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Research and Development Strategic Plan 2006-2015

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Title

Research and Development Strategic Plan 2006-2015

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Summary

The strategic plan for research and development tells how and what to do in the next 10 years. The plan contains nine strategic areas which will be revised every four years in line with the revision of the National Transport Plan.

Sammendrag

Key words:

Research and Development

Norwegian Public Roads Administration

Research and Development

Strategic Plan 2006-2015

Oslo, 23/06/2005

Preface

Via reorganisation and efficiency enhancement processes, it is essential for the agency to focus on the most important areas of its activities and develop them further. The present document is part of this work. The aims of drawing up a strategy document for the agency's research and development activities can be formulated in the following points:

- to ensure management commitment to strategic choices
- to ensure that we carry on research and development in the right areas
- to ensure optimal resource utilisation
- to ensure expedient, efficient internal and external processes
- to clarify the agency's research and development activities both nationally and internationally
- to ensure the existence of skilled research environments at universities, colleges and research institutions
- to fulfil the sector responsibility described in the instructions for the Norwegian Public Roads Administration

Research and development activities associated with administrative support systems are not part of the present research and development strategy.

Oslo, 22/06/2005

Olav Søfteland
Director of Roads

Objective
The Norwegian Public Roads Administration develops and maintains a safe, eco-friendly and efficient transport system.
This is done on a sound professional basis and in cooperation with politicians, users and other interested parties.

Vision
On the road to a better society.

Values
We will:
– take responsibility and show trust
– be open and customer-friendly
– be open-minded and create job satisfaction

Focus areas
Users, society, finances, employees, development

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Part A

1 Rooting

The research and development work is rooted in the agency's vision, objective and values. Research and development are actually part of the “development” focus area associated with the agency’s result-oriented management processes, and the basis for the development of project areas and individual projects can be found in the National Transport Plan and other governing documents adopted by the authorities.

2 Aims

Research and development activities are to contribute to the development and maintenance of a safe, eco-friendly and efficient transport system. This means that we must focus research and development activities on both doing the right things and doing things right. Research and development activities are to develop and secure the agency’s specialist knowledge and skills and ensure that decisions are taken on the basis of professionalism, skill and knowledge.

The results of research and development activities provide the basis for revision of standards and guidelines and will, as such, benefit the entire transport sector. Research and development at the Norwegian Public Roads Administration make a major contribution to the development and administration of its sector responsibility.

3 Roles

The Ministry of Transport and Communications (Samferdselsdepartementet) has overall responsibility for research and development in the transport sector. This responsibility is defined in a guide published by the Ministry of Education and Research (Utdannings- og forskningsdepartementet) and concerns, among other things, financing, balancing short-term and long-term knowledge building, and responsibility for maintaining an overview of the need for knowledge at all times. It is defined as the sector responsibility. This is also described in Report to the Storting no. 20 (2004-2005), *The Desire for Research*:

> “The ministries have both a long-term responsibility for research for the sector, the broad sector responsibility, and a responsibility to meet each ministry’s own needs for a knowledge basis for policy development and administration. The sector responsibility involves responsibility for having an overview of the sector’s knowledge needs, financing responsibility and responsibility for international research cooperation.”

The organisation of the administrative system in the sector gives the agencies great professional responsibility. For the Norwegian Public Roads Administration, the sector responsibility for roads and road transport lies within limits established by the overall authority entrusted to the agency as part of the “Instructions for the Norwegian Public Roads Administration” approved by the Council of State on 27 May 2005. This gives the Norwegian Public Roads Administration independent responsibility for developing the knowledge and skills required to administer its tasks.

The specialist agencies’ research and development activities will mainly be distinguished from the Ministry of Transport and Communications’ own research and development work in that the Ministry’s research and development work is oriented towards developing a knowledge basis for policy formulation, while the specialist agencies mainly orient their work

more towards questions of a specialist and operational nature. The present research and development strategy for the Norwegian Public Roads Administration and the Ministry of Transport and Communications' research and development strategy, which is in preparation, will clarify the roles and create a good basis for avoiding any overlap in the research and development work.

