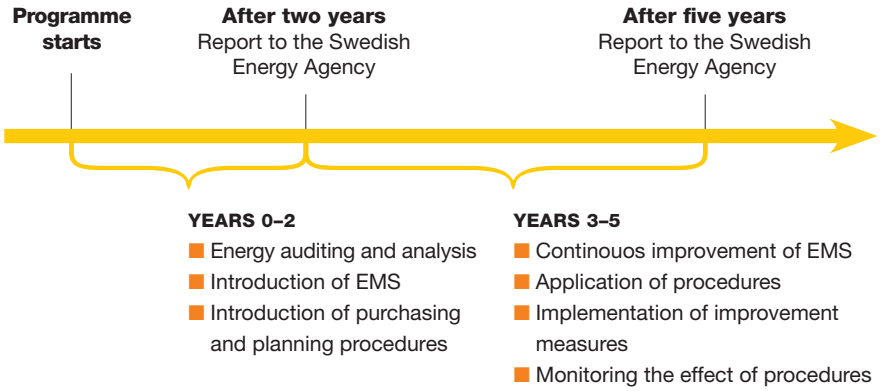
Two years with PFE

The first published results from the Swedish LTA programme for improving energy efficiency in industry

The programme for improving energy efficiency in industry (PFE)

In January 2005, the Swedish Energy Agency launched the programme for improving energy efficiency in industry (hereafter "PFE"). The PFE is a voluntary energy efficiency improvement programme: an economic policy measure aimed at Swedish energy intensive industrial companies. The background to PFE is an EU energy tax directive that came into force on 1st July 2004, setting a minimum tax level of 0.5 euro/MWh on electricity. With the exception of certain manufacturing processes, Swedish industry pays an energy tax of 0.5 öre/kWh (approximately 0.5 euro/MWh). The PFE is a way of compensating for this tax. Companies participating in the programme can receive a tax exemption, provided that they take specific steps to improve their energy performance and carry out measures intended to improve the efficiency of electricity use within their own companies.

The time axis in the diagram below shows how companies are expected to work on energy efficiency improvements over the programme's five year period. The necessary improvements are based on audit and analysis of the company's energy use. Another important element of the work is that the companies must introduce a standardised energy management system (EMS), which must receive approval certification within two years. Work to be carried out during the following three years includes carrying out planned improvement measures and complying with relevant procedures for planning and purchasing of high-consumption electrical equipment.



98 companies have participated in the programme from its start. As this is now over two years ago, the companies have now submitted their first reports. A further 19 companies have subsequently joined the programme, and will present their two year reports in 2007 and 2008. The programme is open to further companies up to and including 2009. Companies can apply to join the programme at any time during the year, and then participate for the following five years.

First results look very promising

A central element in creating an economically and ecologically sustainable Swedish energy system is consideration of the problems presented by energy use in the country's electrically intensive industries. Previous rules for taxing this industry were no longer approved under EU regulations with effect from 2004. Against this background, Sweden started a special programme for energy efficiency improvements in its energy intensive industries. The Swedish Energy Agency was instructed by the Government and Parliament to operate the programme in conjunction with industrial companies.

Two years have now passed since the programme was started, with 117 companies at present involved in it. The first 98 companies submitted their first reports to the Agency during the autumn of 2006. The results to date are very promising: after only two years in the programme, the companies have found ways of reducing their use of electricity by 1 TWh per year, and will now start to apply these improvements. Many companies have also indicated that they are already in the process of finding additional improvements, which will probably be completed before the end of the programme.

However, perhaps the most important result to date is not the efficiency improvement measures as such, but the fact that the companies have now started a continuous process of energy efficiency improvement work. The energy audits and the energy management system ensure that energy awareness now occupies a prominent position among both company managements and company employees.

The Swedish Energy Agency has had positive experience of its work with the companies, and is looking forward to continued work of helping companies to improve their energy efficiency and thus also their competitiveness. In a wider perspective, the programme also has beneficial effects in other sectors, including regional development and an improved environment.

