
R&D in the Construction and Real Estate Cluster FINLAND

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A. R&D Organisations

1. Organisation: TEKES, the National Technology Agency

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Description:

Teques, the National Technology Agency is the main financing organisation for applied and industrial research and development (R&D) in Finland. The funds are awarded from state budget via the Ministry of Trade and Industry.

The impact of Teques activities is felt in Finland as increasing exports, a broader industrial base, more jobs and an improvement in the general welfare of society.

Teques also co-ordinates and finances Finnish participation in international technology initiatives. Teques and its technology programmes offer excellent channels for co-operation with Finnish key players in R&D.

Teques has a network of Technology Counsellors in USA, Japan and Brussels whose aim is to increase technological co-operation.

2. Organisation: VTT Building and Transport

Director in charge of CREC actions:

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Description:

VTT, general

VTT Technical Research Centre of Finland is a contract research organisation involved in many international assignments. With its more than 3000 employees, VTT provides a wide range of technol-

ogy and applied research services for its clients, private companies, institutions and the public sector.

The turnover is about 200 million Euro. VTT serve annually over 5000 domestic and foreign customers.

VTT Building and Transport

The field of VTT Building and Transport encompasses buildings and facilities together with their related products, systems, processes and functions; urban planning; transport and logistics; road, civil engineering and rock engineering structures; and environmental technology for communities.

The wider aims of the Institute are to enhance the competitiveness of companies in the industries, to improve the upkeep of the real estate stock, and to promote a high-quality environment in which people can live and work in accordance with the principles of sustainable development.

VTT Building and Transport produces new applied technology in co-operation with domestic and foreign partners.

3. Organisation: Academy of Finland

Director in charge of CREC actions:

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Description:

The Academy of Finland is an expert organisation in research funding and science policy. The Academy's object is to promote high-level scientific research through

- long-term quality-based research funding,
- science and science policy expertise and
- efforts to strengthen the position of science and scientific research.

In 2001 Academy support for research at Finnish universities and research institutes will amount to more than EUR 180 million. This represents around 14 per cent of total government research funding. Each year Academy-funded projects account for a total of some 3,000 researcher-years.

4. Organisation: Finnish National Fund for Research and Development Sitra

Director in charge of CREC actions:

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Description:

Sitra, the Finnish National Fund for Research and Development, is an independent public foundation under the supervision of the Finnish Parliament. The Fund aims to promote Finland's economic prosperity by encouraging research, backing innovative projects, organising training programmes and providing venture capital.

The Fund was set up in conjunction with the Bank of Finland in 1967 in honour of the 50th anniversary of Finnish independence. The Fund was transferred to the Finnish Parliament in 1991.

Sitra aims to further economic prosperity in Finland by

- developing new and successful business operations
- financing the commercial exploitation of expertise
- promoting international competitiveness and co-operation
- initiating operations designed to break new ground
- providing new research information
- anticipating and identifying future challenges
- developing new solutions

Sitras mission is to be a creative and flexible pioneer that endeavours to ensure that the ordinary Finn enjoys a better future than at present.

5. Organisation: Helsinki University of Technology, Department of Civil and Environmental Engineering

Director in charge of CREC actions:

Department Head Prof. **Pertti Vakkilainen**

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Description:

The mission of the Department of Civil and Environmental Engineering is to be an internationally important center of expertise for comprehensive research, teaching and development of sustainable construction technology as well as urban and environmental technology, including the repair, maintenance and utilization of constructed systems. The absolute objective is to be among the ten leading European centres in 2005.

The Department engages both in basic research in technical sciences and in applied research with immediate practical utilization. There can be no graduate, post-graduate or researcher training without high-level research and development.

The basic units for research operations are the individual laboratories:

- Bridge Engineering
- Building Materials Technology
- Construction Economics and Management
- Environmental Protection
- Environmental Engineering
- Highway Engineering
- Transportation Engineering
- Soil Mechanics and Foundation Engineering
- Steel Structures
- Structural Engineering and Building Physics
- Structural Mechanics
- Water Resources

6. Organisation: Tampere University of Technology, Department of Civil Engineering

Director in charge of CREC actions:

Department Head Prof. **Ralf Lindberg**

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Description:

The Department of Civil Engineering has approximately 500 students and little more than 30 graduations per year. The total funding in 1996 was 5,3 million euros. Approximately 60 per cent of the funding consisted of external funding. Department has 200 foreign co-operators and student are encouraged to study also abroad.

