

Tools for Research – Part I

Norway's national strategy for research infrastructure 2012-2017

This strategy is a revision of the first version of *Tools for Research* published in 2008.

About the Research Council of Norway

The Research Council of Norway is Norway's national strategic research planning and funding agency. The Research Council is the central advisory body on research policy to the Government, the ministries, and other key institutions and environments affiliated with research and development (R&D) activities. The Council also works to increase allocations to, and the quality of, R&D in Norway as well as to promote innovation in cooperation with the research community, trade and industry, and the public administration. The Research Council is responsible for identifying research needs and recommending national priority areas. Through the establishment and implementation of targeted funding schemes the Council facilitates the translation of national research policy objectives into action. Other key tasks are to serve as a meeting place for researchers, funders and users of research findings and to advance the internationalisation of Norwegian research.

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Preface

At the time this strategy report went to print, some 40 research infrastructures had been granted funding thanks to government allocations and the Research Council of Norway's National Financing Initiative for Research Infrastructure. These infrastructures will serve a wide range of research groups, many of which are internationally leading in their field and contribute to Norwegian innovation in key areas of society – such as clean energy, technology for future Norwegian industrial products, and improved health. Access to top-calibre research infrastructure promotes quality in Norwegian research and cooperation with the best international research groups, as well as inspires talented students to pursue a career as a researcher.

Most of the projects awarded funding are collaborative projects involving several research institutions and many are part of a larger-scale European collaborative effort. Some of the infrastructures are databases, for compiling data on everything from medieval texts and civil war to climate development and genetic information on humans, animals and plants. Other infrastructures comprise advanced scientific equipment varying in size from small-scale equipment components to large-scale laboratory facilities. Investments in electronic infrastructure (eInfrastructure) for high-performance computing and storage of vast amounts of data are essential to carrying out research accurately and efficiently in a number of disciplines.

Many of the recommendations set out by the Research Council in the first version of this strategy have been realised through the establishment of the National Financing Initiative for Research Infrastructure. The Council has implemented the strategy by establishing funding award processes in which a competition based on scientific merit is combined with an integrated assessment of strategic importance. Projects granted funding – as well as outstanding projects that did not receive grants due to financial constraints – are highlighted on the Norwegian Roadmap for Research Infrastructure (initially published in 2010). The roadmap is designed to indicate major research infrastructures of national importance, and provides a guide to funding bodies, such as the ministries.

The national strategy for research infrastructure will be revised on a regular basis in response to changes in national priorities and the needs specified by the research institutions. This strategy document, which is comprised of two parts, is the result of such an update process. Part I of the strategy (this document) discusses the guidelines for funding of research infrastructure by the Research Council and provides recommendations to the ministries and the R&D institutions.

The need to establish new and upgrade existing research infrastructure, as emerged in the wake of the Research Council's two infrastructure-related funding announcements as well as in relevant strategy documents, is the focus of Part II. Part II presents an updated list of large-scale projects of national importance that the Research Council – after the completion two funding rounds – deems worthy of funding. However, due to the limited amount of funding available, only a few of the highest-ranked projects have received grants from the Research Council. ([The Norwegian-language version of Part II](#) provides further insights into the need for infrastructure in specific research areas,

outlining in more detail the strategic basis for the Research Council's thinking and priority-setting in this regard.)

Part II of this strategy is an updated version of the Norwegian Roadmap for Research Infrastructure. This printed version is valid for 2012. Subsequent updates to the roadmap will be incorporated into the electronic version of this strategy that is available online. The roadmap supports the strategy's recommendations of increasing the investment volume in, and ensuring long-term funding of, research infrastructure in the years to come.

Arvid Hallén

Director General of the Research Council of Norway

Objectives

This strategy seeks to achieve the following primary objective:

> To ensure that the Norwegian research community and trade and industry have access to relevant, up-to-date infrastructure that facilitates high-calibre research, which in turn will help to solve major knowledge challenges facing society.