Thomas Korsfeldt
Director General

COMPANIES' EXPERIENCE

Greater awareness and better knowledge within Stora Enso – a group of integrated pulp and paper mills

– The PFE has contributed to a greater awareness of energy aspects, and better knowledge of them, says Anders Heldemar of Stora Enso AB. Within the Group, we thought that we were already on top of things, as we constantly carry out checks and perform energy balances for various purposes, such as tax returns. However, we engaged a few consultants in order to get some new input to the energy audits.

– There weren't any major surprises: we were already aware of most of the points found, but they hadn't been documented as clearly.

– We shall, of course, do everything that we've promised, and hopefully a little more quickly, unless there are any major changes to our production portfolio, says Anders Heldemar.

At some integrated pulp and paper mills, such as Kvarnsveden, the efficiency improvement programme commitments have been included in the mill's official targets. Under the programme, Kvarnsveden has listed 13 improvements that are due to be carried out by not later than 2009, but the company has now promised that at least four of them will be in place by 2007.

– We hope that this is just the first five year period of the programme, and that it will be continued. There won't, of course, be as many substantial improvements left to deal with during the next programme period, but it's important to continue with a systematic and concentrated approach in the energy sector.

The two year reports promise well for the future

The first 98 companies in the programme have now submitted their two year stage reports, describing the results of their energy audits and analyses, i.e. covering electricity, fuels and heat. The energy audits are a way of finding areas for improving the efficiency of energy use. In addition, the companies report that they have introduced an appropriate energy management system, and had it certified. This means that the companies now have improved knowledge of their energy use, giving themselves a good foundation for future efficiency improvement work.

Together, the 98 companies have listed almost 900 improvements to reduce their use of electricity. They are due for implementation by 2009 at the latest, and will cost the companies SEK 1000 million (about 110 million euro) in investments. In total, the improvements should save at least 1 TWh/year of electricity. With an average electricity price of about 50 öre/kWh (6 cent/kWh), this means that the companies should make annual cost savings of about SEK 500 million (55 million euro). And this is just the beginning: several of the participating companies have already stated that considerably more electricity efficiency improvement measures are in progress, and will be carried out during the programme.

In addition to the direct savings through reduced electricity costs, the companies also receive a total tax reduction of about SEK 150 million (17 million euro) through their participation in the programme.

SUMMARY STATISTICS FROM THE FIRST 98 COMPANIES

Electricity use: 29 TWh/year
Electricity efficiency savings under the programme: 1 TWh/year
Investment costs of electricity efficiency improvement measures: SEK 1000 million
Number of electricity efficiency improvement measures: 900

Katarina Byström, Imerys Mineral AB

– The advantage of a programme such as this is that we're forced to examine and review our activities. We can't just rely on previous experience. An example of this is how we deal with our large motors: traditionally, we've had them rewound when they break down. We now realise that this not particularly efficient, and so it's no longer something that's done automatically.

– Working as part of a large global group can sometimes be difficult. It's not always that the owners in other countries look at energy matters in the same way that we do, although our Swedish group level management is very much engaged. Swedish companies are at the leading edge of energy awareness, and we have to show that it pays.

– I think a programme such as this is excellent. It provides an additional impetus for change when it's realised that there's legislation behind it – even though it may be voluntary regulations that we've undertaken to comply with.

Magnus Pettersson, energy coordinator, Höganäs AB

– This is by no means the first time that we've been working on energy savings. However, the big difference this time is that the introduction of an energy management system has made the work more structured. The system has also been well received within the company: it complements the existing environmental management system, which means that everyone knows where they are.

– High energy prices naturally have more effect in terms of looking for improvements than does the PFE. However, the programme has been introduced at the right time, and provides additional help in the work of saving energy.

– It would be excellent if programmes such as this could continue. It's important to develop new ideas and new approaches on how to deal with such matters. A programme such as this keeps everyone on their toes and ready to keep looking for improvements.

Gunilla Segerstedt, Boliden Mineral AB

– As a result of the programme, we've introduced an energy management system that has been favourably received by everyone in the business, although it was hard work putting it in place. This was also the first time that we've carried out such a structured energy audit: previous audits were more limited in their coverage, so it's an advantage to get an overall view of the entire business.

– The most important benefit of the programme is not the resulting tax reduction, but the major savings we make as a result of our improvement measures.

– The programme is effective, and it would be excellent if it could continue.

