



Center for International
Climate and Environmental
Research – Oslo
Senter for klimaforskning

Annual report

CICERO

Center for International Climate and Environmental Research – Oslo was established by the Norwegian government in April 1990 as a non-profit organization associated with the University of Oslo.

The research concentrates on:

- International negotiations on climate agreements. The themes of the negotiations are distribution of costs and benefits, information and institutions.
- Global climate and regional environment effects in developing and industrialized countries. Integrated assessments include sustainable energy use and production, and optimal environmental and resource management.
- Indirect effects of emissions and feedback mechanisms in the climate system as a result of chemical processes in the atmosphere.

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CICERO

CICERO (Center for International Climate and Environmental Research – Oslo) is a private, nonprofit organization founded by the University of Oslo. CICERO was established by Royal Decree on 27 April 1990 as a follow-up to the recommendations in the World Commission on Environment and Development report on sustainable development.

The purpose of the foundation is to conduct research, report, advise, and provide information on climate-related global environmental matters and relevant policies—all this with a view to acquiring knowledge that can mitigate climate problems caused by human activity and strengthen international collaboration on climate issues.

CICERO was established as a multidisciplinary research center with the following two main goals:

- To develop a research base for domestic and international climate policy measures.
- To keep decision-makers and the public informed about developments in international climate policy.

CICERO's first Board of Directors was chaired by Gro Harlem Brundtland, then member of parliament and later prime minister of Norway. CICERO's first director was Ted Hanisch (1990–93), followed by Helga Hernes (1993–96), and Knut H. Alfsen (1997–).

Initially, the acronym CICERO referred to “Center for International Climate and *Energy* Research – Oslo.” To better reflect its broader scope of research activity, the name was officially changed to “Center for International Climate and *Environmental* Research – Oslo” in 1995.

CICERO's foremost strength is its multidisciplinary approach. Its research staff includes personnel with expertise in natural sciences, economics, political science, and sociology. This is a reflection of CICERO's philosophy that cutting-edge research in an area as complex as climate change demands input from a wide range of disciplines.

The research activity is funded jointly by grants from the Norwegian government and several national and international funding partners, including the Research Council of Norway, the World Bank, the United Nations Environment Program (UNEP), and the European Union.

In addition to conducting research, CICERO provides information on scientific developments and national and international policy in the field of climate change and other related environmental issues. All of the Center's activities are carried out with support from an extensive set of national and international partners and networks. CICERO believes this wide range of expertise is essential in providing policy-makers with the best possible information on which to base decisions affecting the Earth's climate.



Director Knut H. Alfsen

Key financial figures

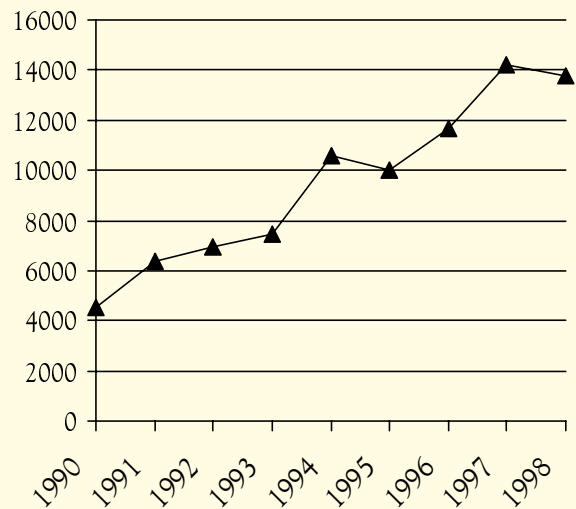
CICERO's 1998 accounts showed a profit of NOK 1,109,812. At the close of 1998, its net worth was NOK 7,817,645. The 1998 profit was added to the operating fund, which, after the addition of last year's profit, totaled NOK 7,767,645.

Like the other research centers in Norway, CICERO receives a basic government grant from the Research Council of Norway. This grant represented 33.82 percent of total revenue in 1998. Comparable figures for previous years are: 73 percent in 1993, 49 percent in 1994, 49 percent in 1995, 45 percent in 1996, and 35 percent in 1997.

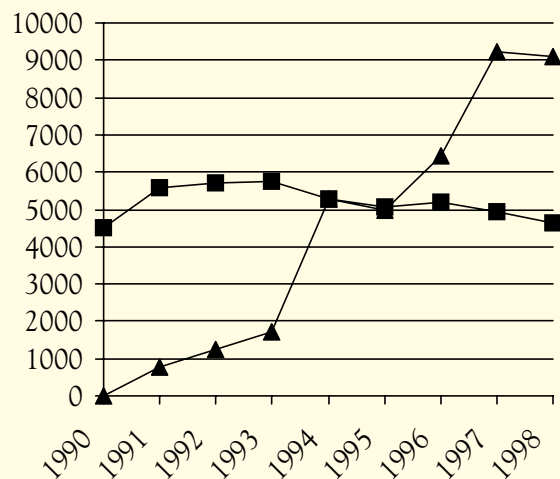
The operating profit in 1998 was NOK 634,190 (equivalent to 4.61 percent of total sales), as compared to NOK 312,618 in 1997.

The annual result and the operating profit in 1998 were the best since CICERO commenced normal operations. There has been a steady influx of assignments, many of which can be attributed to the "boom" in climate-related research in the wake of the Kyoto conference in December 1997. The Board expects that the demand for CICERO's services will subside in 1999. CICERO was able to tackle the increase in assignments without increasing its staff. In addition, CICERO's administrative staff is relatively small and was able to contribute significantly to the total income in 1998.

Income from international clients in 1998 made up 15 percent of the total revenue (as compared to 26 percent in 1997). With respect to domestic sources of income, the various ministries accounted for 7 percent of the total (as compared to 6 percent in 1997), and the Norwegian Research Council accounted for 31 percent (as compared to 25 percent in 1997). Although it must be considered a positive development that CICERO has received a greater share of funding through the Research Council of Norway, in the future CICERO hopes to diversify its sources of income to avoid becoming overly dependent on a few research



▲ Income (in NOK thousands)



▲ Sales and assignments (in NOK thousands)
■ Government grants (in NOK thousands)

programs sponsored by the Research Council. To become more financially robust, CICERO is aiming to diversify its range of products.

The key financial figures show that CICERO has had a satisfactory financial development in 1998 with good liquidity and equity. The current liquidity ratio is 3.07 (as compared to 2.14 in 1997), and its net worth at the beginning of 1999 accounted for 77.51 percent of the liability and shareholder's equity (as compared to 68 percent in 1998).

New climate model

Research Director Jan S. Fuglestedt and Senior Research Fellow Terje Berntsen at CICERO have developed a simple climate model for scenario studies of the possible impact of anthropogenic emissions on climate.

The model uses emissions scenarios for 29 greenhouse gases as input to calculate future atmospheric concentrations. On this basis, the radiative forcing from 35 components is calculated and the change in global mean temperature and sea level rise is estimated.

To calculate CO₂ concentrations in the atmosphere, a parameterization based on a larger and more complex model of the carbon cycle is used. Data on chemical degradation in the atmosphere is used to calculate concentrations of the other gases. The calculation of radiative forcing from changes in concentrations is based on relations published in the scientific literature.

Many of these relations are found in the work of Professor Michael Schlesinger at the University of Illinois whose own model calculates the effect of radiative forcing in the form of temperature changes on a global and hemispherical scale, as well as changes in the sea level due to thermal expansion of the sea and melting of glaciers.

The climate model developed at CICERO includes the following greenhouse gases: CO₂, CH₄, N₂O, SO₂, CFC (5 gases), CCl₄, CH₃CCl₃, HCFC (7 gases), HFC (4 gases), CF₄, C₂F₆, SF₆ and bromine gases (4 gases). In addition, radiative forcing is calculated for the following secondary components: tropospheric O₃, stratospheric O₃ and H₂O, soot, sulfur particles (direct and indirect effects) and particles generated from the burning of biomass.

CICERO's model is similar to that used by the Intergovernmental Panel on Climate Change (IPCC) and is a useful tool to study the impacts of various emission scenarios on temperature and sea level.

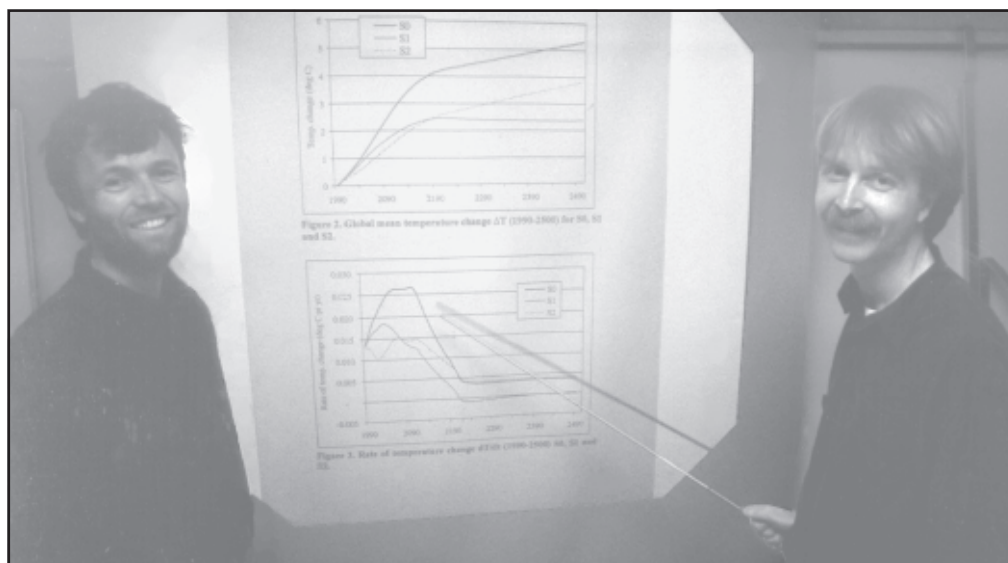
Examples of this applications is found in the IPCC reports and in several articles in scientific journals. The model can also be used to study the effects of reduction in emission of greenhouse gases and international agreements, for example the impact of the Kyoto Protocol.

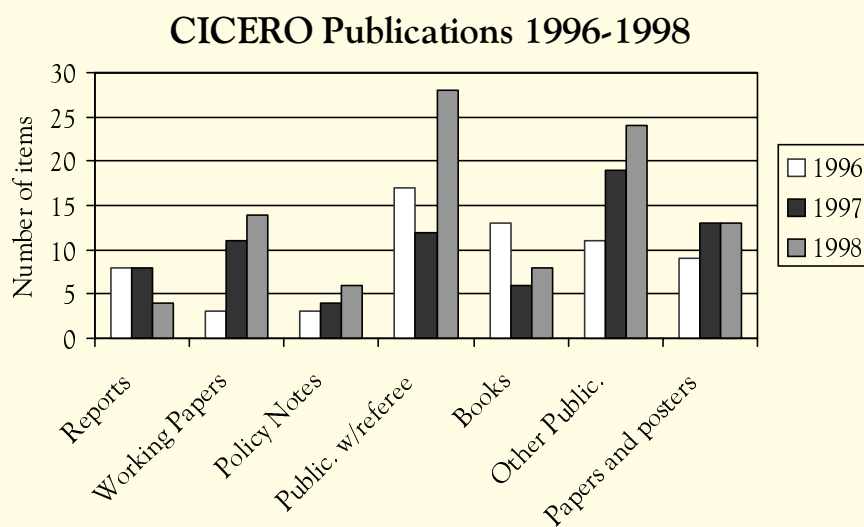
CICERO is currently working on breaking down the findings of the model by region with the help of detailed results from more comprehensive climate models.

