

# Results Report 2005

# A total result of 2 TWh in 2005

In 2005 Enova entered into agreements with 186 projects that together provided an energy result of 2 TWh. The result is almost evenly divided between projects providing higher energy production and projects that reduce energy use. The energy production consists of 585 GWh in new wind power and 409 GWh in new heat energy in 2005. Overall for the period 2001 to 2005, Enova contracted for energy results of well over 6.6 TWh. Enova is doing well in relation to the objectives set for its activities.

Most of Enova's projects will have an environmental impact, and it is important to have good estimates in this regard. Using different assumptions we can estimate a range of between 0.7 and 0.8 million tonnes for the CO<sub>2</sub> impact for 2005. If we look at the period 2001-2005, the reduction will be 2.2-2.5 million tonnes CO<sub>2</sub>, this corresponds to about 4.5 per cent of Norwegian CO<sub>2</sub> emissions in 2004.

Disregarding Enova's operating budget, 88% (NOK 657 million) of the Energy Fund's grants in 2005 was spent on programmes for energy use and energy production. Of these funds, 12% (NOK 86 million) was allocated to the areas information and communication (including the campaign aimed at children and young people), analysis and international activities. For 2005 the operating budget amounted to NOK 36 million excluding value added tax. Enova manages a project portfolio that at 31 December 2005 consisted of in all 2,035 projects totalling NOK 2,891 million. At year-end there remained 962 active projects representing a residual commitment of in all NOK 1,334 million.

In 2005 Enova was active in terms of public outreach and participated in trade fairs through Enova's help line. Various brochures and reports were published and distributed. Part Two of the book involved in Enova's campaign aimed at children and young people, The Rainmakers, was completed. Two annual user surveys measuring awareness, knowledge and attitude to the Rainmakers have been conducted since the programme was launched in November 2003. Awareness is now at 40 per cent in the entire target group, and at 52 per cent for those between 9 and 12 years of age. We are also pleased that more and more young people know about the Rainmaker Club. We see a clear connection between Rainmakers, knowledge level and behaviour.

Education and training are an important part of Enova's work for achieving its targets and objectives and is therefore an important part of the programme work in all areas. During 2005, several courses were held, wholly or partly under the aegis of Enova. In the course of 2005 Enova served as adviser to the Ministry of Petroleum and Energy (MPE) in connection with cases relating to Enova's ambit. Enova enjoys regular and good contact with inter alia the Norwegian Water Resources and Energy Directorate, the Research Council of Norway, Innovation Norway and Statnett. Enova has participated in international fora within its field of activity, and been active in arenas where it was strategically correct to participate.

Enova also manages some non-Energy Fund assignments. In 2005 this pertained to the competitive bidding system for the final use of natural gas in industry and transport through the establishment of LNG receiving terminals, the EU programme Intelligent Energy Europe (EIE) and the IEA programme Energy Technology Data Exchange (ETDE).

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# 1 Background

**Enova's vision is to be a driving force for the energy solutions of the future. The principal tool Enova has at its disposal is the management of the money from the Energy Fund. An agreement has been made between Enova and the Ministry of Petroleum and Energy (the MPE) on the management of the Energy Fund. By the end of 2010 the money in the Energy Fund shall contribute to at least 12 TWh in energy savings and new green energy. This results report provides an overview of Enova's activities and results, including activities funded outside the Energy Fund. The results report for 2005 is the fourth results report that Enova has prepared since its start-up in 2001. Over time there has been an evolution in the way results are presented; this is a natural result of the experiences gained. This year's report has by and large the same structure as last year's.**

The agreement with the MPE stipulates requirements for reporting Enova's results. The results to be reported shall be contracted for or realised. It is an objective to be able to report more in the way of realised results. Several years may elapse from when a project is completed until there is sufficient data to calculate realised results. Therefore, a decision has been made to introduce 'final reported results' as a new term. 'Final reported results' are based on the final report that all projects supported by Enova are obliged to submit at the end of the project. It is important to look at final reported results because there will be updated information at the conclusion of the project. Consequently, the results figure will be a better estimate than the contracted for results. In this report we are reporting final reported energy results for the first time.

Energy results are reported for the year in which they are contracted for. Since there may be changes in the project portfolio, the figures in this results report will not necessarily be identical to the figures in previous results reports. Some projects were interrupted and cancelled, others may acquire a different scope than originally envisaged in the contract with Enova. Changes in energy results are explained and discussed in the results report.

Enova's tool for ensuring a uniform method for evaluating support for project applications is referred to as the 'common frame of reference'. The work on the common frame of reference was continued in 2005. The common frame of reference shall ensure that the requirements for project follow-up and reporting made in Enova's agreement with the MPE are satisfied. The method that has been worked out shall ensure that the triggering effect requirement is satisfied at the project level so that the aggregated results show the real result of Enova's work. In 2005 Enova developed and adopted an application for investment analyses; use of this tool ensures a uniform calculation of grant funds and improved documentation, which is important in relation to the application evaluation procedure. The application for investment analyses will help ensure the principle of triggering effect.

Most of Enova's projects will have an impact on the environment. This year's report estimates the effects on CO<sub>2</sub> emissions. Enova will make a more thorough analysis of the environmental effects of Enova's product portfolio and the assumptions underlying the calculations will be evaluated more carefully.

In the next section there is a glossary of terms used.

## 2 Glossary

### **Other renewable energy:**

In this publication, by 'other renewable' we mean renewable energy that is not wind power or heat energy.

### **Energy Fund:**

Support for increased production of renewable energy, increased access to heat energy and reduced energy use is funded through the Norwegian Government's Energy Fund. The Energy Fund is funded by a levy on the tariff for power drawn from the distribution network, from 1 July 2004 in the sum of 1 øre per kWh. The Energy Fund also funds the operation of Enova. Its background is in Section 4-4 of the Act to Amend Act No. 60 of 29 June 1990 relating to Production, Conversion, Sale and Distribution of Energy etc. (the Energy Act), see also Proposition No. 35 to the Odelsting (2000-2001) and Recommendation to the Odelsting No. 59 (2000-2001). The Statutes of the Energy Fund are laid down by the MPE.

### **Energy conversion:**

The contract between the MPE and Enova says that the Energy Fund shall be used to promote an environmentally friendly conversion of energy use and energy production. This means that Enova is to encourage energy use that is less dependent on a single energy source and switching between non-renewable to renewable energy sources.

### **Energy results:**

One of the Energy Fund's prime objectives is to contribute to energy results, either through reduced energy use or through increased production of green energy. This is an important part of Enova's agreement with the MPE. In this agreement two different terms related to the energy results are employed, contracted for and realised. Enova has introduced a third result concept, final reported energy results, see separate definitions for the various result terms.

### **Renewable energy:**

Enova uses the same definition of 'renewable energy sources' as the EU's Renewables Directive (2001/77/EC). The directive defines renewable energy sources as renewable non-fossil energy sources: wind, solar, geothermal, wave, tidal, hydropower, biomass, land-fill gas, sewage-treatment plant gas and biogas. Biomass is further defined as biodegradable fractions of products, waste and residues from agriculture (including vegetal and animal substances), forestry and related industries, as well as biodegradable fractions of industrial and municipal waste.

### **Free-riders:**

Enova's definition of a free-rider is someone who receives support for projects that the recipient would have carried out in any case; that is, cases where the Energy Fund's support was not necessary to trigger the project. See also the definition of triggering effect.

### **Contracted for result:**

Enova's results shall be aggregated up from the results of the individual projects that receive support from Enova. Allocated support in the projects is related to expected energy results. This energy result is incorporated into the contractual basis between the support recipient and Enova. If the energy result is not achieved, this will lead to a corresponding reduction in the support amount. Contracted for energy results are realised energy results expected on the date specified in the contract.

**Cost-efficiency:**

One of the purposes of the establishment of Enova was to achieve a more cost-efficient commitment to renewable energy and effective energy use. Enova prioritises projects in accordance with the size of the support requirement relative to the energy result (NOK/kWh), given the project's lifetime and the targets set in the agreement with the MPE. The projects that apply for support from Enova are evaluated in three stages. First we evaluate the energy technology content of the project, thereafter the project economics and need for support are considered. Finally Enova's costs related to the project (support) are assessed against the energy result (kWh). Projects that deliver inadequate energy results relative to the support amount will not succeed in the competition for the funds.