Energy audits have resulted in improvement measures

During the first two years of the programme, companies participating in the scheme have carried out fundamental audits and analyses of all their energy use. The main purpose of this work has been to find ways of improving their efficiency of energy use, and to start to use more renewable forms of energy.

The energy audits and analyses must:

- be carried out in an overall system perspective, which means that companies have to consider how their production processes, or parts of these processes, and ancillary systems can work together to achieve an overall energy efficiency improvement.
- be both long term and short term, which means that companies must consider changes that could affect their use of energy over a ten year period. They must then consider the results of this long term analysis when considering matters that involve changes in their energy use.
- result in measures to improve their efficiency of electricity use. Any such measures that have a payback time of less than three years must be carried out during the programme period.

COMPANIES' EXPERIENCE

Pilkington Floatglas saves in several ways

A working group spent three months on the energy audit required by the programme at Pilkington Floatglas AB. The results have been valuable for the company in many ways.

– It's not just electricity that we save. Many of the measures, such as electrical inverters for motors, mean that there's also less wear and tear of equipment, which in turn reduces maintenance costs, says Lars Andersson, the company's environment manager. He feels that the energy audit was easy, and did not require the services of consultants.

– Many of those in the working group have been with the company for a long time, which was an advantage in carrying out the work. At the same time, there was also a recently employed electrical engineer in the group, who could see things from a new angle.

The energy audit working group looked at three main elements: use of electricity (which accounts for only about 20 % of the company's energy use), use of fossil fuels and use of heat.

Pilkington Floatglas meets all its plant space heating requirements with waste heat from production, and also sells surplus heat to the Halmstad district heating system. The more the company can save on its own heating requirements, the more is available for sale to the town.

– In analysing electricity use, we went through the plant machine by machine and motor by motor. Energy consumption was estimated, although we've now installed meters on many machines, says Lars Andersson.

The audit identified many pumps and fans that were running on full load, but with their output controlled by a valve or damper. The group also found lighting that was left on unnecessarily. Frequency control of motors, with time control of ventilation and lighting, are examples of improvements that have now been carried out.

– We found a good example of a simple measure to reduce electricity demand in a department that had been closed. It included a large transformer, which was still connected to its supply. Simply by bypassing it, we made considerable savings, says Lars Andersson.

He feels that greater importance has now been attached to energy and environmental matters in the company.

– Lots of our staff talk about it away from work, which means that interest in the whole subject is kept alive.

He already expects that the promised 5.7 % improvement in the use of electricity will probably be exceeded.

– Not least because the investment costs will probably be lower than we had expected, and because many of the investments have a short payback time.

The energy management system – an effective tool

The energy management system is a tool for ensuring that energy matters are consistently and systematically considered in an organisation. They provide a means for the company to plan, implement, monitor and improve the company's energy aspects. The Swedish standard for energy management systems sets out three main targets for their work: improvement in the efficiency of energy use, an increase in the proportion of renewable energy, and an increase in energy exchange with the surrounding community.

The PFE requires participating companies to introduce energy management systems, and to get them certified, within the first two years in the programme. All the companies that have so far submitted their two year reports have also achieved certification in accordance with SS 62 77 50, the Swedish standard for energy management systems.

In addition to compliance with the standard, the programme also specifies additional requirements. Companies must follow special procedures when purchasing equipment with high electrical energy demands, and in connection with planning, modifications and replacement/renewal. When purchasing equipment with a high electrical energy demand (more than 30 MWh per year), companies must either select the equipment in the highest energy efficiency class or they can calculate the equipment's life cycle cost (LCC), and compare it with the cost of conventional equipment. If the additional cost for energy efficient equipment is repaid within three years, the company must choose this equipment, this goes for both alternatives.

TOOLS FOR IMPROVING ENERGY EFFICIENCY

The Energy Agency has designed handbooks and other aids that make it easier to participate in PFE. These can naturally also be used by others who want to improve energy efficiency in a company environment.

- Handbook on energy management systems
- Handbook on energy audits and analysis
- Handbook on routines for purchasing and planning
- A template for calculating the LCC according to PFE requirements.

These can be downloaded at www.energimyndigheten.se/pfe at "Energikartläggning och energiledningssystem med krav på rutiner".

