

Summary

This report explains the first detailed inventory of emissions of greenhouse gases and long-range transboundary pollutants for the Faroe Islands. Emission estimates are carried out according to the IPCC Guidelines for National Greenhouse Gas Inventories (IPCC 1997a & b). Special efforts have been made to collect and validate the data used in the inventory. Also it has been prioritised to develop a inventory model to be used in future emission inventories.

The emission inventory (1990-2001) can in the future be used for different purposes:

- ◆ Reporting to international protocols
- ◆ As input to air quality models for estimation and projection of local air pollution and evaluation of reduction methods
- ◆ As a basis for government evaluation of technical regulation and taxes
- ◆ As a basis for emission projections

Activity data

Fuel combustion

The total consumption of fossil fuels from 1990-2001 is presented in Figure 2.1. The energy use has risen from 8.7 PJ in 1990 to 9.6 PJ in 2001 corresponding to an increase of 10%. From 1990-1993 the energy use decreased with 24%, caused by the economic crisis in the Faroe Islands during that time period. The energy use has after this increased with 45% until today (from 6.6 PJ in 1993 to 9.6 PJ in 2001).

Figure 2.2 shows the proportion of fuel use per fuel type for the time period 1990-2001 compared with the use of fuel in 1990. The figure shows that the use of heavy fuel in 2001 has increased by 33% compared with 1990 and the use of gas-diesel fuel has increased by 9%. The use of gasoline fuel has decreased by 24% compared with 1990.

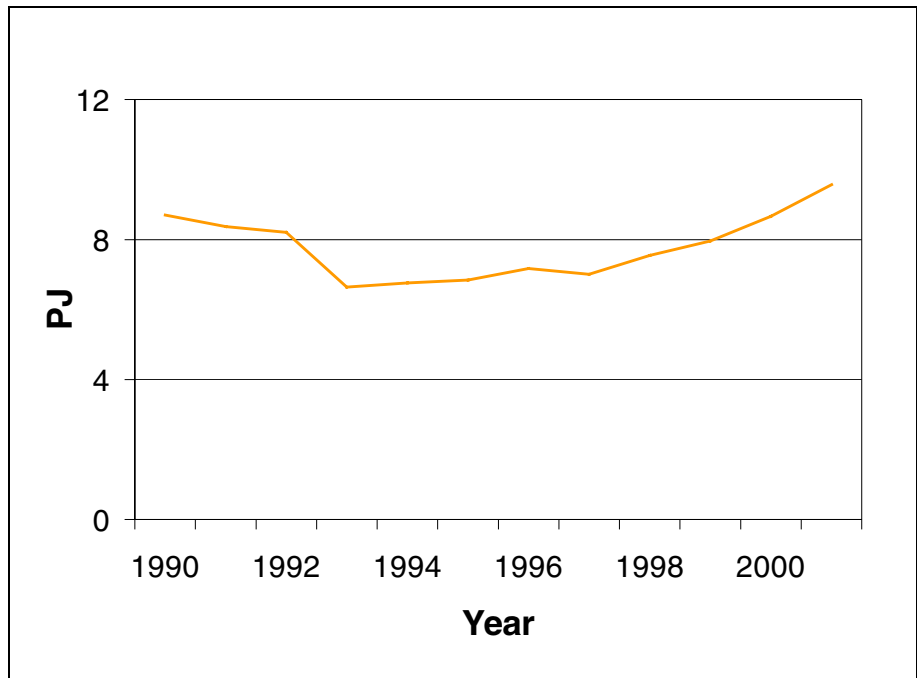


Figure 2.1 The total energy use from fossil fuels in the Faroe Islands from 1990 to 2001. Source: Statistics Faroe Islands; Statoil; Shell.