Focus areas of operationing are following themes, which are important in education and research: renovation and possession of real estate; industrial construction and construction processes; structures, development of those and applying teleinformatics in construction. Development in the future will be based on these focus areas.

7. Organisation: University of Oulu, Faculty of Technology, Department of Process and Environmental Engineering and The Research Unit of Construction Technology

Director in charge of CREC actions:

Head Prof. **Mika Sillanpää** (Water resources and environmental engineering laboratory)

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Description:

The Water Resources and Environmental Engineering Laboratory is divided into two units, the Environmental Chemistry unit and the Water Resources Engineering and Environmental Geotechnology unit. Research has been concentrated on environmental problems in northern regions. The most important research fields are preventing and repairing environmental damage to watercourses, soil and bedrock, purification of runoff water from peat mining areas and the problems of water and wastewater treatment in sparsely populated northern areas. In addition, the laboratory is investigating the utilization of waste materials and industrial byproducts.

The Research Unit of Construction Technology is a research unit of University of Oulu in construction and real estate cluster. Main focus areas are the technical and financial aspects of construction and of the built environment.

The unit has knowledge based on long-term experience, strong scientific competence and desire to serve demanding customers in R&D-projects.

B. National R&D Programmes

1. Title: Infra - Construction and Services Technology Programme

Period: 2001-2005

Budget: 24M€

WWW: <http://akseli.tekes.fi/Resource.phx/rapu/infra/en/index.htx>

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Description:

Vision

The Programme vision consists of an internationally top-level Finnish infrastructure industry. Key technologies of the infrastructure sector will be renewed and knowledge developed through the Programme. New, internationally competitive products and services will be developed in the operation and maintenance sector as well. The Programme supports the change of opening markets in infrastructure construction and maintenance.

Programme Concentrations

The Programme will concentrate on the development of project management, construction and maintenance of infrastructure networks, and on the development of associated services, techniques, methods, products, and equipment. Electronic network businesses, water treatment processes etc. will be excluded from the Programme. The Programme scope is expected to be about 24 million euros (140 million FIM), of which about half will be covered by Tekes.

The Structures of Infra in this Programme

Routes of traffic belonging to infrastructure consist of roads and streets, railways, waterways, and airports. Water, sewage, information, gas, heat, and electrical connections form networks. Parks, sports areas and other leisure facilities, dumps, underground spaces and tunnels, and exterior spaces of properties belong to other environmental and earth structures.

Programme Goals

The Programme supports businesses and directions of development leading to a desired change in infrastructure construction and maintenance. Key technologies in the sector will be renewed and knowledge enhanced in order to improve business competitiveness and profits. The Programme is to create new, internationally competitive products and services.

Programme direction in 2001 - 2005 and its results will influence the sector so that towards the end of the decade

- Procurement practices correspond to the opened markets, supporting business ability and internationalisation
- New areas of knowledge have been developed, scope of business has expanded, and new partnerships have been created extensively.
- Information technology is being fully applied in the processes of the sector.
- Principles of sustainable development guide working methods.
Through the programme goals internationally competitive spearhead abilities will be achieved in the sector, within its key technologies, including material, production, use and maintenance and product and equipment technologies.

2. Title: Vera- Information Networking in the Construction Process

Period: 1997-2002

Budget: 29M€

WWW: <http://akseli.tekes.fi/Resource.phx/rapu/vera/en/index.htx>

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Description:

Goals of the programme

Management of the information flow during the entire life cycle of the building. Information should be part of the product, and the as-built information should be handed over at the end of the construction project to form the basis for the use and maintenance of the building.

Improvement of the information management among the project parties. To manage the information flow and to be able to develop integrated information systems it is necessary to agree on the content, structure, format and presentation of the data,

Utilisation of information technology and information networks in the whole construction process. The various parties in the AEC/FM industry have applied and developed information technology focusing only on their own needs. Internal systems are therefore for the most part in place, but information

sharing between the parties and joint utilisation of this information are a bottleneck. Networking is contingent upon broad utilisation of information technology in the whole value chain.