Literature:

- CICERO Working Paper 1999:2 Jan S. Fuglestedt and Terje Berntsen: *A simple model for scenario studies of changes in global climate.*

Senior Research Fellow Terje Berntsen (to the left) and Research Director Jan S. Fuglestedt.





Research and publication

The organization of CICERO's academic staff was changed in the latter half of 1998. The previous division into three discipline-based groups was abandoned. Two programs were established, each led by a research director.

Program 1 concentrates on atmosphere chemistry and climate, integrated pollution abatement and the impacts of climate change. Program 2 focuses on environmental and climate policy measures and international negotiations. Jan S. Fuglestedt (Program 1) and Asbjørn Torvanger (Program 2) were appointed as research directors from 1 October 1998 after an internal search.

The rationale behind the reorganization was to strengthen the research-strategic leadership at CICERO, as well as to promote interdisciplinary work by establishing two interdisciplinary programs.

In 1997, CICERO prepared a strategic plan for the next few years and followed this up by applying to the Research Council's grant committee for funding for a strategic institution program (SIP). The strategy and the institution program focus on developing formal models that

can be used, among other things, to study the significance of greenhouse gases other than CO₂. The model framework will function as a common reference for activities at CICERO, tightening the focus of the Center's area of expertise. This will help ensure effective use of CICERO's limited research and informational-activity resources, as well as shape the long-term development of the Center.

During 1998, CICERO participated in a number of key national and international processes regarding the climate problem. The use of CICERO as an important competence center within climate research is rising. It is a favorable development that not only the IPCC, the Research Council of Norway and the Norwegian ministries, but also the private sector have shown an increased demand for our services. There were a greater number of in-house publications printed in 1998 compared to previous years. External publications have also increased, as have the number of popular-scientific publications.

CICERO researcher Kristin Aunan defended her doctoral thesis in 1998. At the close of the year, there were four PhD Students at CICERO.

Greater cost-effectiveness through permit trade

The Kyoto Protocol allows for the possibility of international trading of emissions quotas. The numerical model ACT, which has been developed by Senior Research Fellow Bjart Holtsmark at CICERO, estimates that the total costs for industrialized countries of complying with the climate agreement are reduced by about 40 percent with a well-behaving permit market.

ACT (Achieving Commitments by Trading) is CICERO's numerical model for analyzing the impact of the Kyoto Protocol. One of the key aspects of ACT is that when the industrialized countries use taxes or tradable permits to reduce domestic emissions of greenhouse gases, their consumption of fossil fuels is affected. This results in an international ripple effect through the energy markets, which is in turn affected by trade in the international permit market.

ACT can help explain how an international permit market may look, how the energy markets are affected, and the size of the socioeconomic costs incurred by various countries and regions. The model includes all the gases in the Kyoto Protocol, although non-carbon gases are combined into one group. The regional focus of the model can be easily shifted.

Since the main cause of the climate problem is the CO₂ released from the burning of fossil fuels, the markets for oil, natural gas, and coal are central elements of the model. A global oil market is modeled, where OPEC's production is shaped by strategic concerns. Three regional natural gas markets are also built into the model: one in North America, one in Europe, and one in the East Asian region. A global market for coal is also incorporated.

The model assumes that the industrialized countries comply with the Kyoto Protocol either through taxes on emissions of greenhouse gases or through auctioning a certain number of tradable



Senior Research Fellow Bjart Holtsmark

emissions permits to domestic actors. In addition, permits may be bought and sold internationally. Regardless of the policy regime, the implementation of the Kyoto Protocol will change the price the consumers must pay for fossil fuels, and thereby the demand. This will also result in changes in the supply of fuels before the markets are brought into a new equilibrium with different supplier prices than before.

Trade on the permit market leads to shifts in abatement measures and thereby the demand for oil, natural gas, and coal in various regions. The model captures the fact that the changes taking place in the oil, natural gas, and coal markets due to the implementation of the Kyoto Protocol reflect developments in the international permit market.

Literature:

- CICERO Report 1998:1 Holtsmark, Bjart and Cathrine Hagem: *Emission Trading under the Kyoto Protocol*
- CICERO Working Paper 1998:12 Holtsmark, Bjart: *Nasjonal klimapolitikk i lys av Kyoto-protokollen [Domestic climate policy in the light of the Kyoto Protocol]*
- CICERO Working Paper 1998:9 Holtsmark, Bjart: *From the Kyoto Protocol to the fossil fuel markets*
- Holtsmark, Bjart: «Fra kvotebørsen til petroleummarkedene» [From the quota exchange to the petroleum markets]. *Sosialøkonomen* 1999:1, p. 16-21.

Research cooperation

CICERO's location at the University of Oslo and its close cooperation with relevant institutions is essential in a field where there is such a close tie between basic and applied research. CICERO's association with the University is strategically important and mutually beneficial.

Cooperation with the University of Oslo is formalized through framework, operations, and leasing agreements. CICERO takes on as many teaching and graduate-student advising assignments as possible at the University in cooperation with the relevant departments.

CICERO's three senior researchers hold permanent positions at the University of Oslo, and its research fellows participate in the formal post-graduate instruction at the University.

The original intentions of the Norwegian government in the founding of CICERO in 1990 included giving CICERO the responsibility of helping coordinate climate policy research in Norway.

CICERO has thus been assigned the task of coordinating the research program "Norwegian Energy and Environmental Policy: Constraints, Opportunities and Instruments" (SAMRAM) in the Norwegian Research Council, as well as acting as secretariat for the Research Council's *Samarbeidsutvalg for klimaforskning* (joint committee on climate research).

CICERO has also continued to cooperate with the Fritjof Nansen Institute in 1998 through the support of earmarked funds set aside by the Research Council for joint ventures between foreign policy institutions in the Oslo area.

Facing the

Adaptation to changes in climate has been the focus of ever-increasing attention. A UN project coordinated by Senior Research Fellow Karen O'Brien at CICERO has focused on the potential impact of climate change on five selected countries. The main objective is to find out what initiatives should be implemented to reduce the potential damage of future changes in climate.

In the debate about an increased greenhouse effect, attention has naturally centered on how we can remove the causes, that is, reduce the emissions of greenhouse gases. However, there is a growing awareness that today's climate will change almost regardless of how much abatement takes place. The Kyoto Protocol will result in only small reductions in greenhouse gases.

Thus greater attention is being paid to how we can best address and adapt to these possible global climate changes. Developing countries and economies in transition are of particular interest because they are considered the most vulnerable to changes in climate. At the same time, developing countries are the least able to cover the extra costs associated with these changes.

A project under the auspices of the UN Environmental Program (UNEP) charts the impact of change and strategies of adaptation in five countries: Estonia, Pakistan, Cameroon, Antigua and Barbuda, and Cuba. CICERO was engaged to coordinate technical advising, assistance, and training of researchers from these countries to explore these countries' vulnerability to climate changes.

Each of these countries has had its own team comprising around twenty researchers responsible for implementing the national sector studies. The countries have opted to study different areas, depending on which economic sectors within each country were judged to be the most vulnerable to potential climate changes. The researchers have therefore come from a wide and varied range of national research institutions.

challenge of climate change



Senior Research
Fellow Karen
O'Brien

The focus of the researchers in Estonia has included the possible impact of climate change on forestry and agriculture; the Pakistan team has looked at the impact of climate change on water access, for both agriculture and the population in general; the Cameroon group has focused on the effects of sea-level rise on coastal areas and infrastructure; and the island-state of Antigua and Barbuda in the Caribbean Sea has studied what kind of impact a change in sea level and frequency of cyclones would have on the tourism industry; the Cuba team has looked at impacts on coastal areas and biodiversity

In its work to support the national research groups, CICERO employed a network of international researchers and specialists from the Intergovernmental Panel on Climate Change (IPCC), other UN institutions, and universities. The support consisted of sending out experts to assist the teams on site, arranging short specialized courses, organizing visits for the research teams to recognized research institutions all over the world, acquiring literature and computer software and submitting the final reports for reviews.

The first phase of this work has been concluded in the individual countries. CICERO is now assisting these countries in obtaining an international evaluation of their research. The work is expected to provide important input to the Third Assessment Report of the IPCC.

Literature:

- *Developing Strategies for Change: The UNEP Case Studies on Climate Change Impact and Adaptation Assessment*. Forthcoming CICERO report.
- *Cameroon Country Case Studies on Climate Change Impacts and Adaptations Assessments*. 1998. Climate Change Unit, Cameroon, UNEP, GEF.
- *Country Case Study on Climate Change Impacts and Adaptation Assessments in Republic of Estonia*. 1998. Stockholm Environment Institute and Ministry of Environment, Republic of Estonia, UNEP, GEF.
- *Country Case Study on Climate Change Impacts and Adaptations Assessment, Antigua and Barbuda*. Ministry of Planning, Government of Antigua and Barbuda, UNEP, GEF.
- *Study on Climate Change Impact Assessment and Adaptation Strategies for Pakistan*. Government of Pakistan, Ministry of Environment, Local Government and Rural Development, UNEP, GEF.
- *Cicerone* no. 3/98, p. 8. «Stor usikkerhet om effekter av globale klimaendringer: Øket fokus på kortsiktige klimavariasjoner» [Significant uncertainty about the impact of global climate changes: Increased focus on short-term climate variations]

Personnel

During 1998, 31 people were associated with CICERO (compared to 33 in 1997). Of these, 28 were employees (compared to 29 in 1997), representing a total of 22.3 full-time equivalent (FTE) positions (compared to 20.9 in 1997).

The number of research FTEs was 20 (compared to 17 in 1997). At the close of 1998, the center employed 26 people (compared to 26 in 1997). CICERO had two alternative national service positions in 1998.

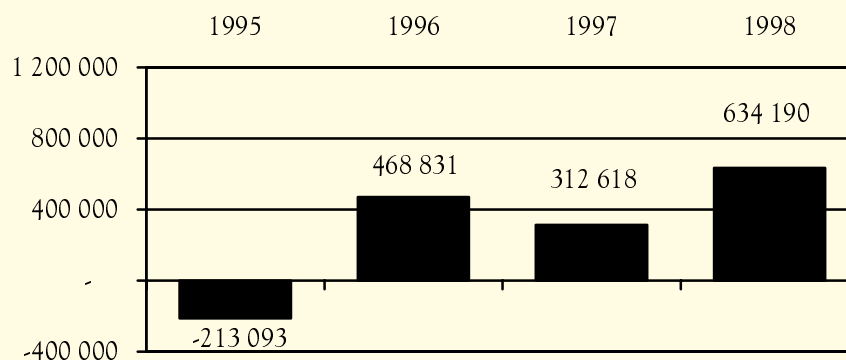
Six of the employees took maternity or paternity leave in 1998, representing two FTEs.

