

# Resources

## Natural Resources

### Hydropower - An important energy source for Norway in the future?

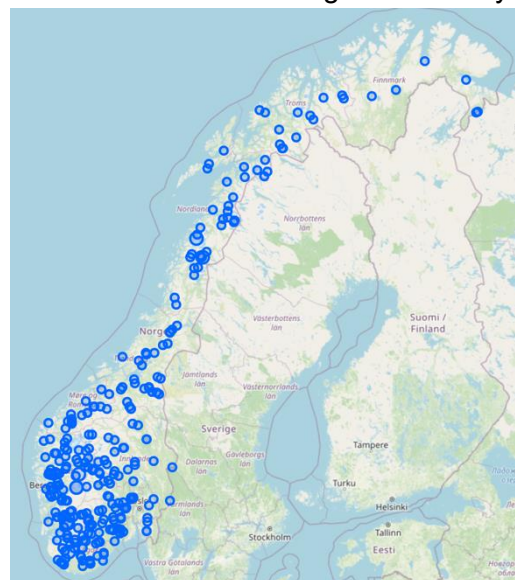
In 2016, the Norwegian government announced a plan on the future of Norway's energy system in 2030. This included a reduction of overall carbon emissions and a focus and increase of renewable energy. Due to its natural advantages of its topography with the long coastline and the fjords, it seems like Norway has the perfect conditions for hydropower. Might hydropower be a target that should be strengthened?

Hydropower uses the natural flow of the water to produce renewable energy. The generated energy needs to be converted into electric energy through turbines and generators and it is mandatory to build a dam or a similar structure to be able to store the water and lead it through the turbine to generate the wanted electricity. After the process of electricity generation, the water can be returned to the natural water cycle, which makes this energy form a renewable energy.

Therefore, no resources are being destroyed or used up in the process of creating electric energy from the natural flow of the water. Moreover, it can be adjusted based on the amount of power that is needed. Other than all of the other known forms for renewable energy production like solar power or wind energy. The potential energy can be determined through the amount of water flowing through the structure and the height of the dam or reservoir.

There are every many hydropower plants in Norway, that create most of the Norwegian electricity.

The energy plants are mostly located in the south of Norway along the many fjords in central regions of the country as well as in coastal regions. In central and northern parts of Norway plants can occasionally be found. In total 291 hydro power plants are located there and have a total capacity of 30.474 giga watt.<sup>1</sup> In our days 96 per cent of the electricity in Norway is generated through renewable hydropower. The largest producer of hydroelectric power worldwide is China with a capacity of circa 300 giga watt, which is about 10 times more the Norwegian capacity.<sup>2</sup> While in Germany the total capacity amounts 9.7306 giga watt and 109 plants, which is about one third of the Norwegian capacity and total amount of plants.<sup>3</sup>



*Location of the hydropower plants in Norway*

Overall, hydropower offers many benefits to Norway like easy access to cheap energy: the overall costs are about 0.12 EUR per kWh. Furthermore, it contributes a reliable and stable source as it is not dependent on natural phenomena (like the sun for solar power, wind for wind energy) other than a constant flow of water which is most of the time given in Norway because of the weather

<sup>1</sup> <https://database.earth/energy/power-plants/hydro-power/norway> (Retrieved 2024-03-28)

<sup>2</sup> <https://database.earth/energy/power-plants/hydro-power/china> (Retrieved 2024-03-28)

<sup>3</sup> <https://database.earth/energy/power-plants/hydro-power/germany> (Retrieved 2024-03-28)

conditions. Additionally, it is quite flexible and through small changes adaptable to both: large- and small-scale electricity generation.

Next to these positive factors there are also many negative aspects that limit the spread of more hydropower plants in Norway. Firstly, there is space needed for the construction of energy plants which can destroy vegetation and a dam in the fjord can destroy the landscape and lead to a rather monotonous landscape and a destruction of biodiversity and nature. The location, which is as well important for the plants is quite hard to find, as there is more space in the rather northern regions of the country, but there also is a higher number of indigenous people living there. This can again lead to conflicts with the population through the destruction of natural habitats or important places for the indigenous people. One example for this is the Alta hydropower in Sautso in Alta Municipality, which is the biggest hydropower plant in the Finnmark region. It has an annual production of 694.7 GWh<sup>4</sup> and uses the 110-meter-high concrete dam to produce energy. It was and still is a controversial topic in the area as there is reindeer herding and salmon migration in the Alta River and those things cannot happen as they used to be due to the construction of the hydropower dam, which started to produce energy in 1987.

