NORWEGIAN MINISTRY
OF EDUCATION AND RESEARCH

Summary in English: Report no. 20 to the Storting (2004-2005)

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National research policy reflects society's commitment to develop new knowledge. This report sets ambitious goals. High-quality research should provide us with genuinely new knowledge and have influence on both theory and practice. This presupposes inspired researchers, high expectations and good conditions for research. The Government will increase the public research effort. If Norway is to become a leading nation in research, contributions from researchers, society and industry are also called for – a common commitment to research.

A leading research nation

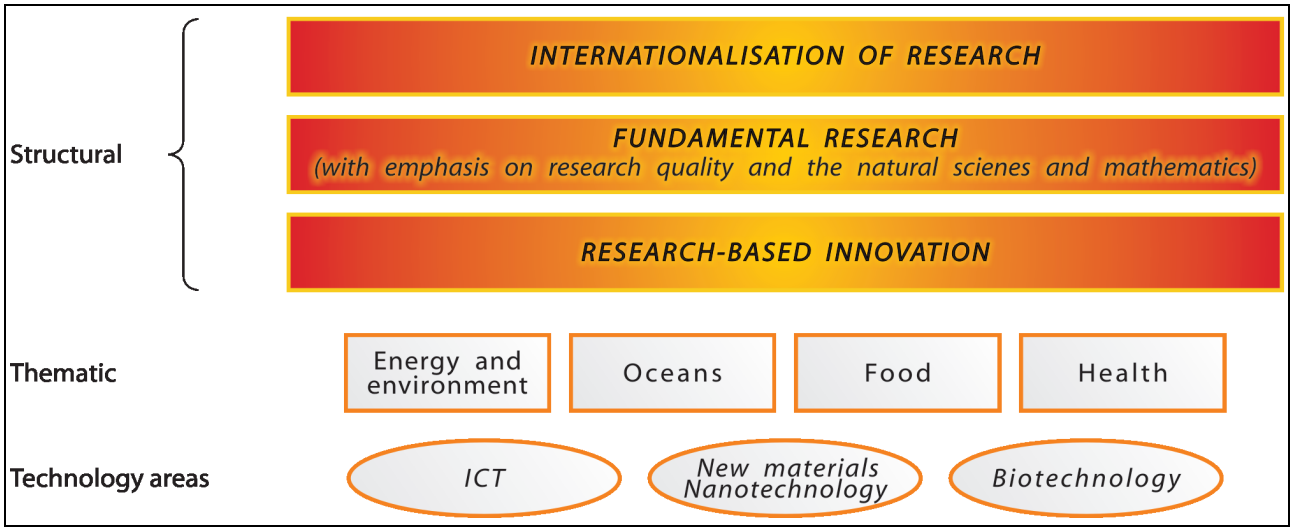
The Government's goal is to ensure that Norway occupies a leading position internationally in terms of new technology, skills and knowledge[1]. Norway has one of the world's highest gross domestic products per inhabitant and the world's highest level of education – factors that provide the preconditions for becoming a leading research nation with regard to:

- Measurable research results, i.e. the number of scientific publications, citations and patents
- Success in the EU's framework programmes
- The number of researchers per 1,000 employees
- The attractiveness of a research career for young talents
- The attractiveness of research communities for top international researchers
- The research intensity of business and industry
- Society's ability to transfer and use research-based knowledge
- The population's knowledge of research, as well as its interest in and commitment to this area.

Norwegian research performance is already good measured by several of the above indicators. However, greater efforts will be needed to maintain a leading position and to raise the level in areas where our performance is average or below average. To enable Norway to become a leading research nation, the Government has decided to increase the total investment in research to three per cent of the GDP by 2010. Public sources will account for one per cent of the GDP. The Government proposes to increase the capital in the Research and Innovation Fund to NOK 50 billion from 1 January 2006.

When increasing funding, the Government will give priority to the following areas:

[1] The Government's inaugural address, 23 October 2001.



New priorities in Norwegian research policy.

Priorities in Norwegian research policy

Three structural areas are to be given priority. Firstly, internationalisation is to constitute an overall perspective in research policy, and international participation will be emphasised when resources are channelled into research. Secondly, fundamental research will still be a priority area. Emphasis will be given to quality rather than capacity building. Research in the field of mathematics, science and technology will be strengthened. Thirdly, the Government will invest in research-based innovation and business development. This will provide support for the reorganisation and renewal of Norwegian business and industry and the public sector.