In 1998, a total of NOK 464,792 was paid out in wages and remuneration to the director. Last year the directorship was changed to a fixed-term contract position with a five-year term of office and a possible extension for a second term. Director Knut H. Alfsen was appointed for a first five-year term from 1 January 1999.

During 1998 CICERO employed the following persons:

- Alfsen, Knut H., Director
- Alver, May R., Administration Officer
- Aunan, Kristin, Research Fellow
- Barosen, Marit, Senior Accountant (from 8 June 1998)
- Berntsen, Terje, Senior Research Fellow (50%)
- Bretteville, Camilla, Ph.D. Student
- Borg, Lene Kristin, Senior Accountant (until 31 March 1998)
- Dahle, Øystein, Adviser (20%)
- Evensen, Reidar, Information Officer
- Fuglestedt, Jan S., Research Director
- Gan, Lin, Senior Research Fellow
- Godal, Odd, Project Assistant (from 16 February 1998)
- Hagem, Cathrine, Research Fellow
- Hagen, Kjell Arne, Assistant Director/ Research Coordinator
- Hauglin, Knut Marius, Alternative National Service Employee (from 21 January 1998)
- Holtsmark, Bjart J., Senior Research Fellow
- Isaksen, Ivar S. A., Professor (50%)
- Kasa, Sjur, Ph.D. Student
- Meze, Elisabeth, Ph.D. Student (until 30 April 1998)
- Næss, Lars Otto, Research Assistant
- O'Brien, Karen, Senior Research Fellow
- Ringius, Lasse, Senior Research Fellow
- Romstad, Bård E.W., Alternative National Service Employee (until 1 July 1998)
- Rørvik, Frode, IT Officer (30%)
- Seip, Hans Martin, Professor (20%)
- Skodvin, Tora, Ph.D. Student
- Sjøfting, Guri Bang, Ph.D. Student
- Torvanger, Asbjørn, Research Director
- Underdal, Arild, Professor (20%)
- Varhaug Pedersen, Erlend, Alternative National Service Employee (from 4 May 1998)
- Aaheim, Asbjørn, Senior Research Fellow

CICERO's operating results (in NOK)



Climate initiatives also reduce air pollution

Abatement measures to reduce emission of greenhouse gases also often have a positive effect on local and regional environmental problems that are caused by air pollutants. In their evaluation of climate policy alternatives, governments should not solely consider cost-effectiveness, but also take these beneficial effects into account. This is the main conclusion from the doctoral work of Research Fellow Kristin Aunan.

The objective of Aunan's doctoral thesis is to develop a methodology for calculating the secondary effects of climate measures. This would help contribute to a more comprehensive environmental policy, where decisions about initiatives take into account several environmental issues. In many countries - for example, in Eastern Europe and many developing countries - air pollution is a significant problem, whereas the issue of climate change does not rank very highly on the political agenda.

Demonstrating the kinds of benefits that can be achieved on a local or regional scale by implementing measures that also reduce emissions of greenhouse gases can increase government interest in implementing combined climate and air pollution measures. In her doctoral work, Aunan places special emphasis on investigating how existing knowledge can be used to calculate the impact of air pollution on public health.

An energy-saving program that comprises a main part of Hungary's climate policy has been used as an example. Part of the work has been carried out in cooperation with Hungarian researchers. Findings from studies in Western countries were used to assess the reduced damages to health and environment as a result of implementing the program. Rather few relevant studies within epidemiology and economic valuation have been carried out in Central and Eastern European countries only to a very limited degree.

The main conclusions of the study in Hungary is that the greatest benefit, in addition to reduced



Research Fellow Kristin Aunan

greenhouse gas emissions, is improved public health. Reduced material damages to buildings also make up a significant portion of the economic benefit of implementing the program.

The study, which was carried out at CICERO, is of an interdisciplinary nature. Cooperation with chemistry professor Hans Martin Seip and economist Asbjørn Aaheim at CICERO was particularly important and helped reveal how different analytical methods and assessment methods may influence conclusions in policy analysis.

Literature:

- CICERO Working Paper 1998:13 Aunan, Kristin: *Reduced damage to health and environment from energy saving: A methodology for integrated assessment applied to a case study in Hungary*
- Aunan, K.: *Reduced damage to health and environment from energy saving: A methodology for integrated assessment applied to a case study in Hungary*. Doctoral thesis, Department of Chemistry, University of Oslo, 1998.
- Aunan, K., G. Pátzay, A.H. Aaheim and H.M. Seip: «Health and environmental benefits from the implementation of an energy saving program in Hungary». *Science of the Total Environment*, 1998, 212, 245–268.
- Aaheim, H.A., K. Aunan and H.M. Seip: «Climate change and local pollution effects – an integrated approach». Accepted in *Mitigation and Adaptation Strategies for Global Change*.

Board of Directors

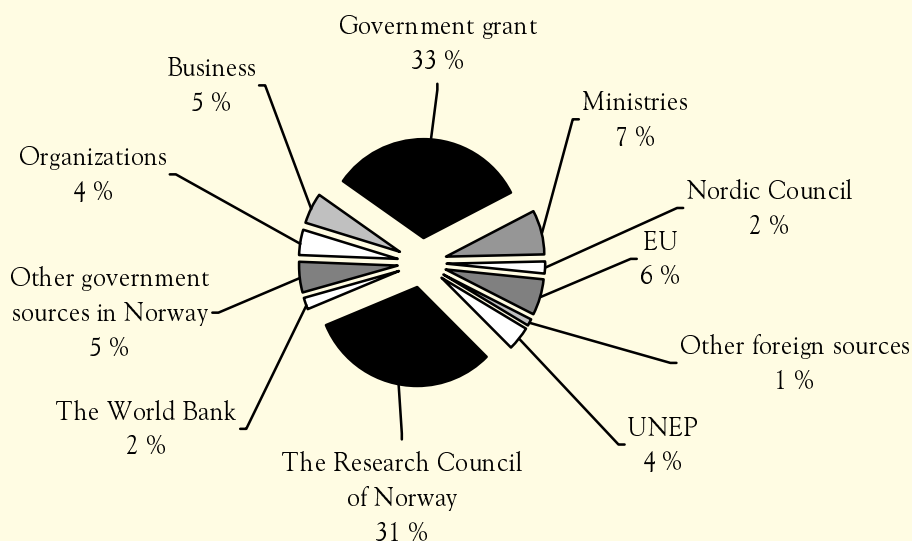
In February 1997, the Norwegian Ministry of the Environment appointed a new Board of Directors for CICERO for the term 21 February 1997 to 20 February 1999. Director Knut N. Kjær from the Central Bank of Norway was appointed chair. University Director Tor Saglie has acted as vice chair since 1991. On CICERO's recommendation, the term of the Board was extended until 30 June 1999.

Board member Inger Johanne Wiese from the Ministry of Environment stepped down in 1998 and was replaced on 1 January 1999 by Eli Marie Åsen from the same ministry. Alternate member Bente Herstad from the Ministry of Environment also stepped down in 1998. In September 1998 she was replaced by Bente Lise Dagenborg from the Ministry of Agriculture.

In 1998 the Board had four meetings, one of which was combined with a scholarly seminar that included some of CICERO's staff members. In 1998, a total of NOK 140,000 was paid out in remuneration to members and alternate members of CICERO's Board of Directors.

- Kjær, Knut N. – Director, Central Bank of Norway (chair)
- Saglie, Tor – Director, University of Oslo (vice chair)
- Hanssen-Bauer, Inger – Senior Research Fellow, Norwegian Meteorological Institute
- Hestenes, Anne Therese, Senior Vice President, Statoil
- Rødseth, Asbjørn – Professor, Department of Economics, University of Oslo
- Skjeie, Hege – Associate Professor, Department of Political Science, University of Oslo
- Åsen, Eli Marie – Adviser, Norwegian Ministry of the Environment
- Aaheim, Asbjørn – Senior Research Fellow, CICERO
- Bente-Lise Dagenborg – Adviser, Norwegian Ministry of the Environment (alternate member)
- Malnes, Raino – Professor, Department of Political Science, University of Oslo (alternate member)

CICERO's funding partners



Increased air traffic exacerbates climate change

Commercial airline traffic has doubled over the last few decades, and the prognosis for the next 10–15 years suggests a continued growth in air traffic. Ivar S.A. Isaksen and Terje Berntsen at CICERO have participated in research under the auspices of the Intergovernmental Panel on Climate Change (IPCC) to increase the scientific understanding of the environmental impact of air traffic.

Today air traffic represents 2–3 percent of the total global consumption of fossil fuels, but emissions of greenhouse gases from air traffic are currently not taken into account in the Kyoto Protocol. This is for two reasons. First, it is very difficult to tie emissions from international air traffic to specific countries. Second, there is currently a significant degree of scientific uncertainty about what the net effect of air traffic emissions is on the climate.

If we ignore the issues of noise and local pollution around airports, there are two environmental problems associated with emissions from airplanes: changes in the stratospheric ozone layer and the impact on the Earth's climate.

Changes in the ozone layer due to air traffic are primarily caused by emissions of nitrogen oxides and particles. Above a certain height (15–17 km, depending on latitude), the emission of NO_x reduces ozone, while emission of NO_x under this altitude leads to production of ozone. Today's (subsonic) planes fly under this altitude, whereas a future fleet of supersonic jets (500–1000 planes in the year 2030 have been projected) will result in NO_x emissions in altitudes where ozone breaks down.

Emissions from aircraft affect the Earth's energy balance (greenhouse effect) and thus climate in at least three different ways:

- 1) Emissions of greenhouse gases (CO₂ and H₂O) lead to direct warming.
- 2) NO_x, water vapor, and particle emissions affect



Professor Ivar S.A. Isaksen

the creation and break-down of greenhouse gases (ozone and methane).

3) Particle emissions affect solar radiation and can lead to changes in cloud formation (e.g., “stripes” of condensation that can cause the formation of cirrus clouds).

Model estimates that attempt to take into account these effects indicate that current levels of emissions from air traffic have contributed 2.7 percent of the increase in the greenhouse effect.

Professor Ivar Isaksen and Senior Research Fellow Terje Berntsen at CICERO, under the auspices of the IPCC, have participated on the “Special report on aviation and the global atmosphere” (1999) to increase the scholarship around the environmental impact of air traffic and thus provide decision-makers with a better foundation for designing policy that affects the entire aviation industry.

Literature:

- CICERO Working Paper 1998:5 Berntsen, Terje and Ivar S.A. Isaksen: *NO_x Emissions from Aircraft: Effects of lightning and convection on changes in tropospheric ozone*
- Berntsen, T. and I.S.A. Isaksen: *Effects of lightning and convection on changes in tropospheric ozone due to NO_x emissions from aircraft*. Accepted for publication in *Tellus*.
- *Cicerone* no. 3/99 “Flytrafikken tar av: Utslip-pene øker oppvarmingen” [Air traffic takes off: Emissions increase global warming], p. 22.

Information activities

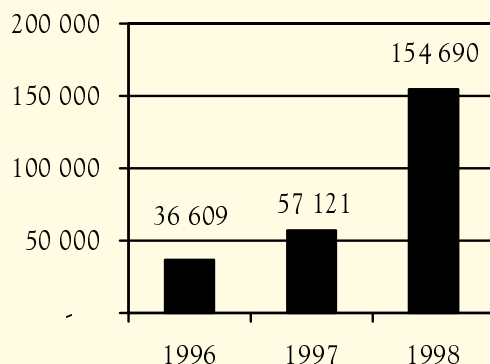
There was a marked increase in information activities at CICERO in 1997, and this increase continued through 1998. CICERO staff members were frequent participants in the public debate on climate issues and often acted as speakers in various forums. The number of visitors to CICERO's homepage increased by almost 200 percent from 1997 to 1998.