## **Oil – Norway as one of Europe's most important oil suppliers**

As Europe's biggest oil supplier, Norway has over 93 oil production platforms. Most of the platforms are located in the North Sea, but also in the Norwegian Sea and the Barents Sea. Oil was first discovered in the Norwegian offshore area in 1969. About 500 kilometers off the coast is the Ekofisk field, which is still one of the largest and most important oil fields in Norway. The discovery of this oil field marked the beginning of a new era for Norway.<sup>5</sup> In 2018, Norway was the world's fifteenth-largest oil-producing country, producing around 1,517,000 barrels per day.<sup>6</sup>

One of Norway's largest oil fields is the Statfjord oil field, which is located in the North Sea. 85 per cent of the oil field is located in the Norwegian sector and 15 per cent in the British sector. The field was discovered in 1974 and has since developed 3 sectors for oil extraction: Statfjord A, Statfjord B and Statfjord C. Statfjord A was considered the largest oil platform in the world after its completion and started to extract oil in November 1979. The platform is located in the center of the oil field and can store up to 1.3 million barrels of oil. It was originally planned to close the platform in 2022, but this was delayed until 2027. Statfjord B in the southern part of the oil field was opened in 1982 and, like Statfjord C in the northern part of the oil field, which was opened in 1985, has an oil storage capacity of 1.9 barrels.<sup>7</sup> The oil in Statfjord lies 2500 to 3000 meters deep and was formed around 160 million years ago. At the height of operations, 700,000 barrels a day were extracted from the earth. By 2004, 4 billion barrels of oil worth 1045 billion Norwegian kroner had been extracted in Statfjord alone. The oil is loaded from the platforms onto tankers which then transport it to the oil harbor.

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<sup>4</sup> <https://www.statkraft.com/about-statkraft/where-we-operate/norway/alta-hydropower-plant/> (Retrieved 2024-05-26)

<sup>5</sup> <https://www.abipur.de/referate/stat/676503772.html> (Retrieved 2024-04-14)

<sup>6</sup> [https://de.wikipedia.org/wiki/Norwegen#Fossile\\_Energieressourcen](https://de.wikipedia.org/wiki/Norwegen#Fossile_Energieressourcen) (Retrieved 2024-04-14)

<sup>7</sup> <https://www.nsenergybusiness.com/projects/statfjord-field-north-sea/#:~:text=The%20Statfjord%20A%20platform%2C%20with,of%20approximately%201.3%20million%20barrels.> (Retrieved 2024-04-14)

One of the newer drilling platforms in Norway is the Goliat drilling platform, which started operations in 2016. The drilling platform is the northernmost in the world and is located in the Barents Sea, 85 kilometers northwest of our partner city Hammerfest.

Goliat is the first offshore field in the Norwegian part of the Barents Sea to produce oil. Under the seabed lies an oil field with 180 million barrels and thus 15 years of reserves. Goliat was one of the first projects in the Barents Sea, but since then more and more focus has been placed on the sea off Finnmark. The oil fields in the North Sea are already largely exploited, while the Barents Sea is still almost untouched. However, there are many disadvantages for oil extraction in the northern parts. The oil fields are located very far out and, unlike in the south of the country, Finnmark has a very poor and underdeveloped infrastructure, which makes projects even more expensive. Another influencing factor are the weather conditions. The cold and storms don't make the work and transport any easier.<sup>8</sup>

Even though oil is repeatedly criticized, Norway is planning to expand its oil industry. On the one hand, oil production will shift more and more from the south to the north. On the other hand, 30 companies were only granted product licenses in 2021. Of the 61 product licenses, 34 are located in the North Sea, 24 in the Norwegian Sea and 3 in the Barents Sea.<sup>9</sup> While Norway is now focusing on the northern oil fields, the resources in the south will soon be completely exhausted. Statfjord is not the only oil platform that is due to close in the next few years. Statfjord was already 48 per cent depleted by the mid-1990s.<sup>10</sup> However, it will be difficult for Norway to move away from the oil industry, as it has been of particular importance to Europe since the Ukraine war started and many European nations previously relied on Russian oil. In addition, it is one of Norway's most successful industries.