Background

In the course of the four years that have passed since the publication of the first version of this strategy, major changes have taken place in the funding of national research infrastructure. The Ministry of Education and Research now sets aside an earmarked allocation for this purpose, and the Research Council of Norway has established a dedicated funding initiative. A total of over 200 grant applications have been processed, and funding has been awarded to around 40 infrastructure projects. Funding decisions have been made in an application review process in which competition based on scientific merit is combined with an integrated assessment of strategic importance. Although funding allocated under the National Financing Initiative for Research Infrastructure has led to significant improvements in a number of research areas, there is still much to be done. Technological developments and new challenges will inevitably lead to an even greater need for more infrastructure.

Knowledge challenges

Research will play a critical role in finding solutions to many of the major knowledge challenges facing national and global society today in areas such as health, welfare, climate and energy. With access to the proper tools, research groups will be able to conduct high-quality, effective research aimed at solving these challenges. Increasingly, the competitiveness of the business sector is tied to expertise and technology developed in close cooperation with internationally leading academic environments with access to modern research facilities. Similarly, the development of services and the public sector is contingent on high-calibre research and advanced research infrastructure. Up-to-date infrastructure also creates a better foundation for researchers from various disciplines to use the infrastructure and collaborate on interdisciplinary projects. Interdisciplinary research often results in surprising new findings and can help to resolve social and technological challenges.

Attractiveness

The Norwegian research community must have state-of-the-art research infrastructure at its disposal if it is to have drawing power as a partner for international research projects as well as attract new recruits and international researchers. Top-notch research infrastructure, combined with outstanding researchers, is essential to the successful implementation of industrial innovation projects. This may be a critical factor when domestic and international companies are considering whether to implement their research activities in Norway.

Efficiency

Proper tools are essential to achieving targeted, efficient operations. This applies to the world of research as well. Modern, up-to-date research infrastructure will support research activity and facilitate more efficient performance of research commissioned for the business sector and public administration. Moreover, at a time when recruitment in certain areas is challenging, it is vital to promote optimal utilisation of the resource that today's researchers represent.

In the context of this strategy, the term research infrastructure refers to the following:

Infrastructure (electronic infrastructure) encompasses high-performance computing resources, grid technology, advanced solutions for data storage and management, and high-speed networks.

Scientific databases are structured, systematised, digitised data such as private or public registries, time series, survey data, digital photographs, text files and audio files from which information can be retrieved through the use of search criteria in a data system.

Scientific collections comprise compilations of physical objects of a certain type, systematised and digitised for scientific purposes. Examples include biobanks and collections of fossils, species specimens and objects.

Scientific equipment comprises everything from basic equipment to which access is essential for many research institutions, to advanced equipment for specialised research purposes.

Large-scale research facilities comprise large-scale laboratories and research installations.

Research infrastructure in Europe and the rest of the world

International cooperation is strategically important to Norway, and research councils and other public bodies in various countries are becoming increasingly integrated into international networks for planning and implementation of research. European research policy at both the national and pan-European level is characterised by a substantial and growing awareness of the importance of research infrastructure. Despite the difficult economic times, the EU has chosen to give priority to research infrastructure as a key component of research and development activities.

The Government white paper on research, *Climate for Research* (2008-2009), emphasises the need for Norway to participate actively in international cooperation, particularly with regard to scientific equipment that is so costly to establish, operate and maintain that a single country cannot shoulder the outlay alone. Norway is involved in a number of major European infrastructures, such as the European Molecular Biology Laboratory (EMBL) and the European Organization for Nuclear Research (CERN), and pays annual membership fees to use them. The country must in addition assess on an ongoing basis whether there are other major infrastructure facilities outside of Europe that would be beneficial for Norwegian researchers to use.