Increased traffic on the Web site

CICERO's Web pages (www.cicero.uio.no) are updated almost daily with news, both in English and Norwegian, on developments on the climate front and climate negotiations. CICERO makes all of its publications immediately available on its Web site, which also displays an overview of all of CICERO's research projects and associates. The site also contains a number of useful links to articles on climate issues and many other Web pages on climate and energy.

CICERO's new focus on news from climate research and negotiations has resulted in a tremendous increase in the number of visitors to CICERO's Web pages. In 1998, CICERO had a total of 154,690 visitors, compared to 57,121 in 1997, and 36,609 in 1996. Forty percent of the visits were from Norwegian addresses (".no"). 10 percent came from other Scandinavian countries, while commercial addresses (".com," mostly from the USA) accounted for 18 percent.

Visits to the CICERO Web



Significant expansion of *Cicerone*

The seventh volume of CICERO's newsletter, *Cicerone*, was issued seven times in 1998 as compared to the earlier four editions per year. Not only was there an increase in editions in 1998, there was also a significant increase in the number of pages per issue.

Cicerone provides news updates from climate and environmental research, from the political arena, and from CICERO. It also contains reports from important international meetings and conferences, as well as articles on the latest developments in international forums.

As a supplement to *Cicerone* no. 2/98, the CICERO publication "The Kyoto Protocol: Official Text with Norwegian Commentary" (in Norwegian) was sent to all subscribers. The booklet provides the official English Kyoto Protocol text and a review of the contents of the individual articles in Norwegian.

Subscription to *Cicerone* is free, and in 1998 the newsletter was distributed to around 1500 subscribers. *Cicerone* is published in Norwegian only, and CICERO's director acts as editor-in-chief.

Resource for the media

CICERO's mandate to disseminate as much information as possible means that virtually all of the research that takes place here is made available to the general public. This also demands a certain emphasis on popular-scientific presentation to increase accessibility.

This accessibility has made CICERO a growing source of information for the media when it comes to both natural science issues and questions connected to climate policy and negotiations.

CICERO's staff members are frequently asked to supply expert commentary, and the Center's publications and newsletter are often used by journalists for background information.

Power and environment

The room for maneuver for cost-effective measures in Norwegian climate policy has been the focus of CICERO's project "Power and Environment". The project, which began in November 1997, is led by Research Fellow Sjur Kasa.

CICERO's project focuses particularly on the work and findings of the "Green Tax Commission," which in 1996 presented its view on how Norway could reform taxes in a more environmentally sound direction. The project has also presented a more detailed impact analysis of the commission's proposal and explored the cost-effectiveness of public policy options other than an across-the-board carbon tax.

The first part of the project involved revealing how the effects of an across-the-board carbon tax would be distributed throughout Norway. The calculations included determining the impact of an evenly distributed carbon tax on different sectors, given that the revenue from this tax to the state remains constant. The figures show that private households would be the big winners, while heavy emissions-intensive industry would lose out. Service industries and the transportation industry would also benefit from such a tax distribution.

Energy-intensive industries in Norway are highly vulnerable to negative consequences of across-the-board, cost-effective carbon taxes—mainly because of their dependence on carbon for production processes in the smelting industry. This project evaluates possible alternative policy instruments for industries that the Norwegian government, for a variety of political reasons, wants to protect.

The second part of the project, which focuses on the politics of ecological taxes in Norway, was completed in December 1998. Here, the emphasis has been on finding out why an ecological tax, which has been shown to be a cost-effective policy instrument, has proven to be so difficult to implement in practice.

The tentative conclusion reflects the findings of other similar studies of ecological taxes in Europe. While the sectors that are most negatively affected by the taxes are well organized and have great political resources, the sectors that could benefit



Research
Fellow
Sjur Kasa

from a more even distribution of the ecological tax—households and service industries—are more poorly organized.

At the same time, it is also a question of prioritization: While taxation of carbon emissions has touched the "heart" of the energy-intensive industry in Norway because of its relatively concentrated and high costs, the potential benefit of ecological taxes is less of a priority for households and service industries. Other tax issues have received greater attention.

Literature:

- CICERO Policy Note 1998:2 Godal, Odd: *Metallindustrien i Norge: Økonomi, sysselsetting og utslipp av klimagasser* [The metal industry in Norway: Economy, employment, and emission of greenhouse gases]
- CICERO Policy Note 1998:1 Alfsen, Knut H.: *Framtidige krav til klimagassutslipp: Mulige langsiktige utslippsforpliktelser for Norge* [Future requirements for greenhouse gas emissions: Possible long-term emissions commitments for Norway]
- CICERO Working Paper 1998:10 Hagem, Cathrine: *Climate policy, asymmetric information and firm survival*
- CICERO Working Paper 1998:8 Godal, Odd and Bjart Holtmark: *Distribution of emission costs under different regulation schemes in Norway*

A network of participation

In addition to its projects and efforts to disseminate information – through lecturing, media appearances, and other types of participation in the general debate – CICERO had good contact with the public throughout 1998, both in terms of quality and increasing quantity.

The Center is represented on a number of boards and other institutions in the Norwegian Research Council: KLIMATEK, NORMIL-2000, SAMRAM, the Energy Forum, *Samarbeidsutvalget for klimaforskning* (the joint committee on climate research), and *Strategiutvalget for energiforskning* (the committee on energy research strategy).

Other key public committees where CICERO has been (and is) represented include the newly appointed *Kvoteutvalget* (Commission for greenhouse gas emission trading systems for Norway), MILJØSOK and the working group that looks at new and flexible instruments in environmental policy, and Statoil's Environmental Forum.

Internationally, CICERO has actively participated in the IPCC process and been represented in, among others, the European Science Foundation's TERM II program and the European Agency's Scientific Committee.

CICERO has also participated in international evaluation groups (including the System Group at IIASA and the Expert Panel under UNFCCC) and assisted in the application approval process within the EU system for other countries' research councils.

In 1998 CICERO also participated in a number of conference committees (e.g., ENS 1999 and NTVÅ's conference *Do we understand global climate change?*). It submitted several contributions to conferences and working group meetings, and participated actively in researcher evaluations and student grading at institutions of higher learning in Norway.

Climate Forum

The Climate Forum assembles participants from the public and private sectors and central research institutions in Norway. On the agenda is the greatest global challenge of our time: The dangers posed by harmful climate changes. Information and discussion about this topic is the objective of the Climate Forum, which is organized by CICERO.

The Forum aims to disseminate knowledge about the latest developments within the area of climate and create a dialog about key climate policy issues between the actors. Fifteen commercial enterprises and governmental institutions are members. In 1998, the Climate Forum met three times with the following themes:

- *After Kyoto: Now what?* 15 January 1998. Speakers were Harald Dovland, Norway's chief negotiator at the climate conference in Kyoto; Jesper W. Simonsen, state secretary in the Ministry of Environment; Knut Thonstad, assistant director of the Ministry of Finance; and Knut H. Alfsen, director of CICERO.
- *After Kyoto – and before Buenos Aires.* 12 October 1998. Deputy Secretary General Thorvald Moe presented OECD's work in connection with climate policy and the challenge of sustainable development. CICERO director Knut H. Alfsen reviewed the conclusions from the conference "Post-Kyoto Strategies," with particular emphasis on the differences between European and American prioritization.
- *Climate and environment: Have the challenges become clearer?* 20 November 1998. Chief negotiator Harald Dovland from the Ministry of the Environment updated the participants on the results from the climate negotiations (COP4) in Buenos Aires. Director Domingo Jimenez-Beltran from the European Environmental Agency (EEA) talked about "Environment in Europe, Status and Prospects, Challenges and Opportunities for Industry."

Small steps for a historic climate convention

The Kyoto Protocol is historic because it is the first binding agreement on reducing emissions of greenhouse gases among industrialized countries. After the climate conference in Buenos Aires in 1998, the main impression of most experts is that the negotiation process is moving forward but at a slower pace than many had hoped for after Kyoto. CICERO's research director Asbjørn Torvanger has followed the climate negotiations throughout the 1990s.

The fourth session of the Conference of the Parties (COP4) to the United Nations Framework Convention on Climate Change (UNFCCC) in the capital of Argentina in November of last year was the first meeting of the parties since the Kyoto Protocol was adopted on 11 December 1997. Through this protocol, the industrialized countries made a commitment to reduce emissions of greenhouse gases by around five percent, relative to 1990 levels, for the period 2008–2012.

It took almost three years of negotiations and a total of eight negotiating sessions before the Kyoto Protocol was adopted. The protocol has yet not entered into force since too few parties have ratified it and there still remain a number of unresolved issues that the countries have not been able to agree upon:

- Rules for the Kyoto Protocol Mechanism: Emission trading, joint implementation and the Clean Development Mechanism (CDM)
- Rules for carbon sinks in forests
- Voluntary commitments for developing countries

Research Director Asbjørn Torvanger at CICERO has participated in most of these negotiation sessions and also participated in COP4 in Buenos Aires. His participation has been invaluable to CICERO's efforts to keep up to date in climate negotiations and to be able to function as a competence center for the government, businesses, and the media. CICERO also receives a number of



Research Director Asbjørn Torvanger

inquiries, from both domestic and international sources, about these negotiations.

Literature:

- CICERO Policy Note 1998:5: Torvanger, Asbjørn: *The state of the Kyoto Protocol negotiations: After the fourth UNFCCC Conference of the Parties (COP4) in Buenos Aires 2-13 November 1998*
- CICERO Working Paper 1998:1 Alfsen, Knut H.: *Kyoto-avtalen: Hva kan Norge gjøre? [The Kyoto agreement: What can Norway do?]*
- Torvanger, Asbjørn: «Små skritt i Buenos Aires: Klimaforhandlingene ga kun enighet om tidsplan» [Small steps in Buenos Aires: Climate negotiations resulted only in agreement about a timetable] *Cicerone* no. 7/98, p. 6.
- Temanummer før klimaforhandlingen i Buenos Aires. [Special issue prior to the climate negotiations in Buenos Aires.] *Cicerone* no. 5/98.
- Torvanger, Asbjørn: «Liten framgang i Bonn: Mange uløyste spørsmål etter klimamøtet i juni» [Little progress in Bonn: Many unresolved issues after the climate conference in June] *Cicerone* no. 4/98, p.12.
- Torvanger, Asbjørn: «Klimaavtalen er historisk: Verda tok eit lite, men viktig skritt i Kyoto» [The climate agreement is historic: The world took a small, but important step in Kyoto] *Cicerone* no. 1/98, p. 7.
- *Kyoto-protokollen: Offisiell tekst med norske kommentarer.* [The Kyoto Protocol: Official text with Norwegian commentary.] Publication that was issued as a supplement to *Cicerone* no. 1/99.