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<sup>8</sup> <https://www.deutschlandfunk.de/norwegen-die-goldenen-zeiten-sind-vorbei-100.html> (Retrieved 2024-04-14)

<sup>9</sup> <https://www.mordorintelligence.com/de/industry-reports/norway-oil-and-gas-upstream-market>

<sup>10</sup> <https://de.wikipedia.org/wiki/Statfjord> (2024-04-14)

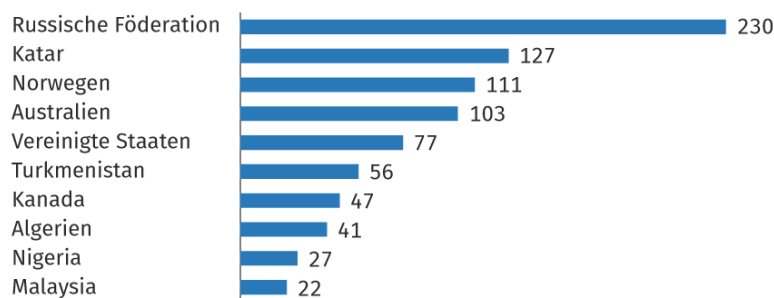
## Natural gas

Natural gas is a naturally occurring mixture of gaseous hydrocarbons, mainly consisting of methane with a percentage share of over 90 percent. It is created from years of pressure and heat that are exerted on remains of plants and animals deep down beneath the earth's surface and in ocean floors. The fossil fuel is a highly valuable energy source once processed fully and burned.<sup>11</sup>

Norway was in possession of 2.08 trillion cubic metres of proved natural gas in 2022.<sup>12</sup> In comparison with Germany's gas reserves estimated at only 0.05 billion cubic metres (bcm) of gas, the significance of natural gas to Norway and its economy becomes obvious.<sup>13</sup> According to the International Energy Agency (IEA), the country is the third largest gas exporter in the world after Russia and Qatar with 111 billion cubic metres of gas exports in 2020.<sup>14</sup> Particularly in recent years, the significance of Norwegian gas reserves to the EU has risen rapidly due to the decline in Russian gas imports as a consequence of the Ukraine war. Thus, Norway has overtook Russia as Europe's biggest gas supplier with 30.3% of natural gas supplied to the EU in 2023.<sup>15</sup>

### Die 10 größten Gas-Exporteure weltweit 2020

Nettoexporte in Milliarden Kubikmeter



Quelle: IEA, vorläufige Daten. Pipelinegas und Flüssiggas.

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All discovered Norwegian gas fields are located offshore in the North Sea, Norwegian Sea and Barent Sea off the west coast of Norway. What is more, the resources are extracted from hundreds of metres below sea level as they lie deep in the seabed.

The largest gas field is Troll which is situated in the northern part of the North Sea about 65 kilometres off the western coast. Its reservoirs are estimated to make up for 40% of all of Norway's proved natural gas.<sup>16</sup> Ormen Lange is the second largest gas field with reserves of around 300bcm which is located further north in the Norwegian Sea.<sup>17</sup> The plant is of great importance to the UK as it supplies 20% of the UK's gas.<sup>18</sup>

<sup>11</sup> Faramawy, S., Sakr, A.-E., Zaki, T.: Natural gas origin, composition, and processing: A review. <https://www.sciencedirect.com/science/article/abs/pii/S1875510016304139> (access: 04/13/2024)

<sup>12</sup> <https://www.statista.com/statistics/703567/proved-reserves-of-natural-gas-in-norway/#:~:text=Proved%20reserves%20of%20natural%20gas,the%20beginning%20of%20the%20century> (access: 04/20/2024)

<sup>13</sup> <https://www.statista.com/statistics/1330140/natural-gas-reserves-proven-germany/> (access: 04/20/2024)

<sup>14</sup> <https://www.iea.org/reports/key-world-energy-statistics-2021/supply#natural-gas> (access: 04/20/2024)

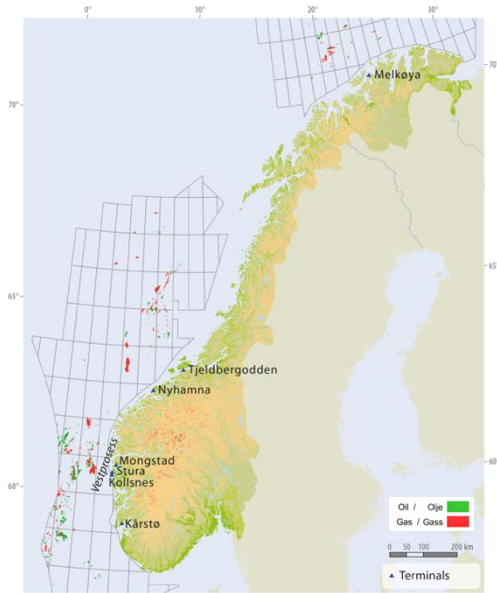
<sup>15</sup> <https://www.consilium.europa.eu/en/infographics/eu-gas-supply/#0> (access: 04/21/2024)