Process development. Information technology must be used as an enabling technology to re-engineer the design, construction and facility management processes.

Schedule and budget

The programme will last until the end of 2002. When the programme started in 1997 the planned total volume was expected to be 28 M Euro, of which 12 M Euro would be funded by Tekes and the rest by the industry. However, the industry interest on the R&D projects on this area has been so strong that the total budget will be 43 M Euro, of which 20 M Euro is coming from Tekes.

About 20% of funding is for applied technical research (public projects) and 80% is for industrial R&D projects.

3. Title: Healthy Building - Construction Technology, Indoor Climate and Quality

Period: 1998-2002
Budget: 4,2M€ annually
WWW: <http://akseli.tekes.fi/Resource.phx/rapu/terve/en/index.htm>

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Description:

A healthy building the main goal

The Construction Technology, Indoor Climate and Quality technology programme, otherwise known as the Healthy Building Programme, will be implemented between 1998 and the year 2002. The scope of the programme covers the entire real estate and construction business and also involves closely the health sector. The Healthy Building Programme will foster co-operation between real estate and construction companies and research institutes.

Among other things, the programme aims to improve the current lifecycle of buildings and extend their service life. It is hoped that the programme will assist in correctly targeting investments in building renovation. Better indoor air is also expected to enhance the level of public health. The estimated annual budget of the programme is approximately FIM 25 million, half of which will be contributed by the Technology Development Centre of Finland (Tekes). Costs will be distributed between applied technical research, product development grants and product development loans.

The Finnish Real Estate Federation is responsible for co-ordinating the Healthy Building Programme, under the management of Mr Markku Rantama. The advisory boards and steering groups underpinning the programme represent a wide spectrum of both society and the business sectors involved.

General objectives of the Healthy Building Programme

- To enhance know-how and health education associated with the physical aspects of indoor air and construction to the level where this know-how becomes a key success factor internationally. This will be achieved through collaborative work in the real estate and construction business, the public health sector, the manufacturing industry and the research sector
- To develop and implement indoor air and health criteria for buildings, and for the products and services used in buildings, and quality classifications to support these
- To develop key spearhead products and processes that are competitive and exportable
- To develop processes for diagnosing and rectifying the indoor air and health properties of buildings.

Priority Areas

- Healthy Building Business Concepts
- Ventilation and Building Services
- Managing the Moisture in Buildings
- Emissions from Construction Materials

4. Title: Rembrand - Real Estate Management and Services

Period: 1999-2003

Budget: 21M€

WWW: <http://akseli.tekes.fi/Resource.phx/rapu/rembrand/en/index.htm>

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Communication Details:

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Description:

Finland is making a major effort to develop world-class know-how in Real Estate Management and Services. The Rembrand Technology Programme was launched in May 1999 as a result of an extensive feasibility study carried out during 1997-1999.

Responding to the New Economy

In the New Economy the customers do not only look for goods or services, they want both. Hence, the product is sold as a part of service. Businesses are shifting their focus from product exchange towards customer relationship management. The new focus gives an opportunity to redefine the substance and meaning of 'technology'. Facilities are seen as a part of a total, ongoing service offering, dedicated to enhancing the well-being of the end-user and promoting the core functions of the clients.

Led by the National Technology Agency, the Real Estate Cluster in Finland is responding to the challenges of the customer relationship approach. The ambition of the Rembrand Technology Programme is to direct development effort into creating a service-orientated real estate cluster by generating fresh ideas, new processes and modes of operation. The Programme seeks to promote and encourage the creation of new customer service products and concepts of space, and to enhance the functionality of the existing building stock and the efficiency of information transfer.

Objectives of the Programme

Rembrand invites networked companies, research institutes and other organisations that develop and produce innovative service solutions for the customers of the real estate cluster to join the Programme.

A multidisciplinary approach and cross-sectoral interaction is called for in order to reach these mutual objectives. Networking and interaction between different parties is expected to yield innovative solutions for customer relationship management.

