

# Methodology note: Climate risk in important industries

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## Purpose

This section provides information on the climate risks that may be relevant to business and industry in each municipality, specifically on both the risks associated with changes to the weather and climate, and on the risks associated with the transition to a low-emission society. These risks may affect the competitiveness of businesses, which can in turn affect municipalities. The information is intended to help municipalities to map the overall level of climate risk to which they are exposed.

Our starting point is that climate risk may create various types of challenge for some industries. Physical risk and transition risk may weaken competitiveness and, in the worst case, result in job losses if businesses do not succeed in adapting to climate change or in adjusting their activities in line with the transition to a low-emission society.

We recommend that municipalities use the questions about the consequences of physical risk and climate risk for business and industry in their mapping of climate risk and when assessing their repercussions for, for example, large-scale land use projects and the risk of depopulation. We also recommend that municipalities consider such questions in dialogue with private sector industry organisations as well as with individual local businesses. Dialogue of this sort can enable municipalities to assess the vulnerability of the businesses in their area. This will enable them to build a more accurate picture than if they just rely on the information on the extent to which the industries in their area are exposed that is presented in this section.

## Which industries are included?

CICERO has chosen to include 24 of the more than 90 industries covered by Statistics Norway's double-digit standard industrial classification codes. Our selection is based on our assessment of each industry's exposure to climate risk. Some industries are already being affected by climate risk. With regard to other industries, models from organisations such as the International Energy Association (IEA) indicate that it is probable that they will be subject to physical and/or transition risk under various future scenarios. When selecting which industries to include, we also used other reports for reference purposes, e.g. *How to Measure Climate Risk* (the Norwegian Climate Foundation) and *An Update on the Known Consequences of Climate Change in Norway* (CICERO and the Western Norway Research Institute for the Norwegian Environment Agency). Even so, not all industries exposed to climate risk could be included and different industries could have been chosen. See table 1 to view the 24 industries that have been included on the lists.

Since the focus here is on the risk to business and industry, areas such as water and wastewater and the water supply industry have not been included. These sectors are exposed to physical risk to a significant extent, but they are mostly dominated by publicly owned organisations that are not subject to competition, meaning that job losses as a result of climate risk are probably not a risk.

## **Which industries are shown at the municipality level?**

The industries that are shown for each municipality are those five industries of the 24 we have selected that employ the largest numbers of people in the municipality in question, with this information calculated on the basis of Statistics Norway's employment figures by place of residence for 2018. In order to be included on the list, an industry also has to be responsible for at least 4% of the people employed in the 24 selected industries for the municipality in question.

An alternative approach would have been to select those industries that employed the largest proportion of people across all industries in each municipality. The picture this would have produced would have been less interesting in this context, as the largest sectors for employment according to Statistics Norway's data are often education and health.

## **Exposure is not the same as vulnerability**

The tables for each industry provide an indication of how the entire industry is exposed to climate risk. For example, the risk table for shipping will be the same for all municipalities that have this industry. Assessments of how vulnerable individual businesses are must be made locally as this depends on the extent to which each individual business is prepared for the risk and the type of capabilities and willingness it has to adapt to the changing climate or to adjust its activities.

## **Risk in focus**

In this tool we only look at risk. The transition phase will also bring opportunities for all industries, and this should not be forgotten.

Each industry is assessed on the basis of the greatest conceivable risk, which is to say on the basis of the worst case scenario for the industry. For agriculture, for example, this means that a scenario involving a high level of global warming has been taken as the starting point. To take another example, for industries related to the oil and gas industry, a scenario that is more in line with the Paris Agreement has been taken as the starting point, and this accordingly involves assuming the industry will need to adapt its activities to a significant extent and therefore will be subject to transition risk.

Table 1: The 24 industries included on the list

Statistics Norway code	Industry
01	Crop and animal production, hunting and related service activities
02	Forestry and logging
03	Fishing and aquaculture
06	Extraction of crude petroleum and natural gas
09	Oil and mining support services
10	Manufacture of food products
19	Manufacture of coke and refined petroleum products
20	Manufacture of chemicals and chemical products
22	Manufacture of rubber and plastics
23	Manufacture of non-metallic mineral products
24	Manufacture of basic metals
25	Manufacture of fabricated metal products except machinery and equipment
28	Manufacture of machinery and equipment
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment
33	Repair and installation of machinery and equipment
35	Electricity, gas, steam and air conditioning supply
38	Waste collection, treatment and disposal activities, materials recovery
42	Civil engineering
45	Wholesale and retail trade and repair of motor vehicles and motorcycles
47	Retail trade except motor vehicles and motorcycles
49	Land transport and transport via pipelines
50	Water transport
52	Warehousing and support activities for transportation

