

Support for energy and climate technology

International evaluation reports have provided proof of climate warming. Challenging objectives have been set in international climate agreements and the EU to reduce greenhouse gas emissions, increase the use of renewable sources of energy and improve energy conservation. Finland's energy and climate strategies have also responded to the objectives in international agreements. In the 2008 energy and climate strategy, research and the development of technology and innovations were regarded as key instruments to achieve climate objectives. Energy technology exports were expected to offer extensive opportunities for Finnish industry in the future.

Demand for energy technology and innovations has grown in Europe as well as emerging countries such as India and China. In the background are tighter requirements concerning emissions and efficiency, the rising cost of energy and ageing equipment and machinery. In Finland the objective is to encourage networking among developers of technology and innovations and service providers so as to create tried and tested products that will be competitive on global markets.

The Government believes that research, energy and climate technology and innovation have a key role in achieving objectives. Investments in research and the development, introduction and commercialisation of new technologies and innovations will be increased substantially in the coming years, with funds for this purpose at least doubling by 2020.

The technology industries' vision is that the energy and environment sector will be a leading industry in Finland and a global market leader in selected business areas in 2050. Turnover in the energy and environment sector is expected to rise from 32 billion euros in 2006 to 100 billion euros a year by 2020.

State budget appropriations in 2003-2011 for aid granted by the Finnish Funding Agency for Technology and Innovation (Tekes) for projects in the energy and environment sector totalled 1.9 billion

euros. Appropriations have grown at a faster pace since 2006 and amounted to 290 million euros a year in 2010 and 2011.

The main question in the audit was how effectively Tekes aid for climate and energy projects has created preconditions for achieving climate and energy objectives and promoted business in this sector.

The audit examined performance management and budget documents, international agreements, Finland's energy and climate strategy, other policy documents as well as reports, studies and evaluations of R&D programmes.

The audit focused on five Tekes aid programmes in the climate and energy sector that were considered representative: the Wood Energy Programme (1999–2003), Climtech (1999–2002), Climbus (2004–2008), Densy (2003–2007) and Biorefine (2007–2012). Climate and energy projects were selected with the help of the Tekes's project management system. Analysing this sample produced information on the volume of aid supplied by Tekes as well as changes in focuses over the past ten years. During the audit an online questionnaire was sent to 200 projects receiving business aid in the climate and energy programme.

The audit indicated that Tekes aid programmes have created preconditions for achieving climate and energy policy objectives, but the aid that has been granted by Tekes to climate and energy projects has not promoted the implementation of climate and energy policy objectives in a significant way. This is due partly to the fact that programmes receiving support from Tekes are broad in scope and extend over several years. Programmes have broad objectives that are good in themselves, such as networking and studying new areas of business on which to focus. Commercial targets in money terms have not been set to speak of, however, and so monitoring has largely been confined to qualitative objectives. Nor have clear and measurable climate and energy policy objectives been set for programmes and projects.

Tekes aid for enterprises' climate and energy projects has not resulted so far in commercial successes to any noteworthy extent. The results that have been achieved cannot be considered adequate in view of the state aid that has been applied. Of course, bringing innovations to market in the energy and climate field can take years. In evaluating results one must also consider the impacts of the recent recession and similar factors.

Finland began responding seriously to climate change and related commercial opportunities fairly late. The Kyoto Protocol was prepared in 1997. According to Tekes, companies were not eager to invest in climate and energy technology before that. Innovation activities require a long-term approach. It takes a very long time before the effects of supporting innovation activities are visible. Tekes aid for energy and climate change technology amounted to 54–64 million euros a year in 1998–2006. In 2006 it accounted for 14 per cent of total aid granted by Tekes. In 2007 this aid was substantially increased and its share rose to 25 per cent of the total. In 2009 the figure reached 35 per cent.

International climate objectives and agreements are government-oriented. In the opinion of the National Audit Office, in spite of the difficulty of the task, it is important for state aid organisations to provide incentives for companies to undertake climate and energy innovation projects.

Climate objectives are glossed over in programme objectives and are mainly of a qualitative nature. The business projects in the Wood Energy Programme appear to have succeeded in influencing the achievement of climate objectives in a measurable way. At least one clear and measurable target was set in the Wood Energy Programme: to increase the use of wood chips five-fold during the programme period. Clear and measurable climate objectives had not been set in other programmes.

Tekes conducts a follow-up three years after the end of a project, at which time it is not necessarily possible to demonstrate the commercial results of a project or judge how well objectives have been met. The follow-up thus fails to achieve its purpose. Tekes should consider lengthening the follow-up period to five years, for example. The form that Tekes uses in follow-ups is the same for all programmes. This rigid practice should be abandoned and the form should be tailored to each programme's needs. Particularly in Tekes's climate and energy programmes, impacts on greenhouse gas emissions, energy conservation and the use of renewable sources of energy should be studied in greater detail. Currently Tekes only asks about projects' environmental impacts on a very general level.

Tekes commissions ex post evaluations of the programmes it has supported. It appears that consultants' evaluations have not examined the effectiveness of Tekes's climate and energy programmes in

relation to national and international climate objectives. Another major shortcoming is that programmes' commercial success has only been assessed in broad terms, if at all.

The National Audit Office conducted a survey that covered business projects in the five climate and energy programmes that have been supported by Tekes. A full 98 per cent of projects were considered to have succeeded in full or in part, so the number of perceived failures was extremely small. This suggests that positive commercial results will accrue later on. Around 40 per cent of respondents noted that their project would have gone ahead without state aid.

According to the survey 35 per cent of projects achieved large or fairly large energy savings. Respondents reported improvements in material utilisation in 60 per cent of projects, and an equal number expected large or fairly large reductions in greenhouse gas emissions as a result of projects. Among respondents 70 per cent said that projects would increase the use of renewable sources of energy.

Tekes and the supervising ministry should perform cost-effectiveness assessments to determine whether the results achieved in climate and energy projects are in correct proportion to inputs, so that comparisons can be made between different climate policy instruments.

Climate and energy projects undertaken by companies generally result in new or improved products. According to the survey the most important benefit of participating in Tekes's climate and energy programmes was access to financial aid. In other words direct aid was considered the most important reason for participating in a programme. In 82 per cent of cases respondents viewed direct aid as a better form of support than a tax subsidy for expenditure on research and development.

When the audit was conducted the results of business projects participating in climate and energy programmes supported by Tekes fell far short of the commercial and job-creating objectives envisaged in the application stage. Positive impacts on employment in Finland were reported in 45 per cent of projects and positive impacts on employment abroad in 8 per cent of projects. According to the survey projects resulted in 314 new jobs in Finland. The cost for the state works out at 90,891 euros per job. Impacts on employment were small, however, particularly if one compares them to the ob-

jectives outlined in applications. Over 80 per cent of respondents mentioned providing work for subcontractors as the most significant indirect impact of projects and a similar number mentioned growth in companies' own research and development activities. Only 12.5 per cent of responding companies said that sales had grown during the three years following a project.

When the state grants aid for a specific purpose, it has specific objectives in mind. Aid conditions should be set to ensure that these objectives are met. In the opinion of the National Audit Office, aid conditions should be changed so that funds can be recovered if a project fails to meet the objectives that have been set for it.