Development work is aimed at the following objectives of the Rembrand Programme:

1. Service Concepts; globally competitive service concepts that rely on partnerships and networks
2. Transparent Real Estate Markets; creating transparent markets and transparent organisational cultures in real estate functions
3. Real Estate Business; efficient use of capital and knowledge to support the core business of the customer
4. Life-cycle collaboration models; life-cycle collaboration concepts and agreements that functionally integrate the sectors into a service-orientated real estate cluster
5. New housing and working environments; producing and maintaining environments that support the core functions and enhance the well-being of end-users
6. Research, Development and Education; integrated education and R&D to enhance the speed of technology transfer

The Rembrand Technology Programme is co-ordinated by the Finnish Association of Building Owners and Construction Clients (RAKLI). Total funding for the five-year Programme is EUR 21 million, half funded by industry and half by Tekes.

5. Title: DIVAN –Technology and Development Programme for the Furniture Sector

Period: 1999-2002

Budget: 17M€

WWW: <http://akseli.tekes.fi/Resource.phx/rapu/divan/en/index.htx>

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Tekes (The National Technology Agency)

Communication Details:

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Description:

Divan, the Tekes technology and development programme for the furniture sector, which is based on trends and market demands, will create the conditions for a profitable, increasingly internationalized and competitive furniture industry.

Manufacturing technology in the Finnish furniture industry is highly developed. There is a long history of wood as a material and sound expertise in its use.

Information technology is very advanced in Finland and its use has been taken up extensively. Finnish design includes the well-known creations of classic designers, but there is also a new generation of competitive young designers in Finland who have already achieved recognition in international markets.

6. Title: Kivi - Technology and Development Programme for Stone Industry

Period: 1999-2002

Budget: 10M€

WWW: <http://akseli.tekes.fi/Resource.phx/rapu/kivi/en/index.htx>

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Organisation in charge:

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Communication Details:

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Description:

Programme goals

To double the turnover of the stone industry to 270 million euros by the end of 2005.

To increase exports to 170 million euros, so that end products would make up 2/3 of total exports by 2005.

To create a working research, education and development culture within the industry.

To bring the Finnish stone industry to the forefront in the utilisation of information technology.

The main themes

- Efficient and environmentally acceptable quarrying
- Efficient and technologically advanced production and distribution
- New products and building methods
- International co-operation in the stone industry
- Public awareness of the industry and ensuring a viable labour market

Schedule and budget

The overall budget of the programme is 10 million euros for the years 1999 to 2002. Public funding covers 50 per cent of the budget.

7. Title: Tukista Tuplasti- Value Added Wood Chain

Period: 1998-2003
Budget: 34M€
WWW: <http://akseli.tekes.fi/Resource.phx/rapu/tukki/en/index.htm>

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Description:

Making Wood a Value Added Product

The Value Added Wood Chain programme's purpose is to increase the use and value added characteristics of Finnish wood products and promote international co-operation in wood processing and related industries.

The programme will create new business opportunities for the wood products industry. Its overall objective is to double the industry's gross sales within ten years. Increasing the use of wood as a construction material in the EU is a strategic focus of the programme. Significant cross-disciplinary co-operation in research, product development and marketing is essential to achieve this objective.

The programme emphasises cooperation contracts and new processing units as a means to stimulate European and global networking. To increase their expertise and grow their customer base, small wood products enterprises are encouraged to work with large enterprises in the sector.

The programme is made up of R&D and basic research projects undertaken by private enterprise, research institutions and universities. Materials technology, production technology and networking comprise the major areas of research. Enterprises retain the commercial rights of their research efforts.

Increasing wood use in construction

The wood products sector is strongly positioned as a key supplier of the construction industry. Construction generates about 70 to 80 per cent of wood product sales, but concerted industry cooperation could increase wood's market share. By networking, enterprises across Europe can offer more value and increase the number of applications for which wood is the preferred material.

The market share of wood products in Europe's construction industry is relatively small, even though wood is a renewable material and a valuable alternative in aesthetic, ecological and economic terms.

The Value Added Wood Chain technology programme is designed to support the development and expansion of the market for building components and systems including design, assembly and other technical services.

Duration and extent of the programme

The programme is planned to last from 1998 to 2003 and its size in terms of cost will be about 34 million euros, about one half of which will be financed by Tekes.

The Value Added Wood Chain technology programme is closely linked to the DIVAN programme, Tekes' technology programme for the furniture industry, as well as to many other forest industry projects.