As the Ministry of Transport and Communications' specialist body for roads and road transport, the Norwegian Public Roads Administration must be highly skilled in these specialist areas so that it can meet the Ministry's need for a good decision-making basis. At the same time, it is the administrator of the road network and responsible for road transport. This indicates that we must have top-level skills in those parts of the specialist field in which no one else naturally has such skills, and in areas that the agency considers to be so important that we want to have top-level skills internally. In other parts of the specialist field, we share the need for skills with other agencies and sectors, and skills can be purchased in many cases. The agency's needs are therefore met by knowing where skills can be found and by good purchasing skills.

4 Definitions of Research and Development

In accordance with the OECD definition, research and development are defined on three levels:

I. Basic research
: Experimental or theoretical activities that are carried out primarily to acquire new knowledge about the basis of phenomena and observations, with no view to special practical objectives or applications.

II. Applied research
: Activities of an original nature to acquire new knowledge, directed primarily at practical objectives or applications.

III. Development work
: Systematic work that applies existing knowledge with the aim of producing new materials and products and introducing new processes, methods, systems or services, or improving those that exist.

In the research and development work of the Norwegian Public Roads Administration, it can be hard to distinguish between what is research and what is development because, in a large number of cases, the tasks will overlap and most projects will comprise tasks in both definition II and definition III. The agency can, to some extent, contribute to supporting basic research at universities, colleges and research institutes when the activity is assumed particularly to enhance skills within specialist areas that are very important to the agency.

In the further description of the organisation and implementation of research and development activities, development work associated with administrative support systems and improvement of the agency's internal efficiency has not been taken into consideration.

5 Organisation of Research and Development Activities

5.1 Responsibility

The responsibility for coordinating and following up on research and development at the Norwegian Public Roads Administration is delegated to the Director of Technology. The

Director of Technology has a research and development secretariat attached to his or her staff that manages the ongoing work, supported by an internal research and development group (see 5.3.). Each department is responsible for implementing the research and development work within its own specialist area and area of responsibility when it has been decided to implement a project. The work is normally then followed up in the line. The regions implement their own research and development work to a lesser extent but participate in the implementation of projects in close cooperation with the specialist departments of the Directorate of Public Roads (Vegdirektoratet) via both sub-projects and sub-tasks in the research and development projects.

5.2 Research and Development Secretariat

The research and development secretariat is the Director of Public Roads' executive body for the coordination and follow-up of research and development activities. The tasks of the research and development secretariat are:

- to improve budget processes
- to propose how research and development funds are distributed
- to prepare research and development cases for discussion in the Director of Public Roads' Managers' Meeting/Agency Managers' Meeting
- internal and external information
- to update web sites for research and development information

Resource usage in the research and development secretariat should be approximately one man-year and is managed by a research and development coordinator.

5.3 Internal Research and Development Group

To ensure a clear, efficient flow of information and documents to the departments of the Directorate of Public Roads and the regions, an internal research and development group has been created to support the research and development secretariat. It has the following tasks:

- to contribute to producing a decision-making basis for which research and development tasks are to be prioritised
- to contribute to research and development activities being performed in accordance with the relevant plan and to function as a reference group for the research and development secretariat for follow-up of the Agency Projects
- to coordinate project plans and projects across departmental borders
- to assist the research and development secretariat in budget work and to propose how development funds are distributed
- to contribute to ongoing research and development work being made known in regions and departments
- to contribute to distributing results and to ensure implementation
- to contribute to developing uniform practice concerning the planning and implementation of research and development tasks (contract types, means for managing assignments, the use of daily penalties, etc.)