**Lifetime:**

A central point related to new production of energy and reduced energy use is how long we will be enjoying the results. Here we may distinguish between technical and economic lifetime. Technical lifetime is related to how long the equipment can remain in use given normal maintenance, whereas economic lifetime means how much time elapses before it becomes more profitable to replace the equipment with new and better technology. Enova bases its lifetime calculations on economic lifetime. This is also reflected in Enova's investment analysis. In addition to the project's lifetime being an important parameter in the evaluation of the support requirement, it also expresses how long we will enjoy the energy result provided by the project. The project's lifetime multiplied by annual energy results (year\*kWh) will express the project's total energy results over the lifetime. Correspondingly, the lifetime energy cost becomes (NOK/(year\*kWh)).

**Programme:**

Enova has chosen to organise its measures by 'programmes'. A programme is an instrumentality directed at one or more specific target groups, with stipulated deadlines and application criteria. This form of organisation was chosen in order to target the use of instrumentalities and so as better to prioritise between relatively similar projects.

**Programme coordinator:**

Enova outsources some of the introductory processing of projects to external players in order to free up internal capacity and ensure rapid decisions. The external processors are called Enova's programme coordinators.

**Realised result:**

In contradistinction to contracted for and final reported energy results, realised energy results are not based on expectations, and in principle are not estimates. Realised energy results shall be based on a review or audit of what the projects have actually achieved in the way of energy results. In practice, it may be a challenge to set a figure to realised results, and the challenges may be different for energy production and energy use. It often takes a long time before the projects are completed and realised results can be reported.

**Final reported results:**

All projects with energy results deliver final reports at the project's completion date. Final reported energy results are an updated prognosis of realised results at the project's completion date.

**Triggering effect:**

As a steward of public funds, it is important for Enova to ensure that the monies we control are optimally employed. This principle is also enshrined in the agreement between Enova and the MPE. The Energy Fund's grants shall contribute to the realisation of projects that would not otherwise be carried out. Enova's use of funds shall trigger projects that contribute to reduced energy use or increased energy production. Projects with a low cost per produced or reduced kWh will often be profitable on their own and therefore ought not to receive support from the Energy Fund. Support is also considered to be triggering if it accelerates a project, or leads to a project being on a larger scale than it would otherwise have been.

## 3 Aggregated results

### 3.1 Energy results

In 2005 energy results related to 186 projects were contracted for, yielding an overall result for 2005 of 2 TWh. Of this, results related to energy production comprised 1 TWh, of which 585 GWh was new wind power and 409 GWh new heat energy. In addition 18 GWh came from the programme for new technology. Reduced energy use makes up 1 TWh, corresponding to almost half of the total results. In this results report Enova is introducing a new results term, 'final reported energy results'.

#### Aggregated results 2001 – 2005

Overall for the period 2001 to 2005, Enova contracted for energy results of well over 6.6 TWh. The result is composed of 2.8 TWh of reduced energy use, 1.6 TWh in increased production of wind power, 2.3 TWh of increased access to heat energy and 54 GWh from new technology.

**Table 1: Aggregated contracted for energy results GWh (2001-2005)**

	2001	2002	2003	2004	2005	Total
Use of energy	372	330 <sup>1</sup>	410	645	999	2 756
Wind	120	80	124	650	585	1 559
<i>-of which transitional scheme<sup>2</sup></i>				116	403	519
Heat	328	197	825	518	409	2 277
<i>-of which biofuel processing</i>		15	391	255	62	723
New technology		0.6		35	18	54
<b>TOTAL</b>	<b>820</b>	<b>608</b>	<b>1 359</b>	<b>1 848</b>	<b>2 011</b>	<b>6 646</b>

In the heat area, projects that have received support for the production of biofuel are reported separately. The programme for processing biofuel was established to develop the value chain in bio-energy. A need was identified for greater production of biofuel so as to ensure more regular access to fuel at a competitive price. However, the paramount reporting vis-à-vis Enova's main target for heat energy, 4 TWh, shall not include energy results from the processing of biofuel that has received support elsewhere in the value chain. Enova will consider this issue in greater detail in 2006. Reported energy results may therefore be reduced in relation to the result that emerges from the analysis of the biofuel processing projects.

Findings made through evaluations of Enova's results reporting, areas and programmes are implemented when they provide a more correct picture of the results achieved. In addition, corrections are made on an ongoing basis for all interrupted and cancelled projects.

#### Final reported energy results

In 2005 there was a process related to the definition and measurement of energy results resulting in Enova introducing the results term 'final reported kWh'. Final reported energy results are an updated forecast of realised results at the project's completion date. The projects report energy results via the final reports for the projects to Enova. At the end of 2005 Enova had 73 final reported projects with energy results of 614 GWh. This means that final-reported energy results were 21 GWh above what was contracted for in the projects concerned.

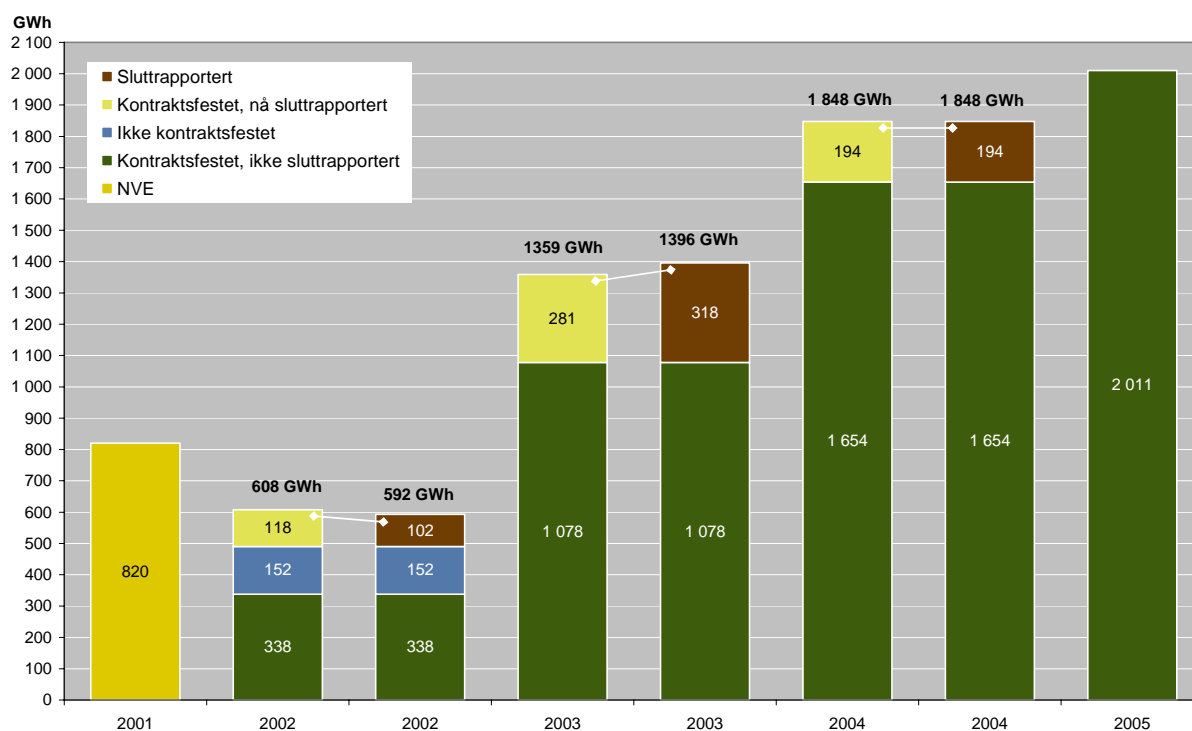
<sup>1</sup> The figures include 152 GWh that is not contract-regulated.

<sup>2</sup> Wind projects that have received support within the transitional scheme, that is, the projects have committed themselves to repay the support if they enter a planned electricity certificate market. The projects have received up to 25% support.

**Table 2: Aggregated final reported energy results GWh (2001-2005)**

	2001	2002	2003	2004	2005	TOTAL
Energy use	0	42	68	6	0	116
Wind	0	0	39	115	0	154
Heat	0	60	210	73	0	343
Renewable	0	0.7	0	0	0	0.7
<b>TOTAL</b>	<b>0</b>	<b>102</b>	<b>318</b>	<b>194</b>	<b>0</b>	<b>614</b>

**Figure 1: Composition of energy results in the reporting period (2001-2005)**



<Key: Finally reported, Contracted for, now finally reported, Not contracted for, Contracted for, not finally reported, Norwegian Water Resources and Energy Directorate>

Under the agreement with the MPE, Enova is to report the results of its activity from 2001 to 2010. The Energy Fund was established in 2002 and results from 2001 have been achieved under the aegis of the Norwegian Water Resources and Energy Directorate (NVE). In order to make the results from 2001 comparable with the Energy Fund's results, an external audit of the 2003 figures was done. Enova is not following up the 2001 projects with further audits. Correspondingly, in 2002 energy results were reported in relation to non-contracted for results. These were also subjected to external audit in 2004, and Enova will not audit these projects. The reason for reporting the projects in relation to the energy target is that the results from corresponding projects were contracted for in 2003. The figure shows a logical trend in which the share of final reported projects is larger for the first years. Since few of the projects from 2005 have been completed, no final reports are available as yet.