8. Title: ProBuild - Progressing Building Process

Period: 1997-2001
Budget: 80M€
WWW: <http://akseli.tekes.fi/Resource.phx/rapu/probuild/en/index.htx>
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Organisation in charge: **Tekes (The National Technology Agency)**

Communication Details: **see above**

Description:

In 1997 National Technology Agency (Tekes) launched the "ProBuild" (Progressive Building Process) program. Its aim is a more effective and better controlled building process that ensures the realisation of owners' requirements and the creation of spaces and buildings that meet users' needs—economically.

Need to Develop the Construction Process

In the future, the clients of the construction sector will increasingly focus on the need to improve the building process and its end products while also emphasizing the building's properties over its entire life cycle. The technological development of other fields will force construction companies to invest in improved quality, productivity and service.

Construction investments account for a large share of the nation's total investments at over 60 percent. The lion's share of Finland's national wealth consists of buildings and infrastructure. The construction and real-estate sectors account for 17-18 percent of the annual GDP cash flow. It is crucial from the viewpoint of the national economy that construction sector investments are profitable and effectively realized. Construction and property maintenance are also a major employer.

The traditional building process is beset by many problems. The responsibilities of the various parties differ with respect to quality. Selection processes based almost exclusively on the lowest tender price do not support sustained development by companies. The preconditions for effective networking and close co-operation are poor.

Construction-sector companies, which are highly production-oriented, must develop their products and process know-how in order to be able to serve owners well.

Various Project Types of Program

- Co-operation projects of various participants: owners, designers, contractors, suppliers.
- Projects dealing with general procurement and delivery practices in construction sector
- Practical pilot projects
- International R&D projects

Advantages of Program

An advanced building process combines flexibility and the advantages of industrial production. Skilful owners, professional designers, competent contractors and knowledgeable suppliers engage in close co-operation based on clear-cut liabilities. The life-cycle economy of buildings is receiving increasing attention at all phases of the building process.

The development of the building process improves the quality and productivity of construction as well as cost control and adherence to schedule. This gives sector companies better opportunities to succeed also in the international markets. The program also promotes development co-operation between companies.

International Co-operation

The problems related to building processes and the need of their development are common in many countries. The building process can be accelerated through international co-operation. It is hoped to include international data exchange and projects in the program.

Schedule and Budget

The overall budget for the ProBuild program is FIM 80 million (US \$ 15 million) for the years 1997 to 2001.

9. Title: CUBE – Technology Programme for Developing Building Services

Period: 2002-2006
Budget: 27M€
WWW: <http://akseli.tekes.fi/Resource.phx/rapu/talotekniikka/en/index.htx>

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FINLAND
<http://www.take-finland.com>

Communication Details:

See above

Description:

The aim of the programme is to strengthen the development of building services and promote applications of building service technology in real estate business in Finland. The programme will be carried out between 2002 and 2006. The areas are transmission of air, water, heating, energy, light and information in changing environments and changing customer requirements. Also security service issues will be covered.

The aim is that new competitive and high-tech products in building services will emerge for demanding real estate markets.

10. Title: PROGRESS - Profitable Green Development in Real Estate and Construction Business Environmental Development Programme

Period: 1999-2001

Budget:

WWW: <http://www.rakli.fi/ProGresS/english.htm>

Contact persons:

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Organisation in charge:

RAKLI , The Finnish Association of Building Owners and Construction Clients
Annankatu 24, FIN-00100 Helsinki, Finland

Communication Details:

See above

Description:

The ProGresS - Profitable Green Development in Real Estate and Construction Business - programme was launched in 1999 to promote environmental expertise and sustainable development in the Finnish real estate and construction industries. Innovation, co-operation, customer orientation, and a business-minded approach lie at the heart of the programme's principles. By bringing together the leaders of the Finnish real estate and construction industries, the programme has created an innovative atmosphere for developing new sustainable business. Joint development work - even between competitors - reflects the common will of the Finnish real estate and construction sectors to enhance environmental excellence.

The real estate and construction industries employ a total of some 500,000 people in Finland, around 20% of the total workforce. As well as being a significant part of the economy, the two also play an important part in shaping the environment in which we live. What they do pro-actively in respect of the environment, therefore, has a major impact on sustainable development.

