

DG Research

**Monitoring Policy and  
Research Activities on  
Science in Society in  
Europe (MASIS)**

National Report, Norway

October 2010

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National Report, Norway

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NB: Q 1, 1.2, 1.3, and 2.4 will be adjusted to the new template with the up-date in 2011.

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## 0 Introduction

The EU recognises the importance of ensuring that European research and research in Member States is firmly rooted in the needs of society, particularly in light of the constantly changing Europe. Efforts to reinforce the societal dimension of research are channelled through the 'Science in society' (SIS) programme. The SIS programme supports activities focusing on the governance of the research system, research ethics, public engagement in science, women in science and the promotion of scientific education and science communication.

The Monitoring Policy and Research Activities on Science in Society in Europe (MASIS) initiative is a major undertaking under the SIS programme. Its aim is to map, steer and monitor the SIS landscape in the European Research Area (ERA) ([http://ec.europa.eu/research/era/index\\_en.htm](http://ec.europa.eu/research/era/index_en.htm)), in order for EU citizens and society to benefit the most from SIS efforts. MASIS also covers the eleven Associated Countries.

The national MASIS reports are cornerstones in this endeavour, as they contain the knowledge gathered by a network of national correspondents on SIS. The reports will be updated every six months. The reporting format was developed on the basis of advice from the network of national correspondents, as well as discussions with authors of the initial MASIS report (see this [LINK](http://ftp.cordis.europa.eu/pub/fp7/sis/docs/sis_masis_report_en.pdf), [ftp://ftp.cordis.europa.eu/pub/fp7/sis/docs/sis\\_masis\\_report\\_en.pdf](http://ftp.cordis.europa.eu/pub/fp7/sis/docs/sis_masis_report_en.pdf)). In addition, the Commission and a network of national validators offered comments and advice.

In total, 38 national reports covering 38 (EU and associated) countries have been produced. This is the report on Norway. It consists of four main sections:

1. National context
2. Priority setting, governance and use of science in policy-making
3. Research related to SIS
4. Activities related to SIS.

The intention of this report is to provide a good general overview of the SIS situation in Norway, including public engagement in science, different models and use of scientific advice and expertise for policy-making, activities related to assessment and ethical issues of science and technology, SIS research activities and scientific culture as well as trends, policies, actors and activities.

Please note, in accordance with the terms of reference for the MASIS project, that the issue of ‘women in science’ is **not included** in the mapping as this has been extensively mapped and reported in other European projects. Please note also that the present report follows the initial MASIS report in using the term ‘science’ in its broadest sense, as in the German ‘Wissenschaft’, covering also the social, economic and human sciences. A few subsections are concerned only with the natural sciences, and in these cases it is explicitly indicated.

## Statistical data sheet, Norway

	2000	2005	2006	2007	2008	2009	2010	EU27 average/total, 2008
<b>Research and development</b>								
Gross domestic expenditure on R&D (GERD), in % of GDP <sup>1</sup>	1,49	1,52	1,52	1,65	1,62	-	-	1,89
GERD by source of funds, % of total GERD <sup>1</sup> :								
- Business enterprise sector	50,6	46,4	46,8	45,3	-	-	-	55,0
- Government sector	41,2	44,0	45,3	44,9	-	-	-	33,5
- Higher education sector	0,5	0,7	0,7	0,6	-	-	-	0,9
- Private non-profit sector	1,0	0,9	0,9	0,9	-	-	-	1,6
- Abroad	6,7	8,0	8,3	8,3	-	-	-	8,9
Number of R&D personnel <sup>1</sup> , % 1000	-	13,0	13,0	13,4	13,6	-	-	
Number of R&D personnel by sector of performance <sup>1</sup> , % of total R&D personnel:								
- Business enterprise sector	26.221	30.492	31.745	34.086	35.676	-	-	2.455.192
- Government sector	54%	52%	52%	51%	52%	-	-	52%
- Higher education sector	18%	17%	17%	17%	16%	-	-	14%
- Private non-profit sector	28%	31%	31%	32%	32%	-	-	33%
- Abroad	-	-	-	-	-	-	-	1%
<b>Patents</b>								
Patent applications to the EPO, total <sup>2</sup>	400	482	487	473	-	-	-	
Patent grants at the USPTO, total <sup>2</sup>	447	541	562	693	-	-	-	
Triadic patent families, total <sup>2</sup>	108	128	127	124	-	-	-	
Patent applications filed under the PCT, total <sup>2</sup>								

	2000	2005	2006	2007	2008	2009	2010	EU27 average/total, 2008
<b>Human resources in science and technology</b>								
Total, % of labour force <sup>1</sup>	21	24	24	25	26	-	-	16
- Scientists and engineers, % of labour force <sup>1</sup>	-	2,5	4,2	-	-	-	-	-
<b>Networks and projects</b>								
No. of individual members of EASST network, % of research positions								
No. of individual members of PCST network, % of research positions								
National share of FP6 SiS budget								
No. of FP6 SiS projects managed in Norway								
No. of FP6 SiS projects in which researchers from Norway were partners								
<b>Tertiary/higher education</b>								
Students at ISCED levels 5-6 enrolled in the following fields: science, mathematics, computing, engineering, manufacturing, construction - as % of all students <sup>1</sup>	16,6	16,6	15,8	16,1	-	-		24,9 <sup>4</sup>
Academic staff (ISCED 5-6), total in full time unit <sup>1</sup>								
<b>Public Understanding of Science (only 2005 og 2010 data)</b> se pdf dokumenterne								

	2000	2005	2006	2007	2008	2009	2010	EU27 average/total, 2008
% of population very interested in new scientific discoveries and technological developments	-	32	-	-	-	-	-	35
% of population very well informed about new scientific discoveries and technological developments	-	10	-	-	-	-	-	15
% of population regularly or occasionally attend public meetings or debates about science and technology	-	6	-	-	-	-	-	11
% of population regularly or occasionally sign petitions or join street demonstrations on matters of nuclear power, biotechnology or the environment	-	6	-	-	-	-	-	14
% of population 'agree' and % of population 'disagree' that thanks to science and technology, there will be more opportunities for future generations	-	86/4	-	-	-	-	-	86/4
% of population 'agree' and % of population 'disagree' that science makes our ways of life change too fast	-	58/22	-	-	-	-	-	49/32
% of population 'agree' and % of population 'disagree' that we depend too much on science and not enough on faith	-	35/38	-	-	-	-	-	24/55
% of population 'agree' and % of population 'disagree' that because of their knowledge, scientists have a power that makes them dangerous	-	60/23	-	-	-	-	-	46/35



	2000	2005	2006	2007	2008	2009	2010	<i>EU27 average/total, 2008</i>
% of population 'agree' and % of population 'disagree' that in my daily life, it is not important to know about science	-	32/56	-	-	-	-	16/74	

Notes: 1) Data from EUROSTAT, 2) Data from the OECD, 3) Data from EuroBarometer 73.1 (2010) and EB 63.1 (2005)

## 1 National context

This section sets the scene and describes political developments, public debates and policy initiatives of major relevance to the place of science in society in Norway.

### 1.1 The place of science in society - current debates

In 2009, a White Paper on research policy stated that “Norway is a knowledge-based society. Human capital accounts for more than 85 percent of the national wealth. A considerable part of the wealth is created by industries such as oil, gas, aquaculture and ICT, who have grown in the last few decades due to systematic efforts in the research and development of technology (St. Meld. Nr. 30 2008-2009: 9)”.

In recent decades, Norway has undergone rapid and profound transformation. At the beginning of the twentieth century, Norway was one of the poorest European nations (GDP per capita was less than three-quarters of the Western European average). As late as 1987 the German essayist, Hans Magnus Enzensberger, described the specific “untiming” or “dissynchrony” wherein Norway “limped behind” as “Europe’s largest regional museum” and was “ahead of time” as “a huge laboratory of the future”. And by the beginning of the twenty-first century, Norway was one of the world's richest nations (GDP per capita was one-quarter higher than the Western European average).