The Government proposes to strengthen research particularly within the thematic areas of energy and the environment, food, oceans and health. These priorities have been defined on the basis of national advantages and needs.

Information and communication technology (ICT), biotechnology, and materials and nanotechnology are three technological areas that are undergoing substantial development and that have wide areas of application. The Government will intensify its investment in these three areas. The three technology areas of priority are all relevant to the development of environmental technology.

Priorities will be made in the light of the need for increased research in and for regions with growth potential and few research activities.

If Norway is to be a leading research nation, research communities, Norwegian industry and the authorities must make united efforts. The Government is inviting those concerned to extensive and committing discussions on how goals and priorities are to be realised in the years to come.

Norwegian research at the beginning of a new era

In the previous report to the Storting (the Norwegian parliament) concerning the Government's ambitions and priorities with respect to research[2], the first Bondevik Government paved the way for the beginning of a new era in Norwegian research. The report's intention was to enhance quality, and it set ambitious goals for greater investment in research. Taking the period as a whole, the grants to research from the national budget have increased by NOK 4.6 billion, NOK 3 billion of which have been allocated during the present coalition government. This corresponds to a real growth in public funding of 27 per cent since 1999. In an international context, Norway is among the countries that have shown the greatest increase in public funding for research in recent years. In addition, the *Skattefunn* scheme was introduced from 2002 to give Norwegian enterprises tax relief for investments in research. So far it is estimated that the scheme has generated tax relief amounting to more than NOK 3.5 billion to research in Norwegian enterprises.

A large amount of the increase in public funding has been employed to strengthen fundamental research. Norwegian research is gradually attaining a better position internationally. For example, figures for 2002 indicate that Norway is on a level with the most advanced countries in terms of citations of scientific articles – a considerable improvement since 1991 when Norway was below the world average on this indicator.

Taking internationalisation seriously

The internationalisation of Norwegian research is assigned high priority in the Government's research policy. International research cooperation is of vital importance if the quality of Norwegian research is to be enhanced and its renewal ensured. It also allows Norwegian scientists, research institutions and industry to take advantage of knowledge and technology developed abroad. In addition, international cooperation is necessary to share the risk and costs of large research investments. The Government places particular emphasis on active participation in European research cooperation, strengthening bilateral research cooperation (particularly in relation to North America and countries in Asia), and better utilisation of national assets to attract researchers and research funding from abroad. Norway also has a responsibility for contributing to the global development of knowledge, particularly in areas that benefit the least developed countries. The Government's measures to strengthen the internationalisation of Norwegian research include the following:

– The Government will initiate an extensive strategic process – involving the ministries concerned, the Research Council of Norway, Innovation Norway and other key players – with the aim of strengthening national efforts to resolve the challenges linked to research cooperation with the EU.

[2] Report no. 39 to the Storting (1998–99) Research at the beginning of a new era.

- Norway will participate actively in the planning of the EU's seventh framework programme for research.
- The Research Council will intensify its efforts to boost coherence between national and international activities with a view to gradually opening national programmes. All large-scale projects and programmes should be assessed and shaped in relation to international activities in the area in question.
- Active participation in European research organisations should be strengthened to enable Norway to recoup more gains from membership. The Research Council will direct its efforts to recruiting more Norwegians to the international laboratories and to encouraging Norwegian industries to take part in the competition to supply them with goods and services.
- Bilateral research cooperation will be strengthened, with special emphasis on research collaboration with North America, Japan and China.
- An overall strategy will be compiled to improve the utilisation of our national advantages in areas such as energy, environment and social science with a view to attracting more researchers and students to Norway.
- Provisions will be made to improve the funding of unique data series in areas that include environment and climate research, medicine, and social sciences – and to utilize them better in both national and international research cooperation.
- Svalbard will be further developed as an international research platform.
- The practice concerning the Directorate of Immigration's specialist quota will be assessed, and provisions will be made to enable foreign employees and Norwegian employers to better exploit such permits. A separate scheme will be set up to simplify the administrative procedures concerning family reunification for researchers who come to Norway through the specialist quota.
- The Research Council's work towards establishing a resource centre for researcher mobility (part of the European Network of Mobility Centres) will be strengthened. The centre will be adapted to the needs of researchers both within and outside Europe. Universities, colleges and other institutions should use this centre actively when advertising vacant positions.
- Research will be more actively integrated as an instrument in international aid policy.
- More scholarships and exchange schemes will be set up for researchers and those with doctorates in order to promote mutual research cooperation as an element in both international aid policy and research policy.
- Norway's strong position in research on security, peace, conflict and development will be maintained.