The electricity and heating used in buildings and construction accounts for 40% of the primary energy used in Finland; and the real estate and construction industries are responsible for one-third of Finland's annual carbon dioxide emissions. Construction and real estate services also have a considerable impact on land use, raw material and water consumption, as well as waste generation.

Building on long traditions in environmental excellence

The Finnish real estate and construction sectors are committed to being international forerunners in environmental excellence, and are well placed to achieve this aim. Finland's geographical location and long tradition in efficient energy use provide a strong foundation here.

Building on this foundation, the ProGresS programme was launched in 1999 to promote efforts on a more systematic, co-operative basis. The programme is financed by the National Technology Agency, Tekes and participating companies; and supported by the Ministry of the Environment and all the main associations in the real estate and construction sectors in Finland. The programme is co-ordinated by the Finnish Association of Building Owners and Construction Clients, RAKLI.

More than 60 real estate and construction companies, central research organisations, associations, and authorities have joined the ProGresS programme since it was launched.

Over 20 development and pilot projects have been launched as part of the programme to identify practical tools and indicators for implementing environmental issues as part of management systems, and for developing new products and services supporting environmental excellence.

ProGresS has initiated the systematic use of tools for managing the environmental load of properties and buildings during their entire life cycle, for example, taking account of the fact that the physical life spans of buildings are long and that decisions taken during the planning phase affect the environmental load imposed during construction and use.

Environmental indicators

One of the most important projects in the ProGresS programme has been the development of environmental indicators for the real estate and construction sectors. The objective of this project is to integrate environmental issues into companies' decision-making and business processes via the use of a balanced scorecard, enabling a set of indicators to be used in both internal and external reporting.

Finland's 15 largest real estate and construction companies are involved in the project, which is co-ordinated by the Institute for Real Estate Economics and KPMG Wideri, as part of a broader Nordic indicator development project.

Partners for excellence

The ProGresS programme will continue until 2002. The results of current projects will steer future focal areas and development projects.

The ProGresS programme is also looking for international partners similarly committed to environmental excellence in the real estate and construction business.

11. Title: Ecological Community Project

Period: 1994-

Budget:

WWW: <http://www.safa.fi/proj/eko/eng/index.html>

Contact persons:

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Organisation in charge:

**Finnish Association of Architects (SAFA)
The Finnish Ministry of Environment
Technology Development Centre (Tekes)**

Communication Details:

see above

Description:

Towards a sustainable city

The greatest environmental challenges are caused by urban areas. The Ecological Community Project focuses on sustainable construction and living in the cities. The project started in 1994 with the Finnish Association of Architects (SAFA), the Finnish Ministry of Environment and the Technology Development Centre (Tekes) as partners.

Transfer of information and generate conversation

The Ecological Community Project intends to collect information and know-how on sustainable urban communities and adapt it to the target areas. The aim is to find ways in which to decrease the negative environmental impacts of construction and real estate maintenance, as well as to improve the environmental awareness of designers, developers and builders.

The Ecological Community Project has released several publications. It has also organised seminars in order to spread information concerning the most interesting innovations, projects and the results of the experimental construction.

New philosophy on urban environment

The Ecological Community Project aims to create good examples of sustainable urban housing and environment. At the same time the construction and design methods and building regulations will be tested and developed. The project is a part of the Environmental Technology in Construction - Programme of the Technology Development Centre Tekes.

The Ecological Community Project focuses on two target areas of different nature, one being a new housing area, the other an existing suburb in need of renovation. The target area for new ecological construction is the Viikki area in Helsinki. The Ristinummi suburb in Vaasa, a typical Finnish housing area of the 1970's, was chosen for renovation.

Implementation and their follow-up

The new ideas and ways of implementation to the target areas were found through planning and design competitions. The implementation of both Viikki and Ristinummi areas is based on the results of the competitions. The solutions in Viikki ecological area will be evaluated by a Viikki follow up project.

Unbiased experimental construction in the Viikki ecological area

Finland's first urban ecological area will be implemented during the years 1999-2002 in Viikki, Helsinki. The planning solution of this housing area for 1700 residents was found through a planning competition. The area has a finger-like structure, in which green areas interlink with the built environment. Most of the construction solutions were found through an invited design competition. The competitions were organised by the Ecological Community Project and the City of Helsinki.