The knowledge embedded in science and technology has played a key role in this truly unique transformation, but in the public debate the role of science and technology has often been implicit and underplayed. Three predominant public and political debates have all reframed science and technology thus: in the discourse of “the petroleum economy”; in the discourse of “sustainability” as an ecological question; and, in anxious scenarios concerning the future “after the oil” has run out. In the three debates, the role and function of science and technology are often reframed, understated or even ignored.

**“The petroleum economy”.** The first oil from off-shore petroleum activities came ashore in 1972; today, petroleum activities constitute Norway’s most profitable industry, creating more than 20 % of GDP and almost 50 % of total export revenues. . The natural resources are extracted with new technological and organizational solutions under unprecedently hazardous and complex conditions. Research, science and technology are prerequisites, from the map-

ping of resources, to the searching and drilling, to refining, cleaning, storing and transporting.

**“Sustainable development”.** Back in 1986, the Norwegian Prime Minister Gro Harlem Brundtland headed the UN Commission *Our Common Future*. In the Rio declaration, the concept of “sustainable development” was formed, paving the way for new political and legal principles such as “the precautionary principle”, “the polluter pays” and so forth. Stating that “we know enough”, the Commission emitted a warning, and in this science or scientific knowledge had two functions: to “prove” the extent of the unintended and unsustainable ecological problem and offer new technological and sustainable solutions to these problems. Linked to the Norwegian petroleum economy, there have been three main aspects to the public debates of sustainability: first, how long the natural resources will last at the current rate of extraction; second, the potential risk of “normal accidents” during production and the potential hazards of producing in the vulnerable North; third, recently Co2 omissions and their effects on global warming have also been prominent in the debate.

**“After the oil?”** Since 2001, oil production has waned. However, since the mid-1990s gas production has increased and today constitutes approximately 40 % of total production. The prosperity which is so dependent on limited (natural) resources has fostered debates about two strategies for the post-petroleum economy: one mainly framed in economic terms, the second as a question of new technological innovations. Part of the surplus is saved and invested in *The Government Pension Fund – Globally* (the former *The Government Petroleum Fund*), funded by oil revenues not allocated in the national budget. At the end of 2009, the fund amounted to more than NOK 2500 billion, more than NOK 500 000 per capita. In addition, the need for new technological innovations is often emphasized. The Government has accordingly designated the following themes as priorities for Norwegian research: energy and the environment, food, oceans, health and welfare, and the “new” technological areas of ICT, Biotechnology and New Materials.

The role of science has also been publically discussed in relation to **welfare and health, gender equality** and **fraud**, issues that will be touched upon later.

## 1.2 Policy goals and priorities

In Norway, political initiatives related to the “internal” regulation of science and research have been less controversial than the three public and political debates related to the “external” role of science (and technology) in the petroleum economy, sustainable development and in the “after the oil” scenario. Three issues and initiatives will be pointed out: the overall political priorities and consensus, the funding and financing of research and new parliamentary Acts.

### Overall consensus and priorities

The latest White Paper on Norwegian research policy states that it is “characterized by shared values and consensus” (NOU 30, 2008-2009: 9). This consensus and differences are illustrated by the three first priorities of two subsequent

White Papers from the Bondevik II government and the Stoltenberg II government respectively.

The 2005 White Paper *Will to Research* by the Bondevik-II center-right government prioritized three structural areas:

- First, internationalization is to constitute an overall perspective in research policy, and international participation will be emphasized when resources are channelled into research.
- Second, fundamental research will remain a priority area. Quality rather than capacity building will be emphasized. Research into mathematics, science and technology will be strengthened.
- Third, the Government will invest in research-based innovation and business development. This will support the reorganization and renewal of Norwegian business and industry and the public sector.

The 2009 White Paper *Climate for Research* by the Stoltenberg II social democratic-left government stated three main goals for Norwegian research policy:

- First, meeting global challenges, with a particular emphasis on the environment, climate change, oceans, food safety and energy research.
- Second, better health, levelling social differences in health, and developing high-quality health services addressing social challenges and provide research-based practice in the relevant professions.
- Third, a knowledge-based industry in all regions and industry-oriented research within food, marine, maritime, tourism, energy, the environment, biotechnology, ICT and new materials/nanotechnology.

### **R&D expenditure**

The amount of R&D expenditures and their relative share between the industrial, higher educational and institutional sectors led to a rather heated political debate.

The “growth objective” for Norwegian R&D was set with reference to the EU’s 2002 Barcelona target, approved after parliamentary discussion of the 2005 White Paper *Will to Research* (St.meld. Nr 20 (2004-2005)). This aimed to increase total national R&D expenditures to 3 percent of BNP by 2010.

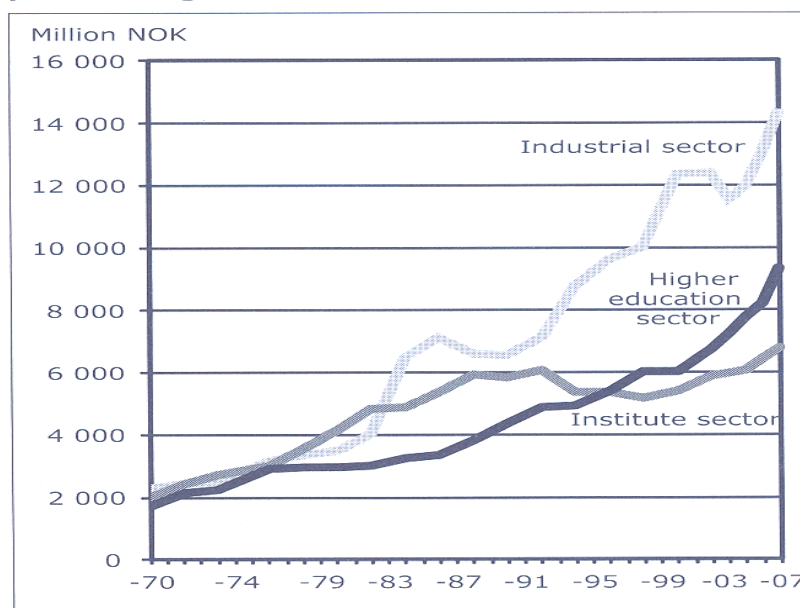
However, in 2007 the OECD described the Norwegian combination of high growth in productivity and income with comparatively low levels of investment in R&D as “paradoxical” (OECD, 2007). Norwegian expenditure on R&D then amounted in nominal terms to NOK 37.4 billion (1.6 percent of GDP). In 2005 and 2006, the corresponding share of GDP was 1.5 percent. R&D expenditures corresponded to 3.6 percent of GDP in Sweden, 3.5 percent in Finland, 2.8 per-

cent in Iceland and 2.6 percent in Denmark. The OECD average was 2.3 percent.

Following a temporary "rest period" for R&D in the annual 2008 Budget, the relevance and realism of the objective (especially the target for private R&D funding) have been debated and increasingly questioned. A background and backdrop are also to be found in the unusual relative share of expenditures between the industrial, higher educational and institutional sectors. The following is illustrated by the figure below:

- The industrial sector has increased steadily in the last three decades, and is now by far the largest sector.
- The second largest sector, the universities and other higher educational institutes, did not surpass the institutional sector before the mid-1990s. They are still only around two-thirds of the industrial sector.
- The share of the institutional sector (of which the governmental part amounts to more than two-thirds, the institutes serving enterprise less than one-third) has declined relatively since the mid-1990s, but is still larger than in nations Norway is usually compared to.
- If the governmental share of the relatively large institutional sector is added to the universities and the part serving enterprises to the industrial sector, the universities and the industrial sector appear rather equal, (but with NOK 19.946 million compared to NOK 17.469 million in 2007, the industrial sector remains the largest).

**R&D expenditure in Norway 1970-2007 by performing sector. Constant 2000 prices.**



Source: NIFU STEP/SSB, R&D statistics

### **New Acts**

During the period, the Ministry of Education and Research has issued a series of new regulations and implemented changes over the annual National Budget, but only two major Acts have been passed by parliament.