Projects completed in 1998

AEROCHEM I

Completed: 1 March 1998

CICERO researchers: Terje Berntsen, Ivar S.A. Isaksen

Funding: EU

Keywords: Aircraft, tropospheric chemistry, global modeling

Literature:

- CICERO Working Paper 1998:5 Berntsen, Terje and Ivar S.A. Isaksen: *NOx Emissions from Aircraft: Effects of lightning and convection on changes in tropospheric ozone*
- Berntsen, T. and I.S.A. Isaksen: "Effects of lightning and convection on changes in tropospheric ozone caused by NOx emissions from aircraft." Submitted to *Tellus*.
- "Modeling of the future atmosphere." Lead author: Ivar Isaksen. In IPCC's special report on emissions and climate effects from aircraft.

Air pollution, climate change and energy production: Decision analysis tools

Completed: Spring 1998

Doctoral thesis: Kristin Aunan

Funding: The Research Council of Norway

Keywords: Integrated assessment, air pollution, health effects, dose-response functions

Literature:

- CICERO Working Paper 1998:13 Aunan, Kristin: *Reduced damage to health and environment from energy saving: A methodology for integrated assessment applied to a case study in Hungary*
- Aunan, K.: *Reduced damage to health and environment from energy saving: A methodology for integrated assessment applied to a case study in Hungary*. Ph.D. thesis, Department of Chemistry, University of Oslo, 1998.
- Aunan, K., G. Pátzay, H.A. Aaheim and H.M. Seip: "Health and environmental benefits from the implementation of an energy saving program in Hungary." *Science of the Total Environment*, 1998, 212, 245–268.
- Aunan, K.: "Exposure-response functions for health effects of air pollutants based on epidemiological findings." *Risk Analysis*, 16 (5), 693–709.

Climate effects of CFCs

Completed: 1 May 1998

CICERO researchers: Jan S. Fuglestedt, Hans Martin Seip

Funding: ReturGass

Keywords: Climate effects, ozone, CFC

Literature:

- Forthcoming CICERO Policy Note.

Climate measures in forestry: Future status and challenges

Completed: 31 December 1998

CICERO researchers: Lars Otto Næss

Funding: CICERO

Keywords: Afforestation, reforestation, climate change

Literature:

- CICERO Report 1999:1 Næss, Lars Otto: *Skogtiltak mot klimaendringer: Oversikt og status etter fjerde partskonferanse til Klimakonvensjonen [Climate measures in the forestry industry: Overview and status after the fourth conference of the parties of the Climate Convention.]*
- Næss, Lars Otto: «Etter Kyoto: mange utfordringer for skogbruket» [After Kyoto: Many challenges for forestry] *Norsk skogbruk* no. 4b/5, 1998
- Næss, Lars Otto: «Skogtiltak mot klimaendringer: Mange utfordringer etter Kyoto-avtalen» [Climate measures in the forestry industry: Many challenges after the Kyoto agreement] *Cicerone* no. 2/98, p. 4.

Converging energy, environment and technology policy: The case of the automobile industry in China

Completed: 1998

CICERO researchers: Lin Gan, Sjur Kasa

Funding: The Research Council of Norway

Keywords: China, automobile industry, environment

Literature:

- Research project proposal completed

Coordination of flexible mechanisms

Completed: 1 December 1998

CICERO researchers: Knut H. Alfsen, Bjart Holtsmark

Funding: The Norwegian Oil Industry Association (OLF)

Keywords: Kyoto Protocol, flexible mechanisms, climate policy

Literature:

- CICERO Report 1998:4 Holtsmark, Bjart and Knut H. Alfsen: *Coordination of flexible instruments in climate policy*

Emission trading and the Kyoto Protocol

Completed: 1 February 1998

CICERO researchers: Knut H. Alfsen, Bjart Holtsmark, Asbjørn Torvanger

Funding: Norwegian Ministry of the Environment

Keywords: Flexible mechanisms, emission trading, Kyoto Protocol

Literature:

- CICERO Working Paper 1998:2 Alfsen, Knut H., Bjart Holtsmark and Asbjørn Torvanger: *Kjøp og salg av klimagasskvoter: Noen mulige konsekvenser av Kyoto-protokollen [Purchase and sales of greenhouse gas permits: Possible impacts of the Kyoto Protocol]*

Emission trading with greenhouse gases

Completed: 1 March 1998

CICERO researchers: Cathrine Hagem, Bjart Holtsmark

Funding: Nordic Council of Ministers

Keywords: Emission trading, Kyoto Protocol

Literature:

- CICERO Report 1998:1 Holtsmark, Bjart and Cathrine Hagem: *Emission trading under the Kyoto Protocol*
- CICERO Policy Note 1997:4 Holtsmark, Bjart and Cathrine Hagem: *Tradable quotas for greenhouse gases: An option also in favor of the environment?*

Energy for the future

Completed: 1 October 1999

CICERO researchers: Øystein Dahle, Reidar Evensen, Asbjørn Aaheim

Funding: Environment Northern Seas (ENS)

Keywords: Energy, sustainable development

Literature:

- CICERO Book 1998:1 Dahle, Øystein: *Energi for fremtiden - Rapport fra konferansen 7.-8.05.98 [Energy for the future: Report from the conference 7-8 May 1998]*

Joint implementation after Kyoto

Completed: 1 April 1998

CICERO researchers: Lars Otto Næss, Lasse Ringius, Asbjørn Torvanger

Funding: Industrikraft Midt-Norge

Keywords: Joint implementation, Kyoto Protocol

Literature:

- CICERO Report 1998:2 Ringius, Lasse, Lars Otto Næss og Asbjørn Torvanger: *Muligheter og betingelser for felles gjennomføring etter Kyoto [Possibilities and conditions for joint implementation after Kyoto]*

Politics of environmental reform in the Third World: The contrasting cases of Brazil and Indonesia 1988-1992

Completed: 1998

Doctoral thesis: Sjur Kasa

Funding: The Research Council of Norway

Keywords: Brazil, Indonesia, forest policy, environmental regulation

Literature:

- Kasa, S.: *Tropical Forests and the Politics of Environmental Reform: The Cases of Brazil and Indonesia from 1988 to 1992/93*. Ph.D. thesis, Institute of Sociology, University of Oslo, 1998.
- Kasa, S.: «Political power and Indonesian forest concession system». In: Palo and Uusivuori (eds), *World forests, society and environment*, Vol. I, Chapter 21, Kluwer. (In press)

Quantification of the impacts of NO_x emissions on climate through changes in tropospheric O₃ and CH₄

Completed: 31 December 1998

CICERO researchers: Terje Berntsen, Jan S.

Fuglestad, Ivar S.A. Isaksen

Funding: The Research Council of Norway, Norwegian Pollution Control Authority (SFT)

Keywords: NO_x, ozone, methane, radiative forcing of climate

Literature:

- CICERO Report 1997:3 Fuglestad, J.S., T. Berntsen, I.S.A. Isaksen, H. Mao, X.Z. Liang and W.C. Wang: *Climatic effects of NO_x emissions through changes in tropospheric O₃ and CH₄: A global 3-D model study*
- CICERO Working Paper 1997:1 Fuglestad, J.S., T. Berntsen, I.S.A. Isaksen, H. Mao, X.Z. Liang and W.C. Wang: *Impacts of reduced NO_x emissions on radiative forcing through changes in tropospheric O₃ and CH₄: A global 3-D model study*
- Fuglestad, J.S., Berntsen, T.K., Isaksen I.S.A., Mao, H., Liang, X.-Z., and Wang, W.C.: "Impacts of reduced NO_x emissions on radiative forcing through changes in tropospheric O₃ and CH₄: A global 3-D model study." Proceedings from *The XVIII Quadrennial Ozone Symposium*.
- Fuglestad, J.S., Berntsen, T.K., Isaksen I.S.A., Mao, H., Liang, X.Z., and Wang, W.C.: "Climate forcing of nitrogen oxides through changes in tropospheric ozone and methane: A global 3-D model study." *Atmospheric Environment*, 21 January 1999 volume/issue: 33/6, pp. 961-977.

Reforestation and climate change mitigation

Completed: 1 May 1998

CICERO researchers: Lin Gan, Karen O'Brien,

Lars Otto Næss, Sjur Kasa

Funding: The Research Council of Norway

Keywords: Reforestation, climate change mitigation, joint implementation

Literature:

- CICERO Report 1998:3 Gan, Lin, Lars Otto Næss, Sjur Kasa and Karen O'Brien: *Reforestation and Climate Change Mitigation: A Background Study for Joint Implementation in China and Indonesia*

Report from the climate negotiations

Completed: 1 December 1998

CICERO researchers: Asbjørn Torvanger

Funding: Norsk Hydro

Keywords: Kyoto Protocol, negotiations

Literature:

- CICERO Policy Note 1998:5: Torvanger, Asbjørn: *The state of the Kyoto Protocol negotiations: After the fourth UNFCCC Conference of the Parties (COP4) in Buenos Aires 2-13 November 1998*
- Torvanger, A.: Små skritt i Buenos Aires: Klimaforhandlingene ga kun enighet om tidsplan. [Small steps in Buenos Aires: Climate negotiations resulted only in agreement about a timetable] *Cicerone* no. 7/98, p. 6.

Review of German climate policy

Completed: 1 February 1998

CICERO researchers: Knut H. Alfsen

Funding: Norwegian Ministry of the Environment

Keywords: Independent review of national communications to UNFCCC

Literature:

- Forthcoming report from UNFCCC

Strategic Institution Program (SIP): Climate model

Completed: 31 December 1998

CICERO researchers: Knut H. Alfsen, Terje Berntsen, Jan S. Fuglestedt, Odd Godal, Bård Romstad

Funding: CICERO

Keywords: Climate model

Literature:

- Fuglestedt, J.S. and Berntsen, T.: *A simple model for scenario studies of changes in global climate: Version 1.0*. Forthcoming CICERO Working Paper in 1999.
- Romstad, B. and J.S. Fuglestedt: *Compilation of*

greenhouse gas data for a simple climate model. Forthcoming CICERO Working Paper in 1999.

Social costs of air pollution

Completed: 15 December 1998

CICERO researchers: Kristin Aunan, Hans Martin Seip, Asbjørn Aaheim

Funding: Directorate of Public Roads

Keywords: Social costs, air pollution

Literature:

- CICERO Policy Note 1998:6 Aaheim, Asbjørn H., Kristin Aunan and Hans Martin Seip: *Kostnader ved miljø- og helseskader ved luftforurensninger: Vurdering av skadefunksjonsmetoden opp mot metoder basert på uttrykte preferanser [Costs of damage to health and environment due to air pollution: Consideration of a damage-function method compared to methods based on expressed preferences]*

Strategies for EU leadership for climate and sustainability regimes

Completed: 15 March 1998

CICERO researchers: Camilla Bretteville, Asbjørn Aaheim

In collaboration with: Royal Institute of International Affairs, United Kingdom, Fridtjof Nansen Institute (FNI), Norway

Funding: The Research Council of Norway, EU

Keywords: Climate policy regimes, EU leadership

Literature:

- Aaheim, H.A.: Sources of conflicts associated with emission reductions in EU countries. In M. Grubb and J. Gupta (eds): *EU leadership in climate negotiations*, Kluwer. (Forthcoming)
- Aaheim H.A. and C. Bretteville: *Conflicts and costs: Options to reduce emissions in EU countries*. Forthcoming CICERO report.