Quality as a crucial factor

Quality is a crucial requirement for all research. High-quality research is instrumental in removing international research barriers. Quality is also important in facilitating access to knowledge from abroad and utilising this knowledge, as well as in attracting international researchers and research cooperation. In addition, high quality is a key element in maintaining good educational provisions and appropriate recruitment into research. Advanced professional specialisation may be necessary to develop particularly good research communities, at the same time as the research system must be wide-ranging and must ensure that it is not only the very best that become even better. Excellent conditions have been provided for communities and researchers of particularly high quality through measures such as Centres of Excellence for research and the Outstanding Young Investigators scheme. The Government will make further investment to strengthen the quality of Norwegian research in the following areas:

- Resources for research will be increased in order to extensively strengthen fundamental research and provide better conditions for promising researchers. Allocation of funds to fundamental research will to a larger extent be based on competition.
- Research institutions will intensify their work towards higher quality. This includes follow-up of discipline-based evaluations and assessments of institutions along with strengthening professional management at all levels. Discipline-based evaluations as a form of assessment will be further developed and assigned greater importance when allocating funds.
- The Outstanding Young Investigators scheme and the Centres of Excellence (CoE) scheme will be expanded in 2006 and 2007 respectively. A new scheme will also be set up on the same pattern as the CoE scheme in the form of centres for research-based innovation.

The path towards economical, social and environmental renewal

Research and development plays a significant role for Norwegian business and industry and the public sector. The competitiveness of industry depends on the ability of the various enterprises to put to use and develop new knowledge and new technological and organisational solutions. The development of more knowledge-based trade and industry is dependent on a good infrastructure of universities, colleges and research institutes, as well as research activity in the industry itself. High-quality research communities are also a prerequisite to encourage foreign companies to locate their research activities in Norway. Government measures to increase research investments in industry, and to generate better collaboration between the various sectors that conduct research include the following:

- Research in industry will be strengthened by increasing grants for user-initiated research through the establishment of Centres for Research-based Innovation, as well as through increased grants for industrial research and development contracts.
- Collaboration between enterprises and research institutions will be strengthened through the establishment of a scheme for industrial doctorates and through a scheme involving regional innovation centres.
- The *Skattefunn* scheme for tax relief for enterprises that carry out research will be continued.
- Efforts to commercialise research results will be reinforced by substantially increasing the grants to the Norwegian *FORNY* programme, and through a scheme providing scholarships for researchers who want to commercialise their concepts by setting up their own business.
- Measures to attract international investments in research and development will be investigated. Internationalisation activities for business and industry will be assessed with a view to strengthening Norwegian participation in the EU's technology platform initiative, boosting the participation of enterprises in the EU's framework programme for research, and increasing support to Norwegian participation in the EUREKA European network.

As research plays an important role within the public sector as a basis for policy development, management and the provision of services, Norway's long traditions of research-based management and policy development will be maintained.

- Modernisation of the public sector will be founded and reinforced through the development and use of research results. Major reforms and reorganisations will be systematically assessed, and public sector development will be founded on research-based knowledge.
- Research directed towards the renewal of the public sector will be strengthened, particularly in the areas of welfare, democracy and law, and international migration and integration.
- The scheme involving public development contracts will be consolidated.
- Databases on aspects of Norwegian society will be further developed, and the establishment of data systems that enable comparisons with other countries will be facilitated.
- Research communities and agencies will be encouraged to take an active part in the EU's work on innovation in the public sector.

Science and society

Research is an important factor in meeting the national and global challenges society faces, and it also contributes to ensuring positive changes in society and to improving quality of life. However, research can also have negative effects or can be misused. Researchers must therefore have considerable ethical awareness. Professional ethics for researchers are also decisive in ensuring good scientific practice and the quality of research results. Since 1990 Norway has had three national ethical committees that together cover all disciplines. The Research Council of Norway will evaluate this scheme. Norway meets many of the same challenges concerning research ethics as other countries, and it is therefore appropriate that the national research ethics committees strengthen their involvement in international cooperation.

- The Government will propose to the Storting legislation on establishing a comprehensive research ethics committee system, including a system for dealing with dishonesty in research.
- The Research Council will contribute to the public research debate and will integrate the precautionary principle in the work on research programmes.
- Research institutions are responsible for ensuring that matters concerning dishonesty are handled in an appropriate and organised manner. Research institutions and the national committees will continue to provide ethical instruction for students, scholarship holders and researchers.

