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EXECUTIVE SUMMARY OF THE
NATIONAL COMMUNICATION OF

ICELAND

submitted under Articles 4 and 12 of the
United Nations Framework Convention on Climate Change

In accordance with decision 9/2 of the Intergovernmental Negotiating Committee of the Framework Convention on Climate Change (INC/FCCC) and endorsed by the Conference of the Parties in its decision 3/CP.1 (FCCC/CP/1995/7/Add.1), the secretariat is to make available, in the official languages of the United Nations, the executive summaries of the national communications submitted by Annex I Parties.

Note: Executive summaries of national communications issued prior to the first session of the Conference of the Parties bear the symbol A/AC.237/NC/___.

Copies of the national communication of Iceland may be obtained from the following address:

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Basic data and national circumstances

1. Iceland is the second largest island in Europe, 103,000 km^2 in area. The land lies in the North Atlantic astride the mid-Atlantic ridge, with its most northerly extremes bounding on the Arctic Circle. Warm and cold ocean and atmospheric currents intersect off the coast and the biosphere is extremely sensitive to any change in the climatic and current systems of the earth. Iceland is a volcanic country, with numerous active volcanoes and extensive geothermal resources.

2. Some 263 thousand people live in Iceland. The settled areas are primarily along the coast, and is concentrated especially in the capital, Reykjavik, and the vicinity, where about 57 per cent of the nation lives. Outside of this area settlement is sparse, with less than one inhabitant per square kilometre, and most of them living in small communities around the coast of the country. Good transportation and communications are thus extremely important for the rural areas, and the volume of transport, especially road transport, is very substantial in relation to the size of the country's population.

3. Approximately two-thirds of Iceland is almost or completely devoid of vegetation. Glaciers cover some 11 per cent of the country, and rivers and lakes another 2.2 per cent. There are just over 28 thousand km^2, or about 27 per cent of the land area, of very or fairly well established vegetation, about one-third of which is wetland. About 25 thousand km^2 are considered to be arable land, some 1400 km^2 of which were under cultivation in 1990.

4. The climate in Iceland is a cold temperate oceanic climate, with relatively mild winters (mean temperatures -2 to O˚C) and cool summers (mean temperatures 8 to 10˚C). The weather is constantly changing and precipitation high, but due to the effects of the warm ocean currents (the Gulf Stream), the mean temperature is considerably higher than in most other locations sharing the same latitude.

5. There are few natural resources in Iceland, the main ones being the bounteous fishing banks and great hydroelectric and geothermal energy potential, together with the unique natural surroundings. According to estimates Icelandic rivers could feasibly be developed to produce 30 TWh of electricity annually, only one-seventh of which has at present been developed. Estimates have placed the geothermal energy potential which could be feasibly developed at around 200 TWh annually for one hundred years, only 1 per cent of which has at present been developed.

6. Fisheries, encompassing both catching and processing, is the main understay of the national economy, accounting for 15 per cent of GDP and 75 per cent of the nation's goods exports. Agriculture represents only 3 per cent of GDP, but produces sufficient meat and dairy products to satisfy domestic demand and is thus very important. Other significant primary sectors include energy production (of hydroelectric and geothermal energy), industry and tourism.

7. Per capita energy consumption in Iceland is among the highest in the world. The total

domestic energy consumption in 1993 was approx. 89 PJ, which corresponds to the equivalent of roughly 2119 thousand barrels of oil. About 65 per cent of the energy consumed by Icelanders comes from renewable energy sources (hydroelectric and geothermal energy) which cause little or no emissions of greenhouse gases, while the comparable figure for other OECD countries is 2 to 3 per cent.

8. From 1970 to 1987, very substantial efforts were made in Iceland to establish geothermal heating distribution centres throughout the country, to utilise geothermal resources and reduce oil consumption for domestic heating purposes. Hydroelectric transmission was also extended to reduce oil-fuelled electricity production. This resulted in a reduction in the emission of carbon dioxide (CO_2) from stationary energy production in Iceland from 590 thousand tons in 1973 to only 145 thousand tons in 1990, despite a considerable increase in total energy consumption during the same period. This dramatic reduction in emissions, 445 thousand tons, is the equivalent of 20 per cent of the total emissions in the country in 1990 (see figure 2.8.1 of the full communication). It is evident that by 1987 the reduction in the emissions of carbon dioxide from stationary energy production had been so extensive that it will not be possible to achieve further substantial progress in this area before the end of this century.

9. The high proportion of domestic energy already provided by renewable energy supplies is not the only factor which makes it difficult for Iceland to reduce its emissions of greenhouse gases below present levels. The unusually high proportion of mobile sources (automobiles, fishing vessels, domestic aircraft and coastal transport vessels), the emissions of which are difficult to reduce, also presents special difficulties for Iceland with regard to complying with the obligations of the Framework Convention on Climate Change. These sources cause approximately 64 per cent of the total emissions of carbon dioxide in the country, a proportion much higher than in other developed countries.