In an appendix to this report there is a detailed review of methodologies and procedures for reporting energy results.



## 3.2 Funding and use of the Energy Fund

Total available funds in 2005 amounted to NOK 837 million, of which NOK 788 million has been allocated. Recommendations for decisions were made in a total of 367 cases, of which 186 involved energy results.

Enova manages a project portfolio that at 31 December 2005 consisted of in all 2,035 projects totalling NOK 2,891 million. At year-end there remained 962 active projects with a residual commitment of in all NOK 1,334 million.

**Table 3: Energy results in relation to use of funds in 2005**

	No. of projects <sup>3</sup>	GWh	NOK million <sup>4</sup>
Energy use	165 (145)	999	204
Homes, buildings and outdoor equipment (BBA)	116 (103)	576	131
Industry	49 (42)	422	73
Wind power	3 (3)	585	287
Heat energy	41 (33)	409	143
New technology	11 (5)	18	24
<b>TOTAL</b>	<b>220 (186)</b>	<b>2011</b>	<b>657</b>

If we disregard Enova's operating budget, 88.4% (NOK 657 million) of the funds in 2005 were spent on programmes in energy use and production. 11.6% (NOK 86 million) of this money was allocated for the areas information and communication (including campaigns aimed at children and young people), analysis and international activities. Enova invoices the Energy Fund for its management of the Fund. For 2005 the administration fee was NOK 36.1 million excluding value-added tax; including VAT the administration fee was NOK 45 million.

**Table 4: Funds allocated to other missions**

	No. of cases	NOK million
Information and communication	65	66
International activities	50	14
Analyses	19	6
Other matters	12	0.3
Administration fee Enova (incl. VAT)	1	45
<b>TOTAL</b>	<b>147</b>	<b>131</b>

The Energy Fund is funded by a levy on the tariff for consumption of electrical power drawn from the distribution network, currently 1 øre/kWh from 1 July 2004. In addition, the Fund earns interest that in 2005 totalled NOK 28.8 million. If projects are not implemented as envisaged, the Fund recovers the money for reallocation to new projects. The Energy Fund received no appropriations from the state budget in 2005. According to the letter of allocation for 2006, the Energy Fund is expected to receive around NOK 689 million from the levy on the net tariff in 2006.

## 3.3 Lifetimes and support amounts for the various result areas

The Energy Fund's money shall be employed cost-effectively. At the same time, the Fund shall attain specific paramount targets for energy results in the areas of wind power and heat energy. Cost-effectiveness involves a maximisation of total energy results per krone spent over the measures' total lifetime. The longer lifetime a project has, the cheaper the measure will be, seen over its lifetime.

<sup>3</sup> In parentheses, number of projects with energy results.

<sup>4</sup> Total funds used per area, including the administration costs.

**Table 5: Lifetimes and cost-efficiency<sup>5</sup>**

		2003		2004		2005	
	Lifetimes	NOK/kWh	NOK/kWh over the lifetime	NOK/kWh	NOK/kWh over the lifetime	NOK/kWh	NOK/kWh over the lifetime
Energy use	10 years	0.24	0.024	0.22	0.022	0.20	0.020
Wind power	20 years	0.20	0.010	0.38	0.019	0.49	0.025
Heat energy	20 years	0.10	0.005	0.21	0.011	0.34	0.017
		<i>0.19</i>	<i>0.009</i>	<i>0.41</i>	<i>0.021</i>	<i>0.40</i>	<i>0.020</i>
		<i>0.03</i>	<i>0.002</i>	<i>0.06</i>	<i>0.003</i>	<i>0.03</i>	<i>0.001</i>
<b>TOTAL</b>		<b>01.16</b>	<b>0.011</b>	<b>0.30</b>	<b>0.020</b>	<b>0.32</b>	<b>0.022</b>

The lifetimes in Table 5 are estimates of average economic lifetimes for projects within the various areas. It is important to note that indirect costs related to for example marketing, information and analyses in the individual area are included in the calculation.

Measured in allocated support per kWh, the costs related to wind power and heat energy projects have been rising up to today. For the heat area, the trend is due among other things to an investment in 2003 and 2004 in facilities for processing of bioenergy. This kind of project has yielded very high cost-effectiveness. In order to elucidate the real cost-effectiveness of heat energy, it is necessary to separate out the projects for processing. The trend for heat energy, taken individually, can be explained in terms of reduced support for biofuel processing, and of the fact that in 2005 Enova has granted support to start-ups of district heating plants. This involves high levels of initial investment and thereby yields lower energy results per krone of support. For the wind area, the maximum support share was increased from the original 10 per cent in 2003 to 25 per cent of approved investment costs in 2004. This was done in order to counterbalance a loss of revenue caused by the fact that Norwegian wind power producers are no longer allowed to export green certificates to the Netherlands.

It is important to be aware that the figures in the table do not necessarily provide an unambiguous picture of the measures' cost-effectiveness. External constraints and the supply of new projects every year will be important in determining changes in the level of allocated support per kWh. Support from the Energy Fund is intended to be a trigger for the implementation of the project. This means that Enova cannot automatically choose to support those projects that yield the highest energy results per support krone, as these will often be profitable to implement even without support. Moreover, Enova is also committed by the agreement with the MPE, which defines targets for wind power and heat energy.

### 3.4 The environmental impact of Enova's projects

**Most of Enova's projects will have an impact on the environment. Estimates of environmental impacts may provide important knowledge about the characteristics of various project categories. When a project leads to changed use or production of energy, this will change local and global emissions. Cuts in energy use reduce the need for production of energy. Increased production of renewable energy reduces the need for other energy production. Conversion to renewable energy sources such as biofuel yields a favourable environmental impact.**

Enova's projects will affect the environment both locally and globally through changes in the emissions of for example NO<sub>x</sub>, CO<sub>2</sub> and methane. Enova wishes to make an evaluation of how the emission impacts of Enova's project portfolio can best be quantified. Enova has many projects with different characteristics. Each project category will have its unique characteristics and associated emission impacts. This results report looks particularly at the effect of Enova's projects on emissions of CO<sub>2</sub>.

<sup>5</sup> The figures in the table show cost-effectiveness at the time of the decision. In the area of thermal energy, however, two lines are shown in italics. Here figures are used from the project portfolio at the date of the 2005 results report.

The Norwegian Pollution Control Authority (SFT) has prepared an analysis: "Reduction of climate gas emissions in Norway" (2005). The analysis has a national perspective on the emissions because the purpose is to see how Norway is to fulfil its Kyoto obligations. The SFT's assumptions are used as a basis for estimating the impact of Enova's projects on Norwegian CO<sub>2</sub> emissions. In this report it is assumed that measures that reduce the use of electricity will yield an emissions reduction corresponding to emissions from production of conventional gas-fired power, namely 367 kg CO<sub>2</sub>/MWh<sup>6</sup>.

Many of Enova's projects lead to reduced consumption of both electricity and fuel oil, and in some cases also other energy-carriers. The share of fuel oil used in different sectors is not fixed over time, but varies with, among other things, energy prices. For example, from 2004 to 2005<sup>7</sup> the sale of fuel oil in Norway was reduced by 25 per cent. Emissions of CO<sub>2</sub> from the use of fuel oil depend on the efficiency of the equipment used, and this efficiency will generally vary between different sectors depending among other things on the efficiency of the equipment<sup>8</sup>. The Norwegian Petroleum Institute gives CO<sub>2</sub> emission figures for the use of fuel oil as follows: the industrial sector 331 kg CO<sub>2</sub>/MWh, other sectors 378 kg CO<sub>2</sub>/MWh.

Enova's energy results for 2005 are 2 TWh, aggregated for the period 2001 to 2005 the result is 6.6 TWh. The change in CO<sub>2</sub> emissions in consequence of this energy result depends on what consequences this has for other energy production. Reduced energy use may, for example, lead to reduced use of fuel oil in homes or in industry. Increased production of wind power may lead to cancelling or postponing the building of gas-fired power stations. Changes in emissions of CO<sub>2</sub> depend on how large a proportion of Enova's results replace electricity, how large a proportion replace fuel oil and in which sectors it is reduced. The emission coefficients for various sources show that reduced use of fuel oil outside the industrial sector account for the greatest impacts on emission; correspondingly the effect will be least if we assume that the entire result leads to less use of fuel oil by industry.