The European Strategy Forum for Research Infrastructures (ESFRI) promotes an integrated approach to policy development relating to research infrastructure in Europe and is an incubator for international negotiations on concrete initiatives to realise future research infrastructure in Europe. ESFRI serves as a meeting place where national representatives discuss relevant infrastructure-related issues. Norway takes active part in ESFRI, and the Ministry of Education and Research has asked the Research Council to draw up an analysis document for decision-making and put forth recommendations regarding Norwegian participation in individual research infrastructures on the ESFRI Roadmap. (*ESFRI Strategy Report and Roadmap Update 2010*: ec.europa.eu/research/infrastructures)

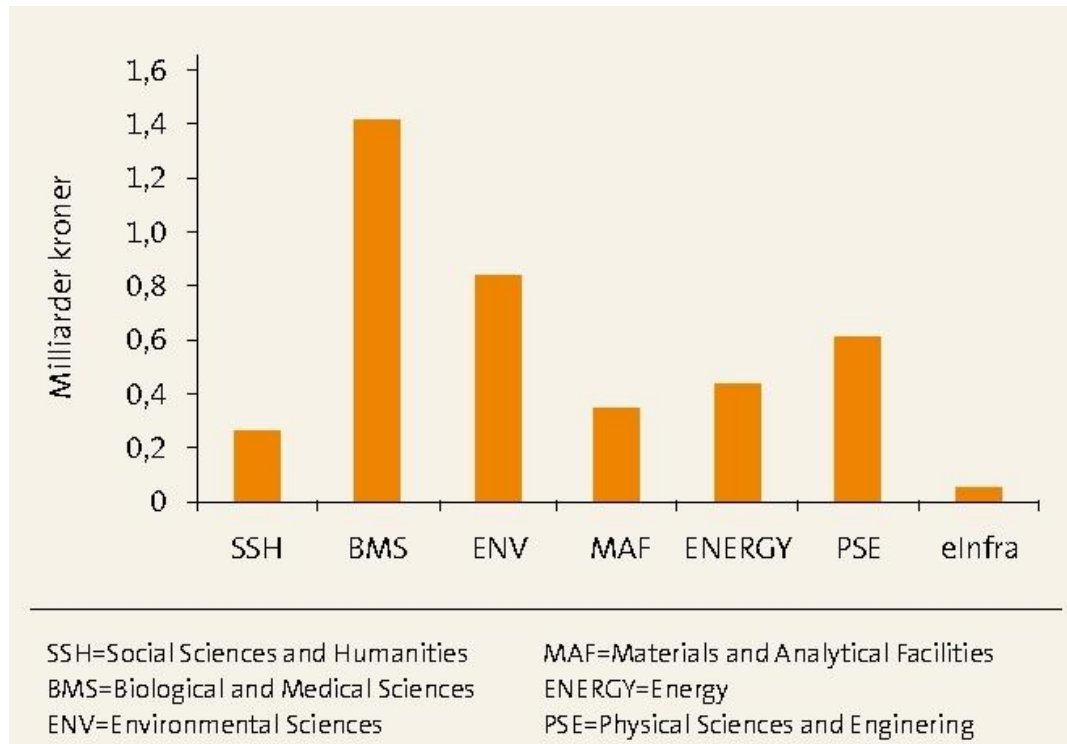
Status in Norway in 2012

NOK 1 billion has been allocated under the National Financing Initiative for Research Infrastructure thus far. Funding has been awarded to just under 40 infrastructure projects (including larger and smaller-scale equipment and facilities, databases and eInfrastructure). A total of NOK 6.7 billion was sought in the initial funding round, while NOK 4.1 billion was sought in the second funding round. In other words, there is a significant gap between the amount of funding sought and the amount of funding available for allocation (as of the most recent funding round, 12 per cent of the applications had received grant awards).