10. Another problem is that industrial processes (heavy industry) create relatively high emissions, about 18 per cent of total emissions of carbon dioxide, due especially to the oxidation of carbon and carbon electrodes in ferrosilicon and aluminium production. The only possibility of reducing these emissions is to reduce production, which was relatively low in 1990.

Emissions of greenhouse gases

11. Estimates were made of emissions of anthropogenic greenhouse gases in Iceland in 1990 in accordance with draft guidelines from the Intergovernmental Panel on Climate Change (IPCC).

12. Total anthropogenic emissions of carbon dioxide in Iceland in 1990 were some 2172 thousand tons. Of these 64 per cent were produced by fishing vessels and transport and

18 per cent from industrial processes. The remaining 18 per cent was the result of fuel consumption by industry and for heating purposes, from geothermal energy production, etc.

13. Total emissions of methane in 1990 were estimated to be some 23 thousand tons. In 1990 the main sources were refuse dumps, producing some 11 thousand tons, domestic animals and animal fertiliser, which produced approximately 11 900 tons. Other sources produced a total of about 0.2 thousand tons.

14. Total emissions of nitrous oxide in 1990 were estimated to be some 0.6 thousand tons. The main source was the use of nitrogen fertiliser which accounted for 0.5 thousand tons or 80 per cent of the total. Another prime source was fuel consumption, which contributed about 0. 1 thousand tons.

15. An appreciable quantity of volatile fluorocarbons, estimated at around 45 thousand tons, is thought to have been emitted from the aluminium plant in Straumsvik, the only aluminium smelter in Iceland, although the estimate is subject to a high degree of uncertainty.

16. If emissions of greenhouse gases in Iceland in 1990 are converted to carbon dioxide equivalents in accordance with methods used by IPCC (based on Global Warming Potential (GWP) 100) the relative importance of the various greenhouse gases can be seen. This is shown in figure IIa of the full communication.

Policies and measures

17. The policies and measures involved in Iceland's action programme are divided into two main areas. On the one hand are general and economic measures which are directed at the general public and the main industrial sectors, and on the other hand specific measures, which apply to individual sectors or services in the society.

General and economic measures

18. The national government has decided to emphasise incentive measures, public education and economic measures to limit emissions of greenhouse gases in Iceland. It will seek the cooperation of local authorities, private enterprises, schools and institutions to this end. In addition, the government intends to review the taxation of fuel, linking it more closely to emissions of carbon dioxide in order to have a limiting effect on them. A special CO_2 tax will be considered for this purpose. Taxation of motor vehicles will also be reviewed in order to further encourage purchase of more economical vehicles instead of vehicles with high fuel consumption.

19. Special rules will be adopted to limit the use of fluorocarbons and other potent and

persistent greenhouse gases, as far as possible. The Icelandic government intends to strengthen research and monitoring of greenhouse effects in Iceland to increase knowledge and to reduce the detrimental effects of the changes expected. The main areas of research to be emphasised by the national government are: marine research, meteorological research, monitoring of the atmosphere, investigation of the effects of a rise in sea level, and research in the areas of land reclamation and afforestation. The national government also aims at substantially increasing its contribution to developmental aid in the final years of this century, so that this contribution will amount to at least 0.3 - 0.4 per cent of GNP by the year 2000. Emphasis will be placed on specialised aid in the area of geothermal development and the reclamation of desertified areas, in addition to projects in the area of fisheries.

20. The Minister of the Environment will appoint a special "ministerial steering committee", in consultation with other Ministers concerned, to direct the implementation of the action programme of the Framework Convention as described in this status report. In addition, calculations of emissions will be reviewed annually and an assessment made as to whether further measures are needed to comply with the Framework Convention.

Specific measures

21. The principal objective of the national government is the limitation of emissions from each economic sector so that wherever possible these will amount to no more in the year 2000 than they were in 1990. Specific measures fall into the following main categories: emissions from fishing vessels, emissions from domestic transportation, emissions from industry, emissions from waste disposal, emissions from agriculture, emissions resulting from the erosion of soil and ground cover, and the sequestration of carbon dioxide as the result of land reclamation and afforestation.

22. Actions concerning emissions from fishing vessels can be roughly divided into three types:

(a) A special working group will be appointed by the Ministry of Industry to prepare a plan to attain the stated objective of reducing emissions of greenhouse gases from the fishing fleet.

(b) The Ministry of Fisheries will promote measures to encourage energy conservation by the fishing fleet in as many respects as possible, for example, through the use of efficiency encouraging measures.

(c) Measures will be introduced to provide for the use of sources of electrical energy ashore by ships in harbour.