With different shares of fuel oil and electricity we can estimate a range for the CO<sub>2</sub> effect for 2005 of between 0.7 and 0.8 million tonnes CO<sub>2</sub>. If we look at the period 2001-2005, the reduction will be 2.2-2.5 million tonnes CO<sub>2</sub>, depending on the share of fuel oil and the sector. By way of comparison, Norwegian emissions of climate gases measured in CO<sub>2</sub> equivalents in 2004 were 55.5 million tonnes. The aggregated CO<sub>2</sub> effect of Enova's projects accounts for up to 4.5 per cent of this.

Table 6 provides an overview of the emission coefficients related to oil, gas and coal in various applications. Given the individual emission coefficient, the emission impact of Enova's projects has also been calculated, provided that the entire energy result provides an emission impact equal to this emission coefficient. An estimate of the impact if the entire result led to reduced production of coal power has also been included for purposes of illustration.

**Table 6: Overview of emission coefficients and estimates of the emission impact**

	Emissions coefficient kg CO <sub>2</sub> /MWh	Emissions effect 2005	Emissions effect 2001- 2005
Fuel oil in the industrial sector <sup>9</sup>	331	0.7	2.2
Conventional gas-fired power stations	367	0.7	2.4
Fuel oil in non-industrial sectors	378	0.8	2.5
Coal-fired power stations	950	1.9	6.3

Sources: SFT, NPI, US Department of Energy

<sup>6</sup> Emissions from conventional gas-fired power stations depend on inter alia technology and degree of thermal exploitation. This estimate is obtained from one of the documents underlying the SFT's analysis: National Climate Action Analysis, Civitas (2005).  
<sup>7</sup> Source: Statistics Norway.

<sup>8</sup> In general, the emission of CO<sub>2</sub> from energy production based on fossil fuels will depend on the carbon content of the energy carrier and the efficiency of the combustion process. Energy generation from fossil fuels can consist of different proportions of electricity and heat. In general the efficiency may be higher with a high proportion of heat production.

<sup>9</sup> The reason for the relatively low emission coefficient is the high efficiency obtained when it is heat that is produced and not electricity.

## 3.5 Funding and allocation of funds – other tasks

**Enova manages monies outside of the Energy Fund through appropriations and authorisations made available in 2005 for natural gas, the EU programme EIE and the IEA programme ETDE. This section deals with funding and allocation of these funds. Chapter 6 provides a broader review of these allocations.**

The biggest management task outside the Energy Fund is natural gas, where the monies are intended to realise the Government's objectives of increased domestic use of environmentally friendly natural gas. Available funds in 2005 were NOK 34.1 million, of which NOK 3.5 million was earmarked for expertise centres for end-user technology in the Haugalandet region (around Haugesund in SW Norway). In the course of the year, funds were recovered from interrupted/cancelled projects in the order of magnitude of NOK 12.5 million. In all NOK 44.9 million was allocated to natural gas in 2005, which means that NOK 18.3 million of the commitment authorisation of NOK 20 million has been spent.

Norway's participation in the IEA's multinational information programme "Energy Technology Data Exchange" (ETDE) was funded by NOK 1.7 million via the state budget. All of this was spent in 2005. Correspondingly the MPE participates in the funding of a selection of projects within the EU programme "Intelligent Energy – Europe" (EIE), where the funds granted for 2005 amounted to NOK 1.5 million. EIE projects that fall within the framework for the use of the Energy Fund's money receive support from the Energy Fund. In 2005 all EIE projects were supported via the Energy Fund. A total of NOK 6.1 million was allocated to the EIE in 2005.

## 4 Results from wind power, heat energy, new technology and energy use

### 4.1 Wind power

In 2005 investment support of NOK 287 million was granted to three projects with contracted for energy results of 585 GWh. There was only a single application round in 2005, resulting in five applications. Two projects were commenced, with the maximum 25 per cent investment support. These were Bessakerfjellet Wind Park and Ytre Vikna Wind Park. The third project, Smøla Wind Park Stage 2, had been allocated money in a previous application round and is being supported within the grant regime with the maximum 10 per cent investment support. For the wind area as a whole, energy results of 1.6 TWh have been achieved.

Table 7: Contracted for energy results wind power GWh (2001-2005)

2001	2002	2003	2004	2005	Total
120	80	124	650	585	1 559

The most imposing barrier to wind power in Norway is the high costs relative to the long-term price of power. In addition, there are considerable challenges related to environmental and land-use conflicts, lack of grid transmission capacity, access to capital and operational experience in extreme weather conditions.

The development of wind power in Norway is facing several challenges. Internationally, the wind power industry has seen consolidation, resulting in fewer but bigger industrial players. In addition, 2005 was marked by mass production of windmills in the 1-2 MW size range thanks to increased investment in wind power in the big markets, including the USA. Higher steel prices in 2005 have affected supplier prices. The increase in steel prices, the consolidation of the industry plus the growth in demand in big markets have had an effect on the Norwegian market too, for example in longer delivery times. The previously expected growth in the size of onshore turbines also seems to have slowed down somewhat. Traditional big markets such as Germany, Spain, Denmark, the Netherlands and the USA are concentrating efforts on offshore wind power. Norwegian engineers are also working vigorously to develop offshore wind technology adapted to deep-sea areas; these trends mean that Enova is expecting the capital costs of wind power to rise in the future.

Investment support, granted in a maximum support proportion of 25 per cent, is allocated with an option of participating in a possible future electricity certificate market if the producer repays the support from the Energy Fund. The postponement of the establishment of the electricity certificate market was the main reason why Enova continued the 2004 investment support scheme in 2005. The letter of 26 January 2006 from the Minister of Petroleum and Energy to the Storting states that the joint Swedo-Norwegian electricity certificate market will not be starting up on 1 January 2007 as planned.

### 4.2 Heat energy

In 2005 Enova increased its commitment to heat energy. The contracted for energy result was 409 GWh, divided between 33 projects with total support amounts of about NOK 142 million. Overall for the period 2001 – 2005 the energy result is 2.3 TWh, including the projects for processing of biofuel. The energy result without the processing projects is 1.6 TWh. In 2005 the heat programme was changed

from separate production and distribution programmes to a programme that embraces both district heating schemes and local heat systems. The programme “Processing of biofuel” was continued, with a lower level of ambition.

**Table 8: Contracted for energy results heat energy GWh (2001-2005)**

	2001	2002	2003	2004	2005	Total
Heat energy	328	197	825	518	409	2 277
<i>-of which biofuel processing</i>		15	391	255	62	723

Enova’s main objective in the area of heat is to meet the national target of at least 4 TWh more water-borne heat based on renewable energy sources by 2010. Enova wishes to help ensure that heat is produced and distributed as efficiently as possible. This should be done by encouraging the construction of energy-efficient and cost-effective heating plants and distribution systems, and by developing value chains for extraction, transport and processing of biofuel.

The most important barrier to development of district heating in Norway is the high and long-term initial investment to facilitate a future customer base. This means that the facilities will have low income compared to the costs in the first years of operation.

This applies also in part to smaller local heating systems. In addition, the access to low-processed fuels such as waste and woodchips is a challenge. In the light of the potential assessments in the heat study of 2003, Enova is particularly worried about the low level of activity related to energy recovery from waste. An unharmonised tax structure for waste treatment in Norway and Sweden is leading to a considerable volume of waste being exported to Sweden. Enova is aware that there will be a need to build considerable new capacity in existing and new energy recovery plants for waste if we are to attain the target of banning all disposal of degradable waste in landfills from 2009 in the most expedient manner. Without better framework conditions for energy recovery from waste, it will be a challenge to implement the ban on disposal of degradable waste at landfills and to reach the target of 4 TWh by 2010.

In order to contribute to the development of an efficient and competitive heat market, Enova has maintained its focus on the value chain through an audit of the heat programmes. The audit led to several sub-programmes being combined into a single heat programme. This was launched in September 2005, with the first application deadline 15 October. In addition, Enova has extended the target group for the heat programme through inclusion of support for conversion of smaller local heating systems to biofuel and heat pumps. Heat energy supplies in the form of cooling are also covered by the programme. The new programme does not contain guidelines for maximum support share and minimum energy benefit per support krone. This was done in order to contribute to increased competition for available funds, and to avoid leading criteria for applying for support.

Since 2002 Enova has prioritised support to new district heating schemes and extensions of existing plants. Establishment of new district heating schemes has been challenging, but 2005 was a good year for this. Among other things a decision was made to build district heating schemes in Hønefoss and Moss, whereas at Stryn and Lørenskog there remain only a few clarifications relating to choice of site before a final decision can be taken.