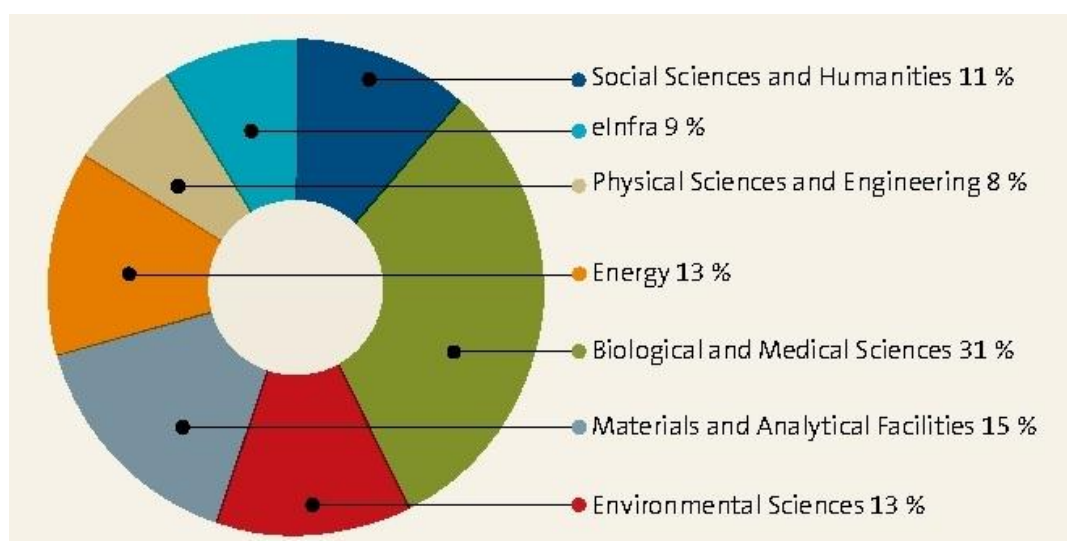
There were proposals for excellent, strategically important infrastructure that did not receive funding within all of the national priority areas. The very best of these, which involve infrastructure with a high level of investment or of great national significance, received top marks for scientific merit and were ranked high in strategic importance. They would have been granted funding had more funding been available for allocation at that point in time. It will only be possible to award grants to a few of these infrastructures under coming funding announcements at today's level of earmarked funding. There are also projects that were not included on the roadmap that will nonetheless be important to realise in the future. This applies not least to Norwegian participation in projects on the ESFRI

Roadmap. There is also a great need for funding of smaller-scale equipment in equipment-intensive disciplines such as the various technology areas.

NOK 4.1 billion in funding was sought in response to the 2010 funding announcement under the National Financing Initiative for Research Infrastructure. The diagram shows the distribution of this amount by research area. The research areas mirror those of the ESFRI Roadmap.



NOK 1 billion has been allocated under the National Financing Initiative for Research Infrastructure thus far. The diagram shows the distribution in percentage by research area. The research areas mirror those of the ESFRI Roadmap.



The National Financing Initiative for Research Infrastructure was funded through earmarked yields from the Fund for Research and Innovation from 2009 to 2011. The Fund has been discontinued, and the initiative is now a separate item in the national budget, with an allocation of NOK 280 million for 2012. The Research Council has set aside a total of NOK 315 million for research infrastructure in its budget, including NOK 35 million earmarked for infrastructure associated with the broad-based climate agreement achieved in the Storting in 2008. The new, index-linked permanent budget item will provide the stability needed for this funding.

The projects on the ESRFI Roadmap in which Norway has clearly signalled its desire to participate already represent on their own an estimated investment of NOK 1.2 billion in the period up to 2020. An additional NOK 1 billion has already been allocated to national infrastructure projects under the National Financing Initiative for Research Infrastructure. This brings the total investment for pledged and anticipated obligations up to some NOK 2.2 billion in the next 10 years. An annual budget at the level indicated above means that there is just under NOK 900 million available for allocation in the next 10 years – which translates into about two larger-scale funding announcements. An increase in national funding is therefore critical to covering Norwegian infrastructure needs as well as future Norwegian participation in relevant infrastructures on the ESFRI Roadmap.

The recommendation proposed in the first version of this strategy to increase the budgets of R&D institutions with earmarked funding for research infrastructure has not been followed up. The institutions are therefore faced with the challenge of incorporating procurement of basic equipment within the framework of their already tight budgets. The possibility of writing off depreciation costs for infrastructure used in a project funded by the Research Council into project accounts will alleviate this situation somewhat.