Södra Cell goes further

– There are always new opportunities for improving energy efficiency when working with the efficiency improvement programme. You can be sure that there are points that we haven't found, and they'll make us even more in favour of the programme, says Jan Malmström at Södra Cell. He is the energy coordinator for all the Södra Cell pulp mills. With five sulphate pulp mills, the company is one of the world's leading manufacturers of paper pulp. Three of the mills are in Sweden, and all three are included in the energy efficiency programme.

Södra Cell's target is to save 14.8 GWh per year within five years.

– However, our internal targets are higher than this, says Jan Malmström, who doesn't think that it was difficult to implement the energy management system.

– We already had environmental and quality management systems. With the introduction of the energy management system, we've combined all three into one integrated management system.

The company has a common reporting system to enable performance of the individual mills to be compared, not least so that each mill can learn from the others.

– The mills have been working very hard on this, and with considerable involvement. We were already operating an energy efficiency improvement programme earlier, but it has acquired a higher profile through our participation in the national programme.

Södra Cell has set up two overall targets for its energy programme over the next few years:

- To reduce the use of fossil fuels by 5 % each year.
- To improve the efficiency of electricity use by 2 % over the three years remaining within the programme.

– As far as electrical efficiency improvements are concerned, they often involve stopping the plant, and it's not certain that we can stop each plant each year. This is why we've set a target for the entire period.

Work on reducing the amount of fossil fuel consumed has been in progress for five years.

According to Jan Malmström, his production colleagues are also energy-aware, and have become a natural part of the Group's productivity work.

– The concentration on improving the efficiency of energy use is regarded as a positive factor, with the environment and energy being close to everyone's thoughts. In addition, we're used to discussing these points, as we've been dealing with them for some years before the national programme.

Jan Malmström points out that there is excellent cooperation in this area within the pulp and paper industry:

– We help each other. This isn't a sector with fierce competition: on the contrary, we provide help. Bearing in mind that this industry is among the most electrically intensive in the country, this is also a matter of survival for us.

Electrical efficiency improvement measures

As a result of the electrical efficiency improvement measures that the first 98 participating companies have reported, they will save about 1 TWh of electricity per year.

The diagram on the next page shows the type of improvement measures concerned. The figures include both those improvements that the companies have decided to implement within three years, and those measures that have already been applied during the first two years of the programme. In addition, about a third of the companies have listed electrical efficiency improvement measures that will very probably be carried out during the next three years, but for which investment decisions have not yet been taken.

About half of the electricity efficiency improvement potentials are in production processes, with the remainder in what are known as auxiliary systems. In this latter group pumps, fans and other motor drives account for the greatest savings potential. The fact that much of the electrical efficiency improvement potential is in pumps can be partly explained by the fact that the majority of the participating companies are in the pulp and paper industry having a lot of pumps installed.

In general, it can be said that many of the improvement measures are concerned with load control (such as speed control), proper adjustment of processes, or optimisation. Changing to more energy efficient products is also a common measure, as is

COMPANIES' EXPERIENCE

Lantmännen found a lot of measures

– We found a lot of "Aha!" cases during the energy audit. We knew that there was a potential for savings, but we didn't realise that it was this much.

So says Hans Fredriksson, who deals with energy matters in Lantmännen, the Swedish Farmers Supply and Crop Marketing Association.

Three of Lantmännen's Lantbruk's division are included in the programme, and have found electrical efficiency improvement measures amounting to 15.9 % for implementation by 2009.

– Once you've started, you find more, says Hans Fredriksson. However, at present, not all of the potential improvement measures have an equally short payback time, which makes it more difficult to fit them into the investment budget.

Lantmännen Lantbruk has about 40 plants involved in the programme at various places around the country, mainly in the form of silos, feed mills and seed plants.

– It was quite difficult to identify everything in the old plants, says Hans Fredriksson.

In order to help with the work, Lantmännen brought in consultants at the start of the energy audit. However, this turned out to be very expensive, and did not produce the expected results. All the energy audits have therefore, in principle, been carried out by the company's own personnel, which has improved involvement and given a good insight into what is in all the plants.

Hans Fredriksson feels that attention has been concentrated on energy matters, both as a result of the programme and because of the rise in energy prices.

– The benefit of something such as this national programme is that it exerts pressure from the outside, something else which sets deadlines. It ought to be obvious that we should take steps to save electricity and thus cut costs, but it's not always given priority.