12. Title: Prima – Technology Programme in Ground Engineering

Period: 2001-2005
Budget: 12M€
WWW: <http://www.prima-kehitysohjelma.net>
Contact persons:

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Organisation in charge:
Finnish Geotechnical Society
c/o VTT-RTE
P.Box 1805 02044 VTT
FINLAND

Communication Details: see above

Description:

The Prima Technology Programme for developing Ground Engineering Technology will focus on three areas:

- Developing new foundation engineering products and methods
- Promoting long-term service life and managing the life-cycle costs of geotechnical structures
- Developing new IT-based design methods and software applications.

The programme consists of 70b individual projects costing totally 12 million euros. The programme will be implemented between 2001 and 2005. About half of the programme's costs and projects are linked to developing new products and methods in the following six areas:

- Foundation systems
- Underpinning
- Piles and piling
- Retaining walls and deep excavations
- Reinforced soil structures
- Reducing vibration problems

Although the PRIMA technology programme is a Finnish effort, its work is also expected to benefit the international construction community.

13. Title: Lyyli - Environmentally Friendly Urban Form and Transport System

Period: 1997-2001
Budget: 0,5-0,8M€ /year
WWW: http://lyyli.kuntaliitto.fi/english/index_e.html

Contact persons:

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Organisation in charge:

Ministry of Transport and Communications
Ministry of the Environment
Ministry of Social Affairs and Health
Ministry of Trade and Industry
Association of Finnish Local Authorities,
The National Technology Agency TEKES
Finnish National Road Administration
Finnish Rail Administration

Communication Details:

see above

Description:

Goal and contents of programme

The Finnish Ministry of Transport and Communications, Ministry of Environment, Ministry of Social Affairs and Health, Ministry of Trade and Industry, Association of Finnish Local Authorities, Technological Development Centre, Finnish National Road Administration and Finnish Rail Administration have launched a 5-year-long research and development programme which primarily concerns the largest built-up areas. The purpose is to provide communities with solutions by means of which necessary transport and travel can be operated with a minimum amount of traffic and by the most environment-friendly transport modes available. This means solutions which

- Conserve energy;
-

- Secure a healthy living and recreation environment for different population groups; and
- Avoid splitting natural regions.

The research and development programme is primarily aimed at target city areas where such measures are regarded which can

- Consolidate community structure;
- Decrease the amount of passenger car traffic;
- Foster mass transport, cycling and walking;
- Secure the viability of city centres;
- Foster such production and service structures that take environment and different population groups into account; and
- Promote operational prerequisites of green logistics.

The measures are chosen according to the characteristics of each town region so that in the evaluation of measures the effects on environment, health, society (including safety) and economy as well as concentrations of effects are regarded. Furthermore, the programme may be used for financing projects which improve generalisation of information and provide the work with information or procedural support.

The more specific research programme has been published in the Publication Series "Mietintöjä ja muistioita" (B18/97) of the Ministry of Transport and Communications. The financing parties compiled this report under the supervision of the Technical Research Centre of Finland, VTT Communities and Infrastructure.

The research needs that were indicated during the preliminary study phase have been turned into projects of the programme. The programme has 6 theme levels:

- I. DEVELOPMENT STRATEGIES OF URBAN FORM
- II. DEVELOPMENT STRATEGIES OF TRAFFIC SYSTEM
- III. ENVIRONMENTAL IMPACT ASSESSMENT AND ANTICIPATION
- IV. MODELLING OF ENVIRONMENTAL IMPACTS AND EXPOSURE
- V. TRAVELLING NEEDS, CONTROL MEASURES
- VI. OTHERS

Altogether there are over 30 titles for individual projects in the programme. Some of the projects are nation wide research and development projects, which aim at covering general gaps in knowledge or methods, and at improving the applicability of knowledge. The main parts of the projects are, however, meant to be linked to local planning and development projects.

The estimated budget of the programme is approximately 35 million FIM/year. It is mainly financed by those parties which are implementing the programme, but there is also some financing by participating municipalities and business.

The official Steering Group was appointed in October 1997. Soil and Water Ltd. was chosen to be the Co-ordinator of the programme.