Distribution of decision-making responsibility regarding funding of research infrastructure

The Government white paper on research, *Climate for Research* (2008-2009), recommends that responsibility for decision-making on funding of research infrastructure be distributed between the R&D institutions, the Research Council and the ministries.

The R&D institutions

R&D institutions are expected to procure the basic scientific equipment necessary to conducting activities of adequate quality within the framework of the basic allocation they receive. R&D institutions are considered to be in the best position to assess which basic equipment they need and to ensure that allocation procedures remain simple and efficient.

The Research Council will contribute to equipment investments of this type in that grants from the Research Council for projects involving infrastructure that is procured by the institution itself may be used to cover a relative percentage of the depreciation costs of this infrastructure. Moreover, “project-specific equipment” may be written off as project costs. This applies to equipment that is necessary for the execution of the project and that will not be of any additional use outside the scope of the project. Applicant institutions may procure necessary equipment after they have been granted their funding award, so they do not have to take on any financial risk at the time of submission of the grant application.

The Research Council

The Research Council is responsible for taking decisions regarding investment in *nationally-oriented* research infrastructure (see below). Funding channelled via the Research Council is intended to support the development of research areas of national priority and industries of national importance with a significant need for research infrastructure. The Research Council is responsible for coordinating investments when a number of research groups need a certain type of infrastructure but the costs are so high that cooperation is the best solution. The Research Council assesses grant applications for research infrastructure involving investment costs starting at NOK 2 million and up, and can grant a maximum of NOK 200 million in project funding. Recommendations for allocations of over NOK 200 million will be submitted by the Research Council to the relevant ministry for special consideration and final allocation of funding. To be eligible for funding, smaller-scale infrastructure with low investment costs must comprise a component of a larger-scale, nationally-oriented research infrastructure or a nationally-coordinated initiative, or be closely affiliated with one of the programme initiatives administered by the Research Council.

Nationally-oriented research infrastructure refers to:

Infrastructure that is of widespread national interest

The establishment of the infrastructure must be of major interest to Norway as a whole. The Research Council will incorporate considerations relating to the priorities set out in the white paper on research.

Infrastructure that will be available in only one or a few locations in Norway, as a general rule

The Research Council encourages research institutions with common interests to implement task-sharing when appropriate and work together on grant applications.

Infrastructure that lays a foundation for internationally cutting-edge research

Allocations are intended to support the activities of research groups that are already at the international forefront or demonstrate good potential realistically speaking to achieve that position.

Infrastructure that will be made accessible to relevant researchers and industries

Access must be given to any groups outside the applicant institution that will need to utilise the infrastructure. Grant applications must include plans for user access.

The Research Council only provides direct support for procurement and establishment of scientific equipment and other infrastructure under dedicated calls for proposals for funding for research infrastructure. These calls are primarily issued under the National Financing Initiative for Research Infrastructure, although they may be included under other programmes at the Research Council. Regardless of funding instrument, grant applications will be assessed according to the principles for priority-setting and allocation of funding described in the attachment to this strategy (see page 19). Infrastructure must be nationally oriented to be eligible for direct funding. In the event that R&D institutions choose at their own risk to invest in the proposed infrastructure before the Research Council has taken the final decision regarding grant awards, they may apply a direct allocation from the Research Council to pay for investments made after the expiry of the application submission deadline.

As a general rule, expenses for operation of research infrastructure are covered by the projects that use the infrastructure. However, in special cases, support for operating expenses for new or existing nationally-oriented research infrastructure may be provided under the National Financing Initiative for Research Infrastructure. Large-scale research facilities with operating expenses of a magnitude that ongoing projects or host institutions cannot reasonably be expected to cover may, after a separate assessment process, be allocated basic funding for operation and maintenance for part or all of the lifetime of the infrastructure.