Eastern Norway is a region with good conditions for the creation of competitive projects and markets. The access to raw materials is good, the customer basis for development of district heating is favourable, and there are several professional project developers and investors in the region. There is also considerable activity in the two Agder counties, the Bergen region and urban areas of Central and North Norway.

Local governments (municipalities) have an important role in facilitating energy conversion. Their attitudes and ability to bring this about are decisive to the establishment of new energy centres and infrastructure for district heating and smaller local heat systems. Enova has therefore held courses for the municipalities and their advisers so as to enhance the municipalities’ expertise in this market area generally and in bioenergy in

particular. Natural gas for heating is in the process of becoming competitive with biofuel. Enova will analyse this competition situation in 2006. A broad analysis of the heat area will also be undertaken in 2006.

The forestry and wood-processing industry has continued its commitment to the heat energy market. Enova considers this to be of great importance, both with a view to raw material and logistics expertise and with regard to supplying projects with capital supply.

## 4.3 New technology

**In 2005 Enova has changed its programme for new technology so as also to cover projects in energy efficiency enhancement, in addition to renewable energy production. In 2005 eleven projects were given support, totalling NOK 23.6 million. This includes a new pilot scheme for tidal power and a joint commitment together with the Research Council of Norway. In all Enova received 34 applications in the programme area in 2005, of which 18 are related to the joint commitment with the Research Council of Norway.**

The national target of achieving 12 TWh saved or produced environmentally friendly energy by 2010 includes an objective to the effect that the Energy Fund's monies should also be used actively to promote innovation chains. This shall be done via the demonstration and introduction of new technology for efficient energy solutions and green energy production that supports the objectives for the energy conversion in the long term.

In 2005, as a consequence of its extended mandate, Enova developed a technology-neutral programme for the introduction of new technology, and has implemented a pilot scheme together with the Research Council of Norway. The new programme provides a considerable extension of the scope of the applications. The revised programme was entitled "New technology", and a major difference from before is that it is open for support of the introduction of technology regardless of energy carrier. This is a continuation and extension of the previous programme for renewable energy.

Enova will use the experiences from the programme changes in 2005 as a basis for further effort to help create a more integrated set of tools for developing tomorrow's solutions for renewable energy production and reduced energy use.

## 4.4 Energy use

One of Enova's paramount objectives is to reduce the growth in energy consumption more than would be possible if the markets were left to themselves. In 2005 a total of NOK 204 million was granted to projects designed to reduce energy use. Contracted for energy results are 999 GWh. The energy result is divided between 422 GWh in reduced energy use in Norwegian industry and around 576 GWh in reduced energy use in buildings and outdoor equipment. In the period 2001-2005 Enova contracted for energy results of 2.8 TWh in reduced energy use.

All the programmes related to buildings, outdoor equipment, industry, education and training are intended to help provide documented energy savings within their areas. Table 9 provides an overview of programmes in energy use and how contracted for energy results and funds are broken down among the individual sub-programmes:

**Table 9: Energy results and use of funds in the area of energy use in 2005**

Areas/programme	GWh	NOK million
Energy use in commercial buildings	285	70
Energy use in outdoor equipment	110	26
Energy use in homes	15	6
Energy use in new construction projects	166	30
Energy use in industry	422	73
<b>TOTAL</b>	<b>999</b>	<b>204</b>

## Energy use in homes, buildings and outdoor equipment

In order to achieve better communication with the market players in the homes, buildings and outdoor equipment areas (BBA), in 2005 Enova changed the programme structure in these areas from several sub-programmes to a single overall programme. The idea was to make it simpler for the players, by having everyone wanting to apply for support for their projects deal only with a single programme. Projects will often consist both of elements in new construction and measures in existing buildings that can be united in a single project in an application. By means of this change Enova hopes to achieve greater flexibility as regards use of resources in the market area. The target group for the programme is people who take decisions and make investments in projects with energy targets. Advisers, architects, contractors, manufacturers and suppliers of goods serve as driving forces for the development and implementation of these projects.

Between 2004 and 2005 the energy result in the area increased from 290 to 576 GWh. This considerable increase may be explained by, among other things, the market having become steadily more familiar with the solutions that Enova offers. Long-term marketing work has yielded results, particularly in new construction and electricity used for transportation purposes. New construction was studied by Enova in 2003 and followed up with active marketing work, yielding good results in 2005. Enova has signed contracts with players in transportation (stationary energy for transportation companies), which is a new market area for Enova. The Norwegian National Rail Administration has been a key source of inspiration for NSB (Norwegian State Railways) and Oslo Sporveier (the Oslo public transport company) beginning the long process of developing energy projects. In the area of existing buildings, in both public and private ownership, the activity level is high and stable, but a rather smaller growth rate in this area was registered between 2004 and 2005 than for the area of new construction and outdoor equipment.

Enova refined its market strategy in 2005 and will become more proactive with an increased focus on big customers via energy agreements. Activities such as energy statistics, networking, campaigns and trade fair participation are considered strategically important. Increased focus on model projects is an important part of the long-term investment in more energy-efficient new buildings.

The first half of 2005 yielded good results for the area. Enova has found that a sharper focus on, and support for investment has created great interest among market players. The conversion began in the summer of 2004 and has resulted in increased market interest in 2005.

## Industry

Enova is working to boost the competitiveness of Norwegian industry through environmentally friendly and efficient energy use. In the course of 2005 Enova has extended its main programme oriented towards Norwegian onshore industry. Via the programme "Reduced energy use – industry", all companies that have projects with total potential energy results of more than 0.5 GWh can apply for investment support. Support is granted to energy-efficient solutions, measures for energy recovery and conversion to renewable energy sources.



Enova emphasises incorporating typical energy management activities into projects, which means that the projects are supported by the company's management, and that the investment is evaluated in relation to other relevant energy-related investment in the company or group of companies. In order to achieve these effects in the optimum manner, it will be an advantage to sign bigger contracts whenever possible. It will be advantageous to sign a contract with a network of companies, for example the group of companies, rather than with the individual firm. In addition to achieving greater aggregated results, the companies and external advisers will enjoy useful collaboration and exchange of experience. Another way of achieving economies of scale is to combine a company's smaller projects into a single big project.

Enova wishes to have a fruitful dialogue with the various industry organisations. It enjoys close market contacts with industrial players, and among other things collaborates with industrial advisers via an annual adviser seminar.

In order to learn more about the work previously done in industry, in 2005 Enova undertook an evaluation of the Industry Network's Advisory Service in the period 1996 – 2002. The evaluation showed, for example, that energy management, energy follow-up systems and energy conservation analyses are important elements for increasing awareness of energy use, and are often a precondition for achieving smart energy solutions. Enova is therefore working to strengthen these activities, in addition to emphasising them as part of the investment projects that it grants support to.

Enova's extended programme for new technology is also regarded as being an important measure in the industrial sector.

# 5 Other activities

## 5.1 Information and communication

**Interest in energy saving rose considerably in 2005. Not since the energy crisis in the spring of 2003 has interest been so keen. During the year, Enova was active in promoting its activities in the media and participated in trade fairs. Various brochures and reports were published and distributed in addition to Part II of the book that belongs to Enova's campaign aimed at children and young people, The Rainmakers. A contract for operation of Enova's help line in the period 2006-2008 was put out to tender in 2005.**

Twice a year Enova conducts a survey whose purpose is to ascertain the effectiveness of communication and trends in attitudes and behaviour. The survey is directed at Enova's professional and private target groups. Interest in energy savings has increased, and the likelihood of an electricity shortage is perceived as greater. Several respondents also have plans for energy saving measures in the near future. Climate change issues and environment are more important motivation factors for people than they used to be.

It is an important part of efforts in this area to create well-written and relevant news articles. Collaboration with the media on regular Q&A columns has continued and is being enlarged. Enquiries from the media are seasonal, at their most frequent during the winter. More than three thousand media items within Enova's ambit were recorded during the year, with wind power being by far the most discussed. News items in which Enova is mentioned numbered more than 600, or around 22 per cent. More figures are provided in Table 10.

Publication and distribution of brochures and reports dealing with Enova's areas and work is important for reaching various target groups. All the programme areas are now covered by programme brochures. The series "Energy Stories" now covers all the areas in which Enova is working. The publications are distributed via events, fairs and on request. The "Energy Stories" have now been adopted in campaigns and press work.

No big changes have been made to Enova's website. A new publication ordering function has been developed and deployed. There has been a high level of activity on enova.no in connection with campaigns, publication of articles and advertising of various events.