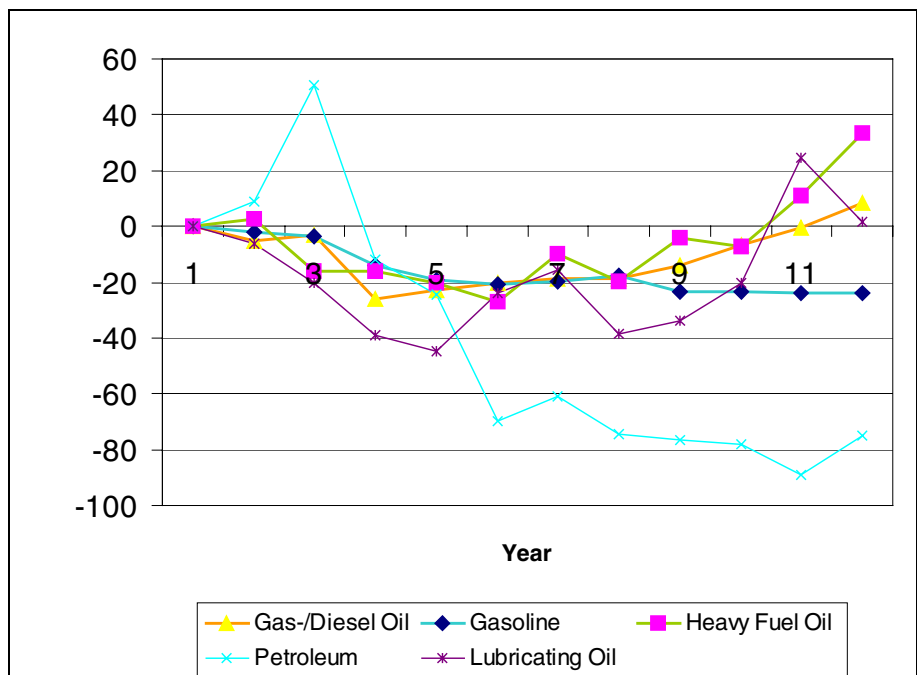


Figure 2.2 The 1990-2001 fuel use development per fuel type compared with 1990 values.

Waste incineration

The total amount of energy produced by waste incineration increased by 99% from 1990 to 2001 and is explained by an increasing import of goods to the Faroe Islands in the same period (Figure 2.4).

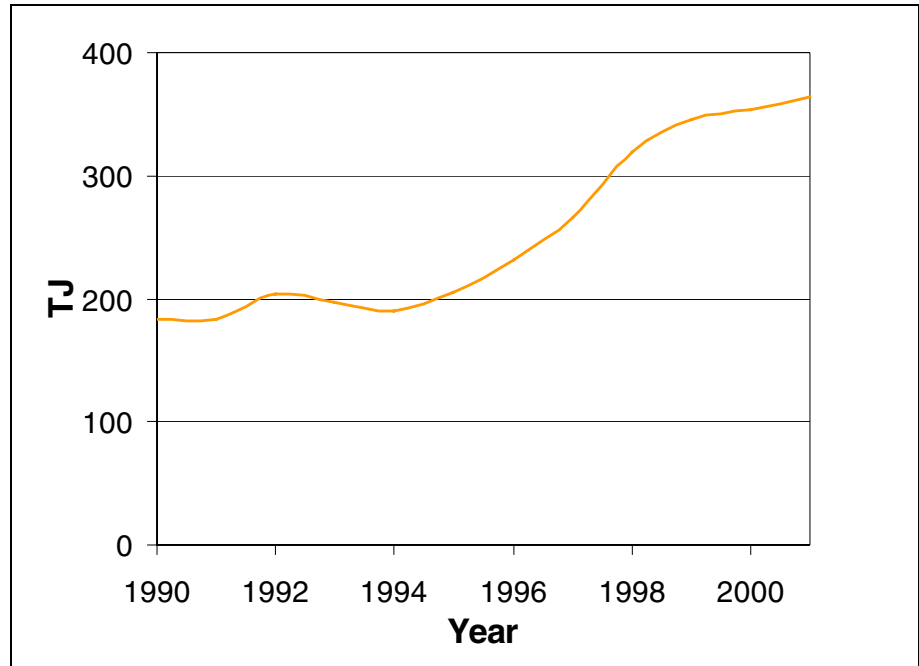


Figure 2.3 Total amount of energy produced by waste incineration in the Faroe Islands 1990-2001. Source: Kommunalá Brennistöðin (KOB); Interkommunalá Renovation Felagið (IRF).