#### **Act of 1 April 2005 relating to Universities and University Colleges**

The official purpose of the Act is to stipulate provisions for universities and university colleges: to provide higher education at a high international level; to conduct research and academic and artistic developmental work at a high international level; and, to disseminate knowledge of the institution's activities and promote the understanding and application of scientific and artistic methods and results in public administration, culture and business and industry.

Following commissions headed by Mjøs and Ryssdal and inspired by New Public Management, the "Quality Reform":

- gave universities and university colleges more institutional and financial autonomy, including the freedom to establish new governance structures,
- implied a (partial) separation of the core funding of research and teaching,
- implemented a new component of performance-based funding of research (*tellekantsystemet*),
- and – after a separate commission report – a stipulation to protect academic freedom was incorporated into the Act.

#### **Act of 30 June 2006 No. 56 on Ethics and Integrity in Research**

The new legislation defined scientific misconduct as "falsification, fabrication, plagiarism and other serious breaches of good scientific practice that have been committed wilfully or through gross negligence when planning, carrying out or reporting on research". In August 2007, the Ministry of Education and Research appointed a national committee to investigate cases of misconduct in research.

The preparation and the approval of the law sped up after the "Sundbø case" in which data was fabricated. This scandal surfaced in 2006, and as a result Jon Sundbø's license to practice medicine and dentistry were revoked as was his doctorate by the faculty of medicine at the University of Oslo.

### **1.3 National challenges, opportunities and trajectories**

In Norway, political debates about science in society have been relatively important compared to other societal debates. However, due to the customary framing of science and technology as questions of economy, sustainability and future expectations, the importance has often been underestimated or even overlooked in the public debate.

The reform of the universities, annual expenditures and the priorities of research policy discussed under 1.2 have been hotly debated by academics, relevant professions and institutions, but in the public debate and on the political agenda they were overshadowed by issues such as public health and welfare, the financial crisis, climate policy, immigration, gender equality and so forth.

A recent trend – and an apparent paradox – is the increased awareness and acceptance of climate change and other unsustainable ecological developments hand-in-hand with an increase in expectations of new technological solutions for the very same problems. Science and technology are often and increasingly considered the cause of acute problems as well as the potential solution for them.

When related to investment decisions concerning the gigantic petroleum plants and facilities, issues of research, science and technology policy tend to become very important. A recent and illustrative example is Mongstad, a petroleum complex in western Norway. Operational since the mid-1970s it consists of a refinery, the Vestprocess NGL fractional plant and a crude oil terminal. With its current technology, it releases approximately 2.3 million tons of Co<sub>2</sub> a year. A heated and as yet unresolved debate over the plant's technological feasibility, cost efficiency and international competitiveness was initiated by the proposals and promises in Prime Minister Jens Stoltenberg's New Year's Address to the Nation in 2007. "Climate emissions must be reduced. Norway is a pioneer in deciding that the Mongstad gas plant shall clean the climate gas Co<sub>2</sub>. We will make it possible. Our vision is to have the technology within seven years. It is a gigantic project for the nation. It is our moon landing."

## 2 Priority setting, governance and use of science in policy-making

This section focuses on the different actors involved in shaping the relationship between science and society and the processes for governing science at national level. This includes government initiatives, institutions and organizations as well as public involvement and policy-making processes at all levels related to science and technology.

Different themes will be elaborated in the Norwegian context, including ethics in science and technology, equality, diversity and inclusiveness in scientific institutions, and ethnic or social minority groups in scientific contexts and careers. Moreover, this section will highlight actors in science communication and technology assessment. Public involvement in science and technology decision-making as well as the use of science in policy-making at the national level will be covered in this section.

### 2.1 Public engagement in priority setting

#### 2.1.1 Formalised procedures for citizen involvement

Norway has – like the other Scandinavian nations – a strong tradition and formalized procedures for involving (organized) citizens in priority-setting and assessment activities – and in recent years this has been expanded to embrace science and technology issues. Three traditions and paths of influence now co-exist and partly overlap: first, a formalized “corporate” tradition related to the welfare state and giving voice to interest organizations, especially the employers' association and trade unions; second, the more activist and less formalized influence of NGOS; third, a recent trend of formalized and state endorsed yet independent advisory boards involving “experts” and “lay people”.

Giving a voice to the “old” interest organizations, especially the employers' association and the trade unions (otherwise known as the **“corporate” tradition**) is a well-established element in the welfare states' normal decision-making procedures. In drafting a law, the government or ministry appoints a committee or working group to make a report, normally published as an *NOU*, and aired at a hearing to all relevant and interested agents, whose input is considered before propositions are presented to parliament.



**NGO's or voluntary organizations**, which are usually committed to a narrower political cause, may also greatly impact on political decision making. The most important include *Naturvernforbundet* (Friends of the Earth Norway, founded in 1914), as well as new, international organizations such as WWF and Greenpeace. Particular attention should be paid to The Bellona Foundation, an international environmental NGO based in Norway. Founded in 1986 as a direct action protest group, Bellona has become a recognized technology and solution-oriented organization with offices in Oslo, Brussels, Washington D.C., St Petersburg and Murmansk ([www.bellona.no](http://www.bellona.no)).

In recent decades, **a new type of monitoring and advisory board** has been initiated and financed by the government. Such boards are independent bodies with a mandate to advise, monitor and promote public engagement in new technologies.

Three *National Committees for Research Ethics* were set up in 1989. The committees for Medical Ethics (NEM), for Ethics in Science and Technology (NENT) and for Ethics in the Social Sciences and the Humanities (NESH) are administrated under the auspices of the Research Council, but operate as independent bodies with both advisory and informative functions. The committees work to enhance researchers' ethical awareness, encourage public debate on research-related ethical matters and have been charged with developing ethical guidelines for research ([www.etikkom.no](http://www.etikkom.no)).

*The Norwegian Biotechnology Advisory Board* was established in 1991 as an independent body. It has 21 members appointed by the government and its main tasks are to evaluate the social and ethical consequences of modern biotechnology and to discuss usage that promotes sustainable development ([www.bion.no](http://www.bion.no)).

*The Norwegian Board of Technology* was established in 1999 as an independent consultative office for technology assessment. The Board works in the interface between technology and society to promote human and environmentally friendly technological development. The Board is mandated to assess technological challenges and the possibilities of new technology in all fields of society, stimulate public debate on technology and outline measures regarding technology management ([www.teknologiradet.no](http://www.teknologiradet.no)).

Norway has an open and at time heated public and political debate on the strengths and weaknesses of the public engagement indicated above, but a national consensus as to the strengths and weaknesses does not exist.

### **2.1.2 Citizen- or CSO-initiated activities with political impact**

In Norway, citizens are consulted and their opinions are considered in science and technology decision making.

- Citizens and their organizations have the possibility to be informed (though only few individuals can be said to be well informed).

- There are (also highly formalized) procedures for consultation.
- The (often conflicting) input from citizens and organizations is considered.
- But citizens' opinions are not binding (neither should they be in a representative and parliamentary democracy).

New social media, such as various blogs, Facebook, Twitter and podcasts have enabled new types of citizen information and involvement. Twitter is used to inform the public about events and insights (for example SIRUS: <http://twitter.com/rusforskning>), universities offer video podcasts of lectures through iTunes (for example NTNU: <http://wiki.math.ntnu.no/tma4105/2009v/podcast>), and in 2010, the Freedom of Expression Foundation granted NOK 2.5 million to civic-minded bloggers (<http://www.fritt-ord.no/hjem/mer/blogg/>).

### 2.1.3 Importance of upstream engagement

Upstream engagement and the proactivity of citizens are both welcomed and usual in Norway. The Norwegian parliament and administration are considered to be “open”, seldom characterized by “top-down” or “downstream” policy making and decisions.

Of the three procedures for citizen involvement mentioned above (under 2.1), the corporative tradition is by and large downstream, while the NGOs and the new monitoring and advisory boards are more upstream, but all three are intended to be and indeed are proactive.