23. Actions concerning emissions from domestic transportation can be divided into five main categories:

(a) A working group will be appointed by the Ministry of Transport and Communications, in particular to establish a basis for an overall transport plan for the country having regard to environmental and energy questions.

(b) Public transport will be effectively strengthened, in co-operation with local authorities in Iceland.

(c) Provision for pedestrians and cyclists in urban areas will be improved.

(d) Rules will be adopted requiring the vendors of new vehicles to provide possible purchasers with standardised data on the fuel consumption of new vehicles offered for sale.

(e) The Public Roads Administration will be assigned the task of finding ways to reduce the use of solvents and reduce pollution caused by organic solvents in road construction.

24. Three main actions are being considered concerning emissions from, industry:

(a) A fuel and energy conservation campaign will be launched in industrial enterprises.

(b) Efforts will be made to further encourage the use of hydroelectric and geothermal energy instead of fossil fuels.

(c) A special analysis will be made of ways to reduce emissions of greenhouse gases from industrial processes and from raw materials used in industry.

25. In the area of waste treatment and disposal three main measures will also be introduced to reduce emissions of greenhouse gases:

(a) Concerted efforts will be made to reduce the volume of refuse with the aim of reducing final waste disposal by 50 per cent by the end of the century.

(b) Emissions of methane from the refuse grounds of the capital area on Álfsnes will be investigated and ways sought to utilise or eliminate the gas.

(c) Open-air combustion of waste will be terminated in Iceland by January 1, 1996.

26. Measures in connection with agriculture, soil and ground cover erosion, and land reclamation and afforestation can be divided into four main areas:

(a) An overall land-use plan for the entire country will be compiled, with emphasis placed on sustainable exploitation and the preservation of vegetation.

(b) A special land reclamation programme will be prepared for the entire country, with the aim of halting rapid erosion of soil and ground cover by the end of the century and renew as much of the country's vegetation as possible.

(c) A special afforestation programme will be drawn up to increase afforestation work in Iceland. The aim of the programme will be to plant at the end of this century at least four times the number of trees annually as were planted in 1990, while reducing the density of planting at the same time.

(d) A special project will be launched with the aim of increasing the sequestration of carbon dioxide in biomass by at least 100 thousand tons annually before the end of this century.

Future prospects and assessment of measures

27. Anthropogenic emissions of carbon dioxide are expected to increase by roughly 5 per cent from 1990 to the year 2000, if no measures were taken to counteract this development, which would represent an increase of nearly 110 thousand tons. The policies and measures of the Icelandic government for the Framework Convention are intended to fully counteract this increase. Measures aim at reducing emissions from fuels by 35 thousand tons, reducing emissions from industry by 50 thousand tons with the electrifying of boilers and other measures in industry. In addition, measures in the transportation sector aim at reducing emissions by some 15 thousand tons, and reducing emissions from fishing vessels by around 10 thousand tons. This would provide a total reduction of 110 thousand tons. In addition, extensive measures are proposed in land reclamation and afforestation, which it is hoped will result in an increase of around 100 thousand tons of carbon dioxide absorption in biomass annually.

28. As far as emissions of methane are concerned, they are expected to decrease during the remaining years of the century due to measures to reduce the numbers of domestic animals and less refuse disposed of as landfill. Emissions of nitrous oxide should not increase during the remaining years of the century. Emissions of fluorocarbons decreased considerably from 1990 to 1993, and no further significant change is expected in emissions during the remaining years of the century. When emissions of all greenhouse gases in Iceland are converted to carbon dioxide equivalents it is clear that total emissions of greenhouse gases in Iceland will decrease considerably from 1990 to the end of the century. This can be seen in figure III.a of the full communication.

Vulnerability and adaptation

29. A great deal of uncertainty surrounds the climate changes which may be expected in Iceland in the wake of increasing greenhouse effects. The country is located at the junction of cold and warm air and ocean currents, and possible changes to the current systems and the most common routes of low pressure systems, together with an overall warming, due to the greenhouse effect could thus have very decisive effects. At present it appears most likely that there will be some, even fairly considerable, warming of the country in the next century, which is expected to have in most respects positive effects on the land itself, for agriculture, for instance, although the effects on the nation's most important economic sector, that is, fisheries, is shrouded in uncertainty. The results of research on the effects of warming on the country's hydroelectric energy production in the coming decades indicates that warming should have a relatively positive effect, especially due to the increasing melting of the glaciers and flow of the glacial rivers.

30. If a rise in sea level occurs as the result of warming the danger of flooding could increase in some locations in Iceland. This is especially true of harbour areas and several villages which are located close to an unprotected ocean front. It is also conceivable that land erosion could increase due to increased ocean assault following a rise in sea level, especially along the southern coast.

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