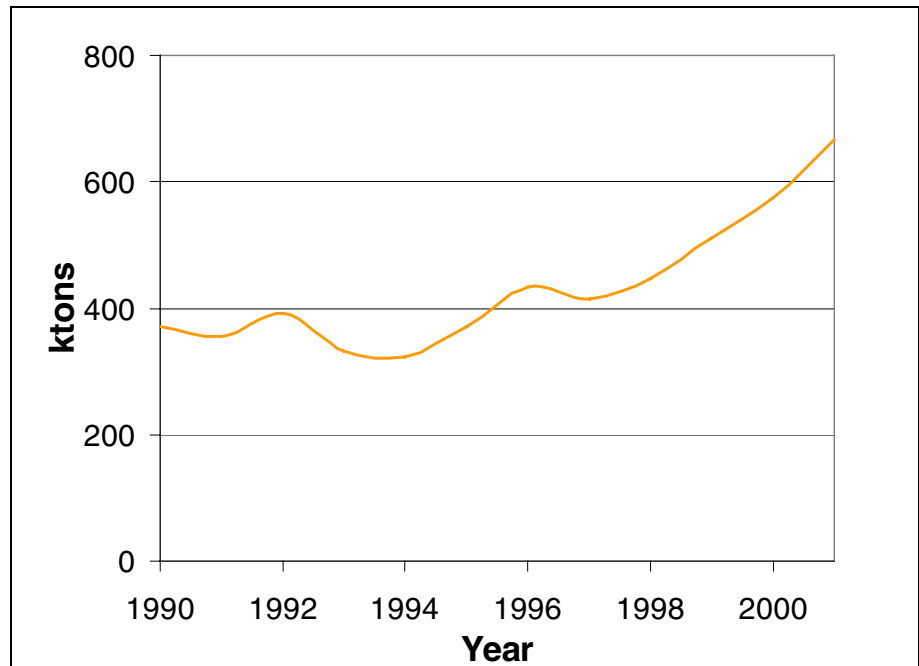


Figure 2.4 Import of goods to the Faroe Islands from 1990-2001. Source: Statistics Faroe Islands.

Agriculture

Sheep and cattle are the two major animal species present in the agriculture in the Faroe Islands. The number of sheep is assumed to be constant at 78940 in the period 1990-2001, while the number of cattle has increased from 1582 in 1990 to 2332 in 2001 (Figure 2.5).