The design of a dynamic tradable permit system under market imperfections

Completed: 31 March 1998

CICERO researchers: Cathrine Hagem

In collaboration with: Hege Westskog, Center for Development and Environment (SUM)

Funding: CICERO

Keywords: Tradable permit system, market imperfections

Literature:

- Hagem, C. and H. Westskog: "The design of a dynamic tradable quota system under market imperfections." *Journal of Environmental Economics and Management*, 1998, Vol 36, No.1.

Towards a sustainable production in East Asia

Completed: 1998

CICERO researchers: Sjur Kasa

Funding: The Research Council of Norway

Keywords: Sustainability, consumption, East Asia

Literature:

- Kasa, S.: "Power, sustainability and the dynamics of global consumption trends." Submitted to *Review of International Political Economy*, September 1998.

UNEP country case-studies program on climate change impacts and adaptations assessment

Completed: 1998 (1999 for Cuba)

CICERO researchers: Karen O'Brien

Funding: The United Nations Environment

Program - UNEP/Global Environment

Facility (GEF), Danida, Denmark

Keywords: Estonia, Antigua-Barbuda, Cameroon, Pakistan, Cuba, climate change, assessment, adaptation

Literature:

- *Developing strategies for Change: The UNEP case studies on climate change impact and adaptation assessment*. Forthcoming CICERO report.
- *Cameroon country case studies on climate change impacts and adaptations assessments*. 1998. Climate Change Unit, Cameroon, UNEP, GEF.
- *Country case study on climate change impacts and adaptation assessments in republic of Estonia*. 1998. Stockholm Environment Institute and Ministry of Environment, Republic of Estonia, UNEP, GEF.
- *Country case study on climate change impacts and adaptations assessment, Antigua and Barbuda*. Ministry of Planning, Government of Antigua and Barbuda, UNEP, GEF.
- *Study on climate change impact assessment and adaptation strategies for Pakistan*. Government of Pakistan, Ministry of Environment, Local Government and Rural Development, UNEP, GEF.

External publications in 1998

Publications w/referee

- **Aunan, K.**, G. Pátzay, **A.H. Aaheim** and **H.M. Seip**: "Health and environmental benefits from the implementation of an energy saving program in Hungary." *Science of the Total Environment*, 1998, 212, 245–268.
- **Berntsen T.** and **I.S.A. Isaksen**: "Effects of lightning and convection on changes in tropospheric ozone due to NO_x emissions from aircraft." Accepted for publication in *Tellus*.
- Berntsen T., S. Karlsdottir and D.A. Jaffe. "Influence of Asian emissions on background pollutants in the Eastern Pacific." Submitted to *Geophysical Res. Lett.* 1999.
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- Callaway, J.M., **L.O. Næss** and **L. Ringius**: "Adaptation costs: A framework and methods in the United Nations Environment Programme," *Mitigation and Adaptation Cost Assessment: Concepts, Methods and Appropriate Use*. Risø, Denmark: UNEP Collaborating Center on Energy and Environment, 1998, 97–119.
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- **Fuglestad, J.S.**, **T.K. Berntsen**, **I.S.A. Isaksen**, Mao, H., Liang, X.-Z., and Wang, W.-C.: "Impacts of reduced NO_x emissions on radiative forcing through changes in tropospheric O₃ and CH₄: A global 3-D model study." In Proceedings from: *The XVIII Quadrennial Ozone Symposium*, Vol. 2, pp. 809–812.
- **Gan, L.**: "Energy development and environmental constraints in China." *Energy Policy*, Vol. 26, No. 2, 1998.
- **Gan, L.**: "Implementing China's Agenda 21: From national strategy to local actions," *Impact Assessment and Project Appraisal*, Vol. 16, No. 4, 1998.
- Gupta, M.L., R.J. Cicerone, D.R. Blake, F.S. Rowland and **I.S.A. Isaksen**: "Global atmospheric distribution and source strengths of light hydrocarbons and tetrachlorethene". *J. Geophys. Res.* V. 1998, 103, 28219-28235.
- **Hagem, C.** and H. Westskog: "The design of a dynamic tradeable quota system under market imperfections." *Journal of Environmental Economics and Management*, 1998, Vol. 36, No.1.
- Hovi, J. and **B. Holtsmark**: «Betingete standpunkter i klimaforhandlingene». *Norsk Statistisk Tidsskrift*, Vol. 14, No. 4, pp. 353–374.
- **Isaksen, I.S.A.** and C. Jackman: "Modelling the chemical composition of the future atmosphere". *IPCC*, chapter 4 (in press), 1998.
- Larssen, T., X. Xiong, R. Vogt, **H.M. Seip**, B. Liao and D. Zhao: "Studies of soils, soil water and stream water at a small catchment near Guiyang, China." In *Water Air Soil Pollution*, 1998, 101, 137–162.
- Liao, B., **H.M. Seip**, T. Larssen, and J. Xiong: "A model study of soil acidification in a small catchment near Guiyang, southwestern China." In Pawlowski, Gonzales, Dudzinska and Lacy (eds), *Chemistry for the protection of the environment 3*, 1998, Plenum Press, pp. 219–244.
- Liao, B., T. Larssen and **H.M. Seip**: "Response of five Chinese forest soils to acidic inputs: Batch experiment." *Geoderma*, 1998, 86, 295–316.
- Myhre, G., F. Stordal, K. Restad and **I.S.A. Isaksen**: "Estimation of the direct radiative forcing due to sulfate and soot aerosols". *Tellus*, 1998, 50B, 463-477.
- Myhre, G., F. Stordal, B. Rognerud and **I.S.A. Isaksen**: "Radiative forcing due to stratospheric ozone". Proceedings from: *The XVIII Quadrennial Ozone Symposium*, LAquila, Italy, 12-21 September 1996. Int. ozone comm., 1998, vol. 2, 813-816.
- **O'Brien, K.**: "Deforestation and climate change: What does the record reveal?" *The Professional Geographer*, 1998, 51/1, 140–153.

- Restad K., **I.S.A. Isaksen** and **T. Berntsen**: "Global distribution of sulphate in the troposphere: A 3-D model study." *Atmospheric Environment*, 1998, Vol. 32, pp. 3593–3609.
- **Ringius, L., A. Torvanger** and **B. Holtmark**: "Can multi-criteria rules fairly distribute climate burdens? OECD results from three burden sharing rules," *Energy Policy*, 1998, 26, 10, 777–793.
- Rognerud, B., **I.S.A. Isaksen** and M. Rummukainen: "3-D model studies of bromine compounds at high northern latitudes and their impact on ozone, polar stratospheric ozone 1997". Proceedings from: *The fourth European Symposium*, 22-26 September 1997, Schleersee, Vabaria, Germany, 1998, 309-312.
- Rummukainen, M., **I.S.A. Isaksen** and F. Stordal: "Global 3-D model calculations on ozone during a northern hemispheric winter". Proceedings from: *The XVIII Quadrennial Ozone Symposium*, LAquila, Italy, 12-21 September 1996. Int. ozone comm., 1998, vol. 2, 779-782.
- **Torvanger, A.**: "Burden sharing and adaptation beyond Kyoto: A more systematic approach essential for global climate policy success," *Environment and Development Economics*, 1998, Vol. 3, No. 3, pp. 406–409.
- **Underdal, A.**: "Explaining Compliance and Defection: Three Models." *European Journal of International Relations*, 1998, Vol. 4, No. 1, pp. 5–30.
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Styrets beretning

Report of the Board of Directors

CICERO Senter for klimaforskning ble opprettet ved Kgl. res. av 27. april 1990. Stiftelsens oppgave er å drive forskning, utredning, rådgivning og informasjon om klimarelaterte globale miljøspørsmål og internasjonal klimapolitikk med sikte på å framskaffe kunnskap som kan bidra til å løse det menneskeskapte klimaproblemet og å styrke det internasjonale klimasamarbeidet.

Kort om 1998

Året var preget av høy aktivitet og oppdragstilgangen var meget god. CICERO endret i 1998 sitt norske navn til CICERO Senter for klimaforskning (mot tidligere Senter for internasjonal klima- og miljøforskning og med akronymet CICERO).

Også i 1998 økte omfanget av CICEROs informasjonsvirksomhet og Styret er av den oppfatning at senteret ivaretar sitt informasjonsmandat på en god måte. Det ble etter intern utlysning tilsatt to forskningsledere som leder av hvert sitt forskningsprogram. Opprettelsen av to programmer innebærer at man har gått vekk fra en disiplinbasert inndeling i tre grupper som senteret har hatt siden opprettelsen. Direktørstilling ble i 1998 omgjort til åremålsstilling med en funksjonsperiode på fem år, og med mulighet for forlengelse for ytterligere én femårsperiode. Det ble avlagt én doktorgrad i 1998.

Det ble i 1998 startet arbeid med å kartlegge mulige problemer som kan oppstå med senterets datasystem ved inngangen til år 2000 og for å iverksette eventuelle mottiltak for om mulig å unngå problemer eller minimalisere disse. Styret har foreløpig konkludert med at CICERO vil være relativt lite sårbar ved en eventuell driftsstans eller driftsforstyrrelser som følge av 2000-problemet. Styret har bedt administrasjonen om løpende

orientering om arbeidet knyttet til problemet.

Bemanning

I løpet av 1998 var 31 personer knyttet til senteret (i 1997 33 personer). Av disse var 28 ansatt (i 1997 29), tilsvarende 22,3 årsverk (i 1997 20,9). Antall forskerårsverk var 20 (i 1997 17). Ved utgangen av 1998 hadde senteret 26 ansatte (i 1997 26). CICERO hadde to sivilarbeiderstillinger i 1998.

6 personer hadde fødsels- eller pappapermisjon i 1998, til sammen 2 årsverk.

I 1998 ble det utbetalt kr. 140.000 i samlet godtgjørelse til medlemmer og varamedlemmer av CICEROs styre og totalt kr. 464.792 i lønn og godtgjørelse til daglig leder.

Økonomiske nøkkeltall

Regnskapet for 1998 er gjort opp med et overskudd på kr. 1.109.812. Egenkapitalen er ved utgangen av 1998 på kr. 7.817.645. Overskuddet i 1998 vil bli tilført driftsfondet, som etter tilførsel av årsresultat vil være på kr. 7.767.645. En mindre del av driftsfondet vil i 1999 dekke kostnader knyttet til et temahefte som skal gis en vid distribusjon i forbindelse med markering av CICEROs tiårsjubileum våren 2000.

Basisbevilgningens andel av samlede inntekter utgjorde i 1998 33,82%. Tilsvarende tall for tidligere år var: 1993 (73%), 1994 (49%), 1995 (49%), 1996 (45%) og 1997 (35%). Driftsresultatet var i 1998 på kr. 634.190 (tilsvarende 4,61% av omsetningen), mens det i 1997 var på kr. 312.618.

Årsresultat og driftsresultat i 1998 er det beste siden senteret kom i normal drift. Det har vært en jevn tilgang på oppdrag. Noe av dette må kunne tilskrives den «høykonjunktur» for klimarelatert forskning og utred-

ning man hadde i etterkant av Kyoto-konferansen i desember 1997. Styret forventer at etterspørselen etter CICEROs tjenester i 1999 vil ligge noe under nivået i 1998. Den økte oppdragsmengden ble håndtert uten at man økte staben. Videre må det påpekes at CICERO har en relativt liten administrativ stab som i tillegg bidro med betydelige inntekter i 1998. De administrative kostnader kan komme til å øke framover pga. nye retningslinjer fra Justisdepartementet som slår fast at sivile vernepliktige ikke vil kunne avgis til forskningspregede oppdrag.