The difference between “upstream” and “downstream” engagement thus overlaps only marginally with the distinction between “proactive” and “reactive” citizen engagement.

Upstream engagement is thus widespread, but not particularly topical in the Norwegian debate.

## 2.2 Public - private interaction

In the last decade, the possibly unexploited potential and backlog of commercialization, patents and innovation, and the better use of university research have been much discussed.

In 2001, a White Paper from the Commercialization Commission argued that the universities in particular ought to concentrate more on commercializing research results. “Commercialization of research with the potential, should be considered part of the institutions obligation to pass on (“formidle”) their results to society” (NOU 2001: 11. *Fra innsikt til industri*). However, a recent review of the evolution of Norway’s national innovation system concluded that “the Norwegian innovation system has been dominated by resource-based innovation. The development of new industries that are less closely linked to

natural resources, in spite of considerable support from public policy, has been relatively unsuccessful in Norway” (Fagerberg et al 2009: 442)

In 2001, the Confederation of Norwegian Enterprise (NHO), the main representative body of Norwegian employers with a current membership of 20,000 companies, organized their knowledge and technology companies into Abelia, which has more than 900 members in 2010 ([www.abelia.no](http://www.abelia.no)).

Despite the critique, an overview of “nuts and bolts for innovation” enumerates more than fifty arrangements mainly administrated by three public agencies:

*Innovation Norway* is a state-owned company formed from four organizations merged in 2004. It employs more than 700 people and has offices in more than thirty countries worldwide. The core group of clients are Norwegian companies, predominantly small and medium-sized businesses. Its mandate is to promote nationwide industrial development profitable to both the business economy and the national economy, and to help release the potential of different districts and regions by contributing to innovation, internalization and promotion ([www.innovasjon Norge.no](http://www.innovasjon Norge.no)).

*The Research Council of Norway (NFR)* offers a *Division for Innovation* with programmes such as FORNY and MATPROGRAMMET and a *Division for Strategic Priorities* with programmes such as FUGE, HAVBRUK, PETROMAKS, and NANOMAT. The *Programme for User-Driven Research-based Innovation (BIA)* was established in 2006 and funds industry-oriented research with no thematic restrictions. The projects must result in substantial value creation for the companies as well as for society at large, and must take an international perspective. In 2009, the programme had a budget of more than NOK 400 million ([www.forskningradet.no](http://www.forskningradet.no)).

*The Industrial Development Corporation of Norway (SIVA)* is a governmental corporation and national instrument founded in 1968. SIVA aims to develop strong regional and local industrial clusters through ownership in infrastructure, investment and knowledge networks as well as innovation centres ([www.siva.no](http://www.siva.no)).

In the last decade, Technology Transfer Offices (TTO) at universities and colleges have been more active in patenting and licensing for business.

A report issued by *The Ministry of Trade and Industry* in 2008 states the targets fairly modestly:

- to strengthen research in industry by increasing allocations to user-oriented research programmes and to R&D contracts,
- to continue the *Skattefunn* tax-relief scheme,
- to contribute to improved interaction between industry and research by strengthening the system of industrial doctorates and efforts related to commercialization of research results,

- to establish favourable conditions for long-term knowledge building, and increase investments in research equipment,
- and finally to strengthen regional research activities by allocating NOK 6 billion to regional research funds (*An innovative and sustainable Norway* (Short version of Report no. 7 to the Storting (2008-2009)).

The will to change became more manifest when the *Ministry of Education and Research* in 2009 mandated an “expert commission” to advise on:

- the need for changes in public funding in order to improve quality and use resources better,
- how the responsible authorities will be able to evaluate resources and recruitment to research better,
- more adequate targets and indicators for the public funding of research,
- the principles and changes that might be needed in order to utilize the objectives in the management of research.

## 2.3 Use of science in policy making

### 2.3.1 Formal procedures and advisory bodies involved

From the preparation of new laws for decision-making to administration, Norway has a longlasting and strong tradition and formalized procedures for knowledge- and science-based policy making.

The government ministries are large and knowledge-based, with high continuity after changes in government. Civil servants are generally well educated, the ministries are in charge of their own “homemade” reports, they commission research from the large institutional sector, and they influence the priorities of the Norwegian Research Council.

Under the auspices of ministries, a large number of directorates are mandated to manage day-to-day routines and thus also avoid the unnecessary politization of the field and manage long-term knowledge creation. Examples include *The Norwegian Petroleum Directorate* mandated to “contribute to creating the greatest possible values for society from the oil and gas activities by means of prudent resource management based on safety, emergency preparedness and safeguarding of the external environment”, and *The Directorate of Health* mandated to “improve the whole population’s social security and health through comprehensive and targeted efforts across services, sectors and administrative levels.”

### 2.3.2 Trends at national level

As indicated above, formalized procedures for science-based knowledge and scientific advice are deeply rooted in Norwegian policy making and administration. However, in the last decade research and scientific advice have increasingly become politicized and questioned, and prestige and impact have decreased. Disagreements between “politicians” and “experts” and between “experts” are now hot issues and often frontpage news.

Recent examples from the public debate and political discourse include the following:

The controversy following the International Panel on Climate Change is the most highly voiced example of the questioning of the very *definition of the political challenges* and the efficiency of means. The scientific “mainstream” is increasingly accused of “political correctness” and criticized for hidden political proposals or agendas.

“Think tanks” and research institutes related to political attitudes and interests such as the liberal CIVITA ([www.civita.no](http://www.civita.no)) and the trade union-based FAFO ([www.fafo.no](http://www.fafo.no)) are growing in number and importance as input to policy-making as well as in the public debate.

Even branches within public administration increasingly interpret *legal principles* along conflicting rationalities and consequently tend to apply them differently. As an example, “taxes” and “duties” are mainly considered to be potential revenue at the Ministry of Finance, but as an incentive to change behaviour/consumption at the Ministry of Environment. And “the precautionary principle” is interpreted and applied more demandingly and restrictively by the Institute of Marine Research, responsible for monitoring and advice on biodiversity, than by the petroleum producing Statoil ASA.

The recent questioning of “experts” and scientific advice in policy making is partly a result of a political intention and wish to revitalize and rehabilitate “values”, but the tendency is also often explained as a legitimate reaction to the false “objectivism” and illegitimate “authority” claimed by “science”. In a wider sense of the word, the balance between the two tendencies, the science-based advice and the new questioning of and suspicion towards “experts”, is in itself a topical and unresolved political issue.

## 2.4 Key actors

### 2.4.1 Ethics in science and technology

An overview and ranking of the most important agenda setting actors in Norway relative to ethical issues does not exist and could not be provided. Below the generic types of institutions are indicated after the best judgement of the national rapporteurs.

Name of actor	Type of actor	Sector	Influence on public opinion	Influence on political decisions
	Universities	Public	Very influential	Somewhat influential
	Industry and business	Private	Very influential	Very influential
	Government and ministries	Public	Extremely influential	Extremely influential
	Ethics councils / committees	Public	Very influential	Not very influential
	Trade unions	Private	Somewhat influential	Very influential

#### 2.4.2 Equality, diversity and inclusiveness in scientific institutions and in educational systems

An overview and ranking of the most important agenda setting actors in Norway relative to the issue of equality, diversity, and inclusiveness does not exist and could not be provided. Below the generic types of institutions are indicated after the best judgement of the national rapporteurs.

Name of actor	Type of actor	Sector	Influence on public opinion	Influence on political decisions
	Media	Mixed	Very influential	Somewhat influential
	Industry and business	Private/ Mixed	Somewhat influential	Very influential
	Government and ministries	Public	Extremely influential	Extremely influential
	Trade unions	Private	Somewhat influential	Very influential
	Religious institutions	Mixed	Very influential	Somewhat influential

#### 2.4.3 Science communication

An overview and ranking of the most important actors in Norway relative to the issue of science communication on the political agenda does not exist and could not be provided. Below the generic types of institutions are indicated after the best judgement of the national rapporteurs.