The research and development group consists of a contact from each region and a contact from each department of the Directorate of Public Roads. The Roads and Traffic Centre (Veg- og trafikkfaglig senter)[1] will have a representative in the group by virtue of its function as a

[1] The Roads and Traffic Centre is located in Trondheim and is one of the sections under the Technology Department.

skills centre and its activities directed at recruitment. The group reports to the Director of Technology and is managed by the research and development secretariat. The research and development group meets at least twice a year and as required.

5.4 External Research and Development Council

An external research and development council is being created to assist the Norwegian Public Roads Administration with the organisation of its research and development activities. This will take place via:

- exchange of information at national and international levels
- experience transfers
- "coordination" of budgets and projects with a view to increased mutual benefit

The research and development council will meet once a year and may be convened at other times as required. The representation in the council may vary over time, but the Norwegian University of Science and Technology (NTNU), UMB[2], representatives of Government agencies dealing with transport, the Norwegian Association of Local and Regional Authorities (Kommunenes sentralforbund), the Institute of Transport Economics (TØI), the Foundation for Scientific and Industrial Research at the Norwegian Institute of Technology (SINTEF) and the Federation of Norwegian Construction Industries (BNL) are being invited to be permanent members. Additional representation from universities, colleges, the consultancy sector, the contracting sector and various user groups (lorry owners, bus companies, cyclists, etc.) is being considered. The group is also considering having representation from one or more of the Nordic countries.

The research and development council is chaired by the Director of Technology and is managed by the research and development secretariat.

5.5 International Contacts

At Nordic level, the Norwegian Public Roads Administration participates in a group consisting of the research and development managers and research and development coordinators in Norway, Sweden, Denmark, Finland and Iceland. The group's main task is to stimulate and initiate pan-Nordic research projects and contribute to the Nordic countries appearing positively in a unified manner in relation to the EU where this is expedient and desirable. As a result of this work, the Directors of Public Roads in the five Nordic countries signed a joint framework agreement in autumn 2004 obliging the countries mutually to implement and secure financing for pan-Nordic research and development projects.

Work is carried on actively to improve international cooperation within the existing fora that have research and development as part of their field of action. The partners are European public roads administrations and research and development players with different statuses in relation to the public roads administrations. The Norwegian Public Roads Administration participates in the Conference of European Directors of Roads, CEDR, which has a separate "Sub-group Research", in FEHRL (the Forum of European Highway Research Laboratories) and in the Joint Transport Research Committee, JTRC, which is a steering group for transport research attached to the OECD and ECMT.

[2] UMB: The Norwegian University of Life Sciences (Universitetet for miljø- og biovitenskap), formerly the Agricultural University of Norway (Norges landbrukshøgskole).

In addition to this, the agency participates as one of several parties in many projects under various umbrellas that are initiated both within and outside the EU. Via its research and development activities, the agency also wants to contribute to making it possible for central research and development environments in Norway in the areas of roads and road transport to participate in international research projects, among other things via the EU's framework programmes.

6 Implementation of Research and Development Activities

6.1 Financing

The Norwegian Public Roads Administration is to have a central research and development budget distributed over items 1320.23 and 1320.30. In addition to this, it will be possible for research and development tasks associated with operation, maintenance and construction activities to be financed via the individual project or installation. The central research and development funds cover activities in both the Directorate of Public Roads and the regions. In principle, the budget is divided into 2 parts. One part goes to Agency Projects (see section 6.4), while the other part is used for pure development tasks. The size of the distribution can vary from year to year, depending on activity and needs, but at least 50 % of the budget is generally used for Agency Projects.

6.2 Own Research and Relations with Research and Development Environments in Norway

The research and development work is carried out via our own work, by commissioning external research environments to perform tasks and via participation in joint research and development projects and programmes in the Research Council of Norway (Norges forskningsråd, NFR). In some cases, research and development funds may be granted to support research environments or concrete projects, for example national support for participation in EU projects.