– A template for a standard contract will be drawn up for externally financed research. This will include a checklist that emphasises the ethical aspects of the assignment.

The dissemination of information from research environments takes place through professional cooperation or in the form of scientific publications and patenting. Conveying research information to the general public is also important in terms of raising the population's general knowledge, stimulating the desire to learn in children and young people, and paving the way for open social debate and a well-functioning democracy. The Government proposes to strengthen the dissemination of research information to the general public through the following measures:

– The funding model for universities and colleges will be expanded to include a new result-based component for dissemination of knowledge. Indicators for the application of scientific method and research results in society at large will be central to this component. All state-funded research institutions will compile annual communication and information strategies from 2006.
– The Research Council of Norway will develop a national research and expert portal for journalists and editorial staffs. Through cooperation with several of the national education programmes for journalists, the Research Council will endeavour to increase interest in research among students, particularly in the natural sciences and technology.
– Support to science centres will be substantially increased. The Research Council and other players will cooperate in the further development and coordination of websites that convey knowledge of the natural sciences and mathematics.
– National agreements for leading professional journals for universities and university colleges will be assessed, and possible agreements will include Norway's main partner countries in development policy.

An attractive research career

Competent researchers are a basic prerequisite for a good research system and for high-quality research. The authorities are responsible for ensuring that the most talented and best-qualified candidates choose a career in research.

Major challenges related to recruitment to research appear to be threefold: increasing recruitment to mathematics, science and technology, improving the organisation of doctoral training and the career path, and making a research career more competitive.

The Government's ambitions for stepping up research investment will increase the need for recruitment of researchers, particularly within the prioritised areas of mathematics, science, technology and health. To meet the challenges outlined above, some general measures are required to improve the organisation of doctoral training and the research career path at universities and colleges. Moreover, it will be necessary to implement specific measures targeted at disciplines with special recruitment problems. Other major themes include increasing researcher mobility, as well as gender equality in the research system. Measures are as follows:

– The number of science credits for pupils who take science subjects in secondary education will be increased. Institutions' basic funding connected to courses in mathematics, the natural sciences and technology will be strengthened.
– Special measures for recruiting medical doctors to medical research will be continued. Recruitment measures in other health-care subjects will be evaluated more closely.
– The Government will continue to increase the number of PhD fellowship positions at universities and colleges.
– The Government will set up a scheme where graduate schools demonstrating high scientific quality can compete for status as national graduate schools with the accompanying financial support. The Government will ask the Research Council of Norway, in cooperation with the Norwegian Council for Higher Education, to prepare a proposal for this scheme.
– The Government aims to increase the number of post-doctoral positions.
– The Ministry of Education and Research will create a new teaching and research post with a duration of four to six years. The holder of the post will be assessed for fixed position as a Professor on expiry of the period.
– In strengthening the funding of Norwegian research, the Government requires that institutions employ the extra resources partly to develop an appropriate local salary policy, and partly to improve other conditions for researchers.
– The Ministry of Education and Research will investigate whether or not a statutory regulation of academic freedom at the level of the indi-

vidual researcher will be beneficial to the research system.
- The Research Council will initiate a scheme for supplementary financing of Norwegian scholarship holders who travel abroad on EU scholarships.
- Schemes to facilitate the repatriation of Norwegian researchers will be assessed.
- Efforts to ensure that Norwegian researchers – particularly early stage researchers – will take research periods abroad, will be strengthened.
- Ongoing efforts to integrate the issues of gender equality at all levels in research administration, processing of applications and reporting will be maintained.
- The Research Council of Norway and the research institutions will continue their work to promote gender equality.
- The institutions must make efforts to increase the proportion of women in Adjunct Professor positions.