Name of actor	Type of actor	Sector	Influence on public opinion	Influence on political decisions
	Media	Mixed	Very influential	Somewhat influential
	Universities etc.	Public	Very influential	Somewhat influential
	Government and ministries	Public	Very influential	Extremely influential
	Other advisory bodies	Public	Somewhat influential	Somewhat influential
	Key individual	Private	Somewhat influential	Somewhat influential

#### 2.4.4 Technology assessment

An overview and ranking of the most important agenda setting actors in Norway involved in technology assessment does not exist and could not be provided. Below the generic types of institutions are indicated after the best judgement of the national rapporteurs.

<b>Name of actor</b>	<b>Type of actor</b>	<b>Sector</b>	<b>Influence on public opinion</b>	<b>Influence on political decisions</b>
	Universities etc.	Public	Somewhat influential	Somewhat influential
	Industry and business	Private	Extremely influential	Extremely influential
	Government and ministries	Public	Extremely influential	Extremely influential
	Other advisory bodies	Public	Somewhat influential	Somewhat influential
	Environmental organization.	Private	Extremely influential	Somewhat influential

### 3 Research related to Science in Society

This section is concerned with research activities related to science in society. The purpose is to describe the efforts in Norway, including the SIS research being undertaken and how SIS issues are embedded in mainstream research. The section will also elaborate on how SIS research is being funded and what the scale of funding is.

A distinction is made between *SIS research* on the one hand and *SIS issues embedded in mainstream research* on the other. SIS research are the studies particularly targeting public understanding of science, governance of science, science policy, science education, science communication, ethics in science and technology, the reciprocal relations of science and culture, young people and science and similar issues. However, SIS issues may also be present in other research activities, in which the main objectives of research are *not* SIS related issues, but in which SIS practices or perspectives are embedded. This could include studies within the natural sciences which apply innovative or extensive use of public involvement in the research process, new ways of communicating research results, ambitious efforts to bring ethical and societal issues into research, innovative ways of involving a variety of stakeholders (politicians, NGOs, industry, social scientists etc.). Such efforts are referred to as SIS issues embedded in mainstream research.

The section provides examples of Norwegian research projects and funding programmes related to SIS, cross-cutting and emerging themes of SIS. Moreover, the role of SIS in evaluative practices of research programmes and institutions are elaborated.

It should be noted that this section is concerned with mapping research activities which are **not fully EU funded**. The subsections are concerned with national as well as international research efforts, but not activities funded solely under the European framework programs. Such research activities are already well-documented elsewhere.

#### 3.1 Research on Science in Society

##### 3.1.1 Research projects

Norwegian research projects and research into SiS are performed through three funding and institutional settings: with grants and funding from the Norwegian



Research Council, NordForsk and the EU, at permanent University Centres, and finally – in the wider sense of SiS issues embedded in “mainstream research” – also as smaller or minor parts in larger institutions and programmes.

**Grants and funding.** NFR’s programme VEKSTFORSK has funded innovation and SiS-related projects, and SiS and STS are at the centre of three NFR programmes: *Etikk, samfunn og bioteknologi*, *Nanomat (Nanoteknologier og nye materialer)*, and *Fuge (Funksjonell genomforskning)*. (Cf. *Etiske, rettslige og samfunnsmessige aspekter ved bioteknologi, nanoteknologi og kognitiv vitenskap*. and *Work programme 2008-2014. Ethical, legal and social aspects of biotechnology, nanotechnology and neurotechnology*.) 23 projects have been granted support.

The largest current projects granted NFR support include:

Name of project	Local, national, or cross-country	Institutions participating	Budget and funding source	Field of study
The interrelationships between R&D, industry dynamics, worker flows and economic growth.	National	Handelshøyskolen, BI	VEKSTFORSK 11.500.000 NKr.	Governance of science
Innovation processes, spatial and regional aspects, and innovation policy.	National	NIFU-Step	VEKSTFORSK 9.550.00 NKr.	Governance of science
Nanotrust. Ethical conditions for a socially robust use of nanobiotechnology in aquaculture.	National	NTNU	NANOMAT	Ethics in S&T
Mapping the language of research-biobanks and health registers.	National	UiO	FUGE 5.000.000 NKr.	Public understanding of science & Ethics in S&T
Reflexive Systems Biology: Towards an Appreciation of Biological, Scientific and Ethical Complexity.	National	UiB	FUGE 5.000.000 NKr.	Governance of science & Ethics in S&T

One planned programme under NFR *Improving knowledge for research and innovation policy (FORFI)* aims to expand and develop the knowledge base for use by various actors responsible for research and innovation policy as well as provide an arena for learning and dialogue between policymakers at various levels – including research and educational institutions – and researchers. The FORFI initiative will support and draw upon independent, critical, high-calibre international research and seek to promote the development of theory and methodology within the field. The preliminary budget is NOK 37 million for a five year period.

The projects currently granted funding from the EU’s SiS programme with the largest Norwegian share includes:

Name of project	Local, national, or cross-country	Institutions participating	Budget and funding source	Field of study
Science Teacher Education Advanced Methods.	Cross-country, National	NTNU, Faculty of Social Science, and UiO, Department of Teacher Training.	Total 4,700,000 euros, Norwegian 1,552,533 euros	Science education
IRIS – Interests & Recruitment in Science.	Cross-country, National	University of Oslo. Department of Physics.	Total 1,322,313 Euros, Norwegian 306,857 euros	Governance of science & equality and social inclusion in science
Mind the Gap: Learning, Teaching, Research and Policy in Inquiry-Based Science Education.	Cross-country, National	University of Oslo, Department of Teacher Training.	Total 780,276 euros, Norwegian 269,452 euros.	Governance of science & Science education & Equality and social inclusion in science

**Permanent University Centre.** The three largest universities have permanent and multidisciplinary centres for SiS/STS. These have their own basic funding and combine research with teaching, their own PhD and Master's programmes and courses in other disciplines.

- *The Centre for Technology, Innovation and Culture (TIK, formerly TMV)* at the University of Oslo was established in 1989. It studies the production and dissemination of knowledge – broadly defined as the development of and interaction between science and technology, innovation and entrepreneurship – through inter-disciplinary linkages between the social sciences and the humanities ([www.tik.uio.no](http://www.tik.uio.no)).
- *The Centre for the Study of the Sciences and the Humanities (SVT)* at the University of Bergen is an interdisciplinary and interfaculty institution responsible for the dissemination of research and information within the theory of science and ethics and for training researchers at the University of Bergen ([www.svt.uib.no](http://www.svt.uib.no)).
- *The Department of Interdisciplinary Studies of Culture (KULT)* at the Norwegian University of Science and Technology in Trondheim was established in 1999. The department's research focuses on gender and feminist studies and science and technological studies, using a variety of interdisciplinary methods and theories. The department also offers a Master's degree and a PhD programme in Interdisciplinary Studies of Culture ([www.ntnu.no/kult](http://www.ntnu.no/kult)).

**Embedded in “mainstream” research.** In the wider definition, as embedded in “mainstream research”, SiS and STS are also part of often larger programs and research institutions. Examples include:

- *The Centre for International Climate and Environmental Research (CICERO)* at the University of Oslo. CICERO’s mission is to provide reliable and comprehensive knowledge about all aspects of the climate change problem ([www.cicero.uio.no](http://www.cicero.uio.no)).
- The *SINTEF* Group, the largest independent research organization in Scandinavia. Each year, SINTEF supports the development of 2000 or so Norwegian and overseas companies via research and development activities. The subdivision *Technology and Society* is a multidisciplinary research institute within the main areas of health, transport, technology management, safety and applied economics ([www.sintef.no](http://www.sintef.no)).
- *The Norwegian Institute for Studies in Innovation, Research and Education (NIFU STEP)* is an independent social-science research institute which is financed by assignments and basic funding from The Research Council of Norway. The mission of NIFU STEP is to be an independent producer of knowledge within studies in innovation, education and research, and to provide theoretical and practical insight into the dynamics of these activities, while contributing to relevant policy development ([www.nifustep.no](http://www.nifustep.no)).