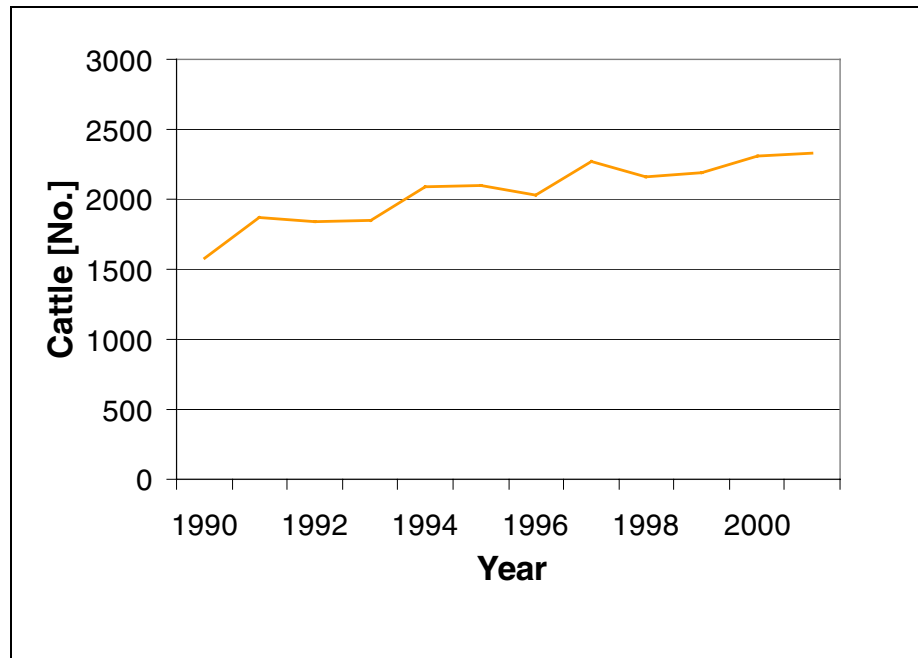


Figure 2.5 Number of cattle in the Faroe Islands from 1990-2001. Source: The Agricultural Institute in the Faroe Islands.

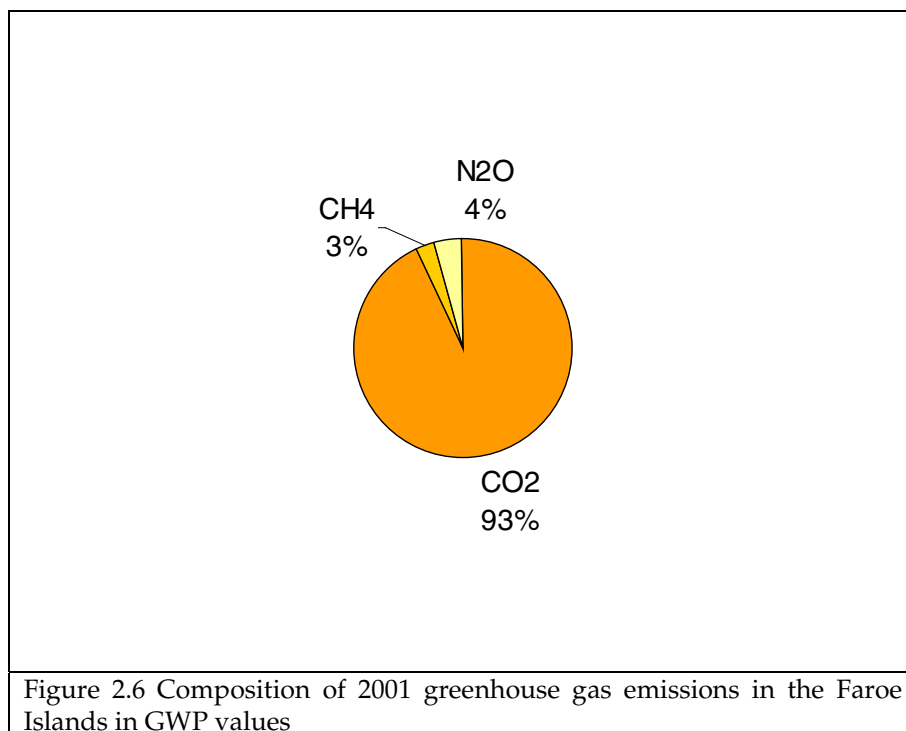
Emission factors

Emission factors connected to fuel combustion have been selected in co-operation with NERI. For road transport the emission factors have been calculated using results from the Danish emission inventory modified for Faroese traffic conditions. Emission factors for waste incineration are based on Danish waste composition. The emission factors for agriculture have been chosen based on information on Faroese animal stocks and have been evaluated using the NP model in Denmark (Andersen, 1999).

Emission results

Greenhouse gases

The composition of greenhouse gases (in CO₂ equivalents) in the Faroe Islands in 2001 is shown in Figure 2.6. The CO₂ emissions constitute 93% of the total emission of greenhouse gases; the N₂O and CH₄ emission shares are 4% and 3%, respectively.



The emissions of greenhouse gases have increased by 12% from 1990 to 2001 (Figure 2.7). From 1990-1993 a decrease of 22% is observed, explained by the economical crises in the Faroe Islands in this time period. After 1993 the emissions have increased by 44 % until today (from 543 ktonnes in 1993 to 782 ktonnes in 2001).