Research at universities, colleges and in health authorities

Universities and colleges have a particular responsibility for carrying out long-term fundamental research and for ensuring that the Norwegian research system maintains an appropriate academic breadth. Funding for fundamental research will be strengthened both directly to institutions and through the Research Council of Norway. Increased resources will be divided between the institutions through competition-based schemes that take academic results and quality into account. The Government will also use the funding system to strengthen fundamental research in mathematics, science and technology at universities and colleges. This will underpin the national thematic investments and will compensate for the reduction in the sector's total research activities in these disciplines in the period 1990 to 2001. Private funding of fundamental research will also be strengthened. The Government will reinforce academic quality in general, and the conditions for fundamental research in mathematics, science and technology, particularly with the following measures:
- A joint financing model for universities and colleges will substitute the existing separate models. The model includes three result-based components: education, research and dissemination of knowledge. Specific formulation of the model will be addressed in the National Budget for 2006.
- The result-based research component will include indicators for scientific publications, graduates with doctorates, and funds from the Research Council and the EU framework programmes.
- The inclusion of a result-based component for dissemination and promoting the application of research results, is especially suited for the applied research profile of state university colleges.
- Research programmes and projects geared towards state university colleges will be continued and strengthened. The programme *Strategic college projects* will enhance the quality and scope of research activities at state university colleges, while business-oriented college programmes will enhance collaboration and mutual competence development between state university colleges and small and medium-sized companies.
- The financing model for research in the health enterprises will be assessed. Research activity in medical disciplines will be safeguarded through funding via both the university system and the regional health authorities.
- As a general rule, the Research Council will concentrate its grants on large-scale projects, while the institutions will be responsible for financing smaller projects carried out by their own employees. To encourage institutions to assign priority to operational funds for research, the Government will introduce a scheme whereby researchers and researcher groups can apply for support for smaller funding needs related to ongoing research projects. The scheme is limited to the period 2006–2010.
- The Government will initiate a national strategy to strengthen fundamental research in mathematics, science and technology.
- The Government will set up a scheme where donations to research of at least NOK 5 million will be matched with a state contribution corresponding to 25 per cent of the amount of the donation. The donation must come from private persons or companies and must be given to one of the universities, the Norwegian Academy of Science and Letters, or the Research Council of Norway.
- Greater investment in research equipment will constitute an important part of the strengthening of basic research in science and technology. The current arrangement comprising funds for equipment both via the Research Council and directly to the institutions as strategic research funding will be retained. The Rese-

arch Council will survey and assess national needs and, in cooperation with the institutions, will develop realistic strategies for assigning investment priorities.

Research institutes

During the past 50 years Norway has built up an extensive research institute sector. The sector is intended to cover specific needs for knowledge and to promote business and regional development. The institutes' framework conditions have changed considerably in the last decade. Universities and colleges focus more and more on commercialising research results and cooperating with business and industry, thus entering an area formerly dominated by the institute sector. Institutes must to an increasing extent compete internationally for research contracts and funding. The need for knowledge in Norwegian industry and public administration is now different from it was when the institutes were established. Last but not least, many institutes have become independent judicial entities and are to a greater extent reliant on the project and contract market. On the background of these changes, the report presents a review of the Norwegian institute sector.

The review of research institutes has shown that the Norwegian institute sector is large when viewed in an international context, although its scope is not unique. In general, research institutes provide research and development services of high quality. They are included in networks and alliances with universities and colleges and with companies, and there is no reason to believe that they create obstacles for cooperation between industry and the university and college sector. Neither is there anything to indicate that industry's purchase of research services from the institutes suppresses the companies' own research. On the contrary, it appears that the two sectors' activities and competencies complement each other.

One of the Government's prime objectives is to ensure the continuation of a strong institute sector that can provide business and industry and the public sector with relevant competence and research services of a high international level. Measures to achieve this objective are as follows:

- The Government will make provisions for the further development of the cooperation between universities, colleges and research institutes.
- The strategic role that the Research Council of Norway plays in the institute sector will be strengthened. The Research Council is assigned the task of compiling suggestions for new guidelines for government funding of research institutes, including a new financing system and allocation regime for basic grants to the institutes.
- Basic grants to the technical/industrial institutes and environmental institutes will be increased in order to strengthen long-term competence building and the institutes' international competitive ability.
- Funding of the regional institutes and the research activities of the state university colleges will be strengthened and will be formulated in a way that promotes cooperation and regional development.
- As a basis for further policy development, the Research Council of Norway will review research institutes in the fields of labour and social policies and of foreign and security policy.
- The administration of core funding for the Norwegian Institute of International Affairs and the research institute Norwegian Social Research will be transferred from the Ministry of Education and Research to the Research Council of Norway with effect from 1 January 2006.

The Research Council of Norway

The Research Council of Norway plays a key role in Norwegian research as an advisor on research policy for the authorities. The Research Council has the main responsibility for monitoring overarching priorities in research policy, and will therefore assume an important role in monitoring the priorities in this report. The Research Council has recently been reorganised, and the restructuring process has placed emphasis on the fact that the Research Council must have an open method of working and an active dialogue with research communities, trade and industry, public administration and other clients. Instruments and procedures must be adapted to the various user groups. The Research Council of Norway is responsible for the entire spectrum – from fundamental research to innovation. This provides good opportunities for coordination and for forming connections between fundamental research and research-based innovation.

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