Enova's help line was set up to field questions from both households and professional users. It has helped to increase signing-up for events, process orders for Rainmaker material and surveying interest in program areas. This kind of activity will continue next year. Enova is expecting increased activity with increased focus on households. Table 10 shows an overview over the number of enquiries to the answer service. The contract for operation of Enova's help line in the period 2006-2008 was put out to tender in 2005, and a contract was signed with the player who has had the assignment up to 2006.

Four campaigns were carried out over the course of the year; for households at the beginning of the year, for advisers/architects, the construction sector and heat energy market. Enova sees major positive changes in the opinion survey conducted among professional groups who were the target of its campaigns. All application deadlines are advertised.

In 2005 Enova's campaign aimed at children and young people, "The Rainmakers", was presented on children's TV, in primary schools, on regnmakerne.no, at housing fairs and in the Energy Centre at Hunderfossen Family Park. In the course of 2005 knowledge of The Rainmakers in the 6-15 target group rose to 36 per cent. Part one of the story of The Rainmakers written by Klaus Hagerup was used by 70 per cent of the primary schools and in the autumn of 2005 Part Two was distributed to all primary schools in Norway. Regnmakerne.no is a popular website with news, energy topics, games and its own Rainmakers Club. The

Rainmakers' 'Frenergy Day' was held in Trondheim. In 2005 there was increased focus on The Rainmakers in schools, with the creation of partnerships with the Education Directorate, the Natural Sciences Centre and the Norwegian Directorate for Education and Training, the National Centre for Natural Sciences in Education and the Research Council of Norway. Curriculum materials have been developed and are being tested by ten selected Rainmaker schools. Energy topics were prepared for primary schools through the Network for Environmental Studies and through weekly items on the PysjPopBaluba television programme on the NRK1 state television channel. For the first time, the Energy Match was produced as a Nordic version with participating children from Norway, Sweden and Denmark. "The Rainmakers" was also visible at the Energy Centre at Hunderfossen Family Park and at Enova's fairs.

In the field of information and communication the results of various activities are measured. Table 10 shows quantitative results for the activities in this field for 2005.

**Table 10: Information and communication**

	2003	2004	2005
Distributed materials, number (excluding The Rainmakers)	n/a	124 000	137 156
Brochures and other publications	8	35	15
Campaigns	3	4	4
No. of media items about Enova	n/a	675	657
Visitors to fairs	40 000	250 000	250 000
Number of enquiries to/from Enova's help line <sup>10</sup>	55 500	35 000	22 000
No. of new Rainmakers	1 200	2 800	6 500
Distributed Rainmakers material to primary schools	n/a	65 000	64 000
Average page hits per day on Regnakerne.no	5 000	15 000	14 000
No. of media items about "The Rainmakers"	n/a	85	145
No. of schoolchildren at The Rainmakers 'Frenergy' Day	n/a	4 000	4000
Viewer figures per broadcast in the Energy Match	250 000-350 000	340 000-560 000	270 000-330 000

## 5.2 Education and training

Education and training is important for supporting Enova's work, and is therefore an important part of its programme efforts. Many courses were held in 2005, wholly or in part under the aegis of Enova. It is also important for Enova to make presentations at courses, seminars and conferences. In 2005 professional-exchange days and seminars were held for industrial companies, the construction industry, and players in bioenergy and natural gas.

Enova's objective for its education and training activities in the heat area in 2005 was to increase energy expertise in local governments and on the part of architects, consultants and others working on bioenergy. In collaboration with the Norwegian Bioenergy Association (NoBio), Enova therefore held the course "Business Development and Design of Bioenergy Plants". Feedback on the usefulness of these courses has been favourable. A technical guide has been prepared as course material.

This year Enova has drawn up a new programme for municipal energy and environmental planning. The programme provides support for the preparation of municipal energy and environmental plans and for analyses of the pre-projects for heat production and infrastructure. The programme's objective was to support good initiatives that may subsequently result in applications in one of Enova's programme. In 2005 Enova

<sup>10</sup> There was very great interest in the grant scheme for households to purchase heat pumps, pellet stoves and control systems in 2003.

arranged three courses in the series “Energy focus in the municipality”, and the course evaluations were positive.

The cooperation agreement with the Norwegian Architects’ Association continued in 2005, and the Association conducted the course “Integrated Design and Holistic Solutions”. Enova participated in the development and implementation of a post-qualification/further education course at the Norwegian University of Science and Technology (NTNU) on low-energy housing and passive houses. This course is a collaborative venture between Enova, the Norwegian State Housing Bank, SINTEF, the EU programme “Intelligent Energy Europe” and NTNU, and is oriented primarily towards architects, consulting engineers, employees in contracting and consulting companies, local government officials and others working on planning design and building of houses and flats.

Various courses and seminars for teachers were held via Enova’s campaigns aimed at children and young people. Enova assists and supports the development of energy monitoring in schools through the Educational Directorate’s webpage “Network for Environmental Studies”. This also includes courses for teachers and dissemination of information in energy monitoring at teachers’ seminars. Twice a year Enova holds two teachers’ courses in connection with The Rainmakers’ ‘Frenergy Day’.

Type of course	Target group	No. of participants
Business Development and Design of Bioenergy Plants	Players working on implementation of bioenergy projects	223
Energy Focus in the Municipality	Advisers and municipal council chairpersons	46
Energy Monitoring in Schools/The Energy Portal on the Network for Environment Studies	Primary and secondary school teachers	450
The Rainmakers ‘Frenergy Day’ – preliminary course for teachers	Primary school teachers	58
Low-Energy Housing and Passive Houses	Architects and other players in the construction industry	37
<b>Integrated design and Holistic Solutions (course series)</b>	<b>Architects</b>	<b>349</b>

### 5.3 Collaboration and advisory services

The agreement between the MPE and Enova requires that Enova function as an advisor to the MPE and represent the MPE and Norway in various international fora. This is also important to contribute to attaining Enova’s objectives in an optimal manner.

In the course of 2005, Enova was an adviser to the MPE in connection with matters related to Enova’s ambit. This advisory role includes providing answers and clarifications within Enova’s professional field and work on consultation hearings and reports. The Internet version at [www.enova.no](http://www.enova.no) provides an overview of the cases in which Enova has made consultative statements and of the reports either authored or commissioned by Enova.

Enova cultivates regular and good contact with the Norwegian Water Resources and Energy Directorate, the Norwegian Petroleum Directorate, the Research Council of Norway, Innovation Norway and Statnett. Enova also has regular contact with other public authorities that have a role in the work on energy conversion, including the Norwegian Pollution Control Authority (SFT). Enova has a cooperation agreement with the Research Council of Norway that specifies the frameworks for the collaboration, and that Enova should have semi-annual contact meetings with the Research Council at a strategic level. In 2005 Enova signed a cooperation agreement with Statnett.

Enova has broad contacts with universities and research institutions, industry organisations, financial institutions and NGOs, plus ongoing contact with market players. Participation by means of lectures in meetings and conferences is a natural part of this work.

Enova has participated in international fora within its ambit, and has been active in arenas of strategic importance. The objective for international work in 2005 has been systematic efforts to support Enova's analysis and programme work. At the end of 2005 Enova itself was represented, or else funded participation and activity, in nine of the IEA's programmes. Enova participated in, and followed up, the work on the IEA programme for renewable energy, "Renewable Energy Technology Deployment" (RETD). Enova also is the Norwegian counterparty in the ETDE agreement and the Norwegian representative on the ETDE's executive committee (ExCo). The ETDE is the IEA's multinational information programme. Enova manages the Norwegian part of EIE, the EU's non-technological programme for renewable energy and energy use, on behalf of the MPE. ETDE and EIE are discussed in more detail in separate sections. Enova also took part in the European Energy Network (EnR) and several of the Network's working groups. The assumption of the presidency of the organisation in 2006 has been prepared, among other things by appointment of a coordinator. In addition, Enova contributed to the work of the European Council for an Energy Efficient Economy (ECEEE). In 2005 Enova participated in various international seminars and conferences, including with its own lectures and papers.

# 6 Activities outside the Energy Fund

## 6.1 Natural gas

By special commission from the MPE, Enova has made agreements with developers of liquefied natural gas (LNG) receiving terminals and storage facilities. The arrangement has been made under the Public Service Obligations (PSO). In 2005 contracts were made with three projects that all together can create the foundation for gas sales corresponding to 745 GWh per year when the facilities are fully operational. A total of NOK 45 million has been allocated.

Enova controls funds appropriated via the state budget for the support scheme for natural gas infrastructure. As part of this task, Enova has developed a general template for design of reception and storage facilities for LNG, tailored to the PSO requirements and Norwegian conditions.