– In a project like this, everyone knows the targets that have been set, and the mileposts that have been set and reached. Everybody knows what they're working towards, which gives a structure to the work, points out Hans Fredriksson.

also the realisation that some equipment is unnecessary, and can simply be shut down. The improvement measures generally have a short payback time, and some require no investment at all.

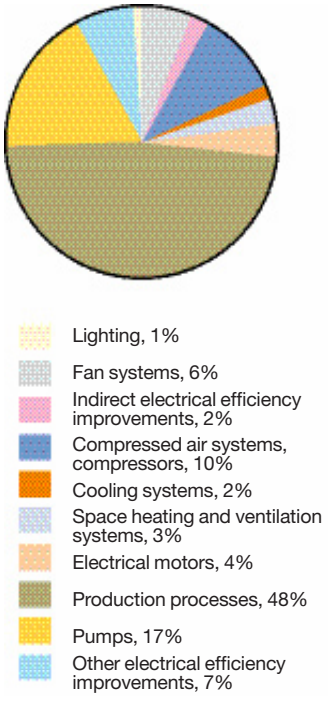
Improvements or changes to compressors and compressed air systems provide a substantial element of energy saving. Savings can be found in such areas as dealing with leaks, making better use of waste heat from the compressors or replacing equipment by more energy efficient equipment.

In certain cases, the electrical efficiency improvement measures carried out by the companies also result in a reduction in the use of some other form of energy. However, measures that involve a direct conversion from electricity to some other form of energy carrier, such as oil, are not accepted within the programme.

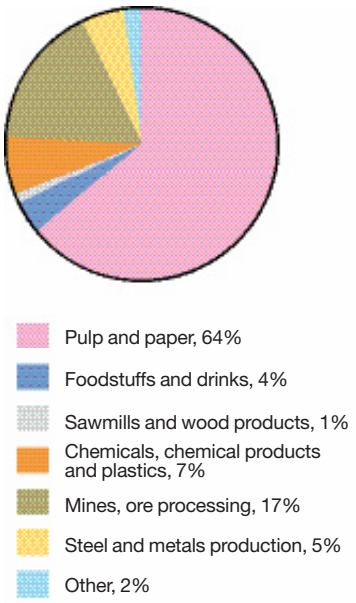
Many other measures concerned with the companies' energy use have also been described, such as improvements in the efficiency of energy and heat use, conversion to renewable energy sources, greater energy exchange with surrounding communities etc. However, these are not counted in the result, as the programme is concerned primarily with improving the efficiency of electrical energy use.

In addition to the measures that have already been described, the programme's procedures for purchasing equipment with a high electrical energy demand, as well as those for planning, modifications and renovations, together with the companies' introduction of energy management systems, will result in further efficiency improvements. These improvements will be listed in the five year reports. It therefore seems very likely that the total improvement in the efficiency of electricity use as a result of the programme will be considerably greater than has been reported hitherto.

Electrical efficiency improvements per improvement area, percentage



Electrical efficiency improvement by sectors, percentage



Electrical efficiency improvement by sectors

The diagram shows the percentage savings of the total electrical efficiency improvement in the various sectors covered by the programme.

The pulp and paper industry is responsible for by far the greatest part of the improvement (about 64 %), but is also the sector in the improvement programme that uses the most electricity, amounting to about 22 TWh.

Comparing the electrical efficiency improvement to the actual electricity use in each sector shows that the pulp and paper industry improvement amounts to about 2.1 %, that of the foodstuffs and drinks industry to 7.1 %, sawmills and manufacturing of wood materials 7.6 %, chemicals, chemical products and plastics 1.9 %, mines and ore processing 6.6 %, steel and metals production 2.5 %, and other industries 5.9 %.

Investments

About SEK 1000 million (110 million euro) will be invested in electrical efficiency improvement measures during the first five year period of the efficiency improvement programme. The figures are based on the investments sums that the companies have so far notified. The average payback time for the various improvement measures is two years. Companies also have various other costs for participating in the programme, such as for carrying out the energy audits and introducing energy management systems, which can also be seen as a type of investment.

Classified by sectors, the largest investments are being made in the pulp and paper industry, followed by mining and ore processing, plastics and chemical companies and steel and metals production companies.