Styret ser med tilfredshet på CICEROs evne til å tiltrekke seg oppdrag. Styret har derimot sett med bekymring på at basisbevilgningen stadig er blitt redusert i reelle termer og at dette skjer uten at det gis en faglig begrunnelse fra Norges forskningsråd. Den negative trenden har i det minste foreløpig stoppet opp og basisbevilgningen for 1999 er i nominelle termer lik som for 1997, noe som er en liten oppgang i forhold til 1998.

Inntekter fra internasjonale oppdragsgivere utgjorde i 1998 15% av samlede inntekter (i 1997 26%). Fra nasjonale kilder utgjorde oppdragsinntekter fra ulike departementer 7% (i 1997 6%) og fra Norges forskningsråd 31% (i 1997 25%).

Selv om det må anses som positivt at CICERO har fått en økende andel finansiering fra Norges forskningsråd, bør man framover differensiere inntektsgrunnlaget slik at man ikke blir for avhengig av noen få forskningsprogrammer. Mange av de forskningsprogrammene i Norges forskningsråd hvor CICERO har fått finansiering, nærmer seg slutten av programperioden. Disse har således ikke flere midler igjen til prosjektstøtte. Det knytter seg en del usikkerhet til hvordan finansieringen av de

forskningsfeltene som programmene har dekket, vil bli framover. Det er også et mål å differensiere produktutvalget for å sikre robusthet i CICEROs økonomi.

Nøkkeltallene viser at CICERO har hatt en tilfredsstillende økonomisk utvikling i 1998 med god likviditet og soliditet. Likviditetsgraden er på 3,07 (i 1997 2,14) mens egenkapitalen ved inngangen til 1999 utgjorde 77,51% av gjeld og egenkapital (i 1998 68%).

Forskning og publisering

Organiseringen av senterets vitenskapelige personale ble endret i siste halvdel av 1998. Den tidligere inndelingen i tre disiplinbaserte grupper ble forlatt. To programmer ble opprettet, hvert ledet av en forskningsleder.

Forskningslederne ble tilsatt etter en intern utlysning. Hensikten med omorganiseringen er å styrke den forskningsstrategiske ledelsen ved senteret, samt å søke å fremme tverrfaglig arbeid ved å etablere to tverrfaglige programmer.

CICERO utarbeidet i 1997 en strategisk plan for de nærmeste årene og fulgte opp denne med søknad til basisbevilgningsutvalget om midler til et strategisk instituttprogram (SIP). Strategien og instituttprogrammet bygger opp under arbeidet med å etablere formaliserte modellelementer med særlig vekt på å studere betydningen av "de andre" klimagassene i tillegg til CO₂.

Modellrammen vil fungere som et felles referansesystem for aktiviteten ved senteret og sikre en tilstrekkelig fokusering av den faglige aktiviteten slik at senterets begrensede ressurser utnyttes best mulig i forsknings- og informasjonsvirksomheten. Dette vil være med på å sikre den langsiktig utvikling av senteret.

I 1998 ble en relativt enkel klimamodell etablert innenfor rammen av SIP. Modellen tar utgangspunkt i utslippsdata og beregner konsentrasjonen av i alt 35 ulike klimagasser i atmosfæren. Dette oversettes så til informasjon om endringer i global middeltemperatur og havnivåendringer som

følge av termisk utvidelse. Det vil bli arbeidet videre med å regionalisere modellberegningene.

Det ble i 1998 også etablert en modell for analyser av det internasjonale kvotemarkedet som forventes å bli etablert dersom/når Kyoto-protokollen trer i kraft. Modellen ble benyttet i en rekke analyser blant annet på oppdrag fra Nordisk Ministerråd. Utvikling av kvotehandelssystemer ble også studert analytisk for å belyse betydningen av ulike måter å tildele kvoter på når en tar hensyn til imperfeksjoner i markedet. Endelig ble samvirke mellom ulike nasjonale og internasjonale markedsmekanismer i klimapolitikken belyst.

I 1998 har CICERO vært med som 'lead author' i en studie av flytrafikkens betydning for klima utført i regi av IPCC. I dette arbeidet har modellering av nitrogenoksidenes innvirkning på klimagassene ozon og metan gjennom atmosfærekjemiske prosesser spilt en sentral rolle.

Arbeidet med å kvantifisere ulike sosiale kostnader knyttet til klimapolitikk i u-land har også blitt videreført gjennom analyser av vegetasjons-, helse- og materialskader som følge av bruk av fossile brensler. Studien inngår i et samarbeidsprosjekt med andre norske forskningsinstitusjoner som ser på mulige klimatiltak i en provins i Kina.

CICERO har i løpet av 1998 deltatt i en rekke sentrale nasjonale og internasjonale prosesser knyttet an til klimaproblemet, og Styret registrerer med tilfredshet at bruken av CICERO som et sentralt kompetansesenter innen klimaforskning er økende. Foruten IPCC, forskningsråd og departementer er det spesielt gledelig å konstatere en økt etterspørsel etter senterets tjenester også fra næringslivet.

Det var en oppgang i interne publikasjoner i 1998 i forhold til foregående år. Også eksternt publisering har økt, og senteret nærmer seg nå målet om å ha minst én publikasjon i et internasjonalt tidsskrift med refereerordning per vitenskapelig ansatt. Det har videre vært en økning av populærvitenskapelig formidling gjennom foredrag, kronikker og ikke minst nyhetsbladet *Cicerone*.

Informasjon og samfunnskontakt

Det var en markert økning i informasjonsvirksomheten i 1997. En fortsatt økning har funnet sted i 1998. Foruten at aktiviteter som nyhetsbrevet *Cicerone* og *Klimaforum* ble videreført, var senterets medarbeidere hyppige deltakere i den offentlige debatten om klimaspørsmål og foredragsholdere i ulike fora. Antall oppslag på CICEROs internettsider har økt fra 36.609 i 1996, til 57.121 i 1997 og 154.690 i 1998. Styret merker seg med glede at CICERO benyttes som kompetansesenter av norske medier.

Senterets nyhetsbrev *Cicerone* utkom med syv numre i 1998, som var nyhetsbrevets sjuende årgang. *Cicerone* distribueres gratis til ca. 1.500 abonnenter. Hovedtyngden av abonnentene er å finne i departementer, direktorater, næringslivet, forskningsinstitusjoner og den videregående skole.

Klimaforum hadde tre møter i 1998. Forumet samler deltakelse fra næringsliv, myndigheter og forskning og har som formål å videreformidle kunnskap om utviklingen på klimaområdet og å skape en dialog om sentrale klimapolitiske emner mellom alle aktørene. Femten bedrifter og statlige institusjoner er medlemmer av forumet.

På bakgrunn av innspill fra administrasjonen, foretok Styret i 1998 en evaluering av informasjonsvirksomheten ved CICERO. Styret sa seg godt fornøyd med informasjonsvirksomheten og ønsker å opprettholde omfanget på arbeidet også framover. CICERO er gjennom sitt mandat gitt en stor oppgave knyttet til informasjon om internasjonal klimapolitikk og -forskning. Det er rom for å gjøre mer, men satsingen vil ikke kunne opprettholdes dersom basisbevilgningene i årene framover fortsatt blir redusert.

Foruten prosjekt- og informasjonsarbeid (inklusive foredragsvirksomhet, mediaopptredener og deltakelse i den allmenne debatt på annet vis) må samfunnskontakten til CICERO sies å ha vært god og økende gjennom 1998. Således var senteret representert i en rekke styrever og andre organer i Norges forskningsråd (KLIMATEK, NORMIL-2000, SAMRAM, Energiforum, Samarbeidsutvalg for klimaforskning, Strategiutvalg for

energiforskning). Av andre sentrale offentlige utvalg hvor CICERO har vært (og er) representert vil vi nevne det nyoppnevnte kvoteutvalget, MILJØSOKs samarbeidsforum, arbeidsgruppen som ser på nye og fleksible virkemidler i miljøpolitikken, også under MILJØSOK, samt Statoils Miljøforum.

Internasjonalt har CICERO deltatt aktivt i IPCC-prosessen og vært representert i blant annet styringsgruppen til European Science Foundations TERM II program og European Environment Agencys Scientific Committee. CICERO har også deltatt i internasjonale evalueringsgrupper (blant annet av Systemgruppen ved IIASA og i ekspertpanel under FCCC) og bidratt til søknadsvurderinger innen EU-systemet og for andre lands forskningsråd.

Utover dette har CICERO i 1998 deltatt i en rekke konferansekomiteer (f.eks. ENS '99, NTVAs konferanse *Do we understand global climate change?*, mv.). CICERO leverte også i 1998 en rekke bidrag til konferanser og arbeidsgruppemøter og deltok aktivt i forskerbedømmelser og sensurvirksomhet ved våre høyere undervisningsinstitusjoner.

Forskningssamarbeid

CICEROs plassering ved Universitetet i Oslo og senterets nære samarbeid med relevante institutter er viktig på et felt hvor grunnforskning og anvendt forskning er meget tett knyttet til hverandre. Senterets tilknytning til Universitetet er strategisk viktig og av

gjensidig nytte og verdi. Samarbeidet med Universitetet i Oslo er formalisert gjennom ramme-, drifts- og leieavtaler.

Ved Universitetet i Oslo påtar CICERO seg så langt kapasiteten reker oppgaver i forbindelse med undervisning og veiledning av hovedfagsstudenter i samarbeid med de aktuelle instituttene. CICEROs tre seniorforskere er fast tilknyttet Universitetet i Oslo. Senterets doktorgradstipendiater deltar i den organiserte doktorgradsutdannelsen ved UiO. Én av stipendiatene disputerte i 1998.

I Norge samarbeider CICERO med Universitetet i Oslo og dets institutter såvel som med andre forskningsmiljøer slik at en kan trekke veksler på hverandres internasjonale kontaktnett. Med utgangspunkt i Regjeringens og Stortingets intensjon for opprettelsen av CICERO, er det en spesiell oppgave å bistå i den nasjonale koordinering på området klimapolitisk forskning i Norge. CICERO har således ansvaret for å koordinere forskningsprogrammet "Samfunnsmessige rammebetingelser og virkemidler for norsk energi- og miljøpolitikk" (SAMRAM) i Norges forskningsråd, samt å bistå Forskningsrådets Samarbeidsutvalg for klimaforskning med sekretariatstjenester.

Gjennom særskilte midler som Norges forskningsråd har stillet til rådighet for samarbeidstiltak mellom de utenrikspolitiske institutter i Oslo-regionen, har CICERO i løpet av 1998 fortsatt samarbeidet med Fridtjof Nansens Institutt.

Arbeidsmiljø

Generelt var arbeidsmiljøet ved CICERO bra. Sykefraværet i 1998 var på 3,1% (i 1997 5%).