After the clarification and description of the relevant public service obligations, in 2004 Enova undertook the first invitations to tender for the scheme. A corresponding invitation was carried out in 2005, after an updating and reworking of the tender documents, among other things in order to allow for compressed natural gas (CNG) and transmission pipes to be covered by the scheme. Enova received offers from in all six different bidders, covering in all eleven different projects. Enova opened contractual negotiations with three bidders with whom contracts have now been made:

- Lyse Gass AS, receiving terminal in Kristiansand
- GASNOR AS, receiving terminal in Mosjøen
- Barents Natural Gas AS, storage facility on Melkøya island, Hammerfest

After a tender round and negotiation on PSO agreements were completed in 2005, an evaluation of the PSO scheme was undertaken. The results and conclusions in this evaluation will be incorporated into the further work on the scheme. In order to quality-assure plans and activities for the natural gas area, Enova has had a report prepared with the title "The Future of Norwegian Natural Gas Distribution, 2015-2025".

In 2004 Enova made a contract with the Norwegian Gas Centre on management of an expertise centre for natural gas end-user technology in Haugalandet, around Haugesund. This work was continued in 2005, with a budget of NOK 3.5 million. An option for extension of the assignment in 2006 has been provided. The work will be followed up in quarterly meetings.

## 6.2 The administration of "Intelligent Energy - Europe" (EIE)

Enova administers the Norwegian part of EIE, the EU's non-technological programme for renewable energy and energy use, in the implementation period 2003-2006 on behalf of the MPE. The administrative responsibility involves both guidance and information to potential applicants, and offers of pre-project support and national co-funding of project implementation.

Up to now two application rounds have been held: EIE 2003 and EIE 2004. In October 2005 EIE 2005 was advertised, with an applications deadline of January 2006. In the course of 2005 Enova held two national information meetings; at the first meeting, in January, it briefed the participants on the working programme for EIE 2004, while at the October meeting it briefed them on EIE 2005. Both meetings were held in Trondheim and both were transmitted over the Net. The national information meetings provided general guidance on the

application process and the formal requirements made by the EU. They were well-attended by a wide range of players. Enova has been providing continuous information about the programme and the application rounds on its website plus a special e-mail address that is used to answer enquiries from applicants. Information about the programme and the economic support and guidance that Enova offers is also sent out by e-mail to around 400 recipients.

In line with this task, Enova participated in three of the programme's three steering committee meetings in 2005, and in the European Commission's information meetings for national contacts. The follow-up of Norwegian applicants and the introductory application processing was performed by Enova's programme coordinator.

An appendix to this report provides further details about the use of funds and the projects supported.

## 6.3 The administration of the Energy Technology Data Exchange (ETDE)

The ETDE is the IEA's multinational information programme. Enova is the Norwegian counterparty in the ETDE agreement and the Norwegian representative on the ETDE's executive committee.

Enova is responsible for following up and funding the work of maintenance and operation of the ETDE database from the Norwegian side. In conformity with the letter of allocation from the MPE, the Institute for Energy Technology (IFE) has been hired to perform maintenance and operation of the ETDE database for Norway.

In 2005 energy literature has been continuously registered in the ETDE database in order to achieve the targets of:

1. Increased registration of energy literature from Norwegian projects and professional communities in the database
2. Increased national knowledge and use of database.

For main targets 1 and 2 the following quantitative results have been achieved in 2005:

Main target 1	Target figures	Result
Number of Norwegian documents registered in the database in 2005	600	642
Number of new users registered in the database in 2005	40	64
Main target 2	Target figures	Result
Number of newsletters and articles about ETDE on the Enova and IFE websites	2	2
Replies and enquiries to potential users	100	314

# Appendices

## 1 The work on a common frame of reference

The term 'common frame of reference' reflects the fact that the decisions taken by Enova shall be based on methods, routines and tools that ensure that the decisions are taken in a uniform manner and that the decisions are scientifically well-founded. The common frame of reference shall ensure that the requirements for project follow-up and reporting made in Enova's agreement with the MPE are satisfied. The methodology worked out shall ensure that the requirement of triggering effect is satisfied on the project level, so that the aggregated results show the real result of Enova's work.

The various elements of the common frame of reference are under continuous development both via specific projects and through increased experience basis with the methods, routines and tools already in use. The work on the common frame of reference will therefore not be concluded, but be implemented continuously as the work yields results. In the course of 2005 several development projects have been implemented within the common frame of reference:

### **Report: Baseline – Prediction of energy consumption to 2020:**

A report has been prepared that estimates future energy use in Norway up to 2020. The analysis is based on a methodology worked out by Vista Analyse, as part of the work on a common frame of reference in 2004. Future consumption is estimated on the assumption of the absence of measures to reduce energy use. The estimated consumption path is therefore to be regarded as an investment path against which Enova's results can be measured on the aggregated level.

### **Methodology for investment analysis:**

The internal work on investment analysis in Enova has been continued. This project objective is to systematise how investment analyses in relation to project applications are to be conducted. The main principle in which this is based is current-value assessment of the project. The maximum support amounts are upwardly limited to the sum that leads to a project having a current value equal to zero for a given required rate of return. This work is important to secure the principle of triggering effect.

### **Implementation of application for investment analysis:**

In 2005 Enova adopted an internally-developed application for investment analyses that calculates maximum support amounts. Use of this tool will ensure a uniform calculation of support amounts and better documentation related to the consideration of applications. This is done inter alia by basing systematic risk and return on capital requirements on exogenic given data.

### **The further development of Enova's ERS processing system and the application centre:**

Enova's processing system is under constant development. The objective of this process is to make the handling of project applications as efficient as possible, both for the applicant and for Enova. The work on a new application centre was begun in 2005.



## 2 Methodology of reporting of energy results

### Development of result concepts

The agreement on the administration of the Energy Fund states that Enova is to report contracted for and/or realised energy results. On this background, energy results (where there are energy results) shall be quantified in all contracts that Enova enters into. Contracted for energy results are an estimate of what energy results will be realised at the time of the contract. It is important to have a strict definition of realised result. Realised energy results shall be based on a review or audit of what the projects have actually achieved in the way of energy results. Enova is concerned that the content of realised results shall be solidly documented, and in the work of concretisation of the definition it was clear that there was a need to introduce a third results concept, final reported results.

In the results report for 2004, realised energy results were reported for the first time, while final-reported energy results are first used in the results report for 2005. The term is an updated prognosis of realised results in relation to contracted for result, at the time of the project's final reporting to Enova. The introduction of a third results concept yields a more precise results reporting, because the prognoses of realised energy results is renewed. It generally takes long time from a project's initiation to its realisation, and so it will take a long time before realised results can be measured. At the same time, it is time-consuming to collect data for measurement of realised energy results, and there is therefore a need to renew the estimates along the way.

The development of terms and definitions is an ongoing process. At this point there still remains a concretisation of how the realised results are to be measured. Enova expects that this will be a time-consuming process that will probably take place by calculations of average energy production over several years or through external evaluations of programme areas. It is planned to develop a method for calculation of realised energy results in the course of 2006.

### Basis for reporting of energy results

The Energy Fund was established on 1 January 2002, but since the agreement between Enova and the MPE also includes 2001, figures are reported from that year where the NVE was responsible for the administration. In order to get comparable figures, the numerical material for 2001 has been evaluated by ECON and the Stavanger Revisjon AS auditing firm. The results of this evaluation have been used and will continue to be used. No further reviews of the 2001 numerical material are planned.

Reporting follows the calendar year, and the date of the decision will determine for which year the results are reported. In each results report, correction is made to contracted for energy result for interrupted/cancelled projects' energy results. Funds allocated to projects that are interrupted or cancelled will be recovered by the Energy Fund and reallocated to new projects. Enova desires external assessments of achieved results and has had the results reports for 2002 and 2003 audited by Ernst & Young. The auditor's recommendations are implemented in the results reporting for 2004. In the autumn of 2005 an internal audit of the energy results was also carried out and implemented in this results report. Moreover, findings and recommendations from the programme evaluations will also be implemented concurrently, if this is thought to make for more correct results reporting. In an integrated presentation of the results, contracted for results related to the final reported project must be written down so as to prevent double-counting.

