will we adapt the follow-up based on changing circumstances over time?

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