For CO₂ alone the emissions from 1990 to 2001 follow the pattern observed for CO₂ equivalents, since CO₂ constitutes 93% of the total greenhouse gas emissions each year in the observed time period. In 2001 32% of the CO₂ emissions originated from fishery, 18% from public electricity, 18% from the residential sector, 12% from manufacturing industry and 10% from road transportation.

The total emissions of CH₄ have increased by 14% from 1990 to 2001. The increase is due to a larger number of cattle in the Faroe Islands. In the same time period the emissions of N₂O have shown a 37% increase, mainly due to an emission increase from agricultural soils.

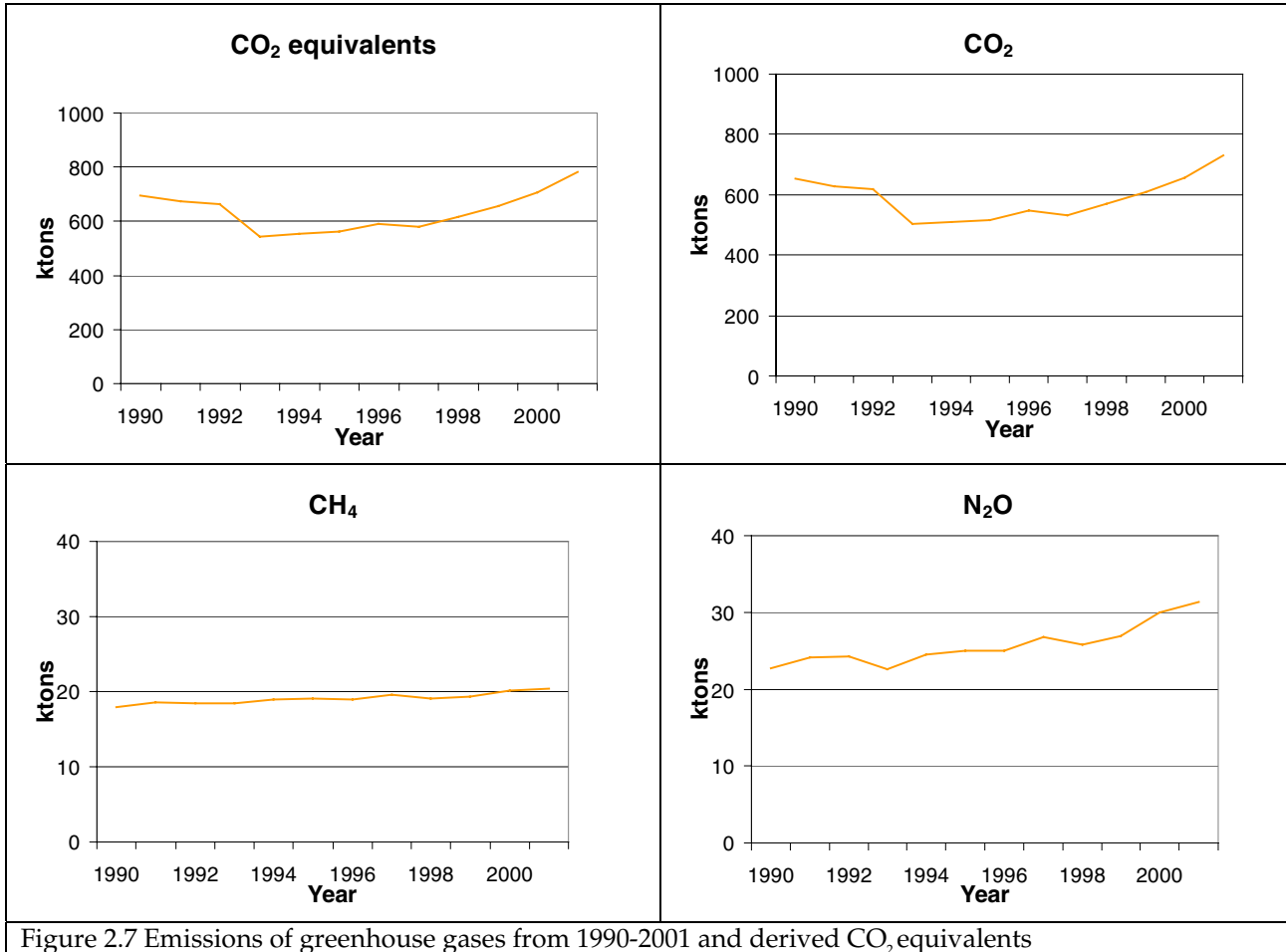


Figure 2.7 Emissions of greenhouse gases from 1990-2001 and derived CO₂ equivalents

Long-range transboundary pollutants

The emissions of NO_x have increased by 7% from 1990-2001 (Figure 2.8). A minimum in the emissions is observed in 1993 (4.0 ktonnes) explained by the economic crises in this time period in the Faroe Islands. Since 1993 the emissions have increased by 46% due to an increase in fuel use in fishery, and test drills (manufacturing industry) in 2001. In 2001, 71% of the NO_x emissions originated from fishery, 8% from navigation, 7% road transportation, 6% from manufacturing industry and 6% from public electricity.

The emissions of CO and NMVOC decreased with 44% and 41%, respectively in the time period 1990-2001 (Figure 2.8). For both emission species the decrease is mainly due to the introduction of gasoline catalyst in private cars.

From 2000 to 2001 a CO emission increase of 6% is observed, which is mainly due to fuel use by test drills. For NMVOC an emission increase of 12% is observed from 1999 to 2001, explained by an increase in fuel use by the manufacturing industries (test drills), navigation and fishery.

In 2001 64% of the CO emissions originated from road transportation, 19% from fishery, 8% from navigation and 4% from manufacturing industry. In the same year 47% of the NMVOC emissions originated from road transportation, 26% from fishery, 17% from navigation and 7% from manufacturing industry.

In the time period 1990-2001 the emissions of SO₂ increased with 18% (Figure 2.8). The increase is mainly due to increasing use of heavy fuel oil in the public industry and manufacturing industry sectors. In 2001, 54% of the SO₂ emissions originated from public industry, 26% from fishery and 15% from manufacturing industry.