### 3.1.2 Trends in research

Well-educated candidates with SiS and Ethical Legal and Social Aspect (ELSA) skills are now employed as civil servants at most of the relevant organizations and institutions. Interest in and funding of SiS and ELSA research seem to have peaked around the beginning of the century with a general focus on values and a particular focus on biotechnology (cloning, stem cells and the human genome). The as yet unlaunched NFR programme *Improving Knowledge for Research and Innovation Policy (FORFI)* might reverse this trend. Main stream research embedding Science in Society issues

## 3.2 Main stream research embedding Science in Society issues

### 3.2.1 Trends and good examples

Also in Norway it is a trend to integrate or “embed” SiS aspects in the narrow sense in “non-SiS studies”, e.i. primarily larger technological projects, which are not designed with an explicit SiS-agenda. Yet, an overview does not exist, and we have not been able to isolate good examples.

### **3.3 Funding for research on Science in Society**

The few earmarked programmes in NFR are listed above under 3.1. “Independent projects” (FRIPRO) is another possibility for funding from NFR, but there is hard competition. Another possibility is “the embedding of SiS” in mainstream projects. The Permanent University Centre and funding from Nordforsk and EU are important for continuity.

### **3.4 Importance of Science in Society issues as evaluative elements for national research programmes and academic institutions**

According to NFR, spin-off effects from SiS to other programmes are difficult to find. “Research ethics” is a compulsory element in every application to NFR, but very seldom substantially related to SiS. The importance of promoting science is emphasized, but always as an additional value, never as decisive for funding.

## 4 Activities related to Science in Society

This section relates to SIS as a field encompassing a variety of different activities particularly concerned with public communication of science and technology in Norway. The issues addressed are formats for science communication and the actors involved in science communication as well as trends at the national level.

### 4.1 National science communication trends

Means	Much less	Less	Same	More	Much more
Science television programmes				X	
Radio				X	
Newspapers			X		
Magazines			X		
Large-scale festivals				X	
Web-based communication					X
Museums, exhibitions				X	
Citizen or CSO initiatives				X	

#### 4.1.1 Good practises

Programmes devoted to science are broadcast primetime on national television channels, science is also popularized in the national press and features in well circulated, specialized weekly and monthly magazines. Its coverage is doubtless more comprehensive than a decade ago.

[www.forskning.no](http://www.forskning.no) is a success story (that might inspire other nations). Owned by 64 members, including all the universities and other research institutes, it is the biggest web-based channel in Scandinavia for Norwegian and international research. [www.forskning.no](http://www.forskning.no) offers news, background, facts and multimedia presentations. It is a very important inspiration and source for media editors.

The new 2005 University Act emphasizes communication with the public (*formidling*) as one of the universities' three responsibilities. The diffusion and use of [www.forskning.no](http://www.forskning.no) offers easy access to public information.

Recently, two pieces of science communication, a fossil named “Ida” and the television series “Brainwashing”, have drawn the attention of academics and of an extraordinarily wide audience.

- Ida is the most complete fossil of a primate ever discovered. It was found in 1983, but kept private from the public until 2007 when it was purchased by the Museum of Natural History in Oslo (<http://www.nhm.uio.no/nyheter/2009/ida.html>). She was presented as “the missing link” at the Museum of Natural History in New York in 2009. Ida has since generated a BBS documentary, an international website (<http://www.revealingthelink.com>) that invites people all over the world to take part in this discovery and a popular exhibition at the Museum of Natural History in Oslo.
- Media attention was unprecedented, but critics have questioned the labeling of the fossil as “the missing link”, as this is allegedly based on an evolutionary model abandoned 150 years ago, and criticized the commercialization of the presentation.
- The second outstanding example of science communication is “Brainwashing” (*Hjernevask*), a series of seven popular science programmes on biology and society produced and presented by Harald Eia, a comedian and who has a Master's in sociology. The series was aired by the Norwegian Broadcasting Corporation (NRK) in the winter of 2010 (<http://www.nrk.no/programmer/sider/hjernevask/>). The programme stressed the importance of genetics and biology, heritage versus milieu, and was a critique of the social sciences and especially gender studies for their constructivist neglect of biological realities.
- It had up to 600,000 viewers and led to wide debate in other media and within academia. Academics interviewed in the programme brought the media ethic and the apparent hidden agenda of the series before the Press Complaints Commission (PFU), but the complaint was rejected ([www.presse.no/Pressens\\_Faglige\\_Utvalg\\_PFU/](http://www.presse.no/Pressens_Faglige_Utvalg_PFU/)).

## 4.2 Science journalism and training activities

The media often frame and report science as news, and the main writers are accordingly allround or news journalists.

*Norsk forening for forskningsjournalister* (Norway Science Journalists' Association, [www.nffj.no](http://www.nffj.no)) was established in 2004 as a member of the European umbrella organization, the European Union of Science Journalists' Associations (EUSJA). The organization is housed by [www.forskning.no](http://www.forskning.no), has no employees, and its level of activity is reported to be modest or even low.

Including radio, television, university magazines and [www.forskning.no](http://www.forskning.no), it is estimated that up to 30-40 journalists might have science and technology as their primary field or as an important subject/field.

There is no special education or training for science journalists. The Faculty of Journalism, Library and Information Science at the Oslo University College has a two-week mandatory course in science journalism at Bachelor level and a voluntary 10 ECTS course at Master level ([www.hio.no](http://www.hio.no)).

Recently, the Research Council has taken steps to encourage courses in “innovation journalism”.

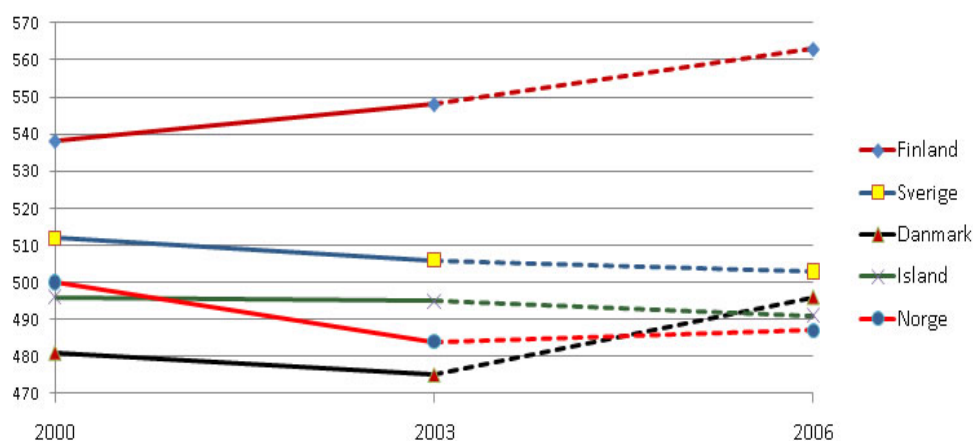
There are few formal training activities. A guest (or hospitality) arrangement sponsored by the Research Council, with scientists visiting the media and people from the media visiting academia, has had an impact and contributed to a better mutual understanding. Voluntary courses in science communication or selling science are occasionally initiated and arranged by (PhD) students, especially in medicine and health. The Norwegian Institute of Journalism, a knowledge and resource centre for media practitioners has had in-house training programmes ([www.ij.no](http://www.ij.no)).

A lack of professionalism is a persistent and often voiced criticism of science communication in the media. Science and technology are often framed under other headings and often presented by all round journalists and/or researchers. Research and science are often presented too optimistically, as promises, progress or success. Caution and critique is often post festum, featured in catastrophes and scandals. Journalism is thus of little help in the necessary evaluation of the information overload.

### 4.3 Young people and science education in schools

#### 4.3.1 Skills and interest

Recently, two international comparative studies have raised doubts as to the results of the otherwise acclaimed Norwegian school system. This has caused a heated debate about the relevance and validity of the studies and possible remedies.