The Research Council will facilitate access to research data (time series, registries and collections) in secure systems and in a form that can be used as a basis for national and international research cooperation. This will in turn promote Norwegian participation in international data networks. The contents of the data bases will be developed (for example, via data collection or digitisation of collections) by the ministries and their subordinate agencies, as well as under research projects funded by the Research Council and activities funded by the R&D institutions themselves. Only funding for activities to further develop and prepare the data for use in research may be sought under the National Financing Initiative for Research Infrastructure.

The Research Council will work to achieve investments in research infrastructure that apply across the entire breadth of Norwegian research, and is at the same time responsible for conducting strategic assessments and ensuring the promotion of national priorities in grant allocations. Thus, specific thematic areas or disciplines may be weighted differently in future funding announcements. In this manner the Research Council can channel investments into areas characterised by high research activity and a significant need for equipment, while at the same time following political and strategic guidelines.

The ministries

Decisions regarding international research cooperation involving major, long-term commitments in the form of investments and membership dues are taken at the ministerial level. Funding for national research facilities involving investments that exceed NOK 200 million will also be dealt with at the ministerial or government level, after consultation with the Research Council. Allocations for such investments should comprise an addition to the permanent budget item for research infrastructure in the national budget.

Norway's high-speed network connecting research institutions is operated by UNINETT AS, with a direct allocation from the Ministry of Education and Research.

Value of national coordination

It is natural that several research institutions collaborate on and use certain types of research infrastructure. A single institution cannot be expected to finance very costly scientific equipment on its own, and it is important that equipment involving such significant investments is utilised effectively by a wider user group. Databases are normally built, developed and used by many research groups. High-performance computing clusters and networks are essential for research activities in almost all disciplines. It is vital that the Research Council assists in coordinating investments in these and other areas and helps to ensure that the infrastructures are satisfactorily utilised nationally.

Analysis and strategic priority-setting regarding individual major investments

Coordinating the allocation of relatively large amounts of funding to nationally-oriented research infrastructure makes it possible to give priority to a few large-scale infrastructures of national importance in a given allocation process. This is usually not possible under the Research Council's other funding schemes and programmes, in part because the amount of funding available is limited, and in part because priority tends to be given to research projects rather than major investments in infrastructure.

Analysis of the grant applications received gives the Research Council an overview over Norway's infrastructure needs, while coordination at the national level can provide a better overview of the investments that are actually made. This will make the Research Council better equipped to set strategic priorities and to target funding announcements for research infrastructure towards specific disciplines and thematic areas as needed.

Cooperation, task-sharing and concentration

All of the Research Council's direct investments in nationally-oriented research infrastructure will be made under, or in coordination with, investments under the National Financing Initiative for Research Infrastructure. The Council sets out clear requirements for cooperation and task-sharing between research institutions and between research institutions and players from industry, the public administration and/or the regional health authorities that infrastructure projects must satisfy to qualify for funding.

A review of the infrastructure that has been awarded funding thus far clearly shows that these incentives have worked as intended: all large-scale infrastructure being established involves partners from several research-performing institutions and research applications are targeted towards players outside of the R&D institutions as well. This creates a culture and practical routines for making research infrastructure accessible to users from spheres outside the host institutions' own researchers. The Research Council stipulates corresponding requirements for cooperation and task-sharing between Norwegian research institutions with regard to funding of Norwegian participation in joint international infrastructures, such as projects on the ESFRI Roadmap.

Generic eInfrastructure

The EU *e-Infrastructure Reflection Group* (e-IRG) points out that since eInfrastructures are increasingly being utilised by new user groups, eInfrastructures need to offer a permanent set of services. This has been widely recognised in the EU's new research and innovation policy.

Providing a common, nationwide generic eInfrastructure to be utilised by researchers of all disciplines is a more cost-effective model than developing parallel eInfrastructure solutions within the individual disciplines and/or institutions.

Norway has established a national coordination of eInfrastructure investments, administered by UNINETT AS or its subsidiary Sigma. Funding comes directly from the Norwegian Ministry of Education and Research, through the Research Council, and to a large degree from the universities themselves. Investments in recent years have targeted activities such as:

- Increasing the reach and capacity of high-speed networks between Norwegian research institutions and with other countries;
- Common high-performance supercomputer facilities;
- NorStore, the national data storage facility;
- Investments in the national grid infrastructure (now administered at the Nordic level by NordForsk).