<sup>16</sup> <https://www.equinor.com/energy/troll> (access: 04/23/2024)

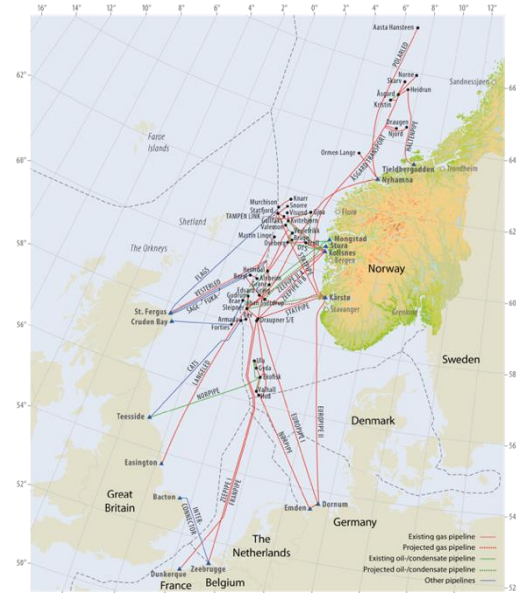
<sup>17</sup> <https://www.enerdata.net/publications/daily-energy-news/norway-approves-40-bcm-expansion-plan-its-second-largest-gas-field.html> (access: 04/26/2024)

<sup>18</sup> <https://www.shell.com/what-we-do/major-projects/ormen-lange/ormen-lange-overview.html> (access: 04/21/2024)

Besides, the Snøhvit development in the southern Barent Sea above the North Cape comprises three fields – Snøhvit, Albatross and Askeladd. This complex was the first development in the Barent Sea and is estimated to contain 193bcm of gas. The Snøhvit compound is directly connected to the Hammerfest LNG plant Melkøya via a 143km long pipeline, from where the gas is shipped aboard by LNG ships.<sup>19</sup> This is rather uncommon as 95% of Norway’s gas production is exported to the EU and UK via pipelines.<sup>20</sup>



Norwegian oil and gas fields<sup>21</sup>



Pipelines for Norway's petroleum exports<sup>22</sup>

Additionally, the total amount of Norway’s gas reserves is equivalent to 457 times its annual consumption.<sup>23</sup> Consequently, the country can easily sustain itself when it comes to the national energy supply. This is due to both the small domestic energy market and the use of green energy. Norway is known for its extensive use of renewable energy sources such as hydropower and wind and solar energy which is why the population makes even less use of its own fossil fuels. As a result, the country is able to export a substantial proportion of its gas. Thus, the natural gas business serves as a major economic branch in Norway as it generates prominent sums of money.

In 2024, Norway’s exporting petroleum industry — both gas and oil — is expected to make up for 23.8% of the country’s gross national product (GDP). Moreover, hydrocarbons contributed around 73% to the total export revenues in 2022.<sup>24</sup> This underlines the importance but also the dependency of the petroleum industry to Norway which might cause issues in the future when natural resources are used up. Therefore, a structural change within the economy will be inevitable due to the monostructural focus on oil and gas exports. In order to smoothen the transition to different economic branches, a stronger commitment towards a diversification within the secondary sector as well as a tertiarisation would help to prepare for what is to come.