- The PISA project is an international comparative survey of the educational school systems. It compares the skills of fifteen-year-olds in reading, mathematics and scientific literacy. The Norwegian reading scores are lower than the OECD average, which itself has decreased from 500 points in 2000. And Norwegian results in mathematics are significantly lower than the OECD average for the first time in PISA.
- The ROSE project is an international comparative research project meant to shed light on factors of importance for the learning of science and technology – as perceived by learners. The Norwegian data indicate a persistent gender gap, with boys more and girls less attentive to and interested in science and technology. [www.ils.uio.no/english/rose/](http://www.ils.uio.no/english/rose/)

Recent initiatives within the field include:

Activity title: **Science circus**

Link: [http://www.jaermuseet.no/jaermuseet/science\\_circus](http://www.jaermuseet.no/jaermuseet/science_circus)

Organizer: Jærmuseet

Activity: A travelling (mobile) knowledge centre that visits schools to stimulate curiosity in the natural sciences. Interactive activities.

Activity title: **Vilje-con-valg**

Activity: Project, resource

Link: <http://www.naturfagsenteret.no/vilje-con-valg/index.html>

Short description: Project aimed at promoting natural-science education to young people.

Organizer: Naturfagsenteret, University of Oslo

Target group: Young people

Activity title: **Renate** (Nasjonalt senter for realfagsrekruttering)

Activity: Project, resource

Link: <http://www.renatesenteret.no/>

Short description: Project aimed at promoting education within the natural sciences to young people.

Organizer: Kunnskapsdepartementet

Target group: Young people

Activity title: **Matematikksenteret** (Nasjonalt senter for matematikk i opplæringen)

Activity: Project, resource

Link: <http://www.matematikksenteret.no/>

Short description: The centre shall lead and coordinate the development of better methods and strategies for teaching mathematics at kindergarten, elementary schools, primary schools, high schools, adult education centres and teacher training centres.

Organiser: NTNU



### 4.3.2 Societal issues and critical reflection

Recent examples of particularly successful ways of bringing societal issues and critical reflection over the role of science in society into (natural) science teaching in schools in Norway are:

Activity title: Nysgjerrigper

Link: <http://www.nysgjerrigper.no/>

Activity type: website

Themes covered: natural science, technology and medicine

Short description: Project initiated by NFR to promote curiosity in students and teachers at elementary school level.

Activity title: Naturfagsenteret

Link: <http://www.naturfagsenteret.no/>

Activity type: Center (UiO, HiO and Skoletjenesten)

Themes covered: natural science, technology and mathematics

Short description: A national resource centre for the natural sciences in education (from kindergarden to teacher training). Seeks to strengthen competence and motivation – both in teachers and pupils/students.

Activity title: Den naturlige skolesekken

Link: <http://www.naturesekken.no/>

Activity type: Website (Kunnskapsdepartementet/Miljøverndepartementet)

Themes covered: natural science, technology and medicine

Short description: A project that promotes learning outside in natural surroundings.

Activity title (web-link): <http://www.naturfag.no/>

Activity type: web site

Number of users: Approx. 72 000 per month

Themes covered: Natural science

Short description: A resource for teachers of natural science. Offers information about conferences, courses, activities and so forth.

## 4.4 Communication activities

The Internet has become a major source of information in Norway. In 2009, 73 percent of the population (age 9-79) used the internet daily (average use per day: between 65 to 73 minutes), and 65 percent of the population owned and used a personal computer at home. Approximately 65 percent of the internet users read news online. Television is still the dominant form of media, as 80 percent of the population (age 9-79) watches television daily (average use per day: two hours and 28 minutes). 68 percent of the population read newspapers daily, and 70 percent subscribed to a newspaper (average use per day: 25 minutes). When it comes to radio, 53 percent of the population listens daily (aver-

age use per day: one hour and 22 minutes), and during the week 42 percent of the population read magazines and/or journals (Norsk mediebarometer, 2009: 7-8).

#### 4.4.1 TV programmes

Eight out of ten watch television during a normal day. Youngsters (aged 9 to 12) and the elderly (ages 67 to 79) watch the most, while the highly educated watch less television. Men watch television more than women. The most popular programmes are news, series and sports. There has been a small, insignificant increase in total time spent watching television (Norsk mediebarometer, 2009: 48-52).

Programme title	Frequency	Duration	Target audience	Themes covered
Schrödingers katt <a href="http://www.nrk.no/katta/">http://www.nrk.no/katta/</a>	Weekly	60 Min	Broad, popular	Mostly natural, medical or tech. Norway's most popular television programme about popular science. Focuses on science and research. Viewers: approx. 520,000
Newton <a href="http://nrksuper.no/super/newton/">http://nrksuper.no/super/newton/</a>	Weekly	30 Min	Children: broad, popular	Mostly natural, medical or tech. Popular science for children. Viewers: Approx. 400,000
Lyngbø og Herlands big bang <a href="http://www.nrk.no/programmer/sider/lyngboe_og_haerlands_big_bang/">http://www.nrk.no/programmer/sider/lyngboe_og_haerlands_big_bang/</a>	Weekly, eight episodes	60 Min	Broad, popular	Varied. A humoristic approach to science in every form – from cultural history to natural science. Viewers: Approx. 900,000
Hjernevask <a href="http://blogg.nrk.no/hjernevask/">http://blogg.nrk.no/hjernevask/</a>	Weekly, seven episodes	60 Min	Broad, popular	Genetics vs socialization. Viewers: Approx. 600,000

#### 4.4.2 Radio programmes

53 percent of the population listen to the radio daily. Mostly older people. Those with higher education listen for less time, but more often than those with no or little education. People are mainly interested in news, entertainment and popular music. There are no significant gender differences in use or preferences. People aged 45-66 listen more to the radio than other age groups, but those aged 67 and older listen for longer each time they turn on the radio (Norsk mediebarometer, 2009: 42-43).

Programme title	Frequency	Duration	Target audience	Themes covered
Verdt å vite <a href="http://www.nrk.no/programmer/sider/verdt_aa_vite/">http://www.nrk.no/programmer/sider/verdt_aa_vite/</a>	Daily	30 Min	Broad, popular	Mostly natural sciences, but varied.
Verdibørsen <a href="http://www.nrk.no/programmer/sider/verdiboersen/">http://www.nrk.no/programmer/sider/verdiboersen/</a>	Weekly	55 Min	Broad, popular	Values in our time
Radiofront <a href="http://www.nrk.no/programmer/sider/radiofront/">http://www.nrk.no/programmer/sider/radiofront/</a>	Weekly	55 Min	Broad, popular	Culture
P2 akademiet <a href="http://www.nrk.no/p2_akademiet/">http://www.nrk.no/p2_akademiet/</a>	Weekly	30 Min	Broad, popular	Essays about science and research in all fields. The essays are presented by leading scholars, and are also published as a book series.
Natur og vitenskap <a href="http://www.nrk.no/programmer/sider/natur_og_vitenskap/">http://www.nrk.no/programmer/sider/natur_og_vitenskap/</a>	Daily	60 Min	Broad, popular	Natural sciences, with a “green touch”.
Kosmo – Natur og vitenskap <a href="http://www.radionorge.com/">http://www.radionorge.com/</a>	Weekly	60 Min	Broad, popular	Natural sciences.  Cooperates with <a href="http://www.forskning.no">www.forskning.no</a>

#### 4.4.3 Popular science articles in newspapers and magazines

Two out of three read at least one newspaper daily. There are no significant gender or geographical differences. There has been an overall decline in use of printed newspapers, most notably in those aged 9-45, and in those with no higher education. Overall, printed newspapers are most commonly used by older people (ages 45 and up) with higher education and a high income (Norsk mediebarometer, 2009: 14-15).

A systematic evaluation does not exist, but the impression is that the four papers below have the most extensive coverage of science.