Generic eInfrastructure has an impact on a great many scientific fields as well as other research infrastructures. Investments in eInfrastructure should be assessed in terms of the resources required for other national research infrastructures. Coordinating investment in national infrastructures enables Norway to tailor investment levels to actual needs and to target activities towards areas where the benefits of investments will be greatest. Centralised coordination of measures also provides opportunities to build bridges between infrastructures and disciplines to promote multidisciplinary research. The Research Council thus seeks to secure adequate, long-term funding for eInfrastructure – within the applicable budgetary constraints and commensurate with the needs to be met.

Norwegian Roadmap for Research Infrastructure

The first version of the Norwegian Roadmap for Research Infrastructure was issued in 2010. It corresponded closely to similar national roadmaps of other countries. The Norwegian roadmap presented the large-scale, comprehensive projects that stood out among the competition after the first call for proposals, whether they were awarded funding or not. Part II of this strategy is an updated version of that roadmap, with new projects included from the second funding round under the National Financing Initiative for Research Infrastructure. The current version contains chapters (in Norwegian only) that describe existing infrastructure and the need for new infrastructure and upgrades within the various research areas. The area-specific chapters make it easier to see the strategic value of projects [highlighted on the roadmap](#) (Norwegian).

The roadmap provides a good overview of valuable projects for infrastructure, since projects included on it have been assessed and quality-assured by the Research Council. The roadmap also provides other funders besides the Research Council with a sound basis for taking decisions on

funding. Without a coordinated process of application assessment and allocations, such a roadmap would scarcely be possible.

Recommendations

Based on the information discussed above, this strategy proposes the following recommendations:

Recommendations for the ministries:

> Continue to increase the volume of investment

The large number of applications received in response to funding announcements under the National Financing Initiative for Research Infrastructure, and the very high quality of many of these, shows that there is both great potential and unmet needs with regard to national research infrastructure in Norway.

It is crucial that Norway increases its investment volume in the coming years to quickly establish national infrastructures that will strengthen Norwegian research. A number of infrastructures involving major investments are also expected to need funding to cover operating costs in the range of 10-15 per cent of the investments. Long-term funding is also critical to maintaining strategic latitude to benefit Norwegian research over time. As of 2012, the annual allocation from the Ministry of Education and Research is NOK 280 million. There is a desire to increase this in the long term, and the Research Council has recommended an annual allocation of NOK 380 million from 2013.

> Utilise the resources found on the Norwegian roadmap

With the Norwegian Roadmap for Research Infrastructure, the Research Council has created a tool to present major research infrastructure projects that have been quality-assured through a rigorous application review process. The updated Norwegian-language version of the roadmap also presents the strategic assessments and priorities in particular disciplines, thematic areas and technology areas, placing selected projects in a more strategic context. The ministries will be able to draw benefit from the Research Council's efforts in assessing and quality-assuring proposed projects if they target their individual investments towards projects on the roadmap.

Recommendations for the R&D institutions:

> Prepare detailed plans for managing their role as hosts

Hosting a national research infrastructure involves taking on significant responsibility and in many cases there are financial ramifications. Potential host institutions should draw up detailed plans of how the infrastructure will be administered, made accessible and operated in the long term. Establishing a sustainable operating and refinancing economic framework for research infrastructures is important for all involved parties.

> Make the costs associated with the infrastructure visible

R&D institutions are encouraged to have financial systems in place that distinguish all costs associated with the research infrastructure, including operating costs and depreciation costs related to infrastructure procured by the institution itself. These costs should be distributed among the projects that are using the infrastructure and entered into the project budgets. In this way, research

fundings, including the Research Council, contribute to covering infrastructure-related costs for the individual projects. With regard to basic equipment primarily used locally by a single institution, the Research Council allows operating and depreciation costs to be incorporated into the research institution's indirect expenses rather than listed as direct expenses.