THE CLIMATE EFFECTS OF ELECTRICAL EFFICIENCY IMPROVEMENT

The efficiency improvement programme helps to reduce environmental and climate effects as a result of the efficiency in the use of electricity achieved by the participating companies. However, attempting to quantify the climate benefit is not entirely straightforward. The effect of electricity use on the climate is disputed, and is dependent on various factors, including where the system boundaries are set and whether a short term or long term time perspective is being used. However, employing a marginal approach indicates that a reduction in electricity use should result in a marginal reduction of the amount of electricity used in total. If we assume that the marginal electricity would have been produced in a coal fired power station in Denmark or Finland, a reduction in electricity use results in a corresponding simultaneous reduction of CO_2 emissions in our neighbouring states. 1 MWh of electricity from a coal fired power station is equivalent to a CO_2 emission of 0.5 1 tonne. The companies in the PFE have hitherto indicated electricity savings amounting to 1 TWh per year which, in accordance with the marginal calculation approach described above, would result in an annual reduction in CO_2 emissions of 0.5 1 million tonnes per year.

In addition to reductions in CO_2 emissions, there will also be reductions in NO_x and SO_2 emissions from cold condensing power stations. In addition, many companies will carry out improvement measures in respect of energy carriers other than electricity, such as in connection with improving the efficiency of use of fuels or heating, which will also reduce the overall environmental impact.

COMPANIES' EXPERIENCE

Energy management systems are worthwhile even for smaller companies

– I was at first afraid that the costs would exceed the tax saving. Certification bodies initially referred to SWEDAC's guidelines, which would have taken many days' work for a certification assessment, even for a small company like us.

– Later offers showed that we could get our energy management systems certified with less work input, which brought the costs down to a reasonable level. As I have some experience of certification of quality management systems from previous employments, we didn't need any consultants. I did it myself.

So says Sven Brandt about setting up an energy management system at Rågsvedens Såg AB in Äppelbo. He is responsible for the company's environmental and quality work, and is nowadays also the energy coordinator for the company.

Rågsvedens Såg is a privately owned sawmill with 80 employees, concentrating on sawn materials with some degree of added value processing. The company has been operating an environmental management system for traceability of products for some time, the experience of which was helpful in setting up the energy management system.

Rågsvedens Såg uses 10 GWh of electricity per year, and expects to save about 6 % by 2009.

– When we've finished, we expect to achieve a better result than the 6 % that we've set up as a target, says Sven Brandt. In addition to dealing with leaks in our compressed air system, changing the method of drying planks from batch kilns to progressive kilns means that we expect to achieve greater savings than had been stated in our report.

– We've also installed a new saw line, which improves the efficiency of our production. This was started up in 2005, so that we've now sorted out most of the initial problems, and are beginning to notice the improved results.

The work on the programme has also meant that energy considerations have become a part of everyday work for the company staff, says Sven Brandt.

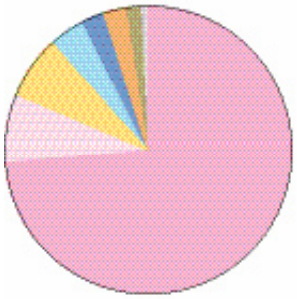
– We can see that our technicians are regarding saving energy as more important. We now consider the energy savings when buying equipment or planning investments. Awareness is higher. We also provide regular information on energy performance at our production meetings.

Participating companies, by sector

- Pulp and paper manufacture, 46
- Sawmills and manufacture of wood products, 22
- Chemicals, chemical products and plastics, 16
- Foods and drink, 10
- Steel and metals production, 9
- Mines, ore processing, 6
- Mineral products, 4
- Other, 4

Total, 117

Electricity use, by sector



- Pulp and paper manufacture, 21.7 TWh
- Chemicals, chemical products and plastics, 2.3 TWh
- Mines, ore processing, 2.2 TWh
- Steel and metals production, 1.2 TWh
- Sawmills and manufacture of wood products, 0.7 TWh
- Foods and drink, 0.7 TWh
- Mineral products, 0.5 TWh
- Other, 0.2 TWh

Total, 29.5 TWh

117 companies in the programme

The PFE opened for applications from energy intensive industrial companies on 3rd January 2005. By the end of 2006, 117 companies had joined the programme.