Title of newspaper	Frequency of science section	No. of print runs	Target audience	Themes covered
Aftenposten (morning edition) <a href="http://www.aftenposten.no">http://www.aftenposten.no</a>	Daily	Approx. 240 000	Target: Broad.  A relatively neutral newspaper, and Norway’s largest in regard to the number of subscribers. A major forum for public debate.	Covers most of the conventional themes.
Klassekampen <a href="http://www.klassekampen.no/">http://www.klassekampen.no/</a>	Daily	Approx. 13 000	Target: Higher education and/or political activists.	Politics, cultural critique, foreign affairs.

			Left-wing, focus on critical journalism and political mobilization. in-depth and feature journalism	
Morgenbladet <a href="http://www.morgenbladet.no/">http://www.morgenbladet.no/</a>	Weekly	Approx. 23 000	Target: higher education, performing artists, activists, intellectuals.  A weekly newspaper, mainly orientated on commenting on culture and politics. In-depth and feature journalism	Culture, media, politics, art and literature
Dagens næringsliv <a href="http://www.dn.no/">http://www.dn.no/</a>	Daily	Approx. 80 000	Target: Business leaders (mainly private) and other interested parties.  Market-orientated, conservative. Part depth and feature journalism	Business, stock exchange, culture.
Nationen <a href="http://www.nationen.no/">http://www.nationen.no/</a>	Daily	Approx. 59 000	Target: Broad	Forskning.no provides a science page every monday.

One out of eight reads magazines or journals daily. Higher education is significant. The most popular types are related to disciplines (especially academic disciplines) and associations that reflect education and/or interests. There has been no significant decline in the use of magazines or journals. One of five who reads magazines and/or journals, reads about popular science, politics and/or culture. Though men read more magazines and/or journals than women, they are more prone to choose those which reflect their hobby or personal interests while women are more concerned with science, politics and culture (Norsk mediebarometer, 2009: 26-27).

Title	Frequency	No. of print runs	Target audience	Themes covered
Illustrert vitenskap <a href="http://illvit.no/">http://illvit.no/</a>	Monthly	64 708	Broad, popular	Natural sciences, medical and technology.
Teknisk ukeblad <a href="http://www.tu.no/">http://www.tu.no/</a>	Weekly	Approx. 300 000	Broad, business oriented	Technology and business
Fra fysikkens verden <a href="http://www.fys.uio.no/publ/fv/">http://www.fys.uio.no/publ/fv/</a>	Less than monthly	Approx. 18 000	Broad, popular	Physics
Levende historie <a href="http://www.levendehistorie.no/">http://www.levendehistorie.no/</a>	Less than monthly	Approx. 20 000	Broad, popular	History and politics
Apollon <a href="http://www.apollon.uio.no/">http://www.apollon.uio.no/</a>	Less than monthly	“This magazine	Employees at universities, business schools and	Research from The University of Oslo

		is not obligated to inform about no. of prints”	other – “a research-interested audience”	
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#### 4.4.4 Festivals, science weeks, etc.

Activity title	Activity type	Organizer	Frequency	Number	Venue	Short description
Forskningsdagene <a href="http://www.forskningssdagene.no/">http://www.forskningssdagene.no/</a>	Science week	Research Council of Norway	Yearly		All over the country	A nationwide event held every year to make science and research available to the public. Forskningsdagene is a member of EUSCEA and a participant in Researchers' Night.
Astrofestivalen <a href="http://www.astrofestival.no/info.php">http://www.astrofestival.no/info.php</a>	Science week	University of Oslo	Varies – the last was held in 2008, the next will be in 2011		Oslo	Festival: Astronomy, rocketry and natural science.

#### 4.4.5 National portals, blogs

Personal computers and internet use can be viewed as a “cross-over” type of media, as some form of all the other types of media listed above is also included.

65 percent of the population used a home computer daily in 2009. There has been an increase for both men and women in usage and time spent. Men are still more prone to use a home computer than women, and higher education is relevant. We also see that people who live in large cities use home computers more (Norsk mediebarometer, 2009: 54).

As with the use of home computers, internet use is also more popular among men than women, with the young, those who live in big cities and among those with higher education. Two out of three internet users read the news online daily (mostly ages 25 to 44), and one out of three is occupied daily with collecting information and background material (Norsk mediebarometer, 2009: 58-60).

Activity title	Activity type	Number of users	Themes covered	Short description
Forskning.no <a href="http://www.forskning.no/">http://www.forskning.no/</a>	web site		All	web-based newspaper focusing on national and international news about science and research. A freelance network, non-profit.
Viten.no <a href="http://www.viten.no/">http://www.viten.no/</a>	web site	Approx. 50 000 per month	The concepts, conventions, laws, theories, and principles of science.	Science museums and centres, web-based science curriculum designed for use in grades 8-13 in science classrooms. Part of the Norwegian Centre for Science Education.

#### 4.4.6 Science museums and centres

The science centres (vitensentrene) constitute a project initiated by NFR and are a strategy for stimulating regional curiosity in science and development within the natural sciences. The focus has been on interactive exhibitions and motivational learning (Persson, Ødegaard og Solhaug Nilesen, 2009: 5, 9).

Activity title	Activity type	Number of visitors/year	Themes covered	Venue (city)	Short description
Norsk teknisk museum/ Vitensenteret <a href="http://www.tekniskmuseum.no/">http://www.tekniskmuseum.no/</a>	Museum and Science center	Approx. 200 000	Technology, industry, medicine, telecommunication, physics	Oslo	The national museum for technology, industry, science and medicine. Includes an interactive "vitensenter". Arranges activities and demonstrations for groups/school classes. Budget: NOK 48 million
Nordnorsk vitensenter <a href="http://nordnorsk.vitensenter.no/">http://nordnorsk.vitensenter.no/</a>	Science center		Technology, natural sciences, mathematics	Tromsø	Aims at promoting nature, business and research as a composed and overall picture for future development. Budget: NOK 5.3 million.
Vitensenteret innlandet <a href="http://www.vitensenteret.no/modules/content/?id=1">http://www.vitensenteret.no/modules/content/?id=1</a>	Science center		Technology, natural sciences, mathematics	Gjøvik	Mainly a resource centre for teachers and pupils (kindergarten, elementary school) for stimulating an understanding of natural sciences. Budget: NOK 8 million.
Norsk maritimt museum/ Vitensenteret Grenland <a href="http://www.marmuseum.no/en/">http://www.marmuseum.no/en/</a> <a href="http://www.vitenlab.no/maindesign.asp?aid=19445&amp;gid">http://www.vitenlab.no/maindesign.asp?aid=19445&amp;gid</a>	Museum and Science center		Technology, natural sciences, mathematics	Grenland	Shipping and mechanical industry. The museum is currently expanding and will include a "vitensenter" by Hydro with a focus on communicating technology and development. New focus will also be placed on cultural, social and economic

<a href="#">=9132</a>					changes in light of Norwegian maritime development.
Vitengården/Vitenfabrikken (Jærmuseet) <a href="http://www.jaermuseet.no/">http://www.jaermuseet.no/</a>	Museum and Science center		Technology, natural sciences, mathematics	Nærbø/Sandnes	Winner of the Micheletti award – best technological museum, 2009. Budget: NOK 38 million.
Vilvite (Bergen science center) <a href="http://www.vilvite.no/">http://www.vilvite.no/</a>	Vitensenter		Technology, natural sciences, mathematics	Bergen	Aimed especially at young people in schools. Interactive activities – learning by doing. Budget: NOK 33.5 million.
Vitensenteret i Trondheim <a href="http://viten.ntnu.no/">http://viten.ntnu.no/</a>	Vitensenter		Technology, natural sciences, mathematics	Trondheim	Aimed especially at young people in schools. Interactive activities – learning by doing. Budget: NOK 11 million.
Bergen Tekniske museum <a href="http://www.bergens.tekniskemuseum.no/">http://www.bergens.tekniskemuseum.no/</a>	Museum		History and development in transportation technology.	Bergen	Focus on technological development in Bergen and surrounding districts. The museum has a large collection of transportation vehicles.

#### 4.4.7 Citizen- or Civil society organisations initiatives

The relevant activities are included above.