Over 50 proposals for projects came in during the first call for proposals which ended in April 1997. Over 70 proposals came in and nearly 30 parties expressed their interest to participate in the programme during the second call which ended at the end of May 1997. The third call for proposals ended in January 1999, and altogether 50 proposals came in. During the years 1997 – 2001 altogether 40 research projects have been implemented. At the moment the programme has got its final research year which aim is to compile guidelines for national, regional and local level decision-makers, authorities and planners how to achieve integrated and environmentally friendly communities. Thus there are four ongoing year 2001 research projects:

- LYYLI –synthesis
- Regional Lyyli Oulu
- Regional Lyyli Turku
- City Lyyli

14. Title: R&D Projects carried out by VTT Building and Transport

WWW: <http://www.vtt.fi/rte>

Contact persons:

Project leader, see project specification

Organisation in charge:

VTT Building and Transport
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Communication Details:

See above

Description:

VTT carries out three types of activities: commercial activities, joint projects and self-financed projects. Commercial activities are performed according to direct demand from customers. Joint projects are initiated on the basis of need and typically jointly funded by VTT, companies, research financiers and other research parties. Self-financed research consists of technology-based strategic research projects aimed at developing competitiveness and acquiring knowledge and expertise to meet the future needs of customers.

On going projects can be found on the VTT Ture Project Databas, see www.vtt.fi/rte.

15. Title: R&D Projects carried out by Helsinki University of Technology, Department of Civil and Environmental Engineering

WWW: <http://www.hut.fi/Units/Civil>

Contact persons:

Project leader, see project specification

Organisation in charge:

HUT / Department of Civil and Environmental Engineering
Street address: Rakentajanaukio 4 A, 02150 ESPOO
Postal address: PL 2100, 02015 HUT
The Department office fax number is +358 9 4513758.

Communication Details:

see above

Description:

The Department engages both in basic research in technical sciences and in applied research with immediate practical utilization. The basic units for research operations are the individual laboratories. More information about their special fields and on-going projects are described in the respective laboratory web pages, which can be found at www.hut.fi/units/civil.

16. Title: R&D Projects carried out by Tampere University of Technology, Department of Civil Engineering

WWW: http://www.ce.tut.fi/index_e.html

Contact persons:

Project leader, see project specification at www

Organisation in charge:

Tampere University of Technology

Department of Civil Engineering
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Communication Details:

see above

Description:

The department of civil engineering have different kind of institutes and laboratories, and they have several ongoing research projects. Further information is available at www-sites mentioned below.

The institutes and laboratories conducting in the department of civil engineering are :

Institute of Transportation Engineering (http://www.tut.fi/liku/liku_eng.html),
Laboratory of Construction Economics (<http://www.rta.tut.fi/>),
Institute of Water and Environmental Engineering (<http://www.tut.fi/units/ymp/bio/en/index.html>),
Laboratory of Geoinformatics (http://www.ce.tut.fi/geod/index_e.html),
Laboratory of Geotechnics (http://www.ce.tut.fi/geotek/geot_eng.html),
Laboratory of Structural Mechanics (http://www.ce.tut.fi/rakstat/rakstat_eng.html),
Structural Engineering (<http://www.ce.tut.fi/trt/trt.html>) and
Wood Institute (<http://www.ce.tut.fi/puu/ptkhome.html>).

17. Title: R&D Projects carried out by University of Oulu

WWW: <http://www.oulu.fi/prene/>
<http://www.rate.oulu.fi/>

Contact persons:

Project leader, see project specification at www

Communication Details:

University of Oulu

Department of Process and Environmental Engineering
Address: P.O. Box 4300, 90014 Oulu, Finland
Tel. +358 8 5532300, +358 8 5532301
Fax +358 8 5532304

Research Unit of Construction Technology
Visiting address: Kasarmintie 4, 90014 Oulu, Finland
Postal address: P.O. Box 4400, 90014 Oulu, Finland
Tel. +358 8 5534410

Description:

Details of research projects are at the home page of **the Water recourses and environmental engineering laboratory** (<http://www.oulu.fi/poves/Povese/index.html>).

Current R&D-projects of **the Research unit of construction technology** deal with road construction and house building based on occupants' needs.