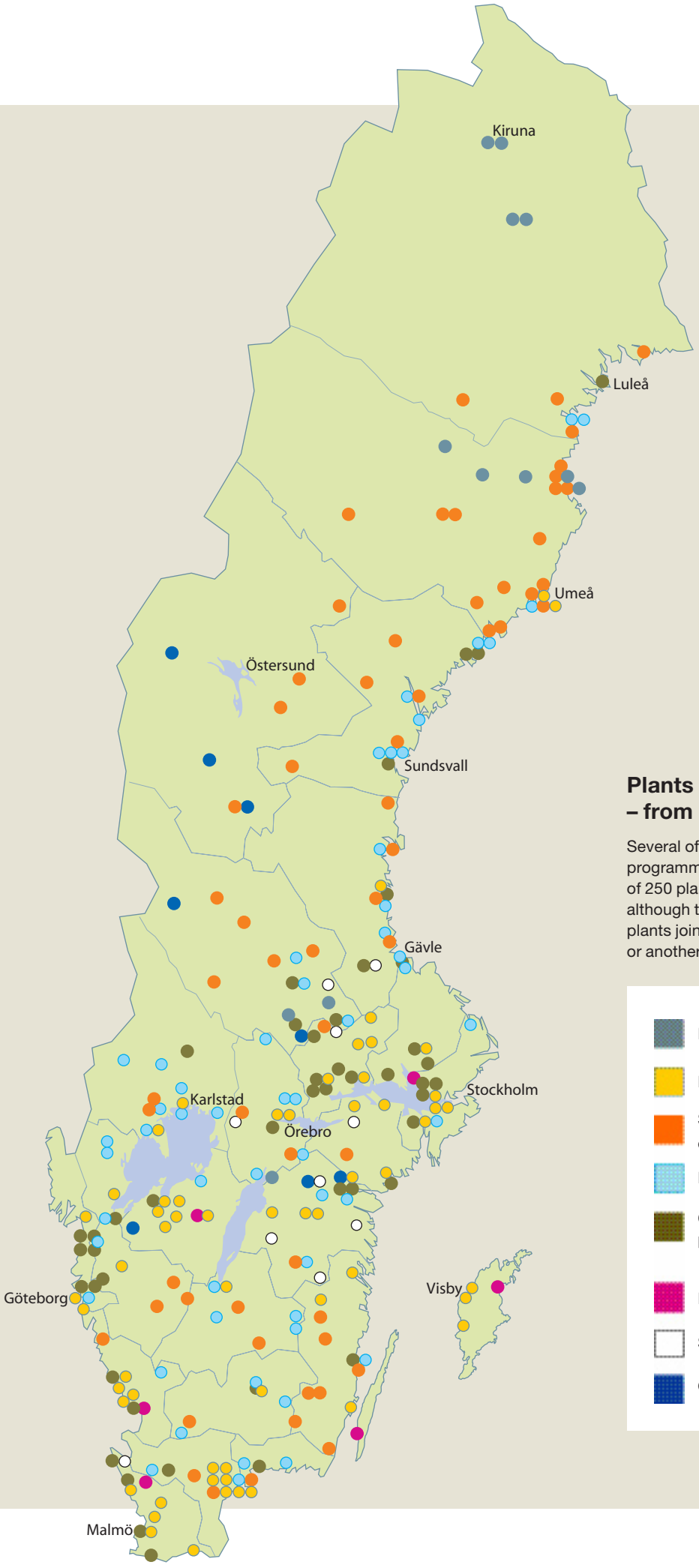
COMPANIES IN THE PROGRAMME MUST:

- be manufacturing industry companies, i.e. SNI code 10-37
- use electricity in their manufacturing processes
- be energy intensive, i.e. with at least 3 % of their production value made up of energy costs, and/or with the company's energy, carbon dioxide and sulphur taxes amounting to at least 0.5 % of added value
- have the necessary economic conditions to be able to complete the programme.

In total, the participating companies use about 30 TWh of electricity per year, which includes both purchased and own produced electricity. This is over one fifth of Sweden's total electricity use, and over half of the electricity used by industry. Based on electricity consumption during the specified base year, the tax reduction incentive amounts to over SEK 150 million/year (17 million euro) for the companies.