<sup>19</sup> <https://www.equinor.com/energy/snohvit> (access: 04/22/2024)

<sup>20</sup> <https://www.norskpetroleum.no/en/production-and-exports/> (access: 04/21/2024)

<sup>21</sup> <https://www.norskpetroleum.no/en/production-and-exports/onshore-facilities/> (modified, access: 04/21/2024)

<sup>22</sup> <https://www.norskpetroleum.no/en/production-and-exports/the-oil-and-gas-pipeline-system/> (access: 04/21/2024)

<sup>23</sup> <https://www.worldometers.info/gas/norway-natural-gas/#:~:text=Norway%20has%20proven%20reserves%20equivalent,levels%20and%20excluding%20unproven%20reserves> (access: 04/21/2024)

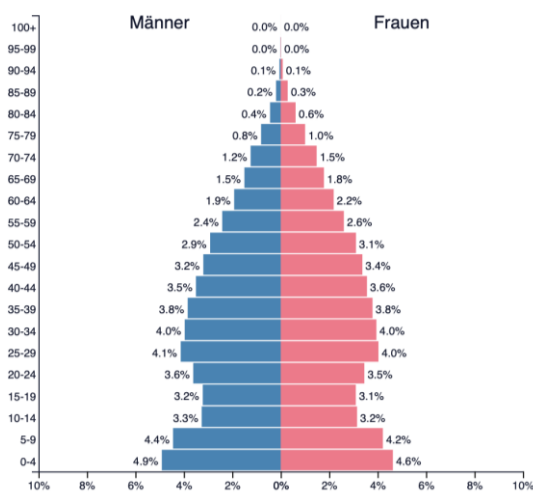
<sup>24</sup> <https://www.statista.com/statistics/1450033/oil-industry-share-of-gdp-norway/#:~:text=In%202024%2C%20Norway's%20oil%20and,Norway's%20export%20value%20in%202022.> (access: 04/30/2024)



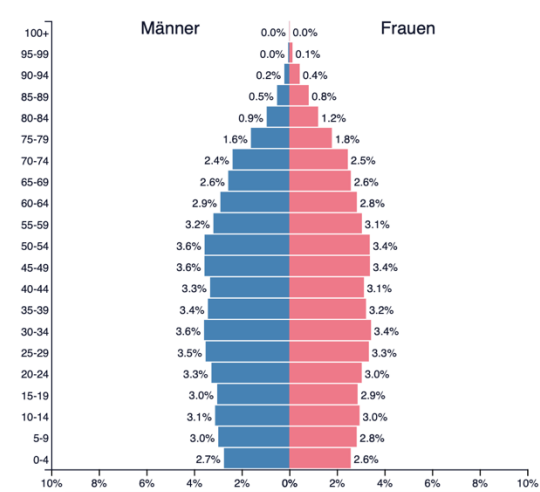
# Human Resources

## Demographic changes

Norway faces an ageing population with low birth rates and will probably have to deal with many difficulties in the following decades. The total population in Norway is 5,457 million and the population density is with 15 inhabitants per km<sup>2</sup> relatively low (for comparison the population density in Germany adds up to 233 inhabitants per km<sup>2</sup>). The birth rates are around 1.5 children per woman and also quite low and still even lower than the birth rates in Germany (1.58 children per woman).<sup>25</sup> The population changed since the 1950s from an aged to an ageing population and the number of births as well as the number of young people went down. Moreover, the number of older people has increased over the last 70 years and more people reach higher ages.



Population Pyramid of Norway 1950<sup>26</sup>



Population Pyramid of Norway in 2020<sup>27</sup>

<sup>25</sup>[https://datacommons.org/place?utm\\_medium=explore&dcid=country/NOR&mprop=count&popt=Person&hl=de](https://datacommons.org/place?utm_medium=explore&dcid=country/NOR&mprop=count&popt=Person&hl=de) (Retrieved 2024-05-26)

<sup>26</sup> <https://www.populationpyramid.net/norway/1950/> (Retrieved 2024-05-26)

<sup>27</sup> <https://www.populationpyramid.net/norway/2020/> (Retrieved 2024-05-26)

## Shortage of workers

Norway suffers greatly from a shortage of skilled workers and professionals. According to the Norwegian Labour and Welfare Administration (NAV), the country's average unemployment rate was at a record low of 1.8% in 2023. In northern counties, such as Nordland, Troms and Finnmark, the unemployment rate was estimated to be even lower at only 1.5%. Therefore, different from Germany, Norway has full employment with rates below 2% which is when the number of unemployed is lower than the number of job vacancies.

The main sectors that are affected by this lack of employees in Norway are the secondary and the tertiary sector. This is particularly pronounced in the north where there was a total of 5,013 vacancies, according to the NAV. Within the secondary sector the issue was most pronounced in the manufacturing industry and in building and construction in March 2023. At the same time the tertiary sector was struggling with even more jobs left unfilled in nursing and healthcare with a total of 1,389 vacancies and almost 500 vacancies in the educational branch. Engineering and IT also lacked more than 300 qualified workers.<sup>28</sup>

In contrast, the labour shortage in Germany is most concentrated in the tertiary sector. This is mainly due to the wages, which are often significantly higher in the manufacturing industry than in service professions.