Det ble i 1998 gjennomført en HMS-undersøkelse blant de ansatte. Undersøkelsen viste relativt stor tilfredshet med det psykososiale arbeidsmiljø og med tekniske hjelpemidler. Derimot ble det avdekket noen svakheter ved det fysiske arbeidsmiljø og da særlig knyttet til inn klima og renhold. Virksomheten forurensrer ikke det ytre miljø.


Styret


Miljøverndepartementet oppnevnte medio februar 1997 nytt styre for CICERO med funksjonstid 21.02.97-20.02.99 og med direktør Knut N. Kjær, Norges Bank, som styreleder. Universitetsdirektør Tor Saglie har siden 1991 vært styrets nestleder. På anmodning fra CICERO ble funksjonsperioden forlenget fram til 30.06.99.

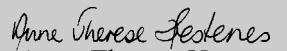
Styremedlem Inger Johanne Wiese, Miljøverndepartementet, trådte i 1998 ut av Styret og ble fra 01.01.99 erstattet av Eli Marie Åsen fra samme departement. Varamedlem Bente Herstad, Miljøverndepartementet, trådte også ut av Styret i 1998 og ble fra september 1998 erstattet av Bente Lise Dagenborg fra Landbruksdepartementet. Grunnet utenlandsopphold deltok styremedlem Asbjørn Rødseth ikke i Styrets arbeid i 1998.

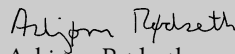
Styret hadde i 1998 fire møter hvorav ett var kombinert med et faglig seminar med deler av CICEROs stab.

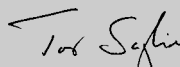
Oslo, 12. mars 1998


Inger Hanssen-Bauer



Knut N. Kjær
Styrets leder


Anne Therese Hestenes


Asbjørn Rødseth

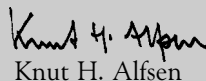

Tor Saglie
Nestleder



Hege Skjeie


Asbjørn Aaheim
Ansattes representant


Eli Marie Åsen


Bente Lise Dagenborg
Varamedlem


Knut H. Alfsen
Direktør


Raino Malnes
Varamedlem

Resultatregnskap for CICERO 1998

	Noter	1998	1997
Driftsinntekter			
Prosjektinntekter	1	9 096 768	9 224 406
Basisbevilgning		4 650 000	4 951 000
Andre driftsinntekter		1 850	16 600
		<u>13 748 618</u>	<u>14 192 006</u>
Driftskostnader			
Innkjøp av FoU og andre underleveranser		1 805 436	2 894 930
Lønn og sosiale kostnader		7 699 658	7 114 753
Husleie		878 580	849 744
Reiser		1 026 130	1 234 462
Konferanser og møter		105 381	92 987
Andre driftskostnader		1 067 239	1 069 776
Avskrivninger, nedskrivninger	2	489 517	308 856
Tap på fordringer	3	42 486	313 881
		<u>13 114 427</u>	<u>13 879 388</u>
Driftsresultat		<u>634 190</u>	<u>312 618</u>
Finansinntekter			
Renteinntekter		465 326	323 252
Agio		35 403	133 193
		<u>500 729</u>	<u>456 446</u>
Finanskostnader			
Rentekostnader		3 718	3 166
Agio		21 388	2 637
		<u>25 106</u>	<u>5 803</u>
Finansresultat		<u>475 623</u>	<u>450 643</u>
Årsresultat		<u>1 109 812</u>	<u>763 261</u>
Disponering av årets resultat			
Overført driftsfond		<u>1 109 812</u>	<u>763 261</u>

Balanse for CICERO per 31.12.98

EIENDELER	Noter	1998	1997
Omløpsmidler			
Kontanter og bankinnskudd	4	3 944 410	4 324 875
Kundefordringer		1 361 730	234 155
Andre fordringer		12 487	98 536
Forskudd til leverandører		0	50 531
Opptjent/ikke fakturert arbeid	5	1 651 226	1 954 413
		<u>6 969 853</u>	<u>6 662 510</u>
Anleggsmidler			
Statsobligasjoner	6	2 699 730	2 876 580
Inventar og datautstyr	2	415 911	311 654
		<u>3 115 641</u>	<u>3 188 234</u>
Sum eiendeler		<u>10 085 494</u>	<u>9 850 744</u>
GJELD OG EGENKAPITAL			
Kortsiktig gjeld			
Leverandørgjeld		103 926	402 394
Skyldig forskuddstrekk, arbeidsgiveravgift, pensjonsinnskudd, fagforeningskontingent og feriepenger og annet pliktig trekk		1 243 888	1 232 820
Forskuddsbetalte prosjektmidler		645 435	985 006
Annen gjeld	7	274 599	522 692
		<u>2 267 849</u>	<u>3 142 911</u>
Egenkapital			
Grunnkapital		50 000	50 000
Driftsfond		7 767 645	6 657 833
		<u>7 817 645</u>	<u>6 707 833</u>
Sum gjeld og egenkapital		<u>10 085 494</u>	<u>9 850 744</u>

V

Noter

Note 1: Prosjektinntekter

CICEROs prosjekter mottok, foruten basisbevilgningen, finansiering fra følgende instanser:

	1998	1997
Forskningsrådet	31 %	25 %
UNEP	4 %	22 %
Departementer	7 %	6 %
Organisasjoner/stiftelser	4 %	3 %
Næringsliv m.m.	5 %	3 %
Andre offentlige institusjoner	5 %	2 %
EU	6 %	0 %
Verdensbanken	2 %	2 %
Nordisk Ministerråd	2 %	2 %
Andre utenlandske institusjoner	1 %	0 %
	<hr/> 67 %	<hr/> 65%

Store deler av inntektene fra UNEP i 1997 var midler som CICERO har betalt videre til samarbeidspartnere/ underleverandører, slik at dekningsbidraget fra UNEP utgjør en betydelig mindre andel enn 22 %.

VI

Note 2: Varige driftsmidler

	Datautstyr	Kontorutstyr	Inventar	Sum
Anskaffelseskostnad per 01.01.98	1 245 438	0	524 234	1 769 672
Årets investeringer	382 637	15 928	18 359	416 924
Avgang til anskaffelseskostnad	911	0	0	911
Akkumulerte avskrivninger per 31.12.98	1 261 797	5 309	502 668	1 769 774
Bokført verdi per 31.12.98	<hr/> 365 367	<hr/> 10 619	<hr/> 39 925	<hr/> 415 911
Årets avskrivninger	284 571	5 309	22 786	312 666
Avskrivningsmetode	Lineær avskrivning over 3 år			

Innkjøp av datautstyr i 1998 er avskrevet med 1/3, uavhengig av når innkjøpet ble foretatt. Dette er gjort på grunn av datautstyr sin korte levetid, i tillegg til et ønske om at balansen ikke overvurderes. Endring i avskrivningsmetode fra 1997 utgjør et beløp på kr. 97 983,-

Investering i varige driftsmidler de siste fem år (tidligere års anskaffelser ble kostnadsført i sin helhet).

År	Datautstyr	Kontorutstyr	Inventar	Sum
1994	407 655		311 463	719 118
1995	366 708		156 993	523 701
1996	238 633			238 633
1997	231 075		55 779	286 854
1998	382 637	15 928	18 359	416 924
Sum	<hr/> 1 626 708	<hr/> 15 928	<hr/> 542 594	<hr/> 2 185 230

Omløpsmidler

Omløpsmidlene er vurdert til virkelig verdi og ikke høyere enn anskaffelseskost.

Nedskrivning

Nedskrivning på statsobligasjoner, på grunn av kursfall, utgjør kr. 176 850.

Note 3: Tap på fordringer

Det er i regnskapet kostnadsført to tap som knytter seg til prosjektoppdrag for UNEP i 1997 pålydende kr. 42 198.

Note 4: Kontanter og bankinnskudd

Posten inkluderer en bankkonto i USD som står oppført i balansen med kurs per 31.12.98. Regnskapsposter i utenlandsk valuta i løpet av året er inntekts- og kostnadsført til periodens kurs.

Note 5: Opptjent/ikke fakturert arbeid

Posten består av direkte lønnskostnader ved den nedlagte arbeidsinnsats med tillegg av andel felleskostnader og direkte prosjektutlegg.

Note 6: Statsobligasjoner

Verdien på statsobligasjoner som ble kjøpt i 1997 er korrigert i henhold til kursen per 31.12.98.

Note 7: Annen gjeld

Denne posten består av avsetning for påløpte, ikke fakturerte kostnader per 31.12.98.

Note 8: Revisjon

Regnskapet er i henhold til Regnskapsloven og blir revidert av Riksrevisjonen.

Kontantstrømanalyse 1998

Kontantstrøm fra operasjonelle aktiviteter	1998	1997
Årets resultat	1 109 813	763 261
Gevinst v/salg av varige driftsmidler	-1 850	
Avskrivninger	312 666	308 856
Nedskrivninger	176 850	
Reduksjon i varelager	303 187	-1 388 374
Økning i kundefordringer	-1 127 575	760 568
Reduksjon i leverandørgjeld	-298 468	106 772
Endring i andre tidsavgrensningsposter	-440 015	1 137 860
<i>Netto kontantstrøm fra operasjonelle aktiviteter</i>	<u>34 608</u>	<u>1 688 945</u>
Kontantstrøm fra investeringsaktiviteter		
Utbetaling ved kjøp av varige driftsmidler	-416 924	-286 853
Innbetalinger ved salg av varige driftsmidler	1 850	
Kjøp av statsobligasjoner	-	-2 876 580
<i>Netto kontantstrøm fra investeringsaktiviteter</i>	<u>-415 074</u>	<u>-3 163 433</u>
Netto endring i kontanter og kontantekvivalenter	-380 466	-1 474 488
Kontanter og kontantekvivalenter per 01.01.97	4 324 875	5 799 363
<i>Kontanter og kontantekvivalenter per 31.12.97</i>	<u>3 944 410</u>	<u>4 324 875</u>



Riksrevisjonen

REVISJONSBERETNING FOR 1998

Vi har revidert årsoppgjøret for CICERO for 1998 som viser et årsoverskudd på kr.1 109 812. Årsoppgjøret, som består av årsberetning, resultatregnskap, balanse, noter og kontantstrømsanalyse er avgitt av stiftelsens styre og direktør.

Vår oppgave er å granske stiftelsens årsoppgjør, regnskaper og behandlingen av dens anliggender for øvrig.

Vi har utført revisjonen i henhold til gjeldende lover, forskrifter og god revisjonsskikk. Vi har gjennomført de revisjonshandlinger som vi har ansett nødvendige for å bekrefte at årsoppgjøret ikke inneholder vesentlige feil eller mangler. Vi har kontrollert utvalgte deler av grunnlagsmaterialet som underbygger regnskapspostene og vurdert de benyttede regnskapsprinsipper, de skjønsmessige vurderinger som er foretatt av ledelsen, samt innhold og presentasjon av årsoppgjøret. I den grad det følger av god revisjonsskikk har vi gjennomgått stiftelsens formuesforvaltning og internkontroll.

Etter vår mening er årsoppgjøret gjort opp i samsvar med regnskaps- og stiftelsesloven, forskrifter og stiftelsens formål, og gir et forsvarlig uttrykk for stiftelsens økonomiske stilling pr. 31.12.1998 og for resultatet av virksomheten i regnskapsåret i overensstemmelse med god regnskapsskikk.

Oslo, 31.mai 1999

Etter fullmakt


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