The largest electricity users are in the programme

According to a target group analysis that the Swedish Energy Agency carried out, using Statistics Sweden's statistics for 2002, about 1150–1300 companies ought to qualify for membership of the programme. However, participation in the programme does involve certain expenses for the companies, such as certification of an energy management system. The Agency therefore expected, prior to the start of the programme, that about 100 companies would probably decide that it was worthwhile participating. Many companies, eligible to join the programme, would probably save more money in electricity costs through a structured approach to energy efficiency improvement than through the tax reduction. This, of course, is perfectly possible even without participating in the programme.



Plants in the programme – from Kiruna to Ystad

Several of the companies participating in the programme have more than one plant. A total of 250 plants is involved in the programme, although this number can change as individual plants join the scheme or leave it for one reason or another. The map is from 2006.

- Mines, ore processing
- Foods and drink
- Sawmills and manufacture of wood products
- Pulp and paper manufacture
- Chemicals, chemical products and plastics
- Manufacture of mineral products
- Steel and metals production
- Other

Others involved in the PFE

Although it is the individual companies that actually reap the energy savings under the programme, there are a number of other parties that play important parts in application and development of the programme.

The Swedish Energy Agency: monitoring authority for the programme

The Swedish Energy Agency is the monitoring authority for the programme, issuing regulations, providing information and developing aids to assist companies in the programme etc. The Agency monitors the results, as reported at the two year and five year stages. If a company fails to fulfil its commitments, or leaves the programme, the Agency may remove its privileges under the programme. In addition to its surveillance role, the Agency also develops and refines the programme, and disseminates information on the progress and results internationally. Among the Agency's other work connected to the programme, it is engaged in developing a European standard for energy management systems.

Industry sectors represented on a programme board

A programme board was set up on 1st April 2005, consisting of representatives from trade associations, public authorities and companies in the energy, forestry, mining, steel, wood and chemical industries. The board meets four times a year in order to discuss matters arising in connection with operation of the programme, such as changes in the regulations published by the Swedish Energy Agency. It assists the programme by putting forward the industries' concerns and interests in connection with energy matters. In addition, it reviews the Agency's annual reports on progress of the programme to the Government.

Swedish Taxation Board deals with tax relief

The role of the Taxation Board is to process the tax reliefs to which the participating companies are entitled if they meet the requirements of the programme. The Board can revoke such decisions if the requirements are not fulfilled. Further information is available from the Board's web site at www.skatteverket.se.

THE PROGRAMME'S BOARD

Thomas Korsfeldt	Swedish Energy Agency (Chairman)
Andres Muld	Swedish Energy Agency (Convening)
Annette Brodin Rampe	E.ON Sverige AB
Karin Emilsson	Södra Cell
Erik Eriksson	Taxation Board
Christer Larsson	Swedish Paper Industry Workers' Association
Mikael Möller	The Swedish Plastics and Chemicals Federation
Peter Pernlöf	Boliden AB, SVEMIN
Birgitta Resvik	The Confederation of Swedish Enterprise
Maria Sandqvist	The Association of Swedish Engineering Industries
Arnold Silverhult	Sandvik Materials Technology
Sven Wird	Holmen AB

Further information on the programme is available from the Agency's website:
www.energimyndigheten.se/pfe
info.pfe@energimyndigheten.se
+46 (16) 544 22 06

Two eventful years

The programme for improving energy efficiency in industry (PFE) is a long term agreement between the Swedish government and the energy intensive industry. Two years have now passed since the programme started. By the end of 2006, it had attracted 117 industrial companies who, between them, used about 30 TWh of electricity, or about one fifth of Sweden's total electricity use. The pulp and paper industry, sawmills, chemicals, foodstuffs, steel and mining industries are those that are most strongly represented on the programme.

During the autumn of 2006, the first 98 companies submitted their first reports on their energy efficiency improvement work to the Swedish Energy Agency. The companies have carried out extensive audits and analyses of their energy use, and introduced and certified energy management systems. In addition, they have undertaken to improve their efficiency of electricity use by a total of at least 1 TWh of electricity per year, for a total investment cost of over SEK 1000 million.

Swedish Energy Agency

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