One particularity in Norway is the population density of 15 people per km<sup>2</sup><sup>29</sup> which is very low when compared to Germany's population density of 239 citizens per km<sup>2</sup>.<sup>30</sup> In fact, Norway's population density is one of the lowest in all of Europe which is why the total Norwegian population is only 5,511,374.<sup>31</sup>

Not only is this caused by large areas of uninhabitable land due to fjords, green areas and high reliefs, but the climatic conditions also make many areas unpopular for long-term stays.

Additionally, the demographic change towards an ageing population, which is very common among more economically developed countries (MEDCs) like Norway, Germany and France, stokes the lack of skilled workers. This is because qualified professionals retire whilst significantly fewer young people move up in the ranks to fill their places.

Generally, it can prove to be difficult to keep up with constant innovation and international competition for highly developed countries like Norway, specifically in branches such as IT and the oil and gas industry. Therefore, even the qualified personnel are obliged to always stay on track with modernisation in order not to be outcompeted by other international corporations.

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<sup>28</sup> this and the previous paragraph refer to: [https://eures.europa.eu/living-and-working/labour-market-information/labour-market-information-norway\\_en](https://eures.europa.eu/living-and-working/labour-market-information/labour-market-information-norway_en) (access: 04/30/2024)

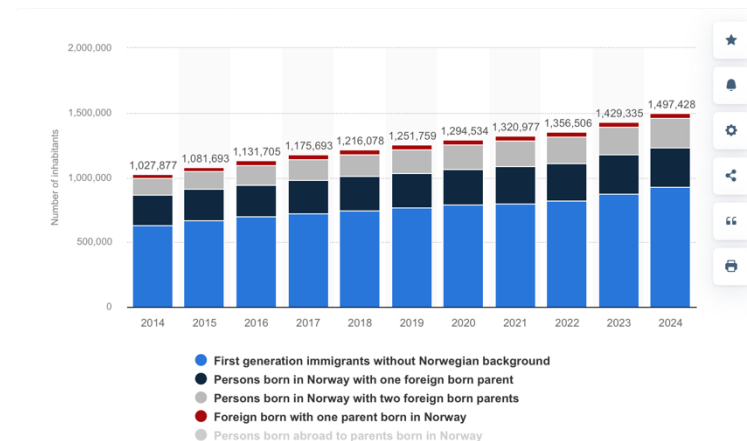
<sup>29</sup> <https://www.worldometers.info/world-population/norway-population/#:~:text=The%20population%20density%20in%20Norway,39%20people%20per%20mi2>. (access: 04/30/2024)

<sup>30</sup> <https://www.worldometers.info/world-population/germany-population/#:~:text=The%20population%20density%20in%20Germany,619%20people%20per%20mi2>. (access: 04/30/2024)

<sup>31</sup> <https://www.worldometers.info/world-population/norway-population/> (access: 04/30/2024)

## Migration – a solution for the worker shortages

Norway's migration history has seen a sharp increase in the last ten years. In 2014, there were approximately 5.1 million people living in Norway, of which 1.1 million were people with a migrant background. In 2024, the number of inhabitants with a migrant background rose to 1.5 million. The total population grew to 5.5 million inhabitants. The largest share, with 930,000, is made up of first-generation migrants<sup>32</sup>. In 2021, most migrants came from Poland, Lithuania and Syria. Of the migrants, 50.5% are said to be migrants benefiting from free mobility, 10.7% are labour migrants, 26.4% came to Norway for family reasons and 12.4% were humanitarian migrants.<sup>33</sup>



<https://www.statista.com/statistics/586719/foreign-population-in-norway-by-immigration-category/>

But is the rising immigration rate in Norway a possible solution to avoid labour shortages?

Norway has faced similar problems as Germany in recent years: too much labour and not enough trained workers. Consequently, the government has increased the annual quota for skilled workers to 6 000 residence permits for the years 2022 and 2023, from a previous limit of 5 000<sup>2</sup>. Most migrants in Norway work in low-wage sectors. The most prevalent fields are construction, manufacturing and healthcare. The majority of labour migrants come from Poland, Lithuania and Romania. Together they account for 80% of the labour migrants in Norway. It is also important to mention that labour migrants are spread all over Norway. In the west of Norway many are employed in shipyards and in the north of the country in the fish industry<sup>34</sup>.