It is essential that the agency continue to have employees who can perform research and development tasks within the main specialist areas. However, the agency does not have, and does not aim to have, top-level skills within all specialist areas. We will, therefore, be dependent on external, skilled research and development environments. Some of the research funds should, therefore, be spent strategically to build up and maintain research environments, primarily in Norway and secondarily in the Nordic countries, so that they are able not only to give the agency the necessary help with research work but also to operate on the European market and therefore be an important "importer" of knowledge and research results into Norway[3]. This benefits both the agency and the specialist environment. In Norway, research funds that are spent externally and research tasks that are commissioned externally will also be extremely important to the development of cooperation with universities and colleges. This is also an important contribution to recruitment within the relevant specialist areas.

In Norway, the majority of research tasks that are implemented externally will be carried out in cooperation with universities, research institutes and selected colleges. The agency has cooperation agreements with NTNU and UMB and a few colleges. The agreements are used in particular as an important part of recruitment work.

[3] This assumes that research funds are spent within the regulations on public procurement.

6.3 Strategic Research and Development Areas

The agency selects strategic research and development areas that are based on the main objectives of the transport policy that is established in the National Transport Plan and the agency's sector responsibility. The selected research and development areas are discussed in part B of this document. The strategic research and development areas are selected via a process in the entire agency and in consultation with external research and development environments. The Director of Public Roads decides the strategic research and development areas on which the agency will focus, following a proposal from the Director of Technology and discussion in the Agency Managers' Meeting.

The strategic research and development areas are revised every four years so that they reflect new directions in transport policy.

6.4 Major Research and Development Projects – Agency Projects

A number of major research and development projects, which are designated as Agency Projects, are established within the strategic research and development areas. It is assumed that the Agency Projects include work within both definitions II and III given in section 4. A significant part of an Agency Project therefore involves procuring new knowledge.

The Director of Public Roads decides which Agency Projects are to be implemented, following a proposal from the Director of Technology and a recommendation from the Agency Managers' Meeting. These projects are clearly designed to achieve the agency's strategic and more long-term objectives. The projects are implemented in specialist departments that have the specialist responsibility. However, they are followed up both in the line and in the Technology Department, which reports to the Director of Public Roads via the Agency Managers' Meeting.

It is assumed that Agency Projects are managed professionally by a project manager who spends most of his or her working hours on project management.

6.5 Development Projects

Development funds are spent mainly to perform tasks within definition III given in section 4, and the performance of tasks here will often aim at a result that can rapidly be applied. Funds for development tasks are planned in the departments in cooperation with the regions and are allocated following an application. The tasks may be performed both in the departments of the Directorate of Public Roads and in the regions. In the latter case, they are performed in close cooperation with the departments of the Directorate of Public Roads. The departments and the regions will be responsible for following up on expenditure of the development funds in the line.

It is recommended that neighbouring development tasks be concentrated under one project manager, either as one large development project or as a collection of projects. This will result in better management, more efficient utilisation of funds and simpler follow-up for management.

6.6 Research and Development Linked to Construction, Operation and Maintenance via Contracts

The contract strategy must make it possible to include research and development in the competition basis for both construction and operation/maintenance contracts. It must be

emphasised that responsibility as the client entails special responsibility for research and development that improve technical quality and safety in connection with the performance of activities and reduce production costs and negative impacts on health and the environment.

The agency must also be open to research and development cooperation with external parties via public research and development projects supported by Innovation Norway (Innovasjon Norge).

6.7 Skills Transfer and Application of Results

As part of the project plan for all research and development projects, there must be a plan for how results are distributed and made known both within and outside the agency. It is important that, before projects are started, consideration is given to who will benefit most from the results and that information channels are selected on the basis of this. The intranet and Internet are effective channels for information distribution. Already developed systems, for example “experience transfer”, must be used where possible.