**Table 11: Aggregated energy results shown for contracted for energy results and contracted for energy results corrected for final-reported results**

		2001 <sup>11</sup>	2002	2003	2004	2005	Total
<b>Energy use<sup>12</sup></b>	-Total contract-regulated contracted for	372	330	410	645	999	2 756
	-Contract-regulated Contracted for, not final-reported	372	282	360	640	999	2 652
	-Final-reported	0	42	68	6	0	116
	-Total, corrected for final-reported	372	324	428	646	999	2 769
<b>Wind</b>	-Total contract-regulated contracted for	120	80	124	650	585	1 559
	-Contract-regulated Contracted for, not final-reported	120	80	84	534	585	1 403
	-Final-reported	0	0	39	115	0	154
	-Total, corrected for final-reported	120	80	123	649	585	1 557
<b>Thermal Heat</b>	-Total contract-regulated contracted for	328	197	825	518	409	2 277
	-Contract-regulated Contracted for, not final-reported	328	128	634	444	409	1 944
	-Final-reported	0	60	210	73	0	343
	-Total, corrected for final-reported	328	188	845	517	409	2 287
<b>New technology</b>	-Total contract-regulated contracted for	0	0.6	0	35	18	54
	-Contract-regulated Contracted for, not final-reported	0	0	0	35	18	54
	-Final-reported	0	0.7	0	0	0	0.7
	-Total, corrected for final-reported	0	0.7	0	35	18	54
<b>TOTAL</b>	TOTAL contract-regulated contracted for	820	608	1 359	1 848	2 011	6 646
	TOTAL corrected for final-reported	820	593	1 396	1 848	2 011	6 667

Overall energy results, corrected for final reported energy results, are 21 GWh higher than contracted for energy results. This shows that the expected realised result at the date of the contract is not materially changed at the time of final reporting.

### Changes in reported energy results

Enova's support shall be triggering for the implementation of the project in question, and Enova's risk profile is therefore higher than for commercial players. Energy results from projects that for various reasons have not been implemented as expected are corrected for in the results reporting. Enova is entitled to withhold support if the project is not completed in line with the preconditions. Corrections over years make it a challenge to follow the evolution of energy results. Enova implemented an internal project in the autumn of 2005 with a view to further quality assurance of the numerical material. Below follows a quantification of the changes from the 2004 results report at an aggregated level.

<sup>11</sup> The energy results for 2001 are included in the table even if they are not contract-regulated. This is because the agreement between Enova and the MPE on administration of the Energy Fund defines 2001 as part of the agreement period.

<sup>12</sup> The energy use for 2002 includes 152 GWh that is not contract-regulated. The figure was audited by Ernst & Young in 2004. The reason for including these is that similar projects were contract-regulated in 2003.

**Table 12: Changes in aggregated contracted for energy results from 2004 to 2005**

	2002	2003	2004
Energy use	-64	-2	-1
Wind power	0	-326	-373
Heat energy	-89	-9	0
New technology	0	0	0
<b>TOTAL</b>	<b>-153</b>	<b>-337</b>	<b>-374</b>

The changes in energy results have different explanations. For the wind area, it is primarily the cancellation of the Kvitfjell wind power farm that accounts for the reduction in 2003 and 2004. For heat energy, in addition to cancelled commitments, there is a project that was double-reported in 2001/2002 that explains the correction. For the energy use area, there are, in addition to cancelled commitments, some projects in whose energy results the indirect effects were included, plus some projects whose scope was reduced in relation to registered contracted for results.

### 3 List of consultation submissions and publications prepared in 2005

All Enova's program areas are evaluated when there is thought to be a need for this. The purpose of the evaluations is to see whether the programme design and work satisfies the necessary requirements of cost-effectiveness and triggering effect. In 2005 three evaluations were completed:

- Nord-Trøndelagsforskning (2005): Evaluation of the subsidy scheme for heat pumps, pellet stoves and control systems, NTF Report 2005:2
- Samfunns- and næringslivsforskning AS (SNF) (2005): Evaluation of the PSO scheme for natural gas
- Stiftelsen Østfoldforskning (2005): Evaluation of the industry network for the industry's analysis scheme 1996 – 2002, OR 22:05

In the course of 2005 several reports have been compiled by and on assignment for Enova:

- Anita Eide (Enova), Benoit Lebot, Paolo Bertoldi, Mithra Moezzi: The myths of technology and efficiency: A few thoughts for a sustainable energy future.
- Energidata AS, the Norwegian Institute of Transport Economics and KEMA Consulting (2005): Bioenergy logistics chain cost structure and development potential.
- Enova (2005): Baseline – Prediction of energy consumption to 2020.
- Enova (2005): Results – Enova's industrial activities 2004.
- Ingunn Ettestøl (Enova): The energy statistics of the Norwegian building network.
- Joule (2005): Consumer-oriented energy conservation measures, description of selected schemes.
- Bodil M. Larsen, Runa Nesbakken (Statistics Norway (SSB) 2005): Classification by purpose of household energy use in 2001.
- Anne Gunnarshaug Lien (Enova), Håvard Solem (Enova): Energy savings and costs in low energy houses from 13 countries.

- Marintek (2005): The future of natural gas distribution 2015 – 2025.
- NoBio and Sweco Grøner (2005): Business development and design of bioenergy plants. Bioenergy – an alternative to heating with ever-dearer oil and electricity.
- Norwegian energy (2005): Facts project on district heating.
- Point Carbon (2005): The power of carbon: The impact of CO<sub>2</sub> emissions trading on Nordic electricity prices.
- Håvard Solem (Enova), Andreas K. Enge (Enova) and Anita Eide (Enova): Short-term objectives and direct impacts versus long-term energy efficiency: A case study of Norway's energy agency model.

In the course of 2005 Enova has made consultation submissions in a number of cases related to its ambit, such as:

- Proposal for a directive on end-user energy-efficiency and energy services, for the MPE (several).
- The European Commission's Green Book on energy efficiency enhancement to the MPE.
- Proposal for new EU directive on energy labelling of immersion heaters.
- New Chapter 3 on the Norwegian register for climate quotas in the SFT's climate quota regulations.
- Draft bill on mandatory electricity certificates, for the MPE.
- Amendments to the Natural Gas Act, for the MPE.
- Introduction of a duty of public notice under the national threshold value, for the MPE.
- Auditing of industry requirements for shopping centres, for the Eco-Lighthouse Foundation.
- Amendments to the regulations on delivery quality, measurement and settlement and economic and technical reporting, income frameworks and tariffs, for the NVE.
- Draft bill on amendments to the Energy Act, for the MPE.
- Draft amendments to the Corporate Democracy Regulations and the State-Enterprise Regulations, for the MPE.
- Proposals from the European Commission on the establishment of a new EU programme for competitiveness and innovation, including energy.

Several of the evaluations, reports and consultation submissions are available on Enova's home-pages.

## 4 Project overview EIE

So far two application rounds have been held, EIE 2003 and EIE 2004. In October 2005 EIE 2005 was advertised, with an applications deadline in January 2006. Due to the advertising at the end of 2004, in 2005 Enova processed applications for pre-project support for both EIE 2004 and EIE 2005, in addition to granting co-funding of projects via EIE 2004. In the programme's second application round, EIE 2004, six of the 15 Norwegian applications were granted EU support. In all, 16 applications for pre-project support were

processed and granted support, seven of them related to EIE 2004 and nine related to EIE 2005. Five projects were granted national co-funding.

Enova granted pre-project support to seven applicants via EIE 2004, and made commitments for national co-funding to the same number, of whom five were granted support after their projects were finally approved by the EU. The pre-project support for the 2004 round was NOK 330,000, and the national co-funding was NOK 6.8 million. For its part, the European Commission has given commitments for EUR 706,881 to the six<sup>13</sup> Norwegian project applications that were granted support. No Norwegian applications were rejected because they failed to meet the EU's formal requirements. The pre-project support in connection with the nine applications considered in connection with EIE 2005 comprised NOK 425,000. Only around half of the main areas, or 'key actions', were open for applications in connection with EIE 2004, whereas all were open for EIE 2005. Nine applications for pre-project support in connection with EIE 2005 were considered and granted support in November 2005. An overview of funding and the various projects is provided in a separate Appendix.

The table below provides an overview of all Norwegian applications that were considered and approved in 2005 by the EU Commission in connection with EIE 2004 and the pre-project support to EIE 2005.

Pre-project support to EIE 2004	330 000
Pre-project support to EIE 2005	425 000

**Table 13: Overview of approved applications to EIE in 2004**

Project name	Applicant	National co-funding (in NOK)	Funding from the EU (Euro)
ALTENER			
WasteWaterHeat <sup>14</sup>	Norconsult		54 159
SAVE			
TREES	SINTEF Building and Environment	200 000	25 850
Remodece	SINTEF Energy Research	1 400 000	78 376
E-Street	Hafslund	1 000 000	186 350
HORIZONTAL ACTIONS			
Active Learning	Norwegian energy conservation and energy	980 662	166 795
3-nity	New Energy Performance	1 800 000	195 281
<b>Total</b>		<b>5 380 662</b>	<b>706 811</b>

<sup>13</sup> One application bypassed Enova, see overview in Table 12..

<sup>14</sup> The application bypassed Enova.

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