> Prioritise research infrastructure within the framework of the basic allocation

Research institutions must continue to make room for new investments in and upgrades and operation of research infrastructure within the parameters of their own budgets. The need for basic equipment is particularly great.

The Research Council will:

> Further develop the Norwegian research infrastructure landscape

The establishment of the National Financing Initiative for Research has given the Research Council a tool for shaping the Norwegian research infrastructure landscape. Assessments of the scientific merit and integrated strategic importance of proposed infrastructures will help to identify which investments will be most advantageous for Norwegian research. In order to take adequate account of strategic perspectives, it is important that the initiative is coordinated with other instruments and funding schemes at the Research Council.

> Promote optimal use of infrastructures

The Research Council's centralised allocation process provides a better overview of existing infrastructures at any given time. The requirement of making national research infrastructure accessible to many users will also help to promote more effective use. Coordination and concentration of equipment in certain locations means that many research groups will find themselves a long geographic distance from the infrastructure they need. In such cases, it is vital that the Research Council promotes the optimal use of the infrastructure and assesses on an ongoing basis whether funding must be set aside for this specific purpose.

> Enhance the innovation capacity of industry and the public sector

The Norwegian business sector is mainly comprised of small and medium-sized companies. The Research Council would like to see more research activity in these companies as well as more of the research results utilised. The Council would also like to see more innovation in the public sector and underscores the importance of an extensive, wide-ranging national knowledge base. One of the Research Council's objectives is to encourage companies and public enterprises to collaborate with Norwegian and international researchers on a broader scale to better exploit research results for development and innovation. Up-to-date research infrastructure is a critical factor for achieving this objective, and the Council's investments in infrastructure are intended to support such collaboration.

> Promote efficient management, operation and accessibility of infrastructure, in keeping with international principles

Through its contracts with the responsible institutions, the Research Council will promote efficient national organisation and management of the infrastructures as well sustainable operation in accordance with the statutory framework. The infrastructures will also be established in keeping with international principles for user access and sound processing and publication of data and findings.

Attachment:

Principles for priority-setting and allocation of funding under the National Financing Initiative for Research Infrastructure

Direct funding for national infrastructure is allocated via funding announcements under the National Financing Initiative for Research Infrastructure. The funding announcements are followed by an assessment and prioritisation process that gives consideration to both scientific merit and strategic relevance.

It is essential that research infrastructure projects exhibit high scientific merit to be deemed worthy of funding. The scientific review is carried out by international referees and serves as important input for the Research Council's strategic review and decision-making process. Grant applications are normally assessed on the basis of the following criteria:

- Quality and impact of the proposed research using the infrastructure;
- Planned ability of the infrastructure to enhance innovation in existing industries and/or newly established companies as well as the competitiveness of Norwegian industry internationally;
- Quality and national standing of the research groups in their particular field, as well as the institution's suitability as a host institution for the infrastructure;
- Interaction between new infrastructure and any existing infrastructures;
- Position of the infrastructure in the international landscape as well as in planned and existing international cooperation;
- Potential to establish international networks, and capacity to carry out high-priority research that Norwegian research groups could not otherwise conduct on their own;
- Quality of the project plans and competence of the project management team.

Grant applications for national infrastructures must satisfy the strategic requirements and guidelines set out in the funding announcements. Applications will also be assessed on the basis of the following criteria:

- The infrastructure must be of widespread national interest;
- The infrastructure must support strategic priorities specified in national strategies and described in more detail in the funding announcement;
- The infrastructure must promote effective task-sharing and coordination between Norwegian research groups within the relevant research areas;
- There must be plans in place to make the infrastructure accessible to users outside the host institutions;

- The infrastructure must support national industrial priorities (when relevant);
- The infrastructure must contribute to long-term competence building in research areas that are expected to be of major importance to Norway;
- The infrastructure must reflect and reinforce the host institutions' strategic plans and priorities, and there must be plans in place for funding the operation of the infrastructure once the project period is concluded;
- The infrastructure must be of relevance and benefit to Norwegian society.