Our host mother also reported a labour shortage in Hammerfest. As the town grew, especially with the expansion of Melkøya, many workers were needed for the island. At the same time, schools, hospitals and social facilities were to be expanded in order to attract as many workers as possible to the north. Strategies such as cheap housing and good education for their children attracted many new residents to Hammerfest. There is also a special focus on schools. The aim is to inspire and train young people for the work on the island of Melkøya.

<sup>32</sup> <https://www.statista.com/statistics/586719/foreign-population-in-norway-by-immigration-category/> (Retrieved 2024-06-09)

<sup>33</sup> [https://www.oecd-ilibrary.org/sites/7879415d-en/index.html?itemId=/content/component/7879415d-en#:~:text=In%202021%2C%20Norway%20received%2039,\)%\)20and%2012.4%25%20humanitarian%20migrants.](https://www.oecd-ilibrary.org/sites/7879415d-en/index.html?itemId=/content/component/7879415d-en#:~:text=In%202021%2C%20Norway%20received%2039,)%)20and%2012.4%25%20humanitarian%20migrants.) (Retrieved 2024-06-09)

<sup>34</sup> <https://www.fes.de/en/displacement-migration-integration/article-page-flight-migration-integration/labour-migration-to-norway> (Retrieved 2024-06-09)



Debates about the effects of increasing labour migration are ongoing in Norway, as many fear for their own opportunities in areas dominated by labour migrants. In addition, companies reportedly no longer demand the training of new skilled workers, but rather hire migrants to save themselves labour and effort. However, these arguments hardly change the general perception that labour migrants help Norway to avoid labour shortages<sup>35</sup>.

Another group of migrants in Norway are refugees. In 2022, there were 75,000 refugees in Norway, living all over the country. There is also a special refugee camp in our partner city Hammerfest. It is the northernmost refugee camp in the world. In 2016, over 5,000 refugees were accommodated in Hammerfest. Most of them had fled from Syria and Afghanistan. In the refugee camp, they first have to get used to the conditions in the far north and familiarise themselves with Norwegian culture through language courses and support workers. Many are later sent to the slightly larger town of Alta to find work there<sup>36</sup>.

## **Animal resources**

### **Wildlife in Norway**

There is a wide range of land, air and sea animals that live in Norway. The Norwegian wildlife is dominated by animals that can easily adapt to the changing temperatures and the special vegetation, that is mostly found in the northern parts of the country. An example is the arctic fox, that only lives in the most northern regions of the country. These foxes can easily adapt to extremely cold temperatures and can therefore live vest in the arctic tundra. In the Norwegian seas many fish as well as whales and seals can be found. The Sperm Whale for example is spread along the coast and can be seen in the summer months.<sup>36</sup>

### **Reindeers in Norway**

The Norwegian Reindeers can mostly be found in the northern regions of Norway like Finnmark and are also connected to the indigenous people. Overall, about 500,000 reindeers can be found in all of Norway. They can be separated into wild and domestic reindeers, where the domestic ones determine most of the population, as the wild ones have almost died out and there are only about 25,000 reindeers living in Norway<sup>37</sup>. The Sámi people, an indigenous tribe, that mostly lives in the north of Norway, are connected to the reindeers. Those are the people that mostly herd the reindeers and move them around in the country in the different seasons.

But also, in the everyday live reindeers often play a role for the Norwegians inhabitants. As the reindeers are so popular in the northern regions they often also accrue in the backyards of the people. Furthermore, there are events when the reindeer herds cross big rivers for example and one can see many reindeers swimming trough a fjord for example. The reindeer also gets eaten frequently by parts of the Norwegian population, while it is rather unusual to eat reindeers in other parts of the world. As an example, dried reindeer can be bought as a snack and reindeer is a popular pizza topping.

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<sup>35</sup> <https://www.welt.de/vermischtes/article152410054/Das-Leben-im-noerdlichstn-Fluechtlingslager-der-Welt.html> (Retrieved 2024-06-09)

<sup>36</sup> <https://www.naturetravels.co.uk/wildlife-in-norway.htm> (Retrieved 2024-05-26)

<sup>37</sup> <https://www.hurtigruten.com/en-us/inspiration/wildlife/reindeer> (Retrieved 2024-06-16)