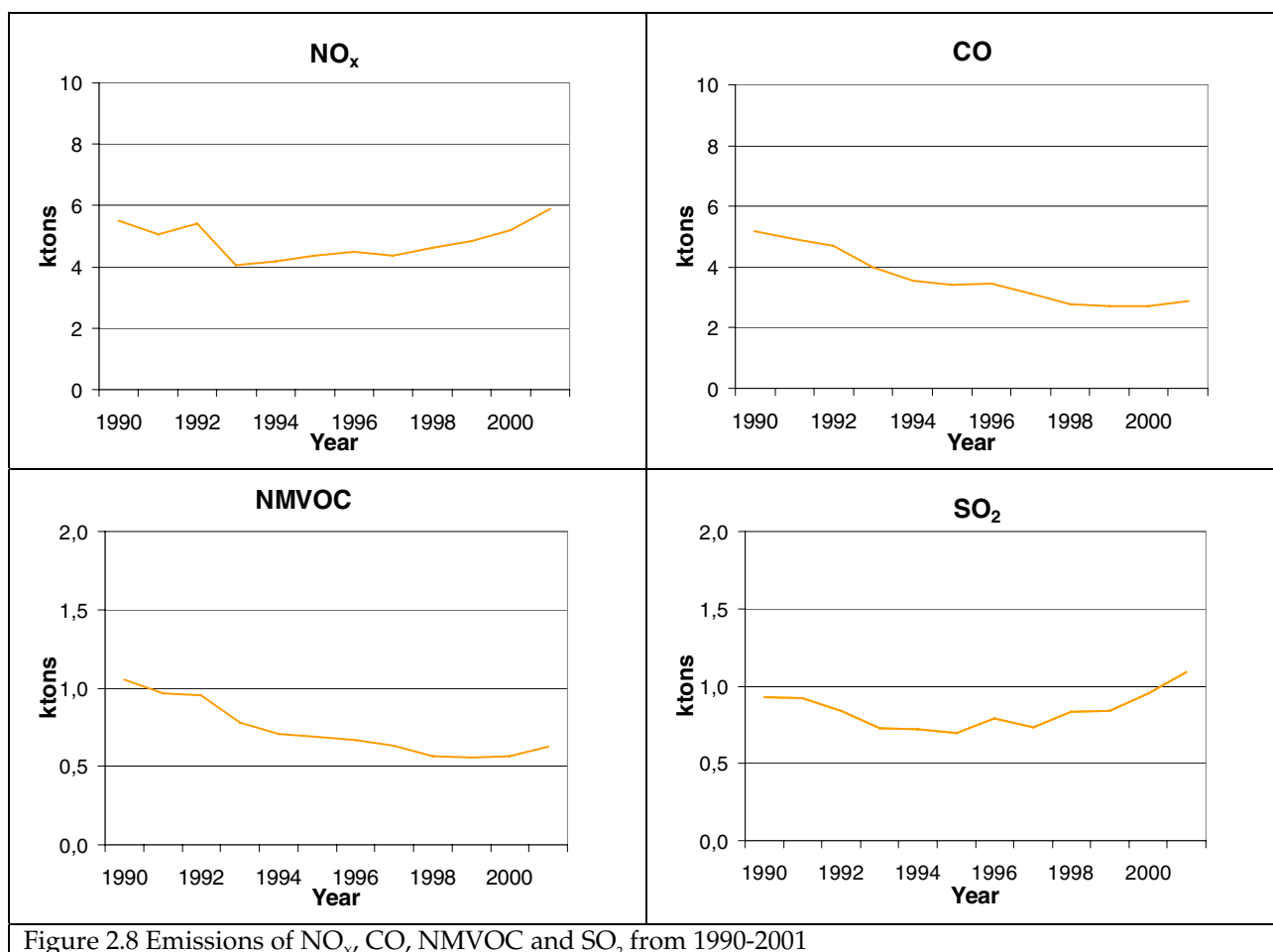


Figure 2.8 Emissions of NO_x, CO, NMVOC and SO₂ from 1990-2001

Conclusions

In the present project emission inventories were established for the 1990-2001 according to the guidelines of the UNFCCC convention. The inventory comprises estimates of the greenhouse gases CO₂, N₂O and CH₄ and the long-range transboundary air pollutants SO₂, NO_x, CO and NMVOC.

Suggestions for improvements of background data are made in the following areas in order to make the future annual inventories more precise:

The fuel data used in the emission inventory are presently not grouped according to IPCC categories, and moreover the reporting formats of the two oil companies differ. It is therefore suggested to evaluate a new common format.

The new format should include more detailed information on fuel sold to fishing ships (according to gear). Moreover, the fuel sold to Faroese ships bunkering outside Faroese waters and fuel sold to foreign ships, must be classified as either fishery or other vessels and furthermore be divided into sub-totals for other vessels according to destination. For the industrial sector it is necessary to make a fuel split into sub-groups according to the UNFCCC reporting format.

In terms of transport more detailed Faroese vehicle fleet and mileage figures must be obtained for road transportation vehicles. For aviation and sea transport, specific data (aircraft/vessel type and destination airport/seaport) must be gathered in order to classify the emissions as being either domestic or international.

The emission factors used for the emission inventory presented in this report have mainly been provided by NERI. It is recommended that the Faroe Islands in the future adjust the present emission factors on the basis on more detailed information of fuel types used in the Faroe Islands. This relates also to detailed emission information for sea vessels.

Resources must be set aside to continue the emission inventory work in the future. This implies continuous efforts to ensure a timely, consistent and accurate provision of activity data by relevant companies and institutions. Lastly it must be legally clarified where in the Faroe Islands the responsibility should be placed for preparing the final report of the Faroese air emission results in the future.