It is necessary to ensure that the knowledge generated via research and development work is incorporated in standards and guidelines and is used in the revision work on the National Transport Plan. The internal research and development group (see section 0) will have a central role to play in ensuring that information reaches the right environments.

6.8 National and International Publication

In addition to publication via the intranet/Internet, there will still be a need for hard copy reports. As an important part of the agency’s profile, uniform publication of research and development is guaranteed for the entire Norwegian Public Roads Administration. Publication must ensure that reports and results can be found, whether they have been published internally or by external participants in projects. All publication must ensure that the agency’s policy in respect of rights to results and possible patents is followed.

In connection with research and development activities linked to construction activities or operation and maintenance, it is important for both planned research and development activities and useful experience gained via the ongoing work to be reported and published so that they can benefit both the agency and the specialist sector. The experience transfer project will be a suitable tool for reporting such newfound knowledge and experience.

To ensure international distribution of the results of research and development activities, all reports that are published in Norwegian by or for the Norwegian Public Roads Administration must, as a minimum, contain a summary in English.

Project managers and other central project employees must be encouraged to publish results of research and development activities in national and international journals and publications and to submit contributions to major international conferences and present them there.

6.9 Evaluation of Agency Projects

6.9.1 Internal Evaluation

All Agency Projects implemented must be concluded with a self-evaluation. The primary aim of the self-evaluation is to ascertain whether the project’s defined objective has been achieved. The project’s implementation is then evaluated in practical and financial terms. The

evaluation is incorporated as part of the project plan and the project is not regarded as completed until the evaluation has been carried out.

In most cases, it will be the task of the project manager, often in cooperation with a project group or reference group, to perform and report on a self-evaluation. In some cases, the Internal Audit may be a useful tool for an internal evaluation.

6.9.2 External Evaluation

Selected Agency Projects are put out for external evaluation by a research institute or an environment that is highly skilled in the evaluation of research projects. The primary aim of an external evaluation is to examine whether the objective of the project according to the project plan has been achieved. However, it is equally important to map whether the results and findings of the project have been applied (implemented). The evaluation also looks at the implementation of the project in respect of contracts, regulations and ethics. An external evaluation is performed two to four years after the project is completed.

Part B

7 Strategic Research and Development Areas

7.1 Strategic Research and Development Areas

The main focus of the agency's research and development activities must lie within the strategic research and development areas in which a number of Agency Projects are established. The strategic research and development areas are revised every four years in line with the revision of the National Transport Plan.

7.1.1 Mobility of People and Transport of Goods

- Trade and industry transport
  - data on goods transport
  - movement of goods throughout the transport and logistics chain
  - development of trade and industry and regional development
  - transport of goods by public transport
  - IT systems to support goods transport, etc.
  - terminal structure and efficiency in terminals
- Intelligent transport systems and services – ITS
  - Multimodality and coordination between different means of transport
  - Electronic payment and ticketing systems
  - Traffic management, security and support systems for operational management of the road network and traffic
- Eco-friendly urban transport
  - walking, cycling and public transport
  - parking
  - street design, aesthetics
  - area and transport planning

7.1.2 Safety and Security

- Traffic safety
  - vision of having fatal accidents reduced to zero
  - road user behaviour
  - safety management
  - new vehicle technology
  - vehicle simulator
- Risk and vulnerability
  - consequences of climate change
  - landslide, landslip and avalanche
  - risk analyses
  - terror

7.1.3 Environment, Energy and Resources

- Impact calculations
  - Comparable calculations across agencies
  - Deficiencies in current benefit calculations?
  - Benefit calculations at macro level

- ☞ Tool development for cost-benefit analyses

7.1.4 Competitive Design and Production Systems

- Road tunnels
  - ☞ planning, projecting
  - ☞ interiors, installations
  - ☞ fire safety
- Road technology
  - ☞ eco-friendly road surfaces
  - ☞ model development
  - ☞ reinforcement methods
- Social effects of operation and maintenance

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