

NORWAY

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Energy and CO₂ emissions remain 'hot' topics as Norway has signed the Kyoto protocol. However, as one of Norway's major sources of energy is hydroelectric power, there are not many alternatives for cutbacks. The steadily increasing oil and gas production gives a large emission of CO₂ and more may come with the Snøhvit field gas liquefaction project. The metallurgical industry is using large quantities of fossil carbon as a reductant. A changeover to biocarbon may be a technical solution and is under investigation. The costs are more questionable and it may have to be subsidised.

The government spends a lot of money on 'CO₂-free' gas-powered plants, and companies like Hydro and Aker are working on different technologies to reach this objective.

In mining and quarrying, a total of 65 Mt of material was extracted in 2001, with a value of NK7.0 billion. The Norwegian Geological Survey publishes an extensive overview each year (www.ngu.no).

Exploration

Kenor, a Norwegian gold producer operating mainly in Guinea, west Africa, and producing 3.3 t of gold last year, has been quite active at home. It has been granted a District Fund loan of NK3 million to pursue a find by the Norwegian Geological Survey at Gjedde lake in the Pasvik Valley on the border with Russia. The find measures 450 m by 60 m and the maximum grade is 14.7 g/t Au. The same company is also looking at gold finds in the Setesdal Valley in southern Norway.

Conoco/DuPont gave up the eclogite deposits containing rutile in the Sunnfjord area perhaps mainly for environmental reasons. Tailings disposal is a difficult question because the landscape leaves not much room for tailings except in the fjord. As no heavy metals are

involved and the fjord is deep it is less of a technical/environmental problem than a publicity issue.

A programme to remap high-purity quartz deposits is underway, not least because Norway is a major producer of silicone and lately also of wafers for solar cells.

A new national park is planned in the scenic Sognefjord area. The planners have recognised that the large anorthosite deposits in the area may be commercially exploited one day and that the possibility still exists to mine them by underground methods. They contain billions of tonnes. One possible use for anorthosite is as a raw material for aluminium.

Iron ore and Base metal

Nikkel and Olivin in Ballangen, the last sulphide mine in the country, will be closed in mid 2002. Rana Gruber had its first year of production from the new underground mine. Part of the concentrate is upgraded into pigments and chemical raw materials.

Industrial Minerals

Industrial minerals production and beneficiation is the most important part of the Norwegian minerals industry and has taken over the role of iron ore and base metals mining which has almost disappeared. The Stjernøy plant of North Cape Minerals had its largest production since 1992 with 342,000 t of nepheline syenite. The capacity increase was due to the opening of an open pit at the top of Nabbaren (summer work only), the mountain that has sustained the underground operation for decades as well as investments in the processing plant. Production of processed nepheline syenite, feldspar and quartz suitable for the glass, ceramic and other markets is summarised in the production table.

Moving from the extreme north of the country to the south, Titania A/S is celebrating its centenary during 2002. Regular mining started in 1919 to supply the forerunner of Kronos Titan A/S, utilising the processes to produce titanium dioxide pigments developed by professor Farup in Trondheim. The present deposit, Tellnes, was discovered in 1954 and reserves may be sufficient for some centuries to come. The ilmenite concentrate is used in the sulphate route process to produce pigment, for reduction to iron and titanium slag, and finally as a heavy mineral in drilling muds.

Limestone is used in many applications and total mine production last year was 4.3 Mt. Quartz and quartzite production was 1.3 Mt.

Mineral and Smelter Production (t)

	1999	2000	2001
Iron and metal mines			
Nickel conc. 12% Ni	25,000	17,000	22,799
Iron ore conc	534,000	470,000	384,000
Industrial minerals			
Ilmenite	580,000	n.a.	n.a.
Processed quartz and silicates	460,000	460,000	465,000
Olivine	3,200,000	3,600,000	3,200,000
Graphite	7,580	9,000	9,000
Cement	1,658,000	1,620,000	1,440,000
Ground calcite	1,840,000	2,030,000	1,770,000
Metallurgical production			
Si metal	153,000	n.a.	n.a.
SiO ₂ dust	132,000	n.a.	n.a.
FeSi	354,000	n.a.	n.a.
Al primary	952,000	n.a.	n.a.
Energy			
Coal (Store Norske)	404,000	630,000	1,890,000
Oil ('000 t)	150,000	158,625	163,100
Natural gas (million m ³)	48,200	53,100	57,465
Electricity (GWh)	123,000	143,000	122,000

n.a. Not available.

Dimension stone and Aggregates

A number of aggregate quarries have been started along the southern and western coast of Norway for aggregate shipment to Europe. Some 28% of the production of crushed rock is exported. The latest member of the export quarry club is Bremanger Quarry, owned by Bontrup Beheer of the Netherlands. An adit and a spiral tunnel totalling 3,000 m is under way to the top of Sæbufjellet where the open pit will be situated. The pit will, in this way, be visible from the air only.

Total production in 2001 was 51 Mt, at a value of NK2.5 billion. The value of dimension stone and flagstone production by value was NK980 million and most was exported.

Metallurgy

Hydro Aluminium has purchased the German aluminium producer VAW from the energy firm E.ON for €1.9 billion. Hydro has thereby increased its downstream capacity considerably and will be one of the world's leading three producers selling about 3 Mt/y of aluminium.

Hydro Aluminium is now also extending its plant at Sunndalsøra to 321,000 t/y up from 153,000 t. It will then be the largest primary aluminium smelter in Europe. Hydro is further planning to reduce its commitment to magnesium production in Norway and its plant at Herøya, with a capacity of 50,000 t, was closed.

Elkem is closing its ferrochrome plant in Mo i Rana. The plant was a continuation of the electric pig-iron furnaces of Norsk Jernverk, which were closed in 1990. The successors to Norsk Jernverk include Fundia, a Finnish-owned scrap steel plant, and Fesil Rana producing ferrosilicone.

Some 27% of the electricity produced in Norway last year was used for 'power-intensive industry', mainly metallurgical plants. The discussion about power for this industry has started all over again, as it becomes evident that the use of electric power in Norway in the near future will exceed supply and windmills appear to be the only politically possible source of new power.

Energy

Oil production is increasing slowly but is expected to remain more or less constant for some years to come. Activity has reached a state where decommissioning and removal of used platforms are becoming important. Gasfields are being developed more actively, with increased production as a result. Development of the Snøhvit gasfield close to the North Cape is being considered and could depend upon a tax break for onshore production of liquefied gas as the field is too far from the markets to justify transport by pipelines.

The coal company Store Norske, operating at Spitsbergen, has finished the preparatory

work for its 1.2 Mt/y capacity Svea Nord mine, using large-scale British and Australian equipment on a large coal seam giving high production rates. The operation has gone exceedingly well, surpassing planned production by 50%. Truck transport over a glacier to the harbour costs NK48 million per year and, because coal dust must be minimised in the arctic environment, plans are being drawn up for a 15 km tunnel with a coal conveyor. The estimated cost is NK260 million. Proven reserves are 41 Mt.

A Russian coal company may re-open the Grumant mine, 20 km from Longyearbyen, which was closed around 1960.